From: Colleen Flannery <colleen@northdeltawater.net>
Sent: Tuesday, July 29, 2014 5:35 PM
To: 'Colleen Flannery'; BDCP.Comments@noaa.gov
Cc: 'Melinda Terry'
Subject: RE: North Delta Water Agency BDCP EIR & EIS comments (2 of 3)
Attachments: NDWA Exhibit B.pdf; NDWA Exhibit C.pdf; NDWA Exhibit D.pdf; NDWA Exhibit E.pdf

Over the next three e-mails, I will be submitting the North Delta Water Agency's comments. This email contains Exhibits B-E.

The complete list of items in our comments follows:

- NDWA Final BDCP EIR_EIS Comments 07_29_2014
- NDWA Exhibit A_Contract
- NDWA Exhibit A_MOU
- NDWA Exhibit A_Amendment
- NDWA Exhibit B
- NDWA Exhibit C
- NDWA Exhibit D
- NDWA Exhibit E
- Reference Library_Part A
- Reference Library_Part B
- Reference Library_Part C
- Reference Library_Part D
- Reference Library_Part E

Apologies for any duplication that occurs during this process.

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Melinda Terry, Manager

July 29, 2014

Via hand delivery and E-mail (BDCP.Comments@noaa.gov)

BDCP Comments
Ryan Wulff, NMFS
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

Subject: Comments of the North Delta Water Agency on the Draft Bay-Delta Conservation Plan and EIR/EIS

Dear Mr. Wulff:

In 1981, the North Delta Water Agency (NDWA or Agency) and the Department of Water Resources (DWR) executed its *Contract for the Assurance of a Dependable Water Supply of Suitable Quality* (1981 Contract), a copy of which is attached to this letter as **Exhibit A**. The Agency values and respects DWR as a contractual partner and appreciates its commitment to maintain the assurances provided to North Delta water users for the last thirty-three years.

On the eve of the parties signing the contract, DWR stated the benefits to North Delta landowners of becoming a SWP Delta water contractor would be receiving "more water, or water of better quality, than they did before" the construction of the Central Valley Project and State Water Project.[1] Based on DWR's long-standing good faith in performance of these obligations for the past three decades, we submit these comments to raise serious concerns regarding the department's ability to continue ensuring these water supply and quality protections over the next half century, if the Bay Delta Conservation Plan (BDCP or Plan) is implemented as currently proposed.

To secure this contractual right and the rights of Agency landowners to adequate water supply and quality, NDWA submits these comments on the Draft BDCP and the accompanying Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS).

[1] DWR Director Ronald Robie quoted in the Sacramento Bee, "Water Payment Progress Helped By Fear Of Canal." (March 21, 1980).

These comments also are being submitted on behalf of the following districts that exist and operate, in whole or in part, within NDWA:

- Reclamation District 501
- Reclamation District 551
- Reclamation District 563
- Reclamation District 900
- Reclamation District 999
- Reclamation District 2060
- Reclamation District 2068
- Maine Prairie Water District

Because the BDCP states that the Plan and supporting documents are incorporated into the EIR/EIS, NDWA's comments on the BDCP should also be considered comments on both the Plan and EIR/EIS.

I. PRELIMINARY PROCEDURAL COMMENTS AND CONCERNS

The release of the BDCP Plan and EIR/EIS for public comment and review is premature due to the failure of these documents to satisfy the requirements of the California Environmental Quality Act (CEQA), the National Environmental Protection Act (NEPA), the federal Endangered Species Act (ESA), the California Natural Communities Conservation Planning Act (NCCPA) and the Delta Reform Act. Nonetheless, NDWA submits these comments in order to exhaust its administrative remedies and preserve its legal standing should this project proceed toward permitting and implementation without first addressing the numerous deficiencies identified in this letter.

The Agency's primary reasons for rejecting the adequacy of these documents for public comment at this point in the environmental review process are as follows:

A. Inadequacies Inhibit Ability to Properly Evaluate Project Impacts

The NDWA contends the release of the BDCP and EIR/EIS is premature due to fundamental inadequacies that prevent the public and decision-makers from being fully informed of the project description and scope, and the severity of the project's environmental impacts if implemented as currently proposed.

Due to the voluminous, internally inconsistent, and disorganized nature of the BDCP and EIR/EIS, [2] the NDWA has been forced to incur considerable time and expense in order to develop these comments. Included in the costs incurred by the Agency are: (i) the cost of retaining an engineering consultant with expertise in hydrologic modeling (MBK Engineers) to review and comment on the flawed modeling that underlies the Plan's Effects Analysis; and (ii) the cost of retaining a fisheries biologist (Dave Vogel) to evaluate the credibility of the

[2] See, e.g., Panel to Review California's Draft Bay Delta Conservation Plan, *A Review of the Use of Science and Adaptive Management in California's Draft Bay Delta Conservation Plan* (2011); *accessed at:* http://www.nap.edu/openbook.php?record_id=13148 ("The lack of an appropriate structure creates the impression that the entire effort is little more than a post-hoc rationalization of a previously selected group of facilities, including an isolated conveyance facility, and other measures for achieving goals and objectives that are not clearly specified.") ["NAS comments"]; Delta Independent Science Board, *Review of the Draft EIR/EIS for the Bay Delta Conservation Plan* (May 15, 2014), *available at* http://deltacouncil.ca.gov/sites/default/files/documents/files/Item_9_Attachment_3.pdf. ("The DEIR/DEIS provides an exhausting wealth of information about the Delta and the likely impacts of the proposed alternatives. However, this wealth of information and data is not organized in a way that can usefully inform difficult public and policy discussions.") ["ISB Comments"].

conclusions reached concerning fisheries impacts and environmental benefits contained in the Plan's Effects Analysis and EIR/EIS. The findings and recommendations of these consultants are set forth in the following attachments, which are submitted with this letter and incorporated herein by reference:

Exhibit B:
Vogel, D., *Comments on the Public Draft Bay-Delta Conservation Plan (BDCP) and Draft BDCP Environmental Impact Report/Environmental Impact Statement* (June 6, 2014).

Exhibit C:
Bourez, Walter, *Report on Review of Bay Delta Conservation Program Modeling* (June 14, 2014);

Exhibit D:
MBK Engineers, *Technical Comments on Bay-Delta Conservation Plan Modeling* (July 29, 2014)

B. The Plan and EIR/EIS Ignore Independent Science Reviews and Federal Agency Assertions of Inadequacy

Several independent science reviews of the Plan, EIR/EIS, and the Effects Analysis in particular have been conducted. All of these reviews have questioned the scientific methodologies and conclusions reached in regard to BDCP's ability to contribute to the recovery of listed or covered species. These reviews have all been particularly critical of the biological benefits claimed in the BDCP and the EIR/EIS. These scientific experts have also identified serious flaws in the Conservation Measures, in the modeling and Effects Analysis, and in the environmental impacts analysis and conclusions.[3]

DWR's decision to release the Plan and EIR/EIS despite requests by federal agencies to do otherwise, and DWR's failure to resolve the serious concerns raised by these independent science review panels and federal agencies in the prior two Administrative Drafts[4] is both perplexing and concerning.

C. The Plan and the EIR/EIS Must Be Substantially Revised and Re-Circulated for Public Review and Comment

Over the past several years, there have been hundreds, perhaps thousands, of comments and suggestions for changes in the BDCP submitted by other Cooperating, Responsible, and Trustee Agencies (e.g., SWRCB, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Bureau of Reclamation, Delta Stewardship Council, Delta reclamation districts, etc.), non-governmental organizations, and members of the public (e.g., Delta Counties Coalition, Local Agencies of the North Delta, DSC Independent Science Board, etc.) . Few, if any, of these comments and suggestions have been addressed in the current Plan or the EIR/EIS.

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[3] Vogel, D., Comments on the Public Draft Bay-Delta Conservation Plan (BDCP) and Draft BDCP Environmental Impact Report/Environmental Impact Statement (June 6, 2014) ["Vogel Report"]; *See also* NAS and ISB comments.
[4] Fish and Wildlife Service (FWS) and National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS), *"Red flag" comments regarding the September 2011 draft of the Bay Delta Conservation Plan* (April 2012). *See also* "Federal Agency comments on the Bay Delta Conservation Plan (BDCP) Second Administrative Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS)" (July 2013).

The following are a few examples of numerous major omissions not analyzed, disclosed, or mitigated in the EIR/EIS that constitute significant "new information" and warrant recirculation under CEQA and NEPA:

- The effects on BDCP project design, location, and operation from DWR complying with SWP operational obligations and limitations associated with contractual assurances in the northern Delta not being adequately quantified or addressed in the Plan or EIR/EIS.
- The Water Supply Chapter fails to identify the combined adverse impacts from the Groundwater, Water Quality, Health, and Agriculture Chapters (Impacts: GW-1, GW-2, GW-3, GW-4, GW-5, GW-7, WQ-5, WQ-7, WQ-11, WQ-14, WQ-18, WQ-22, WQ-26, PH2, and AG-2, AG-4) resulting in a significant adverse water supply impacts on the Delta region.
- The Water Supply Chapter fails to include lowered surface water elevations from reduced flows and tidal flux as significant adverse impacts on the overall local water supply and water quality in the Delta region.
- The Surface Water, Groundwater, and Water Supply Chapters fail to identify the specific and serious public safety, economic, and environmental impacts (including water quality impacts) caused by both raised and lowered surface water and groundwater elevations.
- The Surface Water, Water Supply, and Recreation Chapters all fail to identify the significant adverse impacts of lowered surface water elevations on other beneficial uses (e.g., recreational boating and commercial navigation, marinas and yacht clubs, hunting clubs, fishing) in the Delta region.
- The Surface Water Chapter fails to identify the substantial modification of the location and configuration of the Sacramento River Flood Control Project (SRFCP) facilities (levees, bypasses, weirs, and pumping stations) proposed in CMs 1-10 or to analyze the localized and system-wide public safety impacts.
- The Surface Water Chapter fails to provide an emergency response and evacuation or recovery plan for flood events during the 10-year construction of CM1.

In order to adequately address the concerns raised in these comments from NDWA, comments on the Plan and the EIR/EIS submitted by other commenters and previous comments submitted by federal agencies and interested parties, it will be necessary for DWR and the Bureau of Reclamation to substantially modify the project's design, location, size, and operations. A reconfigured BDCP will of course result in environmental impacts that are different from those analyzed in the Plan and the EIR/EIS. Accordingly, it is NDWA's position that recirculation of the BDCP and the EIR/EIS will be required under CEQA, NEPA and other applicable state and federal law.

D. Summary of Primary Procedural Concerns

DWR's decision to release for public comment a BDCP Plan and EIR/EIR despite multiple requests by federal agencies not to do so raises fundamental questions about the ability of the DWR to discharge its various statutory obligations in a fair and impartial manner. So, too, does the overwhelming criticism of these documents from independent scientific review panels and several Responsible, Cooperating, and Trustee agencies as well as elected officials. The NDWA

considers the premature release of legally inadequate documents to be an act of bad faith on the part of the State of California that has placed an undue hardship on the Agency and the public. This act will only serve to further undermine the credibility of the BDCP as a biologically justified project, and to erode the public's trust in DWR and the State to uphold statutory, regulatory, and contractual obligations to protect the value of the North Delta's unique ecosystem, water supply, agricultural community and socioeconomic environment.

II. INCORPORATION OF APPENDICES AND OTHER COMMENTS BY REFERENCE

A. Supplemental Comments and Informational Attachments

While the comments in this letter contain the bulk of the NDWA's comments, we have created a Reference Library to include additional documentation supplementing or supporting comments contained herein. The documents in the Reference Library are the prior comments submitted by NDWA during the BDCP process. They must be considered by DWR, and the federal action agencies must be included in the administrative record for the Plan and EIR/EIS. Likewise, the attachments to this letter must be considered by DWR and the federal action agencies and must be included in the administrative record for the Plan and EIR/EIS.

B. Comments on BDCP by Other Entities

The NDWA hereby incorporates by reference the comments submitted in this proceeding by the North State Water Alliance, the Sacramento Valley Water Users, and the County of Sacramento, as though fully stated herein. NDWA hereby joins the comments submitted in this proceeding by:

- North State Water Alliance;
- Sacramento Valley Water Users;
- Sacramento County;
- San Joaquin County;
- CA Central Valley Flood Control Association.

III. SUMMARY OF NDWA'S SUBSTANTIVE COMMENTS ON THE DRAFT PLAN AND EIR/EIS AS CURRENTLY PROPOSED

As discussed in Part IV of this letter, DWR and NDWA executed a *Contract for the Assurance of a Dependable Water Supply of Suitable Quality* in 1981 (1981 Contract). DWR's compliance with the binding terms of the 1981 Contract is not discretionary.

Moreover, the legal standards that govern DWR's discharge of its obligations under the 1981 Contract are quite different from the legal standards that govern DWR's discharge of its obligations under CEQA and other applicable law. For example, while CEQA requires DWR to implement feasible mitigation measures to reduce significant impacts of the project to less-than-significant levels, DWR may not, as a matter of contract law, choose not to comply with the specific requirements of the 1981 Contract based on a determination of infeasibility. As discussed in detail below, the 1981 Contract requires DWR to meet specific obligations –

including assurances concerning water quality, maintenance of surface water elevations and prohibitions against modification of flow patterns – that rise above and beyond what is required under CEQA/NEPA or permits issued under ESA/CESA. Maintaining compliance with the 1981 Contract will also require substantial modification to the proposed BDCP project configuration and operations as well as to the governance structure and oversight of BDCP implementation.

The Plan and EIR/EIS indicate that implementation of Alt. 4 would violate several provisions of the 1981 Contract, including (but not limited to) the following:

- Alteration of existing water elevations to the detriment of North Delta channels and water users (lower tidal flows in Sutter and Steamboat Sloughs, as well as attenuation of tidal elevations associated with increased flooded habitat creation);
- Alteration of natural flow patterns (reverse flows created at Georgiana Slough and Delta Cross Channel) to the detriment of North Delta channels and water users; and
- Creating seepage and erosion damage to the lands, levees, embankments, or revetments adjacent to Delta channels from BDCP conveyance and habitat projects changing the estuary's hydrodynamics.

Beyond the requirements of the 1981 Contract, the Plan and EIR/EIS fail to satisfy the requirements of the federal Endangered Species Act (ESA), the California Natural Communities Conservation Planning Act (NCCPA) and the Delta Reform Act. More specifically, the Plan and EIR/EIS fail to:

- Accurately and comprehensively assess the current ecological conditions and compare to full extent and severity of potential adverse impacts;
- Utilize the best available science;
- Protect listed or covered species consistent with HCP/NCCP laws;
- Comply with state and federal law governing economic analysis of public water infrastructure;
- Develop an appropriate range of feasible alternatives;
- Provide balanced, unbiased governance and oversight of the project;
- Assess the full scope and intensity of likely project impacts;
- Properly mitigate impacts to, and provide any direct benefits for, residents, communities and local governments in the Plan Area; and
- Properly identify or mitigate for cumulative impacts that will occur in the Plan Area over the 50-year term of the HCP/NCCP permits.

In summary, release of the Plan and the EIR/EIS was premature and has caused an undue financial hardship on the NDWA and other persons and entities within the North Delta to prepare these comments due to the documents' serious inadequacies.

IV. FACTUAL BACKGROUND

A. North Delta Water Agency History

Beginning approximately 160 years ago, farmers within the area now comprising NDWA began reclaiming lands from flooding, appropriating water to beneficial use and establishing vibrant agricultural communities pursuant to the federal Swamp Land Act of 1850.[5] In the 1930s, the U.S. Bureau of Reclamation (Bureau/USBR) began constructing the Central Valley Project (CVP), damming the major tributaries on the Sacramento River and holding back substantial quantities of the Delta water supply. Before government reservoirs began withholding much of the Sacramento River system's high winter flows, the Delta channels stored sufficient fresh water to sustain water quality in the northern Delta throughout and often beyond the irrigation season.

This natural phenomenon of the Sacramento-San Joaquin Delta in its natural state acting as a freshwater reservoir instead of a stream is commonly referred to as the Delta Storage Concept.[6] Historically, the Carquinez Strait acted as a confined outlet for the salty water, thus protecting the Delta as a freshwater estuary for most of the time.[7] This sustained freshwater quality remained long after the inflow subsided from the several rivers that feed into the Delta. This Delta freshwater "storage" effect is evidenced by water quality monitoring conducted in the western Delta since 1914 by the East Contra Costa Irrigation District. These records show that water of usable quality was continuously available at that location throughout the entire irrigation season during the period between 1914 and the completion of the Shasta dam in the 1940s, except during severe drought conditions experienced in October of 1931.[8] In addition, because the tides raised surface water elevations twice a day, a supply of water always remained physically available in the Delta.

Since the SWP and CVP water supply operations commenced, however, the reduction of naturally occurring high flushing flows from upstream storage combined with the pull of the State and federal export pumps have contributed to the intrusion of salinity into the Delta.[9] Now, the SWP and CVP water conveyance project operations have effectively transformed the natural

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[5] Arkansas Swamp Lands Act, Act of September 28, 1850, codified at California Public Resources Code Section 7552, 7552.5.

[6] *See Basye, George "The Delta Storage Concept*."(November 21, 2009) **EXHIBIT E.** Credit Consulting Engineer Gerald H. Jones with the development and promulgation of the original concept.

[7] *Id., See also* Thomas H. Means, *Salt Water Problem, San Francisco Bay and Delta of Sacramento and San Joaquin Rivers* April 1928, pp 9-10:"Under natural conditions, Carquinez Straits marked, approximately, the boundary between salt and fresh water in the upper San Francisco Bay and delta region of the two tributary rivers—the Sacramento and San Joaquin.... At present [1928] salt water reaches Antioch every year, in two-thirds of the years running further [sic] upstream. ... The cause of this change in salt water condition is due almost entirely to the works of man." [Quoted in Water Resources Department, Contra Costa Water District "Historical Fresh Water and Salinity Conditions in the Western Sacramento-San Joaquin Delta and Suisun Bay: A summary of historical reviews, reports, analyses and measurements (Technical Memorandum WR10-001) (February 2010)]

[8] Water Resources Department, Contra Costa Water District "Historical Fresh Water and Salinity Conditions in the Western Sacramento-San Joaquin Delta and Suisun Bay: A summary of historical reviews, reports, analyses and measurements (Technical Memorandum WR10-001) (February 2010)

[9] Hanak et.al, Managing California's Water: From Conflict to Reconciliation (Public Policy Institute of California 2011). ("Delta farmers complained of increasing salinity in their water supplies as upstream diversions and combined CVP/SWP operations depleted more of the natural flow.')

Delta freshwater "reservoir" into more of a flowing stream, resulting in relatively minor decreases in outflow that can have a serious impact on Delta water quality. These changed conditions are the basis for DWR executing a water supply availability and quality contract with the NDWA.

As it did with landowners along the Sacramento River, the United States conducted extensive studies and negotiations to provide contractual assurances for a sufficient supply for water right holders in the northern Delta. Discussions with Delta landowners were protracted, however, due to the complex issues of both water quantity and quality. The issues only intensified with the construction of the State Water Project by DWR in the 1960s.

In 1973, the NDWA was formed by a special act of the Legislature to represent northern Delta interests in negotiating a contract with both the Bureau and DWR in order to mitigate the water rights impacts of the CVP/SWP Projects.[10] Representing nearly one-half of the legal Delta, the Agency's boundaries encompass approximately 300,000 acres. This includes all of that portion of the Sacramento-San Joaquin Delta, as defined in Water Code Section 12220, situated within Sacramento, Yolo and Solano Counties.[11] NDWA's boundaries also include portions of northeastern San Joaquin County, including New Hope Tract, Canal Ranch and Staten Island.

After undertaking extensive analysis, study, and review between 1974 and 1979, the Bureau, DWR, and the NDWA collectively determined the outflow necessary to meet water quality standards for irrigated agriculture, reviewed the paramount water rights of landowners within North Delta's boundaries, and evaluated the Delta channels' historical function as natural seasonal storage for purposes of executing a water supply and quality contract.

B. The 1981 Contract

In 1981, DWR and NDWA executed a *Contract for the Assurance of a Dependable Water Supply of Suitable Quality* (1981 Contract), which remains in full force and effect.[12] The crux of the 1981 Contract is a guarantee by the State of California that, on an ongoing basis, DWR will ensure through the operation of the SWP that suitable water will be available to satisfy all agricultural and other reasonable and beneficial uses in all channels within NDWA's boundaries.[13] Specifically, the State must furnish "such water as may be required within the Agency to the extent not otherwise available under the water rights of water users."[14]

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[10] North Delta Water Agency Act, Chapter 283, Special Statutes of 1973.

[11] ENGINEER'S REPORT AND REPORT OF THE ASSESSMENT COMMISSIONERS FOR THE NORTH DELTA WATER AGENCY ASSESSMENT ADJUSTMENT: Pursuant to Article XIII D of the California Constitution (November 3, 2010) Available at http://www.northdeltawater.net/assessments.html

[12] Contract for the Assurance of a Dependable Water Supply of Suitable Quality (1981 Contract). A copy of this contract is attached to this letter. Note that by reference to this contract, NDWA intends to reference all relevant Memoranda of Understanding, including the memorandum of understanding dated May 26, 1998 (MOU). This MOU provides that DWR is responsible for any obligation imposed on NDWA to provide water to meet Bay-Delta flow objectives, so long as the 1981 Contract remains in effect. This agreement was formed in connection with the hearings that preceded the State Water Resources Control Board's adoption of Water Right Decision 1641. In Decision 1641, the State Water Board made the following findings and determinations: "Based on the agreement, the SWRCB finds that the DWR will provide the backstop for any water assigned to the parties within the NDWA as specified in the MOU. This decision assigns responsibility for any obligations of the NDWA to the DWR consistent with the MOU." (Decision 1641 at 66). The latter findings and determinations were upheld by the trial and appellate courts that subsequently reviewed Decision 1641.

[13] 1981 Contract Art. 8(a)

[14] Id.; 1981 Contract Art. 8(b)

The 1981 Contract specifies year-round water quality criteria.[15] It also contains provisions pertaining to physical hydrologic changes,[16] obligating DWR to provide specific remedies, including limitations on the operations of the SWP.[17] In return for the benefits received, NDWA makes an annual payment to DWR.[18] NDWA further expressly consents to the export of water from the Delta "so long as this contract remains in full force and effect and the State is in compliance herewith."[19]

C. Provisions of the 1981 Contract Relevant to the BDCP

The NDWA's 1981 Contract contains numerous provisions that protect water users and channels in the North Delta from harm caused by changes in SWP water conveyance infrastructure and operations.
The Recitals section contains important background principles that are critical to understanding the parties' intent in entering into the Contract and direct relevance to the actions proposed in the water conveyance and related habitat restoration projects contained in the BDCP.
Most notably, the contract:

i. Binds the State to: "[m]aintain within the Agency a dependable water supply of adequate quantity and quality for agricultural uses and, consistent with the water quality standards of Attachment A, for municipal and industrial uses, that the State will recognize the right to the use of water for agricultural, municipal, and industrial uses within the Agency, and that the Agency will pay compensation for any reimbursable benefits allocated to water users within the Agency resulting from operation of the Federal Central Valley Project and the State Water Project, and <u>offset by any detriments caused thereby</u>. "[20]

ii. Acknowledges that the construction and operation of the CVP and SWP have previously and will continue to change the regimen of the rivers and tributaries of the Sacramento-San Joaquin Delta, specifically altering from unregulated flow to regulated flow in Delta channels, and that the CVP and SWP's regulation of these flows at times "<u>[a]lso alters the elevation of water in some Delta channels</u>."[21]

iii. Asserts that "[g]eneral welfare, as well as the rights and requirements of the water users in the Delta, <u>require that there be maintained in the Delta an adequate supply of good quality of water</u> for agricultural, municipal and industrial uses."[22]

iv. Reaffirms by inclusion Part 4.5 of Division 6 of the CA Water Code's statutory requirement that "<u>[a]ffords a first priority to provision of salinity control and maintenance of an adequate water supply in the Delta</u>" and "*relegates to lesser priority all exports of water from the Delta to other areas for any purpose*."[23]

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[15] 1981 Contract, Art. 2
[16] *Id.* at Art. 6
[17] *Id.* at Art. 12
[18] *Id.* at Art. 10.
[19] *Id.* at Art. 8(e)
[20] 1981 Contract, p. 1, Recital (a) [emphasis added]
[21] Id. at Recital (d) [emphasis added]
[22] Id. at Recital (f) [emphasis added]
[23] Id. at Recital (g) [emphasis added]

v. Recognizes that NDWA "[a]sserts that water users within the Agency have the right to divert, are diverting, and will continue to divert, for reasonable and beneficial use, water from the Delta that would have been available therein if the FCVP and SWP were not in existence, . . ." [24]

The Contract's articles of agreement also contain a series of provisions directly relevant to the BDCP as operational constraints on DWR's discretion in relation to the design, size, and location of new SWP water conveyance and related habitat restoration projects as currently proposed in BDCP. Within the four corners of the contract, the State:

i. Commits to operate the SWP to provide water quality "[a]t least equal to the better of: (1) the standards adopted by the SWRCB as they may be established from time to time; or (2) the criteria established in this contract . . ."[25]

ii. Will not exceed certain salinity levels at specific locations within NDWA; to wit, the "[14]-day running average of the mean daily EC at the identified location shall not exceed the values determined from the Attachment A."[26]

iii. Pledges that the water quality criteria in the Contract "[m]ust be met at all times except for a transition period . . ."[27]

iv. Further "[a]grees not to alter the Delta hydraulics in such a manner to cause a measurable adverse change in the ocean salinity gradient or relationship among the various monitoring locations shown on Attachment B and interior points upstream from those locations, with any particular flow past Emmaton." [28]

v. Binds itself in case of changes in natural flow direction or water surface elevations in Delta channels and remedies for damages to water users. Specifically, the State must "[n]ot convey SWP water so as to cause a decrease or increase in the natural flow, or reversal of the natural flow direction, or to cause the water surface elevation in Delta channels to be altered, to the detriment of Delta channels or water users within the Agency. If lands, levees, embankments, or revetments adjacent to Delta channels within the Agency incur seepage or erosion damage or if diversion facilities must be modified as a result of altered water surface elevations as a result of the conveyance of water from the SWP to lands outside the Agency after the date of this contract, the State shall repair or alleviate the damage, shall improve the channels as necessary, and shall be responsible for all diversion facility modifications required."[29]

vi. Provides assurances in regards to water availability and diversion rights. Specifically, the state agrees that "[w]ater of such quality shall be in the Delta channels for reasonable and beneficial uses on lands within the Agency, and said diversions and uses shall not be disturbed or challenged by the State so long as this contract is in full force and effect."[30]

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[24] Id. at Recital (h) [emphasis added]
[25] 1981 Contract p. 2, Art. 2(a)(i) [emphasis added]
[26] Id. at Art. 2(a)(iii) [emphasis added]
[27] Id. at Art. 2(a)(iiii) [emphasis added]
[28] Id. at Art. 2(b) [emphasis added]
[29] Id. at Art. 6 [emphasis added]
[30] Id. at page 3, Art. 8(a)(i) [emphasis added]

vii. Acknowledges Agency landowners' water rights by stating that "The State recognizes the right of the water users of the Agency to divert from the Delta channels for reasonable and beneficial uses . . ." and in exchange for payments received under the Contract the State is obligated to "[f]urnish such water as may be required within the Agency to the extent not otherwise available under the water rights of water users."[31]

viii. Adds additional affirmation regarding the State's intent on water rights in the NDWA by committing itself to "[d]efend affirmatively as reasonable and beneficial" their release of SWP stored water in order to "provide and sustain the qualities established in this contract . . ." and prevents the State from examining such uses of SWP water unless a court determines "[t]hat all uses of water exported from the Delta by the State and by the United States, for agricultural, municipal, and industrial purposes are reasonable and beneficial, and that irrigation practices, conservation efforts, and groundwater management within areas served by such exported water should be examined in particular."[32]

ix. Provides that, in consideration of the benefits offered by the State under the 1981 Contract, the Agency explicitly consents to "[t]he State's export of water from the Delta so long as the contract remains in full force and effect and the State is in compliance . . ." with the provisions contained in the Contract.[33]

x. Consents to provisions in the remedies section of the Contract that would impose significant operational constraints and limitations on DWR's water supply management if "[t]he water quality in Delta channels falls below that provided in this contract, then, at the request of the Agency, the State shall cease all diversions to storage in SWP reservoirs or release stored water from the SWP reservoirs or cease all export by the SWP from Delta channels, or any combination of these . . .."[34]

D. NDWA's Good Faith Participation in the BDCP Process

The NDWA recognizes the importance of achieving the State's coequal goals of "providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem."[35] Moreover, in the 1981 Contract the NDWA expressly consented to the State's export of water from the Delta *so long as DWR/SWP complies with its obligations under the 1981 Contract*. (1981 Contract para. 8(e); emphasis added).

Accordingly, the Agency has actively engaged in the development of the BDCP as an act of good faith, to assure that adequate protection measures are applied to the design, location, size and operation of the conveyance and habitat projects, and to also: 1) protect its rights under the 1981 Contract; and 2) assure compliance with all applicable state and federal laws and regulations relating to protection of the North Delta ecosystem, communities, economic and public safety activities, water rights (including riparian, pre-1914, and post-1914 appropriative rights) and area-of-origin statutory protections.

[31] Id. at page 3, Art. 8(a)(ii) [emphasis added]
[32] Id. at Art. 8(d) [emphasis added]
[33] Id. at Art. 8(e) [emphasis added]
[34] Id. at page 4, Art. Article 12(a) .
[35] Public Resources Code Section 29702(a)

Over the past several years the Agency has invested significant time and expense to participate in the BDCP process, including, but not limited to:

- Serving as an active member of BDCP Steering Committee[36]
- Serving as a cooperating Agency under NEPA with USBR[37]
- Serving as a member of the BDCP Governance and Finance Committees
- Submitted Cooperating Agency Comments, 1st & 2nd Admin Drafts and other related BDCP documents[38]
- Submission of numerous letters.[39]

NDWA has a clear statutory mandate to assure that the lands within the North Delta have a dependable supply of water of suitable quality sufficient to meet present and future needs in accordance with the 1981 Contract.[40] For this reason, NDWA has repeatedly asserted during the various Delta planning processes that any projects, programs, and actions pursued in the name of coequal goals, including the BDCP, must: 1) be based on the best available science; 2) be consistent with the contractual obligations of the State under the 1981 Contract; and 3) be undertaken in compliance with all applicable state and federal law.

E. Summary of Background Facts

NDWA's successful negotiation of a water supply and quality contract with the State in 1981, and its more recent efforts to actively participate and provide expertise in the development of the BDCP Plan and EIR/EIS have proven the Agency's willingness to act in good faith as a water contractor with DWR. The comments provided here, as well as the NDWA comments provided during the process of developing the BDCP, seek to incorporate compliance with the 1981 NDWA Contract into the design, location, and operation of the Plan's Conservation Measures, ensure that the impacts associated with the proposed project are properly described and analyzed, and require mitigation of project impacts in accordance with applicable law.

V. ECONOMIC IMPACTS AND FISCAL ASSURANCES

A. Economic Evaluation of BDCP Is Inadequate and Biased

The NDWA is concerned about inherent inequities that exist in the assumptions the cost-benefit analysis consultants used to develop the Finance Chapters in the BDCP and EIR/EIS based on the Agency's participation as a member of the Finance Committee and the documentation provided in public venues. Following are examples of questionable data and biased assumptions applied to BDCP's economic analyses:

- ***Inconsistent No Action Alternative (NAA)*** – The BDCP EIR/EIS' Existing Conditions Assumptions for State Water Project and Central Valley Project[41] uses USFWS/NMFS

[36] See Reference Library: June 11, 2008 NDWA letter requesting admittance and MOU with USBR
[37] See Reference Library: May 7, 2013] NDWA letter requesting Cooperating Agency status and MOU with the Bureau
[38] Refer to comments in the Reference Library, April 16, 2013 – July 31, 2013.
[39] See the Reference Library, generally.
[40] North Delta Water Agency Act, Chapter 283, Special Statutes of 1973.
[41] Appendix 3D Section 3D.3.1.2 (page 3D-3).

BiOps as the assumption for the NAA. However, the BDCP's economic consultant publicly confirmed his analysis used lower export water delivery assumptions potentially as low as 3 MAF, which is substantially lower than existing conditions, arbitrary, and inconsistent with the BDCP EIR/EIS No Action Alternative. To be credible and consistent with BDCP documents the assumptions used in the BDCP cost-benefits should *not* differ or deviate from the BDCP EIR/EIS.

- ***Favors Quantifying Benefits, While Ignoring Harm*** – The BDCP economic analyses spend a greater level of effort in researching, analyzing, and quantifying the positive impacts (benefits) than assessing the negative impacts of the project in the Plan Area. Consultants favored quantifying positive impacts without equal quantification of negative impacts in the Plan Areas of: water quality and reliability, construction emissions, soil erosion, flood risk, and GHG benefits.
- ***Greater Emphasis on Quantifying Impacts for Exporters Than Delta/ Other Impacted Parties –*** Analysis primarily focused on quantifying the positive impacts (benefits) to the water export service areas than quantifying the negative impacts to in-Delta water users and natural resources. This inequitable level of effort prevents a comprehensive and unbiased quantification or comparison of who benefits and who is harmed by the project.
- ***Minimizes Delta Impacts –*** The Task Order for development of the BDCP economic analysis refers to the *permanent* conversion of over 45,000 acres of Delta farmland to aquatic and terrestrial habitat as a "short-term" loss of cultivated land.[42] Permanent means forever, so under BDCP this farmland would be gone for good – and so would the food grown on those acres.
- ***One-Sided Analysis -*** Water quality improvements for Delta water exporters were emphasized, but the analysis failed to quantify the reduced water supply reliability for in-Delta water users resulting from the degraded water quality identified in EIR/EIS Chapter 8 *Water Quality*.

The BDCP economic analysis is also strangely silent on Delta local government and community impacts. This is a significant omission in light of the fifty-two "Significant and Unavoidable Impacts" imposed upon local agencies. Moreover, the economic analysis fails to acknowledge the commitments made to the Delta Counties Coalition by the BDCP managers during the development of the Plan.

Finally, the BDCP has failed to follow existing state and federal guidelines governing the comprehensive development of cost-benefit analyses for public water projects: "Economics and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies" (P&G) and the "Department of Water Resources Economic Analysis Guidebook."

Significantly, DWR's Guidebook states: "DWR should also broaden the economic analysis to include regional economic development (RED) or other social effects (OSE) accounts, which can significantly assist in the decision-making process. The RED account is particularly important if a proposed plan will have significantly different effects upon regions that might otherwise be irrelevant to the NED national perspective." As described below, the BDCP certainly represents different benefits and impacts between Northern and Southern California.

[42] Architectural & Engineering Contracts Task Order (October 22, 2012; December 2012) at 3.

RECOMMENDATION: DWR must undertake objective and comprehensive cost-benefit and socioeconomic analyses. The new effort must be consistent with applicable economic analysis standards and independently peer-reviewed for accuracy and efficacy of the methodology, assumptions, models, and results. The independent analysis should specifically describe, analyze, and quantify the adverse impacts to the Plan Area (Delta) that are identified in the EIR/EIS such as:

- The cumulative impacts to in-Delta water supply (agriculture and drinking water) from 7 significant and "unavoidable" adverse impacts identified in *Water Quality Chapter 8*;
- The cumulative impacts to levee stability and Delta flood risk from CM1 steel pile driving, dewatering lowering groundwater 10-20 feet, sediment loading, 9 cofferdams in the Sacramento River and tributaries, and damage from erosion, seepage, and overtopping.
- The cumulative impacts to Delta agriculture from land conversion, seepage damage, water quality degradation, soil contamination (salinity absorption), blocked access to parcels, and lower water elevations (surface and groundwater) stranding diversion intakes and wells.

B. 1981 Contract Compliance Costs Are Not Included in the Finance Chapter or the Underlying Economic Analysis

Costs to comply with the 1981 Contract will be incurred in the environmental review, design, construction and operational phases of the BDCP (assuming, *arguendo*, that the project is constructed), so DWR's binding obligations under the 1981 Contract will most certainly have economic repercussions for BDCP during the 50-year implementation. Yet neither the Finance Chapter of the Plan, nor the economic analyses upon which that chapter is based, mention or quantify the costs of complying with the 1981 Contract. This is a significant oversight, and casts doubt on the credibility of the financial analysis that underlies the Plan.

RECOMMENDATION: Amend the Plan (Chapter 8) to acknowledge the financial obligations associated with implementing measures to comply with DWR's assurances to NDWA in the 1981 Contract and include Contract compliance costs into the BDCP's Annual Work Plan and Budget (Sec. 6.3.1).

RECOMMENDATION:BDCP must conduct a new cost-benefit and socioeconomic analysis quantifying the following examples of potential fiscal impacts to BDCP if Contract remedies are invoked, (references to relevant provisions of the 1981 Contract are shown in parentheses) including compensation by DWR during Plan's 50-year implementation such as:

- Implementing physical or operational measures necessary to maintain water quality in North Delta or providing engineered alternatives for water supply or other remedies (Articles 2 and 6);
- Curtailments of SWP reservoirs (storage or releases) and exports from the Delta if the Contract water quality criteria are not maintained (Article 12);
- Modification to existing local diversion facilities as a result of altered water surface elevations, or changes in natural flows that are detrimental to North Delta channels and water users, including seepage and erosion damage to lands, levees, embankments, or revetments (Article 6);

- Compensation paid under special contract claims procedure if Emergency Provisions are invoked (Article 4);
- Reduction in reimbursable benefits allocated to water users with the Agency for detriments to North Delta channels and water users resulting from BDCP operations resulting in reductions in payments by the Agency (Article 9);
- Damage claims for harm to crops caused by the Project's impacts (e.g., grapes, kiwis, apples, pears and cherries, are extremely sensitive to seepage within the plant root zones and alfalfa, which is widely grown throughout the Delta, is very sensitive to salinity in irrigation water, corn is unable to establish itself in soil with a high salt content, and salinity introduced into soils have long-term effects that require additional water to leach salts out (Article 2); and
- Litigation costs incurred by DWR to affirmatively defend use of SWP water to meet Contract's water quality criteria as reasonable and beneficial, including examination of all beneficial uses, irrigation practices, conservation efforts, and groundwater management in Service Areas of the SWP and CVP (Article 8);

C. Local Assessment Payments and Willing Sellers Must Be Conditions of Permit

Like other local agencies dependent on property assessments to fund its core functions, NDWA would incur a significant loss of assessment revenues from the proposed conversion of approximately one-third of its land base from private to public ownership. NDWA is concerned that the massive conversion of land in its jurisdiction proposed by BDPC may seriously impede the Agency's ability to administer and enforce the 1981 Contract. Local government agencies in the Plan Area need a reliable mechanism and funding source to replace lost local government revenues (taxes, assessments), including NDWA and reclamation and other special districts within NDWA, resulting from conversion of lands to habitat, water supply infrastructure and other actions associated with implementation of BDCP.

DWR and USBR not only have a duty under CEQA and NEPA to identify these significant fiscal impacts; they also have a duty to mitigate these impacts. Moreover, the 1981 Contract imposes other, contractual obligations on DWR including, *inter alia*, the implied covenant of good faith and fair dealing, not to take actions that undermine the Agency's ability to perform under, or enforce, the 1981 Contract. [43]

Put more plainly, the BDCP must incorporate permit terms and conditions in the Plan, Implementing Agreement, and EIR/EIS to ensure that the NDWA remains whole. Without such binding assurances the remaining landowners within NDWA would be left with a proportionally higher share of the Agency's fixed and administrative/ overhead costs.[44]
Resolution of this matter is additionally critical to the Agency because state agencies do not have a good track record of paying local property taxes and assessments, forcing NDWA and other local government agencies to sue for recovery.[45] In fact, the three largest delinquent landowners who have not paid current NDWA assessments are State agencies.[46]

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[43] Special Act, Sec. 115-4.1
[44] The Agency incurs substantial costs related to engineering, management, consulting, and other necessaries related to administration of the Contract and protection of water rights and water quality.
[45] See, e.g., North Delta Water Agency v. CA Department of Fish & Game (Case No. 06AS03923); Manteca Unified School Dist. v. Reclamation District 17 (fees for school assessments); Kruger, Harold "Levee District 1 tells

Using the Agency's current assessment rates for FY 2014-15, the annual amount of lost revenues would range from $310,000 to $772,000 if all 100,000 acres proposed for conversion to public ownership in the NDWA are in fact converted.[47] To put the severity of this fiscal impact into perspective, using the Agency's recently approved budget (FY 2014-15) as a comparison point, the removal of 100,000 acres from NDWA's assessment base would equate to a 27 percent to 67 percent reduction to its annual budget (revenues.) There is nothing co-equal about such a disproportionate fiscal burden being placed on NDWA its landowners.

The Delta Reform Act (approved by the State Legislature in 2009) includes a specific statutory requirement for BDCP to enter into contracts (or make other arrangements) to pay full mitigation of property taxes and assessments levied by local government agencies and districts for all lands used in the construction, location, mitigation, or operation of the new Delta conveyance facilities.[48] The BDCP proponents should be required to enter into similar binding agreements with local agencies for the acreage in the Plan Area proposed for habitat restoration, particularly since most of these acres are existing regulatory requirements of the CVP/SWP as acknowledged in Table 3.2-1 of the Plan, "Consistency of the BDCP with Requirements of Recent Biological Opinions."

Finally, the concept of willing sellers is a foundational element of environmental land acquisitions, but is missing from BDCP. "Taking" private land in order to provide endangered species Incidental "Take" Permits to DWR and USBR in order to benefit regions outside the Delta by the delivery of "up to full contract amounts" as stated in the BDCP Project Purpose sends the wrong message to Delta residents; significantly reduces any opportunity for cooperation from them on the implementation of the Project Goals and Objectives; and is contrary to state and federal constitutional protections and eminent domain law.

The California State Legislature thought a "willing seller" policy was important enough to include as a requirement for the Delta Conservancy (Cal. Pub. Res. Code § 32366) which is designated in the Delta Reform Act as a primary State agency to implement ecosystem restoration in the Delta. The California Legislature clearly intended that the "willing seller" policy would apply for North Delta habitat acquisition and the BDCP Plan and Implementing Agreement must do the same.

RECOMMENDATION: Insert language in the Plan *Governance* Chapter 7 and *Finance* Chapter 8 acknowledging the obligations of the State to financially offset "any detriments" to North Delta channels and water users resulting from the operation of the CVP and SWP, as required by the 1981 Contract, [49] and declare DWR's commitment to enter into a binding

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Caltrans to pay up" Appeal-Democrat (November 2, 2013). Available at http://www.appeal-democrat.com/levee-district-tells-caltrans-to-pay-up/article_510ee3bf-be28-53ca-8b52-449318e471a5.html?mode=jqm

[46] Specifically, the Department of Fish and Wildlife (whose assessments are offset by DWR contact payment reductions pursuant to a settlement in the above case, Case No. 06AS03923), Caltrans, and the Department of Parks and Recreation.

[47] The broad variation in revenue is due to the variation in benefit assessment charged by NDWA pursuant to Proposition 218, and caries according to the landowner's water right. Those with riparian lands pay $3.10 per acre, while those with no apparent water right or with post-1954 (newer) water rights pay up to $7.72 per acre. For information about NDWA assessment rates, go to http://www.northdeltawater.net/assessments.html.

[48] Cal. Water Code § 85089(b)

[49] 1981 Contract Recitals, p. 1

agreement to mitigate lost assessment revenues associated with implementation of all actions under CMs 1-22.

RECOMMENDATION: As a permit condition, require[50]DWR to negotiate and execute a binding agreement with NDWA prior to implementation of BDCP providing for a providing for a reduction of 1981Contract payments for any lands transferred from private to public ownership (whether owned by State, federal, or local agencies) for purposes of implementing CM1 and meeting the Plan's habitat restoration goals in CM-2-22, including Biops/FRPA mandates identified in Plan Chapter 3, Table 3.2-1. This is consistent with BDCP's existing obligation under the Delta Reform Act (Water Code § 85089 (b)) to enter into contracts for payment of local agency tax or assessments for all lands associated with implementation of CM1 conveyance facilities.

RECOMMENDATION: Require the Implementation Office to track and the Annual Progress Reports to disclose the number of acres that are purchased each year for "the construction, location, mitigation, or operation of new Delta conveyance facilities" so that a proper accounting can be kept of the in-lieu property taxes and assessments that CVP and SWP water contractors are responsible for paying to local government agencies in accordance with Water Code § 85089(b).

RECOMMENDATION: Mandate, via a requirement inserted into the Plan Chapter 8 and a condition inserted into the HCP/NCCP permit requirements and Implementing Agreement requiring the BDCP Proponents to also "pay for all property tax or assessments levied by local governments or special districts for all lands used in the construction, location, mitigation, operation, maintenance, or management of BDCP habitat conservation projects and activities." The commitment must provide for increases in the rates due to inflation and other economic pressures. This commitment should be additionally memorialized by DWR immediately executing MOUs with each local agency with affected revenues upon purchase of BDCP-related lands in impacted agency's jurisdiction including lands in Plan Chapter 3, Table 3.2-1 and Chapter 6, Section 6.2 *Interim Implementation Actions* related to (but not limited to) the following processes that will be credited in BDCP under this section:

- Fish Restoration Project Agreement (FRPA);
- Federal Biological Opinions for jeopardy associated with the continued operation of existing SWP and CVP South Delta pumps; and
- OCAP or any other regulatory requirements such as meeting existing statutory fish-doubling requirements as obligations under the CVPIA.

RECOMMENDATION: Revise the Plan and Implementing Agreement to specifically adopt as terms and conditions the "willing seller" policy for all lands and easements acquired for implementing any actions in CMs 2-22 with an explicit prohibition of using eminent domain for habitat actions stated very clearly.

[50]Via language inserted into the Plan's *Finance* Chapter 8, or other appropriate section

D. Inadequate Funding Assurances Prevent Approval of HCP/NCCP Permits

The precarious and elusive nature of the BDCP's ability to fully fund permit activities is illustrated by the failure of the Plan to identify reliable sources of money to pay the Project costs disclosed in Chapter 8, despite state and federal laws requiring a fiscally sound funding plan for HCPs and NCCPs.
Section 10 of the ESA requires the United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) to ensure the applicant for an incidental take permit (ITP) has sufficient funding available to implement an HCP,[51] including specifying the sources of funding to implement mitigation measures to minimize impacts to the covered species in the plan.[52] Where perpetual funding is required to implement any mitigation measures, the HCP must establish programs or mechanisms to generate those funds,[53] because an applicant for an ITP cannot rely on speculative future actions of others to fund activities related to an HCP.[54]

At least two HCPs in California have been invalidated due to the uncertain nature of funding to support the activities contemplated in the species conservation plans: 1) City of San Diego's HCP; [55] and 2) City of Sacramento's HCP for the Natomas Basin was invalidated due, in part, to inadequate funding assurances.[56] In the City of San Diego's case, the city prepared an HCP that needed funding to acquire land for a "preserve" and to administer the plan for the life of the incidental take permit. San Diego's proposed source of funding relied on future actions, consisting of future regional plans with other local jurisdictions, raising the sales tax, or issuing bonds, which would require voter approval.

While San Diego promised to use its "best efforts" to implement the financing and land acquisition components of the plan, the federal court found that the proposed funding source was unreliable and speculative, concluding the USFWS could not rationally accept that the City would "ensure adequate funding" as contemplated by the ESA. Like the San Diego and Natomas HCPs, the BDCP fails to demonstrate adequate funding will in fact be available for land acquisition, administration of the HCP or the future mitigation required for issuance of an ITP. BDCP has been criticized in recent independent science reviews and intensively questioned by the Delta Stewardship Council about relying on future water bonds being approved by California voters, particularly in light of several delays of the water bond drafted in 2009 to even appear on the ballot. The precariousness of BDCP's funding is exacerbated by waffling on how much funding is even needed according to the introductory paragraphs of the Plan's Funding Chapter (Chapter 8) where the document qualifies the entire funding discussion as being based on a "programmatic level" estimation of project costs.

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[51] 16 U.S.C. Sections 1539; *Southwest Center for Biological Diversity v. Bartel* (S. Dist. Cal. 2006) 457 F.Supp. 2d 1070, 1105.
[52] 16 U.S.C. §§ 1539(a)(2)(A), (B).
[53] U.S. Department of the Interior, *Habitat Conservation Planning And Incidental Take Permit Processing Handbook* (November 4, 1996) Fish and Wildlife Service
[54] *Southwest Center for Biological Diversity v. Bartel* (S.D. Cal. 2006) 470 F.Supp. 2d 1118, 1155, citing *National Wildlife Federation v. Babbitt* (E.D. Cal. 2000) 128 F.Supp. 2d 1274, 1294-1295, and *Sierra Club v. Babbitt* (S.D. Ala. 1998) 15 F.Supp. 1274, 1280-1282.
[55] *Southwest Center for Biological Diversity v. Bartel, supra*, 470 F.Supp. 2d at p. 1118.
[56] *National Wildlife Federation v. Babbitt, supra*, 128 F.Supp. 2d at p. 1274

Another fatal defect in BDCP Financing Chapter 8 is the intentional deferral of funding responsibilities,[57] to an Implementation Office, which will, at some unspecified future time, develop annual capital and operating budgets.[58] Indeed, the BDCP itself admits the Plan is not intended to establish an allocation of costs or repayment responsibilities; instead, finance plans will be developed separately by "various funding agencies" through future discussions.[59] Intended to serve as an NCCP under California law, the BDCP also fails to meet the funding mandates of this Act. The NCCPA demands an Implementing Agreement detailing, among other things: 1) provisions "specifying the actions [CDFW] shall take … if the plan participant fails to provide adequate funding"; and 2) "mechanisms to ensure adequate funding to carry out the conservation actions identified in the plan."[60]

The BDCP also relies on federal funding sources – sources that require future action by Congress to authorize the ongoing expenditure of funds or new authorizations to provide funding for BDCP activities over 50 years. However, the BDCP financing scheme conveniently ignores the federal Anti-deficiency Act which prohibits, among other things, (i) the creation of obligations in excess of amounts already appropriated, and (ii) the commitment of the federal government to pay funds not yet appropriated. Relying on funding sources that exceed current federal authorizations or require the future appropriation of funds, does not constitute an available or reliable funding source as required in HCP and NCCP permits.

Finally, the certainty of reliable funding being available for mitigation implementation, reimbursement of in-lieu assessments, payment of 1981 Contract violation remedies, or compensation to third parties for damages caused by BDCP is even more suspect and elusive according to Section 14.3 of the BDCP Implementing Agreement which explicitly absolves BDCP Permittees from providing any additional financial compensation beyond the level specified in the Plan.

RECOMMENDATION: Approval of HCP and NCCP permits and authorizations must be deferred until BDCP can demonstrate the availability of reliable funding sources, such as securitized endowments, to fully fund the implementation, monitoring and adaptive management, and 50-year management of all conservation and mitigation measures.

E. Inadequate Funding Assurances Require Establishment of Endowments

As mentioned previously, the acquisition of 158,000 acres of property in the Plan Area (Delta) to create habitat will result in the transfer of ownership from private to public, resulting in substantial local government tax and assessment revenue losses. If these payments are lost (or even simply delayed as a result of budgeting-process vagaries) the Agency might not be able to operate. There is zero benefit to the NDWA or its water users from widespread restoration of habitat within NDWA, but the loss of assessment revenue as a result will be fiscally devastating to the Agency's annual revenues which are solely dependent on assessments collected from landowners.

[57] BDCP EIR/EIS, p. 8-2.
[58] BDCP EIR/EIS, p. 8-1
[59] BDCP EIR/EIS, p. 8-2.
[60] (Fish and Game Code, § 2820(b)(3)

This is particularly concerning to the NDWA since neither the federal nor state government has a good track record of paying local property taxes and assessments to the counties, cities, reclamation district, or other special districts. Therefore, long-term, reliable funding mechanisms unencumbered by the vagaries of legislative appropriations, such as an endowment fund, must be included as a condition of the Implementing Agreement, in order to offset both the lost assessment revenue and the potential disruptions to the 1981 Contract.

Endowments are common funding tool used in HCPs to generate annual management funding over long time horizons. In an interest-bearing endowment, revenues are funded up front or in increments in an amount sufficient to generate enough yearly income to fund annual project management. Because only the interest is available for use and the principal is not withdrawn, an endowment is non-wasting, and provides a perpetual source of funding.

In contrast, "Payments in Lieu of Taxes" are payments to local governments that help offset losses in property taxes due to non-taxable State government lands within the agency's boundaries. While endowments are lasting, enduring financial arrangements, in-lieu payments are subject to the whim of the annual budgets.

Costs incurred by DWR actions to avoid or remedy 1981 Contract violations, or pay in-lieu assessments to NDWA, are not theoretical and should be budgeted in a way that recognizes the fiscal gravity and significant impact to the Agency.

More broadly, the Agency is concerned about the availability of funding to implement mitigation measures for the hundreds of individual actions called for in *Avoidance and Minimization Measures* (Plan Appendix 3.C) and for the 750 impacts identified in the EIR/EIS. According to a California Department of Fish and Wildlife report on species conservation plans, one of the challenges the eleven conservation plans had in common was: "Costs for management and monitoring were universally underestimated and, as a result of scant resources, these programs have been largely under-funded and inadequately staffed." [61]
Currently, the Plan Chapter 8 on BDCP financing provides muddled recommendations when dealing with endowments and other long-term funding mechanisms rather than dependable assurances – as can be seen in these excerpts:

- Section 8.4.1 says, "Endowment funds may be advanced on a short-term basis," and "Management, restoration, or monitoring actions ***may be deferred until funding sources are available***" [emphasis added; this offers only uncertainty and ambiguity]
- Section 8.4.2 says, "The Authorized Entities will not be required to provide land, water, or monetary resources beyond their commitments in this Plan in the event of a shortfall in state or federal funding."
- Section 8.3.7.2 on the other hand indicates a commitment that BDCP will in fact have endowment funds, "It is assumed these costs will be paid from a nonwasting endowment that will be funded over the course of the permit term." "Under CM11 *Natural Communities Enhancement and Management*, an endowment will be established for post-permit term costs of CM3 through CM10."

[61] *See Comparative Review of Governance Structures for Ecosystem Management* (November 2006). *Available at* https://www.dfg.ca.gov/habcon/nccp/publications.html.

Section 8.4.3 also mentions having a "target size" for an endowment to fund management and monitoring after the permit term, but fails to indicate the amount of the target.

RECOMMENDATION: To comply with NDWA contractual obligations and the requirements of state and federal law stated above, the BDCP must clearly describe all sources of funding for all elements of the BDCP and require as a condition in the permits and Implementing Agreement the establishment of multiple, long-term, and reliable funding mechanisms such as endowments to fund all aspects of BDCP over the 50-year life of the plan. Specifically, the BDCP must provide endowments or other durable methods of funding the following:

- The Mitigation Monitoring Plan, including the hundreds of individual actions called for in the *Avoidance and Minimization Measures* (Plan Appendix 3.C), and any actions necessary to avoid or remedy 1981 Contract violations;
- The Plan's Monitoring and Adaptive Management Program;
- Management contingency assumptions (Sec. 8.4.1);
- Payment of in-lieu property assessments (via an endowment or other stable and steady source of income) for lands associated with CM1 (Water Code § 85089(b)) and for habitat/conservations lands transferred from private property in the North Delta pursuant to execution of MOU with Agency. The endowment or other long-term, reliable funding mechanism must pay for both a) the contract price of water to rise, as laid out in the 1981 Contract,[62] and b) the price of assessments to rise in accordance with the limits set by the voters and the North Delta Water Agency Board.[63] Payment of Agency assessments using BDCP funding is appropriate, given the original purpose of the 1981 Contract.[64]

RECOMMENDATION: Chapter 8 of the Plan must provide more details on specific amounts to be deposited into each endowment fund at start-up and annually thereafter, including the total "target size" stating when endowments will be considered fully funded.

F. Inappropriate Transfer of CVP/SWP Delta Export Water Contractor Costs Onto Public and Plan Area

There are significant inadequacies and inequities contained in the BDCP's current funding strategy that require substantial modification to prevent serious economic harm to the North Delta region.

An in-depth review of the BDCP's funding strategy reveals an attempt to receive economic benefits that absolve BDCP proponents of future responsibility to provide any future compensation, land, or water supply beyond what is specified in the Plan for the next 50 years while transferring costs for regulatory obligations of the federal Biological Opinions and for absorbing economic and environmental degradation from 52 "significant and unavoidable"

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[62] Article 10, providing that the contract price for North Delta Water Agency water can rise by as much as 25 percent every five years (5 percent each year).

[63] North Delta Water Agency Assessment Adjustment (approved by voters in 2011).

[64] *See* MBK Engineers report, *Assessment Commissioners for the North Delta Water Agency Assessment Adjustment Pursuant to Article XIII D of the California Constitution* (2010) (" The Agency's Contract payment was based on the average annual deficiency in the water supply available to meet the water supply and water quality requirements of water rights of the lands within the Agency. The Contract payment represents the majority of the Agency's annual costs.")

adverse impacts on to other parties. In addition, the BDCP displays a serious disregard for financial obligations under the Delta Reform Act, other Delta protection statutes, area-of-origin, and other responsibilities.

For instance, the BDCP suggests that state and federal contractors are only responsible for 12.6% of the costs of CM4. (BDCP, Table 8-41.) The rationale is that only a small portion of restoration occurring under CM4 is currently required by the USFWS Biological Opinion for the Long-term Operational and Criteria Plan. However, the BDCP fails to disclose that tidal restoration will also serve to mitigate the adverse impacts of locating new SWP diversion facilities in the North Delta – in other words, is mitigation for implementation of CM1. In fact, according to the Plan Effects Analysis CM4 and CM5 are necessary to reduce the frequency and severity of reverse flows created in the Sacramento River at the Delta Cross Channel and Georgiana Slough from the construction of new SWP pumping facilities in the North Delta (CM1). Accordingly, the cost of CM4 and CM5 should be borne by CVP and SWP water contractors because these actions mitigate the operational impacts of the North Delta intake facilities (CM1), which solely benefits the water contractors at great expense to the Delta water quality, environment, and economy.

Imposing the costs of most of the BDCP's Programmatic conservation measures on the general public when those activities should be funded by the BDCP Proponents receiving the benefit of improved water quality and supply reliability and some extraordinary long term sweetheart deals certainly does not appear to be co-equal. Particularly in light of the adverse economic impacts imposed on the Delta with degraded water quality, community blight from building abandonment, and crippling of an agricultural paradise going back to the Civil War in order to achieve benefits in export service areas.

The most valuable benefits directly conferred upon CVP and SWP Delta export water contractors is the 50-year HCP "No Surprises" protection[65] (Section 14.0 of the BDCP Implementing Agreement) from future ESA obligations and the explicit NEPA Project Purpose, repeated many times throughout the BDCP documents, to "restore and protect the ability of the SWP and CVP to deliver up to full contract amounts." This is partially achieved by maximizing water supply for SWP and CVP relative to the Annual Operating Plan according to the "Real-Time Operational Decision-Making Process" described in Plan Chapter 3, Section 3.4.1.4.5. Under the No Surprises regulatory assurances policy, once the incidental take permit has been issued the federal government will not require additional conservation or mitigation measures, including land, water (includes quantity and timing of delivery), money, or restrictions on the use of those resources covered in the Plan.[66]

The Plan's Implementing Agreement acknowledges as much:

> *"[T]he USFWS and NMFS shall not require the Permittees to provide additional land, water or other natural resources, or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level provided for under the BDCP, this Agreement and the Federal Permits with respect to Covered Activities without the consent of the Permittees."*[67]

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[65] 63 FR 8859, Feb. 23, 1998.
[66] 63 FR 8868
[67] *Implementing Agreement for the Bay Delta Conservation Plan, Section 14.3*

This means that if the status of a covered species in the HCP unexpectedly declines any time during the 50-year permit term, the primary obligation for undertaking additional conservation measures rests with the federal government, other government agencies, or other nonfederal water users and/or landowners who have not yet developed HCPs. So, if the BDCP fails to improve species or causes further decline of covered fish as predicted in the federal Red Flag comments, Delta and northern California water users or taxpayers may end up responsible for conditions caused by CVP/SWP operations.

The nexus for the federal agencies providing these regulatory assurances is the purported benefits to be achieved by implementation of Conservation Measures, including CMs2-22 which, according to Red Flag comments and the Plan's own Effects Analysis, are needed to offset the numerous significant adverse effects of CM1 on covered species and their habitats.

Allowing the burden to supply extra outflows be the responsibility of other legal users of water for the next 50 years, expecting other landowners to sacrifice their property for habitat restoration, and asking other taxpayers to fund the BDCP while the economic and regulatory benefits accrue to CVP and SWP export service areas would be inequitable and an illegal re-direction of impacts to the North Delta and Northern California region.

In the aggregate, the aforementioned direct benefits accruing to CVP/SWP Delta export water contractors as a result of BDCP is an argument for *all* Plan and EIR/EIS costs to be borne by BDCP proponents.

RECOMMENDATION: Revise Plan Chapter 8 and the Implementing Agreement to clarify that in exchange for the benefits received (50-year shielding from ESA, explicit prohibitions from contributing additional flows from CVP/SWP for 50 years, explicit intent to deliver full contract amounts) BDCP Proponents are responsible for all costs associated with implementing conservation actions (including mitigation of actions) identified in Plan Chapter 3, Table 3.2-1 and all mitigation measures associated with construction and operation of CM1 including any other actions in the CMs that mitigates the impacts of CM1. Other examples include any costs associated with compensating for harm to other parties arising from implementation of BDCP conservation measures, including water users in the Plan Area harmed by degraded water quality as described in EIR/EIS Chapter 8 or separate permitting actions like changing D-1641 salinity compliance from Emmaton to Three Mile Slough.

RECOMMENDATION: Insert a Table into Chapter 31 of the EIR/EIS that estimates the number of acres and approximate locations of lands to be used for mitigation of CM 1 so that local agencies with assessments, like the NDWA, can evaluate the potential revenue loss and seek payment under Cal. Water Code § 85089(b).

RECOMMENDATION: Require the Implementation Office to track and the Annual Progress Reports to disclose the number of acres that are purchased each year for "the construction, location, mitigation, or operation of new Delta conveyance facilities" so that a proper accounting can be kept of the in-lieu property taxes and assessments that CVP and SWP water contractors are responsible for paying to local government agencies in accordance with Water Code § 85089(b).

RECOMMENDATION: Insert a condition into the HCP/NCCP permit requirements and Implementing Agreement requiring the BDCP Proponents to "pay for all property tax or

assessments levied by local governments or special districts for all lands used in the construction, location, mitigation, operation, maintenance, or management of BDCP habitat conservation projects and activities." This commitment should be additionally memorialized by executing MOUs with each local agency with affected revenues upon purchase of BDCP-related lands in impacted agency's jurisdiction. The commitment must provide for increases in the rates due to inflation and other economic pressures.

RECOMMENDATION: Mandate, via a requirement inserted into the Plan Chapter 8, that the CVP and SWP Service Contractors be financially responsible for paying all local in-lieu property assessments to NDWA for all lands purchased for purposes of complying with habitat restoration mitigation requirements contained in (at minimum):

- Fish Restoration Project Agreement (FRPA);
- Federal Biological Opinions for jeopardy associated with the continued operation of existing SWP and CVP South Delta pumps;
- OCAP or any other regulatory requirements such as meeting existing statutory fish-doubling requirements as obligations under the CVPIA.

VI. BDCP GOVERNANCE AND OVERSIGHT

A. Improper Transfer of SWP Decision-Making Authority

Under the BDCP, State Water Project Delta export water contractors and federal Delta export water service contractors (collectively "BDCP Proponents") are given new extraordinary decision-making authority as voting members of BDCP's primary decision-maker – the Authorized Entities Group (AEG). Under this proposed SWP/CVP management scheme, the BDCP Proponents' influence, power, and authority would also extend to participation on the Implementation Board, Adaptive Management Team, the Stakeholder Group, Real-Time Operations Team, and even as Supporting Entities.

According to Table 7-1 the Authorized Entity Group (AEG) has final authority over:

- Selection of the Program Manager;
- Oversight, administration, and approval of program funding, contracting , and resources;
- Oversight and implementation of conservation measures;
- Implementation of outreach, compliance monitoring and reporting requirements;
- Contracting for and acquisition of interests in real and personal property, and obtaining permits and other authorizations; and
- Review and approval of Annual Work Plan, Annual Budget, and Annual Delta Water Operations Plan.

Although exceptions to AEG authority purportedly excludes control over SWP/CVP "water operations," the AEG will still hold the purse strings for SWP/CVP management and water operations and as members of the Real-Time Operations Team. As such, these export water contractors will be included in the water operations decision-making process for "developing

adjustments to CM1 operations, in real-time," in order to "maximize water supply for SWP and CVP relative to the Annual Operating Plan" according to Plan Chapter 3, Section 3.4.1.4.5. As a result, SWP/CVP export service contractors with junior water rights will be allowed to participate directly in decision-making while holders of senior water rights and contractual entitlements, such as NDWA, are excluded.

According to the EIR/EIS, as BDCP proponents the SWP/CVP Delta water export contractors will also decide all of the discretionary issues related to mitigation implementation such as whether a remediation measure is "feasible" or "cost-effective" as well as control development of all studies regarding baseline conditions and project impacts that have been deferred.

The extensive role of the BDCP proponents as Authorized Entities in virtually every aspect of BDCP governance raises fundamental questions. Most importantly, will the State of California continue to manage the State Water Project for the benefit of all citizens of the State, or will a small group of project beneficiaries in effect manage and operate the SWP? The authority that would be granted to the BDCP proponents under the BDCP is simply unprecedented. Such a transfer of authority over state and federal public works far exceeds the scope, jurisdiction and authority of the HCP/NCCP processes or the original legislative intent of the state and federal statutes authorizing the two water conveyance projects.

The proposed transfer of power over the CVP and SWP to the Delta water export contractors represents a clear transfer of the state and federal government's sovereign authority over the operation and management of these projects. Such a transfer could interfere with DWR's performance of its specific binding obligations under the 1981 Contract with NDWA. NDWA objects to the proposed transfer of decision-making authority to the state and federal export contractors; such action would diminish DWR's ability to comply with its obligations under the 1981 Contract to operate the SWP to "maintain within the Agency a dependable water supply of adequate quantity and quality." [68] This transfer of authority would also limit the State's ability to "affirmatively defend" the reasonable and beneficial uses of water by NDWA landowners.[69]

RECOMMENDATION: BDCP governance must be significantly realigned to put representatives of holders of senior water rights and contractual entitlements, such as NDWA, on equal footing with the state and federal export contractors regarding BDCP governance. The HCP/NCCP permitting agencies must reject the BDCP governance structure and process as currently laid out in Chapter 7 of the Plan. As the lead agency, DWR must re-engage stakeholders to develop a governance structure that more appropriately distributes decision-making authority among all stakeholders, particularly other SWP contractors that will be directly impacted by BDCP implementation, such as NDWA.

B. The Plan Must Incorporate 1981 Contract Into BDCP Implementation and Oversight Program

The Agency could only find cursory references to the NDWA and the 1981 Contract in the Plan, two of which are merely footnote acknowledgements of the Contract. As the Agency asserts in comments above, the assurances provide to NDWA by DWR are particularly relevant to BDCP's

[68] 1981 Contract at Art. 8(e).
[69] *Id*. at Art. 8(d).

proposed SWP and CVP water operations because the 1981 Contract significantly constrains such operations.[70]

NDWA's prior comments also establish the fiscal ramifications if the terms and conditions of the 1981 Contract are violated as a result of BDCP operations. Despite DWR's long-standing acceptance and commitment to uphold the provisions of the Contract, NDWA is concerned about DWR's ability to do so based upon the anticipated outside influence imposed on management of the SWP for the next 50-year under the governance structure proposed in BDCP.
Of particular concern to the Agency is the Plan's failure to acknowledge the nature and extent of DWR's obligations to operate the SWP in compliance with the 1981 Contract, and the failure to include the 1981 Contract in the BDCP's annual reporting program.

NDWA, by virtue of the vote approving the Contract that occurred in 1981, consented to the export of water from the Delta "so long as this contract remains in full force and effect *and the State is in compliance herewith.*"[71] By virtue of signing the Contract, the State bound itself to affirmatively defend the use of water by North Delta landowners.[72] Accordingly, since NDWA is also a SWP contractor (although not a BDCP proponent because receives no benefits from the Project) it is appropriate to incorporate compliance with the 1981 Contract into the BDCP governance, oversight, and budgeting process in order to prevent or mitigate for any potential contractual breach which the State of California would be liable.

RECOMMENDATION: In order to ensure future compliance with the 1981 Contract, the annual operating and monitoring plans and reports should include, without limitation, the following:

- Annual Delta Water Operations Plan, Sec. 6.3.2
- Annual Progress Report, Sec. 6.3.3
- Annual Water Operations Report, Sec. 6.3.4
- Annual Work Plan and Budget, Sec. 6.3.1
- Five-Year Comprehensive Review, Sec. 6.3.5
- Adaptive Management and Monitoring Program, Sec. 3.6

RECOMMENDATION: Incorporate the specific year-round water quality, flow, and elevation criteria of the 1981 Contract as metrics to be achieved in the Annual Delta Water Operations Plan, in order to prevent or mitigate for any potential contractual breach for which the State of California would be liable.

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[70] This would apply to Contract violations caused by loss of water quantity or water quality, harm from surface water elevations, damage from seepage, harm caused by overland facilities, damage to existing flows and diversions, or any other provisions identified in Articles.
[71] Art. 8(e) [emphasis added]
[72] Id. at 8(d), DWR, CA Natural Resources Agency and U.S. Dept. of the Interior, "What is the BDCP", Available at http://baydeltaconservationplan.com/AboutBDCP/WhatistheBDCP.aspx DWR, CA Natural Resources Agency and U.S. Dept. of the Interior, "What is the BDCP", Available at http://baydeltaconservationplan.com/AboutBDCP/WhatistheBDCP.aspx (Providing that "The State agrees to defend affirmatively as reasonable and beneficial the use of water required to provide and sustain the qualities established in this contract.")

RECOMMENDATION: Disclose in the Annual Water Operations Report any operational changes, remedies for damages caused by prior year's BDCP operations that were implemented, and any significant physical modifications made to SWP facilities (i.e., alternative water supply infrastructure) implemented as a result of complying with water quality and supply obligations under the 1981 Contract. This disclosure would provide transparency for decision-makers, and could operate to mitigate for any potential contractual breach for which the State of California would be liable.

RECOMMENDATION: Add the 1981 Contract to the list of items that must be tracked in the BDCP's Annual Progress Report, Adaptive Management and Monitoring Program, and the Five-Year Comprehensive Review. To avoid contractual breach, the EIR/EIS and these documents should require "compliance " with any and all DWR and USBR contractual obligations still in full force and effect that are associated with the operations of the SWP and CVP, including the NDWA 1981 Contract."

RECOMMENDATION: Request a map be added to the EIR/EIS Chapter 1 Appendices that depicts the NDWA's boundaries and seven water quality monitoring locations specified in the 1981 Contract.

RECOMMENDATION: Incorporate into the Annual Work Plan and Budget a description of any anticipated actions and costs associated with remedies to alleviate or eliminate any 1981 Contract violations incurred over the previous fiscal year or projected for the next fiscal year. This would provide transparency, and serve as a mitigation measure to ensure that any contractual breaches caused by the BDCP are mitigated.

C. Extraordinary Amount of Mitigation Requires Increased Governance and Oversight

The Plan, Chapter 6 *Plan Implementation*, Chapter 7 *Governance*, and Chapter 8 *Implementation Costs and Funding Sources*, devotes a great deal of attention to responsibility for implementation of actions necessary for the construction of CM 1 and to showing scheduled progress in meeting the biological goals and objectives applicable to all programmatic natural community and species conservation measures. However, the Plan lacks the same level of commitment and oversight regarding the effective implementation of the thousands of individual mitigation actions required in a tiered and bifurcated project (Project Level and Programmatic Conservation Measures) of this size, being constructed over several decades.

NDWA could only find passing mention of mitigation implementation or effectiveness in Plan Section 6.3 *Planning, Compliance, and Progress Reporting* or Section 7.1 *Roles and Responsibilities of Entities Involved in BDCP Implementation* or anywhere else dealing with HCP/NCCP permit compliance.

Under NEPA, mitigation includes avoiding, minimizing, rectifying, reducing over time, or compensating for an impact.[73] CEQA contains similar requirements. In order to ensure compliance with HCP terms and conditions, permitting agencies will need to have a robust tracking mechanism to monitor whether the thousands of discrete mitigation actions listed in the EIR/IES chapters[74] and contained in the *Avoidance and Minimization Measures* (Plan Appendix

[73] 40 CFR § 1508.20
[74] As well as those contained in the *Avoidance and Minimization Measures* (Plan Appendix 3.C).

3.C) are being implemented properly, and that the mitigation measures are performing as intended to reduce the seven hundred and fifty significant impacts listed in the EIR/EIS.[75] In accordance with NEPA/CEQA, the BDCP permitting agencies must be clear with each other and transparent with the public as to who is proposing each mitigation measure, and who will monitor and enforce measures that are adopted as terms and conditions of the approved permits.[76] Failure to ensure the implementation and effectiveness of these mitigation measures will result in a substantial increase above the fifty-two "Significant and Unavoidable" adverse impacts expected to be imposed on human and environmental resources from the implementation of BDCP according to the EIR/EIS (Chapter 31).

NDWA could find no mitigation monitoring plan, governance oversight entity, or adaptive management process specifically described for developing replacement mitigation measures in the event that an action portrayed in the EIR/EIS is ineffective. The BDCP complicates the tracking and governance of mitigation even further by incorporating existing mitigation requirements from previous ESA processes (specifically, the requirements of existing Biological Opinions governing Delta operations) into the Conservation Measures.[77]

Of most concern to the NDWA is the potential for breach of the 1981 Contract by DWR that could result in substantial adverse impacts on water users and the physical and human environment in the North Delta, if BDCP fails to properly implement compliance measures and/or mitigation measures to avoid or remedy violations of the 1981 Contract.

RECOMMENDATION: BDCP permitting agencies must assure, by memorializing in the Implementing Agreement and as permit terms and conditions, an equal level of attention and oversight to the proper and timely implementation of feasible mitigation measures to reduce project impacts to a less-than-significant level, in accordance with applicable law. In order to protect Delta-as-Place in accordance with the coequal goals of the Delta Reform Act, and to properly implement its mitigation, the Plan must define:

- The entity responsible (among construction contractors, NMFS, USFWS, DWR, USBR, BDCP Implementation Office, and the other key players)) for the timing and implementation of mitigation actions[78] contained in the EIR/EIS's Mitigation Measures and Plan Appendix 3.C, *Avoidance and Minimization Measures* including the development of hundreds of studies, field surveys, avoidance protocols, reports, best management practices, etc. to be implemented during all phases of the project from design to maintenance, monitoring, and adaptive management;

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[75] ICF International, *Impacts, Mitigation Measures, and Conclusions for Alt. 4 in the 2nd Administrative Draft of the BDCP EIR/EIS* (May 2013).

[76] *See, e.g., NEPA and CEQA: Integrating State and Federal Environmental Reviews*, Draft for Public Review and Comment, March 2013, the U.S. Council on Environmental Quality (CEQ) and CA Governor's Office of Planning and Research

[77] See Plan Chap. 3, Table 3.2-1 Consistency of the BDCP with Requirements of Recent Biological Opinions; See also existing "OCAP" biological opinions, available at http://www.fws.gov/sfbaydelta/cvp-swp/cvp-swp.cfm; Reclamation Board, *Remanded Biological Opinions on the Coordinated Long-Term Operation of the Central Valley Project and State Water Project* (March 2012). *Available at* https://www.federalregister.gov/articles/2012/03/28/2012-7488/remanded-biological-opinions-on-the-coordinated-long-term-operation-of-the-central-valley-project; California Department of Fish and Wildlife and the Department of Water Resources; *Fish Restoration Program Agreement* (FRPA) (October 2010). *Available at* http://www.water.ca.gov/environmentalservices/frpa.cfm.

[78] Mitigation actions contained in the EIR/EIS's Mitigation Measures and Plan Appendix 3.C, *Avoidance and Minimization Measures*

- The governance and oversight entity in the BDCP to be responsible for ensuring mitigation implementation and for reporting to the permitting agencies and the public on the progress and effectiveness of all mitigation measures applied to activities in CMs 1-22;

- The state or federal agency designated with the regulatory responsibility for implementation of each mitigation action and for reporting on whether the conditions in the permits are being met;

- The entity responsible for ensuring adequate funding is available for all mitigation measures associated with CMs 1-22 and for annually reporting the fiscal costs of mitigation;

- What the Project and permit ramifications will be if the thousands of mitigation actions are not being properly implemented in a timely manner to alleviate adverse impacts identified in the EIR/EIS and as mitigation requirements in the numerous other additional permits required beyond those in the HCP/NCCP for BDCP construction and operations; and

- The entity responsible for tracking and enforcing implementation of hundreds more mitigation requirements that will be imposed by agencies such as SWRCB, USACE, CVFPB, county building permits, etc. that will additionally be required for each Conservation Measure.

RECOMMENDATION: Require through the Implementation Agreement and through revisions of Plan Chapter 7 that the Permit Oversight Group, Section 7.1.5, be mandated to include a quarterly assessment of compliance with the timing and effectiveness of mitigation measures required as HCP/NCCP permit terms and conditions, with particular attention to any mitigation measures and actions that are behind in implementation or not performing as intended to reduce adverse impacts, and provide recommendations for alternative mitigation measures/actions to replace those that are not working. This will ensure that mitigation occurs and that adaptive management is properly applied to mitigation.

RECOMMENDATION: To ensure that mitigation and adaptive management are truly occurring, require the BDCP Annual Progress Report, Section 6.3.3, to assess the following:

- Progress made regarding the implementation of all mitigation measures contained in the EIR/EIS;
- Progress of new mitigation requirements added in separate permits that must be issued (i.e., change of diversion, SPFC encroachment, air quality, water discharge, etc.)
- Progress in implementing individual actions contained in the Plan Chapter 3 Table 3.2-1, Plan Appendix 3.C, *Avoidance and Minimization Measures;*
- Status of lands purchased for CM 1 construction mitigation in order to pay in-lieu local property taxes and assessments pursuant to Water Code § 85089(b);
- Compliance actions implemented by DWR/BDCP to avoid and remedy violations of the NDWA 1981 Contract;
- Any mitigation actions that are behind in implementation schedule;

- Any mitigation measures that are not performing as expected; and
- New mitigations recommended by the Permit Oversight Group (see comment above) that may be necessary to replace mitigation measures that are not working as advertised in the EIR/EIS.

D. The Plan Fails to Include NDWA's Contractual Remedies as Covered Actions Associated with SWP Operations

The NDWA appreciates the Plan Chapter 4, Section 4.2 *Covered Activities* recognizing in a footnote that DWR has separate water quality obligations pursuant to the 1981 Contract; however, the nexus between the requirements of the 1981 Contract and actions DWR will have to undertake under the BDCP incidental take permits as existing SWP obligations is not made anywhere in this chapter, the Plan, the Implementing Agreement, or the EIR/EIS.

In regards to any future physical and operational modifications DWR may have to implement in order to avoid violations of the 1981 Contract, the BDCP should include such remedies as Covered Activities in Chapter 4 and the HCP Implementing Agreement as part of DWR/SWP's existing operational requirements.

RECOMMENDATION: Request Plan Chapter 4, Section 4.2 *Covered Activities*, p. 5, lines 24-29, that lists six categories of covered activities be amended to include the following as another category:

- *Actions to maintain compliance with contractual obligations to in-Delta water users.*

RECOMMENDATION: Include a new subsection to Plan Chapter 4, Section 4.2 *Covered Activities* (could be added as new Subsection 4.2.8 under *Transfers and Other Transactions*) as follows:

4.2.1.5 Compliance Actions Pursuant to NDWA 1981 Contract

Under the NDWA 1981 Contract DWR is responsible for maintaining year-round water quality criteria and for several physical obligations such as diversion facility modifications or seepage and erosion damage repairs required due to detrimental altered water elevations. BDCP's proposed modification of the Delta's hydrodynamics during the 50-year implementation may require DWR to occasionally undertake actions to avoid or remedy Contract violations as part of binding assurances given to North Delta water users in 1981 Contract. The BDCP will therefore include complying with DWR's obligations to implement physical and operational actions and activities necessary to avoid or remedy violations of the NDWA 1981 Contract as covered activities.

VII. MAJOR PLAN AND IMPLEMENTATION DEFICIENCIES

A. Significant Environmental Uncertainty Warrants a Phased Approach

The NDWA agrees with BDCP Project proponents that uncertainty is not a good reason to do nothing. However, in the case of the BDCP, the high degree of uncertainty for achieving any meaningful benefits for covered species as expressed by independent science reviews and ESA

permitting agencies,[79] results in a fundamental failure of BDCP to comply with NEPA, CEQA, ESA, NCCPA and other applicable law. [80] According the independent review of the Plan and Effects Analysis by fisheries biologist Dave Vogel, every aspect of the impacts of BDCP on salmonids is either "uncertain" or "highly uncertain."[81]

What are the uncertainties associated with implementing the BDCP? According to the BDCP documents, uncertainty exists in nearly every aspect of the project: fishery benefits, availability of private land for habitat, to the success of proposed mitigation. Listing the uncertainties would take too long because the word "uncertain" appears 1,008 times in the Plan and appendices, and 2,303 times in the EIR/EIS and appendices.

Despite the criticism of these uncertainties by independent scientists and others, BDCP proponents continue to blindly pursue a "damn the torpedoes, full steam ahead" attitude like they did when promoting the original Peripheral Canal in the 1980s. However this time, the BDCP proponents are not including the same precautionary measures such as phased construction and important assurances to the Delta and environmental resources that they did in the original Peripheral Canal proposal. Nor are they seeking voter approval for the BDCP. Instead, BDCP proponents appear to be betting everything on one horse to win and ignoring the extreme amount of risk for species and water supply reliability if they have chosen a horse hobbled by severe environmental and fiscal uncertainty.

It is noteworthy that the original Peripheral Canal legislation (SB 200 and ACA 90) contained specific protections that were designed to reduce environmental uncertainty and protect Delta communities, including:

- DWR was to assure protections for fish restoration and protection in the Delta to pre 1967 levels;[82]
- DWR executing water supply and quality settlement contracts with 8 in-Delta entities, including NDWA;
- Prohibition against DWR transporting water for the CVP until Congress enacted legislation or the Secretary of the Interior entered into a permanent contract with the department that specified certain terms and conditions;
- Phasing the construction of the project so that a new intake in Hood would be operated for two years to establish adequate fish screen and operational criteria before the next phases could proceed.

The administration of Governor Edmund G. Brown, Jr. obviously agreed to this precautionary approach the first time around and should do no less now. Currently, CM1 as proposed will require the three new North Delta intakes to undergo some operational fish screen testing prior to full pumping but only *after* all three North Delta diversions have been built. If these never before-used screens do not function as planned in terms of fish protection, then this gamble will end up a losing proposition for at least one out of the following three: the Delta ecosystem,

[79] Vogel Report, NAS Comments, ISB Comments , Latour, R., Ph.D., Technical Review of the Bay-Delta Conservation Plan (BDCP) and Related Environmental Impact Review (EIR) (May 16, 2014) ("Latour Report")
[80] Vogel Report, Latour Report, NAS Comments, ISB Comments
[81] Vogel report
[82] SB 200, (chap 632) 1979-1980 Regular Session, §11256

Delta-as-Place, or the CVP/SWP Delta export water contractors (who will be stuck with long-term payments on a very expensive stranded asset).

Finally, it is important to point out a fact that is rarely discussed in BDCP – size matters. Other than the CVP/SWP existing diversion intakes in the South Delta, the average size of the Delta's agricultural water diversion intakes is about 12 inches with a 10-15 cfs capacity (mostly siphons, not pumps) while the urban intakes are less than 300 cfs. By comparison, each of the BDCP individual intakes will be 3,000 cfs with a combined fish screen length of a little over a mile to be placed on a four-mile stretch of the Sacramento River's east bank.The BDCP used the size of the Glenn-Colusa Irrigation District's (GCID) 3,000 cfs intake as the precedent for the size selected for CM1. However, GCID's facilities are not located in a tidal estuary, do not have to screen for smelt, and were not without their own problems that ultimately resulted in a very expensive redesign of fish screens and forebay.[83]

RECOMMENDATION: To mitigate environmental and human resource impacts, require the CM1 construction to be phased so that one intake is built and fish screen effectiveness and compliance with permits is tested and the water quality, elevation, and reverse flows monitored to assure the 1981 Contract and California's "No Injury" rule are not being violated.

B. Masquerading as "Conservation Measure" Does Not Meet ESA/CESA Standards

Under the ESA, conservation measures are "actions to benefit or promote the recovery of listed species that are included by the Federal agency as an integral part of the proposed action. These actions will be taken by the Federal agency or applicant, and serve to minimize or compensate for, project effects on the species under review."[84]

The Plan improperly characterizes as "conservation measures" various actions that do not fall within the foregoing definition because the activities will not benefit or promote the recovery of listed species. The most egregious example of this systemic flaw is the characterization of Conservation Measure 1 ("CM1). The Plan's Executive Summary describes CM1 as follows:
CM1 Water Facilities and Operation is intended to meet or contribute to a variety of biological goals and objectives that are related to flow management and reduced entrainment of covered fish species. Many of the conservation actions proposed under CM1 constitute a continuation of existing operational criteria being implemented under the biological opinions[85] that currently constrain State Water Project and Central Valley Project operations. (Plan, p. 10)
This description of CM1 is disingenuous, to say the least, because it does not disclose that the thrust of CM1 is the construction and operation of three new North Delta intakes and associated pumping and water conveyance (i.e., tunnel) facilities.

As detailed in the report of fisheries biologist Dave Vogel filed herewith, the North Delta intakes and accompanying fish screens will lead to "ideal conditions" for predation of juvenile salmon by creating flow conditions that disorient juvenile salmon and pull them to one side of the Sacramento River directly into a target-rich environment for predators waiting to feed. Furthermore, when the North Delta intakes are operating the pumping facilities will cause reduced Sacramento River stream flow which will adversely affect migration of juvenile winter-

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[84] *ESA Handbook* at xii (emphasis added)
[85] See, e.g., Chapter 1, Introduction, Section 1.3.2.2, Relationship of the BDCP to Existing Biological Opinions

run Chinook salmon who will be pulled into the Central Delta by increased reverse flows created at the Delta Cross Channel and Georgiana Slough.

Similar issues arise from the Plan's characterization of the "minimization and avoidance" measures described in CM22 as "conservation measures" when the sole purpose of such measures is to mitigate the adverse impacts that will be caused by the construction of CM 1-21. Such chicanery brings to mind the infamous quote from a Shakespeare play, "a rose by any other name would smell as sweet," in which Juliet argues that the names of things do not matter, only what they "are."[86] In the case of BDCP the opposite could be said about CM1— it only matters what it "is," not what it is named.

In a similar vein, the Plan characterizes actions that are required to be taken pursuant to the current Biological Opinions as "conservation measures," however these are existing regulatory mandates for jeopardy findings under ESA necessary to maintain incidental take authority at the SWP/CVP South Delta pumps. (See Plan Table 3.2-1, *Consistency of the BDCP with Requirements of Recent Biological Opinions*, p. 3.2-11 of Plan).

The Plan's characterization of CM1, the "minimization and avoidance" measures of CM22 and the requirements of current Biological Opinions as "conservation measures" violates the letter and spirit of the ESA. Contrary to the Plan's assertions, these are not new "actions to benefit or promote the recovery of listed species." In the case of the Biological Opinion requirements, they are regulatory requirements with which the CVP and SWP will have to comply regardless of whether the BDCP is ever constructed.

RECOMMENDATION: Revise the Plan's Conservation Strategy (Chapter 3) to remove the new SWP North Delta conveyance facilities (CM1) and the minimization and avoidance measures (CM22) as Conservation Measures. The conveyance facilities and operations should be identified as Covered Action Projects seeking ESA ITP authorization. The avoidance measures should be identified in the EIR/EIS and the Mitigation Monitoring and Implementation Plan as new Mitigation Measures necessary to offset significant adverse effects of the Project, actions, and operations.

RECOMMENDATION: Revise the Plan's Conservation Strategy (Chapter 3) to separate all the BiOps and FRPA habitat actions from the Conservation Measures and identify them in the EIR/EIS and the Mitigation Monitoring and Implementation Plan as existing ESA Mitigation Measures (i.e., baseline conditions) for the ongoing CVP/SWP water operations proposed in the BDCP.

C. The BDCP Shifts Future ESA Obligations to Northern California Water Users

One of the most valuable and enduring benefits BDCP proponents would receive under the Plan is 50-year protection from providing any more land, water (includes quantity and timing of delivery), money, or restrictions on the use of those resources beyond what is specified in the Plan.[87]

[86] *Romeo and Juliet*, Act II, Scene ii.
[87] 63 FR 8868

Practically speaking, this means if the covered species in the HCP decline even further during the 50-year permit term, the primary obligation for undertaking additional conservation measures rests with the federal government, other government agencies, or other nonfederal landowners who have not yet developed HCPs. In other words, water users in the Plan Area (Delta) and upstream throughout Northern California will be like the great Titan Atlas shouldering the entire regulatory responsibility if the BDCP fails to improve species or causes further fishery declines as predicted in the federal Red Flag comments. In contrast, the CVP and SWP Delta export facilities and contractors will be absolved – held harmless.

Conferring this level of regulatory protection is surprising since the BDCP Plan, Effects Analysis, and EIR/EIS bounces back and forth between claiming to benefit covered species and admitting that actions in the Plan will result in additional take of covered species. Moreover , statements in the Plan and EIR/EIS claiming species benefits often do not have any supporting evidence to validate such assertions, while the intensity of the adverse impacts are typically glossed over or the science is presented in a way that makes the adverse impacts appear less severe.

An example is Plan Table 9-7 *Summary of Change in Take Relative to the BDCP Proposed Action*, p. 9-20 of Chapter 9. The number of covered species that would experience increased take is staggering. For instance, "Take Alternative H" (*More Spring Outflow)* would result in an increase take of 26 terrestrial species and "Take Alternative C" (*Tunnels 15,000 cfs*) would increase the take of 10 covered fish species "due to increased number of intakes and heavier reliance on south Delta diversions."

The level of take for species in Table 9-7 is presented in a confusing fashion because it is not comparing the different Take Alternatives to Existing Conditions, but is instead comparing the Alternatives to the Preferred Project (Alt. 4) with 9,000 cfs tunnels and 158,000 acres of habitat. Therefore, the amount of covered species take in Alternatives "A" through "I" in Table 9-7 would actually be much greater if compared against Existing Conditions.

Table 9-7's failure to disclose/quantify any "take" impacts of Alt. 4 violates NEPA's regulations requiring an agency to "rigorously explore and objectively evaluate all reasonable alternatives,"[88] requiring the agency to devote substantial treatment to each alternative,[89] and to identify the preferred alternative where one or more exists.[90] Even more relevant in this case, NEPA requires the environmental impacts of the proposed action and the alternatives to be presented in a comparative form to sharply define the issues and provide a clear basis for a choice among alternatives by the decision makers and public. The failure of Table 9-7 to compare Alt. 4 or any of the Alternatives against a "no action" is a violation of NEPA.[91] Examples like these which are found throughout the BDCP documents prevents the public and permitting agencies from discerning which of the Alternatives is the best option for achieving HCP recovery goals and the least environmentally damaging.[92]

Finally, failure to provide full disclosure of or quantify Alt. 4's take impacts on covered species violates NEPA's requirement to describe severe impacts in more detail than less consequential

[88] 40 CFR § 1502.14(a)
[89] 40 CFR § 1502.14(b)
[90] 40 CFR § 1502(e)
[91] 40 CFR § 1502.14(d)
[92] 40 CFR § 1505.2(b)

impacts.[93] What is obvious from the comparison provided in Chapter 9 is that all alternatives selected for analysis in BDCP will result in irreversible and irretrievable commitment of resources (40 CFR § 1502.16) on a scale that could result in jeopardy for more than one covered species. Table 9-7 would be more helpful in evaluating impacts to covered species populations if it were accompanied by a Table that names the species that would experience the increased or decreased level of take under BDCP. Because the Plan Area is so large, the various species may be more relevant in some areas and specific land and water uses than others.

Any underestimation of covered species adverse impacts that may be caused by implementation of BDCP as currently proposed should be carefully evaluated and avoided in light of the "No Surprise" protections BDCP Proponents will receive automatically shifting future ESA regulatory burdens to people with no say in the development or implementation of BDCP once the HCP/NCCP permits are signed by permitting agencies.

RECOMMENDATION: To be more consistent with NEPA Guidelines for disclosure and alternative comparison, Table 9-7 must be replaced with a new one that: a) adds the Preferred Alt. 4 (9,000 cfs Tunnels); and b) compares all of the BDCP Alternatives against a "no action" Alternative. That way, the difference in take of covered species between Alt. 4 and the other Alternatives will become apparent.

RECOMMENDATION: Request the addition of a new Table or Figure in Section 9.2 Descriptions of Take Alternatives that lists/names the covered species that will experience and increase or decrease in take when comparing all Alternatives to a "no action" alternative.

D. The EIR/EIS Fails To Provide an Adequate Summary Section (NEPA § 1502.12)

NEPA requires that an EIS contain a section summarizing the statement. The summary is specifically supposed to stress:

- Major conclusions;
- Areas of controversy (including issues raised by agencies and the public);
- Issues still pending resolution (including the choice among alternatives).

After a lot of searching, we finally found Section ES.7 *Areas of Known Controversy and Issues to be Resolved*, which listed controversial issues, but provided no discussion of the unresolved issues. This is particularly concerning in light of the long list of unresolved issues in the Federal Red Flag comments and those submitted by Cooperating Agencies. Chapter 1 *Executive Summary* Section ES.1 *Introduction* describes the purported benefits of the proposal, but we could not find a description of the EIS' major conclusions.

Based on the Plan's Effects Analysis and the 750 impacts with fifty-two of them considered "Significant and Unavoidable" in the EIR/EIS, there are certainly some very serious environmental impacts imposed on the natural and human resources in the Plan Area that warrant a comprehensive and coherent discussion for the public to understand the full extent of the scope and nature of the proposal.

[93] 40 CFR § 1502.2(b)

Failure to provide an overall description of how the natural resource and human impacts in the Plan Area will be affected as a result of implementing BDCP prevents the public from understanding the comprehensive scope, complexity, severity, and cumulative nature of how the Delta's biological and socioeconomic environment will be changed during the 10-year water conveyance construction or 50-year implementation and oversight.

RECOMMENDATION: Add a separate *EIR/EIS Summary of Conclusions, Unresolved Issues, and Known Controversies* Section that includes all three of the elements listed in NEPA[94] be drafted and included in the EIS.

RECOMMENDATION: Add a comprehensive summary section to the EIS that describes the major environmental impact conclusions made, including a comprehensive and coherent discussion of whether the 750 impacts, including the fifty-two "Significant and Unavoidable" adverse impacts outweigh the purported benefits. This can only be done if consistent with NEPA[95] with the summary providing an objective comparison of the benefits versus adverse impacts to see if one side is weighted heavier than the other. The description should include a disclosure of how the Plan Area's water supply and quality, farming production, flood protection, and recreational values will be altered as a result of implementing the BDCP Preferred Alternative.

RECOMMENDATION: Prepare the summary in accordance with §1502.12 to specifically describe the outstanding issues that have been raised in comments by NDWA as a SWP water contractor and Cooperating Agency with the USBR.

VIII. EFFECTS ANALYSIS AND MODELING FLAWS

A. Flawed Modeling Underlying the Plan and EIR/EIS Prevents Evaluation of Impacts

The models used for evaluating water project operations, hydrodynamics, and water quality have been extensively modified for BDCP studies to calibrate for salinity, reflect current Biological Opinion operational constraints, and incorporate the proposed actions and water operations proposed in Alt. 4.

These modified models have been found to be unreliable due to problems highlighted by an independent review, incorporated herein by reference as Attachment 2 to this letter, in a report by MBK Engineers and Dan Steiner entitled *Report on Review of Bay-Delta Conservation Program Modeling* ("Modeling Report").

As explained in the Modeling Report, the BDCP model is an outdated version of the CalSim II model, which contains known errors.[96] By definition, utilization of an outdated version of the CalSim II model does not constitute utilization of best available science.[97] The BDCP must conduct new model runs and Effects Analysis results using the current version of CalSim II. The Modeling Report describes other significant problems with the BDCP modeling:

[94] 40 CFR Section 1502.12
[95] 40 CFR Section 1502.14
[96] These errors are discussed at greater length in the Modeling Report.
[97] Note that NEPA requires application of information of ''high quality'' and professional integrity. 40 CFR 1500.1, 1502.24. Finally, the *Delta Plan* requires application of best available science for all covered actions.

- Methodology used to incorporate climate change contains errors and does not incorporate reasonably foreseeable adaptation measures;
- Climate change assumptions were incorrectly applied, yielding non-sensible results;
- Climate change hydrology in the Upper San Joaquin River basin was incorporated incorrectly into the BDCP Model;
- Incorporation of climate change ignores reasonably foreseeable adaptation measures that would lessen the dramatic effects predicted by the model;
- Includes predicted changes in precipitation and temperature without other changes, resulting in insufficient water needed to meet all regulatory objectives and user demands.

Each one of the above problems contained in the BDCP's models and methodology alter the outcomes in ways that could mask a greater severity in impacts to Delta water quality, temperature, elevations, and unnatural flows. The cumulative nature of these miscalculations essentially renders the BDCP modeling and Effects Analysis useless. In particular, the modeling and Effects Analysis does not adequately evaluate water quality and supply data critical to enforcement of NDWA's 1981 Contract.

An example of methodology miscalculations found in the model used by BDCP is the failure to adjust project operations, as required by the Coordinated Operations Agreement ("the COA"), to "pay back" the water "debt" to the SWP due to additional Delta outflow requirements of proposed BDCP water operations in order to keep the SWP whole. The ability of BDCP to make adjustments in accordance with COA is not clear according to the Modeling Report, because there is no apparent source of CVP or SWP water to satisfy both 1) the increased Delta outflow requirements *and* 2) the COA "debt" to the SWP, without substantially depleting upstream water storage.

From a practical operations standpoint, forcing the SWP to release stored water to meet the increased Delta outflow requirements could result in 1981 NDWA Contract violations. If BDCP operations allow depletion of upstream water storage, this would also cause adverse temperature impacts on salmonids in the Sacramento and American River systems (less available cold water pool) and would violate both California's "No Injury Rule" and the long-standing prioritization of water rights governed by several state statutes.[98]

Another concerning anomaly s described in the Modeling Report reductions in Delta outflows that could cause significant water quality and water supply impacts for in-Delta beneficial uses, including violations of the NDWA 1981 Contract and could lead to additional, unanalyzed adverse impacts on water supplies in the Plan Area (Delta).

When the errors in the BDCP Model are corrected, modeling results reveal that the North Delta Diversions (NDD) could divert approximately 680 TAF/yr <u>more</u> water than what is disclosed in the BDCP Draft EIR/S. Conversely, the quantity of water diverted through the existing South Delta Diversions (SDD) would be approximately 460 TAF/yr less than what is projected in the BDCP Draft EIR/S. This difference in the location of diversions has the potential to reduce water quality in the Delta in ways that were not analyzed in the BDCP Draft EIR/S.

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[98] See Wilson, Craig M., *California's Area Of Origin Laws: A Report to the State Water Resources Control Board and the Delta Stewardship Council* (2013). *Available at* http://www.waterboards.ca.gov/board_info/agendas/2013/oct/100813_7origin.pdf

Once these modeling anomalies are corrected, the NDWA will be able to evaluate whether BDCP's proposed reconfiguration of SWP and CVP water facilities and alteration of Delta hydrology will be in compliance with DWR's assurances provided to North Delta water users in the 1981 Contract.

RECOMMENDATION: To determine the potential effects of the reduced amount of Delta outflow on water quality and water surface elevations, the BDCP must conduct additional modeling, applying tools such as DSM2 and incorporating the new version of CalSim II currently being used by DWR in other projects/programs.

RECOMMENDATION: Once the new modeling is completed, the EIR/EIS Water Supply Chapter must include a new section disclosing whether the changes in water quality and elevations created by Alt. 4 operations will be significant and require mitigation to reduce the level of impacts. If the impacts to water supply availability and quality (agriculture and municipal) is determined to be adversely affected by BDCP water operations then the revised BDCP Plan and EIR/EIS will need to be released for public review and comment.

B. The Modeling Fails to Include the 1981 Contract Requirements

Under CEQA and NEPA, an EIR/EIS must include a description of the physical environmental conditions in the vicinity of the project from both a local and regional perspective.[99] An accurate description of the environmental setting of the Project is critical because it establishes the baseline physical conditions against which a lead agency can determine whether an impact is significant.[100] Most importantly, the baseline helps the public discern its impact on the local natural resources and human environments. [101]

Therefore, to comply with CEQA guidelines and case law, all hydrologic modeling undertaken in connection with the BDCP process must assume as part of the "baseline" condition that the terms and conditions of the 1981 Contract will remain in full force and effect. This includes DWR's obligations to operate the SWP to maintain water quality and supply in accordance with Articles 2, 6 and 8.

To date, the hydrologic modeling underlying both the Plan and EIR/EIS fails to do so – even though the NDWA **at its own expense** has provided a modeling tool to incorporate into BDCP's Effects Analysis modeling to ensure the Contract's criteria is analyzed as a baseline condition of SWP operations. This inclusion is important because the Contract's salinity objectives differ in certain key respects from the water quality requirements in the SWRCB's current Water Quality Control Plan for the Delta (D-1641), particularly in the late summer months where the 1981 Contract requirements are more stringent from a water quality standpoint.

The Agency's evaluation of BDCP's water operation impacts on North Delta water supply availability and quality is further complicated by arbitrary and not well-documented alteration of existing water quality objectives currently contained in D-1641 as the baseline condition. Using

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[99] CEQA Guidelines §15125(a)
[100] Id.
[101] See, e.g., *Communities for a Better Environment v. South Coast Air Quality Management Dist.* (2010) 48 Cal.4th 310 (The ultimate goal in fixing a baseline is to "give the public and decision makers the most accurate picture practically possible of the project's likely impacts.")

hypothetical, future SWRCB changes to D-1641 as the baseline for BDCP modeling of Alt. 4 water operations requires that certain findings be made – and those findings are absent from the EIR/EIS. [102] Applying the baseline without making the necessary findings represents an arbitrary and capricious manipulation of the existing conditions, and improperly skews the analysis of environmental impacts associated with the proposed Project in violation of CEQA and NEPA. Following are references in the Plan describing some of the changes made to existing conditions and used as existing conditions assumptions in the BDCP Effects Analysis modeling:

- Section 3.4.1.2 *Operational Components* – "The BDCP alternatives comprise a range of operational rules for the SWP/CVP in the Delta that would require additions to, **modifications of, or elimination of some of the existing operational rules**, as described in detail below." [Emphasis added.]

- Section 3.4.1.2 *Operational Requirements Influencing Maximum Allowable Exports* – "The E/I ratio, introduced in the 1995 WQCP, limits the CVP and SWP combined pumping to between 35% and 65% of the Delta inflow, varying by month and runoff conditions. This ratio was **assumed to apply only to** south Delta exports; BDCP north Delta intake diversions were **assumed to be exempt** from this rule."[103] [Emphasis added.]

- Section 3.4.1.2 *Operational Requirements Influencing Minimum Required Delta Outflow* – "The D-1641 salinity objectives are assumed to apply to the Existing Conditions, the No Action Alternative, and the BDCP action alternatives." However, this declaration of using current D-1641 salinity objectives is footnoted with tiny print at the bottom disclosing that, ***"An exception to D-1641 objectives is the proposal to change the compliance point from Emmaton to Threemile Slough. For the purposes of modeling, this assumption has been incorporated into the No Action Alternative, as well as each action alternative."*** [Emphasis added.][104]

- Section 3.4.1.2 *Summary Comparison of BDCP Operational Scenarios for Alternatives* – "Each BDCP operational scenario includes many of the No Action rules as well as **several modified or new rules**."[105] [Emphasis added.]

- Section 3.4.1.4.3 *Flow Criteria* – "As part of the BDCP criteria, the location where **D-1641 Emmaton salinity control requirement** is proposed to be complied with is **changed to Threemile Slough** juncture."[106] [Emphasis added.]

As evidenced above, the BDCP modeling methodology assumed so many changes in the so-called existing conditions (most of which were usually disclosed in tiny print of footnotes), that the BDCP has created a jumbled and confusing mess, creating an "existing condition" that can

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[102] See, e.g., *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority* (2013) 57 Cal.4th 439 (EIR may substitute a baseline consisting of environmental conditions projected to exist in the future and omit analysis of a project's impacts on the existing environment only where the lead agency has made adequate findings on the record that an existing conditions analysis would be misleading or without informational value).
[103] North Delta diversions are, at minimum, held to the NDWA Contract requirements for salinity.
[104] See above. The current compliance point is at Emmaton, but BDCP fails to justify the change per *Neighbors*.
[105] See above. Again, BDCP fails to justify the change per *Neighbors*.
[106] Again, BDCP fails to justify rationale for the change of existing salinity compliance point in baseline as required under *Neighbors*.

only be described as a theoretically contrived construct of real conditions. This complicated manipulation of existing conditions has made it impossible for NDWA to assess whether BDCP operations will be able to comply with the 1981 Contract including the provisions on water quality criteria and alteration of surface water levels.
The Agency further questions the assumptions made in the BDCP models regarding the delivery of supplemental Article 21 water to SWP contractors, particularly in terms of how the BDCP assumptions calculate "when excess water is available in the Delta" as it relates to the SWP Article 21 water deliveries assumed in Impact WS-2 for Alt. 4 in the EIR/EIS, p. 5-106.

RECOMMENDATION: To properly compare Alt. 4 CM1 water operations impacts against existing conditions and regulatory criteria currently contained in D-1641 in order to identify impacts that may need to be mitigated in the EIR/EIS, BDCP must conduct new Effects Analysis modeling that:

1) Incorporates the modeling tool provided by NDWA that inserts the 1981 Contract salinity criteria in as a baseline condition;
2) Applies correct existing baseline conditions;
3) Uses ALL of theD-1641 Delta water quality objectives as currently applied by SWRCB, including maintaining salinity compliance at Emmaton; and
4) Shows hydrodynamic and water quality changes without inclusion of BDCP's proposed habitat restoration actions (CM2-22) so that the effects created solely by CM1 Alt. 4 water operations of dual pumping at South and North Delta pumps can be compared to current South Delta pumping effects.

These new modeling results need to be released for public review and comment, along with a revised and recirculated BDCP Plan and EIR/EIS.

RECOMMENDATION: At least one of the BDCP's new model runs must incorporate existing D-1641 baseline conditions as requested above and an assumption that the south Delta diversion E/I ratio (CVP and SWP combined pumping between 35% and 65% of the Delta inflow) would be applied to new north Delta intakes as foreseeable requirements imposed by SWRCB can be evaluated in terms of how will change Alt. 4's impacts to water quality and surface water elevations in the Plan Area.

RECOMMENDATION: To provide more context and comparison of the multi-layered changes to existing conditions that CM1 Alt. 4 water operations assume, the Plan should include a Table that displays the modeling results of existing regulatory requirements (D-1641 w/Emmaton salinity compliance, E/I, X-2, etc) and current BO modeling results, side-by-side next to the Alt. 4 proposed water operations with the modified D-1641 assumptions BDCP proposes.

C. Averaging in Modeling Methodology Can Obscure Significant Fluctuation of Salinity Increases

The Plan's Effects Analysis makes extensive use of averaging. Unfortunately, by its nature, averaging obscures the extreme values that – for some variables and biological and hydrological systems – masks true water quality, water supply, flood risk, and species impacts. For example,

the Effects Analysis analyzes X2 values averaged from December to May, even though that period encompasses a huge seasonal range in natural Delta outflow patterns.

Averaging across these periods tends to conceal larger changes in Delta outflow within and across years that may occur over the BDCP's 50-year implementation. For instance, from a HCP perspective, averaging things like fish entrainment across years obscures the long-term effect of years with high entrainment rates, which could result in further species decline.

The BDCP's use of a 5-month average in the modeling of compliance with X2 requirements could have problematic results, such as a decrease in the temporal variability in salinity that historical conditions and existing Delta standards provide. Improperly treating water quality as a long-term average rather than a daily issue could result in hiding the significant fluctuation of salinity increases that could occur under Alt. 4 water operations as proposed. The water user's ability to divert water of usable quality is decided on a daily basis, sometimes only during certain tidal cycles. Thus, improvements made during periods when water quality is high cannot offset degradation of water quality during periods when the quality is low.

RECOMMENDATION: When conducting new Effects Analysis modeling that incorporates the updated CalSim model and eliminates alterations of existing regulatory Delta requirements, the BDCP modeling team must consult with NDWA and other in-Delta water contractors such as Contra Costa Water District and North Bay Aqueduct regarding the proper averaging to be used as model assumptions.

RECOMMENDATION: The California Water and Environmental Modeling Forum should perform an independent verification of the modeling tools prior to conducting new model runs, to ensure that the best science available is deployed in the best manner possible.

D. Modeling Flaws Mask Nature, Extent, And Severity of Salinity Impacts

While the NDWA understands the need to restore aquatic habitat in the Delta in order to mitigate the jeopardy findings and to provide for the issuance of long-term ESA take permits associated with the water exported from the Delta by the SWP and CVP, BDCP proponents must avoid unintended environmental consequences of habitat restoration actions.

Changes in Delta hydrology can influence water quality across a broad range of constituents. Currently, all of the waterways of the Bay Delta are water-quality impaired for one or more contaminants[107]; therefore, any changes that worsen the existing conditions also exponentially increases the level of significance of each impact under each alternative.

The following salinity impacts identified by the EIR/EIS[108] are of particular concern to NDWA:

- Sea water intrusion as a result of sea level rise or decreased Delta outflow can increase the concentration of salts (i.e. bromides, chlorides, etc.).[109]

[107] United States Environmental Protection Agency, Staff Report: Analysis of Water Quality Issues in EPA's February 2011 ANPR (2011). Available at http://www2.epa.gov/sites/production/files/documents/actionplan-appx1.pdf
[108] EIR/EIS Water Quality Chapter 8
[109] EIR/EIS p. 8-408

- Long-term average annual Delta outflow is anticipated to decrease under Alt. 4 by between 864 (scenario H1) and 5 TAF (scenario H4) relative to the No Action Alternative, attributable only to changes in operations. The result of this will be increased sea water intrusion in the west Delta.[110]

- Overall effects would be greatest at Barker Slough, where substantial increase in long-term average bromide concentrations under all operational scenarios would be predicted, but would be greatest for Scenario H2.[111]

- Impact WQ-11: Salinity level increases in South and Western Delta are labeled as "unavoidable" adverse impacts due to uncertainties surrounding the effectiveness of the mitigation measures to reduce adverse water quality effects.[112]

- Increased inundation frequency in restoration areas would increase exposure to saline and brackish surface water, which could result in increased groundwater salinity beneath. [113]

The EIR/EIS inexplicably uses the year 2060 as the impact assessment date, leaving decision makers, the NDWA, and the public wondering how the Delta's fragile ecosystem and sustainable water supply would fare in the preceding 46 years of BDCP implementation. This arbitrary and capricious selection of 2060 for the EIE/EIS means the environmental analysis of CM1's impacts is based on the inclusion of future, projected climate change effects as well as the assumption that all BDCP habitat restoration will in fact occur – without evidence to support such a conclusion. The lead agency's decision to not use ELT in EIR/EIS conveniently allows BDCP to avoid disclosing the immediate impacts, let alone the scope or intensity that will occur to water users and the ecosystem in the Plan Area when CM1 water deliveries go into full operation.

RECOMMENDATION: Revise the EIR/EIS Impacts Analysis so the conclusions regarding significance of effects is based on near-term modeling results from the Effects Analysis so the impacts associated with the potential operation of CM1 facilities without any habitat restoration can be disclosed and mitigated. Once this new analysis is made available NDWA will be able to offer specific mitigation measures to avoid violations of the 1981 Contract.

IX. <u>WATER SUPPLY AND QUALITY CONCERNS</u>

A. Alteration of Natural Tides Create Elevation and Water Quality Concerns

When export levels are low,[114] the Sacramento River's flow is dominantly tidal with both positive (flow to the north) and negative (flow to the south) oscillations of similar magnitudes with the tides, averaging to a net flow of approximately zero. As exports increase in mid- to late-June, the oscillations shift such that the net flow becomes negative and the number of hours each day when the flow moves to the north is reduced. From mid-July through August, when total exports at South Delta continuously exceed 10,000 cfs, the flow becomes primarily to the south,

[110] EIR/EIS p. 8-408
[111] EIR/EIS p. 8-420
[112] EIR/ EIS p. 8-238 (Bromide impacts unavoidable); 8-246 (chloride impacts unavoidable); 8-255 (electrical conductivity impacts unavoidable)
[113] EIR/EIS, Groundwater, page 7-51
[114] As one example, refer to the data for June 2007.

effectively eliminating the natural ebb tidal flow that would occur otherwise. This creates an unnatural flow pattern in which water no longer oscillates between north and south, but simply flows constantly south in a reverse flow.

The Plan Effects Analysis and EIR/EIS Fish and Aquatic Resources Chapter 11 indicate the combined operation of CM1 and CM2 will also create increased reverse flows at the Delta Cross Channel and Georgiana Slough. These unnatural flows results in diversion of covered fish species into the Central Delta where they would be entrained at the South Delta pumps which will be used 51% of the time under Alt. 4's dual operations.

In addition, the increased tidal marsh area to be created under Alt. 4 will likely produce significant effects on tidal stage (surface elevations) which would impact local water diversions' water availability and quality in the Plan Area. BDCP's own modeling indicates this proposal will cause more than 2,000 acres of existing intertidal habitat within Suisun Marsh to become subtidal and an additional 500 acres will no longer be inundated with the tides.[115] Combined with the additional proposed tidal marsh areas, the subsequent impact on water quality within the Delta is likely to be substantial according to BDCP's modeling results, and will become even worse once the models are properly calibrated to correct current flaws.[116]

RECOMMENDATION: BDCP must conduct new modeling using the recalibrations requested in previous comments to provide a robust analysis of the changes in tidal excursions in the Plan Area and identification of impacts in the EIR/EIS to provide more detail on water quality, surface water elevations (water supply), and covered fish. This analysis should include specific details on the timing, locations, duration, and intensity of the alteration of natural tides in the Plan Area and appropriate mitigations to reduce any adverse impacts on beneficial uses. These new modeling results and impacts to in-Delta water supplies need to be released for public review and comment with a revised and recirculated BDCP Plan and EIR/EIS.

B. Altered Water Elevations Not Analyzed for Impacts to Delta Water Supply or Potential for Specific Damages Under NDWA 1981 Contract

Chapter 5 of the Plan and Appendices (Effects Analysis) and the EIR/EIS Surface Water (Impacts SW-2, SW-4, SW-5, SW-6), Groundwater (Impacts GW-1, GW-2, GW-3, GW-4, GW-5, GW-6, GW-7, GW-8, GW-9) and Agricultural Resources (Impacts AG-2, AG 4) Chapters indicate that the Preferred Alt. 4 will alter both surface and groundwater elevations within NDWA, including reduced surface flows in September within NDWA in about half of all years.[117]

The NDWA is concerned about the water supply availability impacts that alterations in water elevations as described in the Plan and EIR/EIS pose to water users and other beneficial uses in the North Delta:

- More than 2,500 water diversions, including diversions for agricultural uses, in the Plan area.[118]

[115] BDCP EIR/EIS
[116] See Exhibits C and E.
[117] BDCP Chap 5, page 5.3-4.
[118] Plan Chapter 5 Effects Analysis

- Groundwater is used throughout the Delta for agricultural, municipal, and industrial beneficial uses, particularly in the North Delta for irrigation of orchards. In the upland peripheral Delta areas, average annual groundwater pumping is estimated to range between 100,000 and 150,000 acre-feet, both for domestic and agricultural uses.

The NDWA is particularly concerned with potential reductions in water surface water elevations within the North Delta that could constitute a breach of DWR's obligations under Article 6 of the 1981 Contract.[119] Such violations of the 1981 Contract would give rise to damage claims against the State by water diverters within NDWA.[120]

A reduction in surface water elevations would adversely affect water supply availability within NDWA in ways that were neither acknowledged nor analyzed. For example, the impact to agricultural water diverters that utilize gravity siphons and other irrigation systems designed to optimize water diversion and conveyance based on the *current* flow and water level regime have not been analyzed. The gravity siphons and pumps that are used to divert surface water in NDWA simply will not work effectively if water surface elevations are significantly reduced, as contemplated in the Plan. If siphons are rendered inoperable it would become necessary for Delta diverters to install mechanical pumps powered either by electricity (which is often infeasible) or internal combustion engines. If the latter are used, this would cause air quality and other impacts that also are not analyzed in the EIR/EIS.

In addition, the irrigation systems designed based on the use of siphons and gravity diversions would need to be reconfigured. The increased capital and operation and maintenance costs associated with reconfiguring conveyance systems and the conversion to mechanical pumps would be substantial. NEPA requires that the "human" (including economic) impacts associated with increased costs of Delta water diversions be fully analyzed.[121] The EIR/EIS fails to analyze these impacts, because it does not weigh the substantial increased capital and operation and maintenance costs associated with conversion to mechanical pumps.

Due to the Delta's high reliance on groundwater for agricultural and domestic water supplies, the lowering of groundwater elevations would also create significant adverse impacts on those beneficial uses. Loss of groundwater that occurs naturally in the North Delta as a result of lower water pressure would lead to a corresponding loss of sub-irrigation . A reduction in sub-irrigation would, in turn, require increased surface water diversions by agricultural water users. These additional water resource impacts are not analyzed or quantified in the Plan or the EIR/EIS *Water Supply Chapter*, but will certainly mean a reduction in the amount of "water surplus to the Delta" that is assumed to be available for allocation as Article 21 water to SWP water contractors.[122]

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[119] NDWA 1981 Contract, Art. 6 ("The state shall not… cause the water surface elevations in Delta channels to be altered to the detriment of Delta channels or water users within the Agency…).

[120] *Id*. ("….the State shall repair or alleviate the damage… and shall be responsible for all diversion facility modifications required.")

[121] Council On Environmental Quality, Executive Office Of The President, *A Citizen's Guide to the NEPA* ("NEPA requires Federal agencies to consider environmental effects that include, among others, impacts on social, cultural, and economic resources, as well as natural resources.")

[122] Section 3.4 of the BDCP Plan.

Examples of Plan and EIR/EIS descriptions of lowered water elevations and impacts in the Plan Area include:

- A decrease of 6,000 cfs in the Sacramento River could result in as much as a 3-foot reduction in river stage. [123]
- Dewatering activities in vicinity of North Delta intake pump stations and Byron Tract Forebay would lower groundwater levels by up to 10-feet and 20-feet, respectively. [124]
- The sustainable yield of some nearby domestic and municipal wells might temporarily be affected by the lowering of water levels such that existing wells are unable to support current land uses. [125]
- Impacts to well water users may remain significant because sufficient replacement water supplies may not be available meet the existing demands. (*EIR/EIS, Groundwater* Chapter 7.) [126]
- Lowered water levels at pumped diversion locations will increase the cost of pumping to accommodate increased pump lifts.
- Lowered waster surfaces at intakes can alter hydraulic conditions such as approach velocities, volume, and pump efficiency.
- Changes to water elevations also may alter fish habitat, including conversion of farmland to fish habitat – and the resulting need to purchase fish screens or other expensive devices by farmers or irrigation districts.
- Sutter and Steamboat Sloughs flows are lower under the evaluated starting ops because of the Fremont Weir notch which increases the diversions to the Yolo Bypass and because North Delta intakes reduce the Sacramento River flow at these two sloughs. In addition, tidal restoration in the Cache Slough Complex was simulated to shift the tidal elevations and reduce the Sutter/Steamboat diversion fractions.[127]

In addition to water supply availability impacts such as stranded diversion intakes, lowered surface water elevations will also result in adverse impacts to marinas if docks are also left high and dry when Delta channels are lowered. Narrower channels will lead to navigation problems for boats. The Surface Water and Recreation Chapters of the EIR/EIS both fail to disclose the lower water elevations as a problem for boating, marinas, or yachting and hunting clubs.
The Plan Effects Analysis in Chapter 5 of the Plan and EIR/EIS chapters on *Surface Water*, *Groundwater*, and *Agricultural Resources* also describe the potential for <u>increased</u> water surface and groundwater elevations as a result of the Project.
If groundwater or water surface elevations were to increase above historical levels during the growing season, unwanted and involuntary sub-irrigation would increase due to increased hydro-static pressure caused by the increase in seepage. Many crops grown within NDWA, including grapes, alfalfa, kiwis, apples, pears and cherries, are extremely sensitive to increased water within plant root zones. During the growing season, reduced oxygen to the root zone would

[123] Plan Chapter 5 *Effects Analysis* (modeling results for impacts on covered fish)
[124] EIR/EIS, *Agricultural Resources* Chapter 14.
[125] EIR/EIS, *Groundwater* Chapter 7.
[126] EIR/EIS, Groundwater Chapter 7. This is otherwise known as the "Sorry Charlie" mitigation.
[127] Plan *Effects Analysis* Chapter 5

reduce crop yield and, potentially, result in the loss of trees and vines. This will be damaging to crops and to Delta agriculture in general. To the extent increases in water elevations could be mitigated through increased drainage pumping operations of the reclamation districts, the cost of such operations would be substantial. The Plan and EIR/EIS fails to discuss, analyze, or propose mitigation of these impacts.

Finally, the Agency contends that the EIR/EIS *Water Supply Chapter 5* fails to meet the following environmental analysis requirements of CEQA/NEPA:

- NEPA requires that an EIS be prepared when the proposed Federal action as a whole has the potential to "significantly affect the quality of the human environment." The NEPA determination of significance is based on context and intensity. The environmental consequences section of an EIS must discuss direct and indirect impacts of the proposed project.[128] The EIR/EIS does not include substantive discussion of the altered groundwater and surface water elevations, and omits mention of the economic and physical impacts to farmland. Increases or decreases in groundwater would affect "sub-irrigation," harming crops. Additionally, farmers would be forced to invest in expensive new technologies that may have impacts on air quality and the environment. These and other direct and indirect impacts are not discussed, in violation of NEPA.
- Under NEPA, cumulative impacts resulting from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions that can result from individually minor but collectively significant actions taking place over a period of time.[129] The EIR/EIS fails to capture many of these cumulative impacts. For example, changes to surface water elevations will affect the gravity siphons and other irrigation systems currently used by farmers. As a direct result, the farmers will have to invest in expensive new technology to sustain agricultural activities, and that may cause air quality impacts. The collective result of these replacements could be poorer air quality throughout the basin – or could even be the loss of farmland, if the expensive technologies force families to abandon their land.

RECOMMENDATION: Using the updated CalSim model, the BDCP *mu*st conduct new Effects Analysis modeling with a robust emphasis on analyz*ing the water supply impacts* on NDWA water users and channels *caused by altered surface* elevations (higher and lower). Further, the EIR/EIS should identify, disclose and mitigate in the EIR/EIS *Water Supply Chapter* contractual issues, including the potential for increased salinity intrusion, erosion and seepage damage, reversed or otherwise unnatural flows, stranding, and other Plan Area diversion intake effects. Impacts analysis and disclosure in the EIR/EIS needs to provide details on specific locations, durations, timing, size, and intensity in order to comply with NEPA requirements. (40 CFR § 1508.27(a)) [130]

C. Water Quality Mitigations Provided in the EIR/EIS Are Inadequate, Lacking Detail, Certainty

Public agencies must not approve a project as proposed if there are feasible alternatives **or** mitigation measures available that would substantially lessen the significant environmental

[128] 40 CFR §1502.16(a)-(b)
[129] 40 CFR 1508.7
[130] Specifically, 40 CFR § 1508.27(a), requiring analysis of the context and intensity of the impacts.

effects of the project.[131] Unfortunately, all chapters of the EIR/EIS we reviewed contained mitigation measures that were too vague, deferred until studies are conducted in the future, or lack certainty due to discretionary decisions by "BDCP Proponents" at some point in the future. Mitigations limited by such circumstances do not provide stable enough description of actions to be implemented for us to determine if they are in fact adequate to reduce the environmental and human effects of the project's numerous adverse effects.

As mentioned, many mitigation measures would be deferred until more studies are done or require third parties to implement – leaving the reviewer wondering whether remedies will ever be implemented at all. Throughout the EIR/EIS, the lead agency fails to provide any explanation to supply the logical step between the ultimate conclusion regarding level of impacts and the facts in the record.[132]

In many instances, the EIR/EIS also fails to disclose who will be responsible for implementing, monitoring, and enforcing mitigation measures that are adopted. In instances where the EIR/EIS does mention a program for reporting and monitoring the mitigations, details regarding the specific permit conditions, agreements, or other measures that will make it fully enforceable are not provided.

Although these mitigation deficiencies are widespread and found in all EIR/EIS chapter we reviewed, we have limited the following specific examples of the problem to wording found in WQ-5 from the *Water Quality Chapter* in order to illustrate uncertainty regarding mitigation measure to reduce salinity impacts:

- Because the ***effectiveness*** of Mitigation Measure WQ-5 to result in feasible measures for reducing water quality effects is ***uncertain***, this impact is considered to remain significant and unavoidable.
- The EIR/EIS states that changes in bromides would be offset. However, it ***remains to be determined whether,*** how, and ***to what degree*** available and existing salinity response and ***countermeasure actions*** of SWP and CVP facilities or municipal water purveyors would be ***capable of offsetting the actual level of changes*** in bromides that may occur from implementation of Alt. 4.
- In order to determine the feasibility of reducing the effects of increased bromide levels, and potential adverse effects on beneficial uses associated with CM1 operations (and hydrodynamic effects of tidal restoration under CM4), the proposed mitigation requires a series of phased actions to identify and ***evaluate existing and possible feasible actions***, followed by development and implementation of the actions, ***if determined to be necessary***.
- ***Following commencement of initial operations of CM1***, the BDCP proponents will ***conduct additional evaluations*** described herein, and ***develop additional modeling*** (as necessary), ***to define the extent*** to which modified operations could reduce or eliminate the increased bromide concentrations currently modeled to occur under Alt. 4.

[131] PRC § 21002

[132] CEQA Guidelines Sec. 15384 ("Argument, speculation, unsubstantiated opinion or narrative, evidence which is clearly erroneous or inaccurate, or evidence of social or economic impacts which do not contribute to or are not caused by physical impacts on the environment does not constitute substantial evidence.")

- ***If sufficient operational flexibility*** to offset bromide increases is ***not practicable/feasible*** under Alt. 4 operations, achieving bromide reduction pursuant to this mitigation measure ***would not be feasible under this alternative***.

RECOMMENDATION: To mitigate the significant water quality impacts of CM1, construction of the three new North Delta intakes must be phased, one at a time, to permit meaningful monitoring[133] of the impacts to water quality in the Plan Area and the pumping effects on local water supplies and other beneficial uses. To ensure that actual "adaptive management" takes place, require HCP/NCCP permitting agencies to evaluate the final monitoring report and determine whether additional intakes and Alt. 4 water operations would create jeopardy for covered species before allowing construction of the next intake.

D. Water Supply Chapter Silent on Impacts to Delta Water Users

Inexplicably, the EIR/EIS *Chapter 5 Water Supply* contains no discussion, disclosure, or mitigation of adverse impacts to water supplies in the Plan Area (Delta) caused under any of the BDCP alternatives. The chapter's section on regional water use (Section 5.1.2.6) mentions the role of entities such as NDWA which does not even divert or supply water as is implied, but then fails to actually describe how, where, by what method, or for what purpose water is used in the Plan Area. The absence of describing the context in which local water supplies are accessed and used, results in the EIR/EIS *Water Supply Chapter 5* failing to properly disclose the level of significant impacts imposed on agricultural and municipal water users in the Plan Area.

The EIR/EIS *Water Supply Chapter* should describe the impacts to groundwater used by homes and businesses, surface water diversion and groundwater sub-irrigation used by agriculture, and surface water diversions and treatment plants used by municipal/drinking water. Impacts to all three of these categories are described in the EIR/EIS *Groundwater, Agricultural Resources,* and *Water Quality Chapters,* but those adverse impacts are not then transferred over to disclose those natural and human resource impacts on the Plan Area's water supply.

The absence of any adverse impacts from the *Water Supply Chapter* of the EIR/EIS for in-Delta water users is a glaring omission, in light of the significant effects identified in the following Chapters of the EIR/EIS – all of which identify water elevation and water quality effects that will result in adverse impacts on agricultural and domestic water supply uses:

Groundwater	*Agricultural Resources*	*Water Quality*	Surface Water
GW-1	AG-2	WQ-5	SW-2
GW-2	AG-4	WQ-7	SW-4
GW-3		WQ-11	SW-5
GW-4		WQ-14	SW-6
GW-5		WQ-18	
GW-6		WQ-22	
GW-7			
GW-8			
GW-9			

[133] Monitoring of less than two years would not be meaningful, as it would not adequately capture the effects on water quality, water supply, land, and fish.

Impacts from separate chapters can result in adverse impacts that may need to be disclosed and mitigated in another resource chapter of the EIR/EIS is. As one example, the multiple "Significant and Unavoidable" adverse water quality impacts listed in the *Water Quality Chapter* were cumulatively combined to create an unavoidable adverse impact in the *Public Health Chapter 25*, (Impact PH: 2). Unfortunately, the same is not done for cumulative impacts to water supply in the Plan Area.

If the water quality in the Delta is so degraded by seven different constituents to constitute a public health risk, then how is it possible for there to be **no impact** to in-Delta domestic and agricultural water supply from degraded water quality? Or **no impact** to in-Delta domestic and agricultural water supply from the altered surface and groundwater elevations?[134]

For instance, lowering groundwater from CM1 dewatering will impact domestic and agricultural wells and lowering surface water elevations from combined CM1 and CM2 operations may strand or reduce function of existing river diversions. In addition, multiple descriptions contained in the Plan and EIR/EIS reveal that agricultural, municipal, and industrial water uses will be degraded to such an extent to be unusable (or require installation of expensive treatment facilities) in certain locations and times of the year. There are no cost-effective salinity treatment facilities, so those adverse impacts will likely require BDCP operational changes to increase flows to repel salinity intrusion.

Following are a few examples of adverse impacts described in other chapters of the EIR/EIS that were not disclosed as impacts in the *Water Supply Chapter*:

- **WQ-5:** Barker Slough, North Bay Aqueduct facility (provides drinking water to Napa and Solano Counties) will experience substantial degradation due to bromide concentrations increasing by as much as 40 to 98 percent during modeled drought period; the frequency would increase between 20 to 47 percent under Alt. 4. Water treatment plant upgrades would be necessary to meet drinking water health standards.[135]
- **WQ-7:** The EIR/EIS identifies[136] a reduced opportunity for diversion of water for municipal and industrial uses due to increased chloride concentrations would lead to water quality degradation and frequency of exceedance of objectives at Contra Costa Pumping Plant #1 and Antioch as well as increases in chloride concentrations in other areas including North Bay Aqueduct, SF Mokelumne River at Staten Island , Sacramento River at Emmaton, with additional, possibly measurable, increases at San Joaquin River at Buckley Cove and Sacramento River at Mallard Island.
- **WQ-11:** Alt 4, all scenarios, would increase the number of days the SWRCB's salinity objectives would be exceeded in the SJR and OMR, and increases in average EC (salinity) at two interior Delta locations.[137] Salinity levels increased in South and Western Delta represent an "unavoidable" adverse impact due to uncertainty of the effectiveness of the mitigation measures to reduce adverse water quality effects.

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[134] Refer to the Effects Analysis and Groundwater and Surface Water Chapters.
[135] EIR/EIS *Water Quality* Chapter 8 - SIGNFICANT AND UNAVOIDABLE ADVERSE IMPACT
[136] *Id.*
[137] *Id.*

- Increased tidal mixing associated with the new tidal marsh restoration may allow more salt to intrude into the western Delta.[138]
- Habitat restoration activities associated with CM4, CM5, CM6, and CM7 may contribute to reduced water quality.[139]
- Exposure to saline and brackish surface water, potentially resulting in increased groundwater salinity beneath such areas. [140]

The reduced water quality conditions created by BDCP operations is a "taking" of water rights due to the water supplies in the Plan Area essentially being degraded to the point of significant impairment of existing beneficial uses, requiring compensation under the law and under the 1981 Contract. The EIR/EIS must acknowledge and mitigate these adverse impacts in the Water Supply Chapter and consider whether the damage to water users is a violation of California's "No Injury Rule," statutes governing "Priority of Water Rights," or standards in CEQA and NEPA governing disclosure, weighting of impacts, and cumulative effects on environmental and human resources.

Disclosure and mitigation of the numerous significant impacts to local water users and beneficial uses in the EIR/EIS *Water Supply Chapter* would likely trigger recirculation of the Plan and EIR/EIS for public review and comment.[141] As the CEQA guidelines state, "A decision not to recirculate an EIR must be supported by substantial evidence in the administrative record."[142]

Reliable water supply should be assured for ALL regions, including in the Plan Area (Delta), not just for CVP and SWP Service Areas. To do otherwise is not coequal. These omissions may inadvertently cause water users within the Agency to question the sincerity of DWR to honor its water quality and supply obligations in the NDWA 1981 Contract.

RECOMMENDATION: The EIR/EIS must be revised to add a more robust description of water supply access and use in the Plan Area and insert new impacts disclosures and mitigation measures into the *Water Supply Chapter*. The new NEPA/CEQA Impact Conclusions should be based on a rigorous analysis of the adverse impacts to water elevations (surface and groundwater) and water quality described in the Plan Effects Analysis and consider the cumulative impacts to water supplies in the Plan Area described in the EIR/EIS chapters on *Groundwater, Surface Water, Agricultural Resources*, and *Water Quality*. Impacts analysis and disclosure in the EIR/EIS needs to provide details on the specific locations, durations, timing, size, and intensity in order to comply with NEPA. Revised EIR/EIS may require recirculation for public review and comment.

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[138] Plan Chapter 5 *Effects Analysis* and EIR/EIS Chapter 6
[139] Plan *Effects Analysis* Chapter 5
[140] EIR/EIS *Groundwater* Chapter 7
[141] Guidelines Section 15088.5(a), providing that recirculation must occur where the "EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project's proponents have declined to implement."
[142] *Id*. at (e).

E. The Project Description Fails to Acknowledge Habitat Impacts on Water Supply, Water Quality and Access to Water Particularly the Change of Diversion Permit Requirements for CM2

Water Codes § 1707 requires all water users to petition the SWRCB for a change of use for purposes of preserving or enhancing wetlands habitat, fish and wildlife resources, or recreation in, or on, the water, specifying the time, location, and scope of the requested change. In response, the SWRCB may approve the petition subject to terms and conditions once the Board has determined that the proposed action:

1. Will not increase the amount of water the person is entitled to use;
2. Will not unreasonably affect any legal user of water; and
3. Otherwise meets water code requirements.

The restoration of floodplain, tidal wetlands, and other habitat restoration action proposed in BDCP (CM2-10) will require extensive amounts of water, particularly implementation of CM2 to inundate the Yolo Bypass more frequently and for longer duration. However, the Plan fails to identify the volume of water to be utilized by these new habitat areas or whose water rights will be used to provide that diversion. In addition, the EIR/EIS Water Supply Chapter fails to disclose the impacts to the water supplies of the entities such as SWP/CVP that would presumably be supplying the water from storage.

According to the Plan Effects Analysis, CM2 will result in the diversion of approximately 650,000af of Sacramento River water into the Yolo Bypass between November and mid-May through an operable gate with a total capacity of 6,000 cfs in order to benefit fish. Due to the new diversion point on the Sacramento River and the considerable aggregate amount of water to be diverted from the river, the CM2 Project Description must be amended to clarify the operable gate to be installed and managed in accordance with the BDCP's *Annual Delta Water Operations Plan*, Sec. 6.3.2, will require DWR and USBR to petition the SWRCB to change points of diversion, places of use, and purposes of use of water for the SWP/CVP projects. Other habitat restoration projects in CMs3-22 may also require a petition for change of use be filed.

The Petition for Long-Term Change in Place of Use and Change in Purpose of Use process will allow the SWRCB to determine whether such changes should be conditioned to protect the environment or other legal users of water in order to avoid interference with prior water rights, such as those memorialized in NDWA's 1981 Contract with DWR. The SWRCB's process will also weigh public trust issues, such as how navigable waters would be changed and impacted by this new diversion to be evaluated.

Because CM2 is only analyzed at Programmatic level, the Plan permits and Implementing Agreement should include clear conditions: 1) the intent to pursue a full Project-level EIR/EIS evaluation of CM2 with explicit prohibition to tiering off the BDCP EIR/EIS with a Negative Declaration; and 2) DWR and USBR will file change of use permits with the SWRCB for the Fremont Weir modifications proposed in CM2 so the Board can evaluate the cumulative impacts of the 6,000 cfs Fremont Weir diversion, new North Delta intakes 9,000 cfs diversions, with the continued south Delta intake diversions to assure the proposed changes will not result in injury to other legal water users in the system.

RECOMMENDATION: The cumulative effects in the CMs and EIR/EIS *Water Supply* Chapters should identify how much water (and whose water) will be used for construction, operation, and ongoing management of habitat restoration projects and actions in CMs2-11.

X. Conclusion

Under the 1981 Contract, the North Delta Water Agency expressly consented to the export of water, so long as the State remains in compliance with the Contract. As currently configured, the BDCP would appear based on our analysis to adversely affect water quality, water supply, salinity control, water elevation, and seepage in the North Delta. However, because the project description is not well defined, there are enormous gaps in the environmental analysis that prevent the NDWA from assessing the full nature, scope, or severity of these impacts.

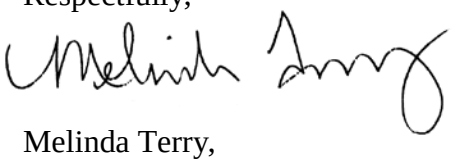
What is obvious are the several aspects of the BDCP's design, construction, operation, maintenance, funding, and governance does not meet the requirements of the state and federal Endangered Species Acts governing conservation plans or environmental review standards and the Plan as currently proposed would violate numerous other Delta protection statutes and contracts that protect water quality and water rights in the Plan Area.

The Agency has attempted in these comments to identify these potential sources of breach of its 1981 Contract, provided financial impact information and governance suggestions, and pointed out potential mitigation opportunities wherever possible. But errors and gaps in the modeling and technical analysis of water quality and supply in the EIR/EIS – including manipulation of baseline conditions and inexplicably using 2060 as the impact assessment date –prevent the Agency from providing project-level comments and mitigation measures.

NDWA has actively participated in the development of the BDCP, including serving on the Steering Committee, as a Cooperating Agency, and participation on the Governance and Finance Committees. At its own expense, the Agency has also provided a modeling tool and independent review and Modeling Report that both should be applied to improve the Plan's hydrological modeling.

The attached documents, including the many consultants' reports and the Reference Library, show NDWA's ongoing commitment to meaningful participation in the BDCP EIR/EIS process. But because of the substantial level of legal defects with the Plan and EIR/EIS as currently presented, DWR must revise and recirculate these documents for public review and comment.

Respectfully,



Melinda Terry,
Manager
North Delta Water Agency

BDCP1674.

EXHIBIT A:

1981 Contract and Related Agreements

North Delta Water Agency

CONTRACT
BETWEEN
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
AND
NORTH DELTA WATER AGENCY

FOR THE ASSURANCE
OF A DEPENDABLE WATER SUPPLY OF SUITABLE QUALITY

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CONTRACT BETWEEN THE STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES AND THE NORTH DELTA WATER AGENCY FOR THE ASSURANCE OF A DEPENDABLE WATER SUPPLY OF SUITABLE QUALITY

THIS CONTRACT, made this 28 day of Jan., 1981, between the STATE OF CALIFORNIA, acting by and through its DEPARTMENT OF WATER RESOURCES (State), and the NORTH DELTA WATER AGENCY (Agency), a political subdivision of the State of California, duly organized and existing pursuant to the laws thereof, with its principal place of business in Sacramento, California.

RECITALS

(a) The purpose of this contract is to assure that the State will maintain within the Agency a dependable water supply of adequate quantity and quality for agricultural uses and, consistent with the water quality standards of Attachment A, for municipal and industrial uses, that the State will recognize the right to the use of water for agricultural, municipal, and industrial uses within the Agency, and that the Agency will pay compensation for any reimbursable benefits allocated to water users within the Agency resulting from the Federal Central Valley Project and the State Water Project, and offset by any detriments caused thereby.

(b) The United States, acting through its Department of the Interior, has under construction and is operating the Federal Central Valley Project (FCVP).

(c) The State has under construction and is operating the State Water Project (SWP).

(d) The construction and operation of the FCVP and SWP at times have changed and will further change the regimen of rivers tributary to the Sacramento-San Joaquin Delta (Delta) and the regimen of the Delta channels from unregulated flow to regulated flow. This regulation at times improves the quality of water in the Delta and at times diminishes the quality from that which would exist in the absence of the FCVP and SWP. The regulation at times also alters the elevation of water in some Delta channels.

(e) Water problems within the Delta are unique within the State of California. As a result of the geographical location of the lands of the Delta and tidal influences, there is no physical shortage of water. Intrusion of saline ocean water and municipal, industrial and agricultural discharges and return flows, tend, however, to deteriorate the quality.

(f) The general welfare, as well as the rights and requirements of the water users in the Delta, require that there be maintained in the Delta an adequate supply of good quality water for agricultural, municipal and industrial uses.

(g) The law of the State of California requires protection of the areas within which water originates and the watersheds in which water is developed. The Delta is such an area and within such a watershed. Part 4.5 of Division 6 of the California Water Code affords a first priority to provision of salinity control and maintenance of an adequate water supply in the Delta for reasonable and beneficial uses of water and relegates to lesser priority all exports of water from the Delta to other areas for any purpose.

(h) The Agency asserts that water users within the Agency have the right to divert, are diverting, and will continue to divert, for reasonable beneficial use, water from the Delta that would have been available therein if the FCVP and SWP were not in existence, together with the right to enjoy or acquire such benefits to which the water users may be entitled as a result of the FCVP and SWP.

(i) Section 4.4 of the North Delta Water Agency Act, Chapter 283, Statutes of 1973, as amended, provides that the Agency has no authority or power to affect, bind, prejudice, impair, restrict, or limit vested water rights within the Agency.

(j) The State asserts that it has the right to divert, is diverting, and will continue to divert water from the Delta in connection with the operation of the SWP.

(k) Operation of SWP to provide the water quality and quantity described in this contract constitutes a reasonable and beneficial use of water.

(l) The Delta has an existing gradient or relationship in quality between the westerly portion most seriously affected by ocean salinity intrusion and the interior portions of the Delta where the effect of ocean salinity intrusion is diminished. The water quality criteria set forth in this contract establishes minimum water qualities at various monitoring locations. Although the water quality criteria at upstream locations is shown as equal in some periods of some years to the water quality at the downstream locations, a better quality will in fact exist at the upstream locations at almost all times. Similarly, a better water quality than that shown for any given monitoring location will also exist at interior points upstream from that location at almost all times.

(m) It is not the intention of the State to acquire by purchase or by proceeding in eminent domain or by any other manner the water rights of water users within the Agency, including rights acquired under this contract.

(n) The parties desire that the United States become an additional party to this contract.

AGREEMENTS

1. **Definitions.** When used herein, the term:

(a) "Agency" shall mean the North Delta Water Agency and shall include all of the lands within the boundaries at the time the contract is executed as described in Section 9.1 of the North Delta Water Agency Act, Chapter 283, Statutes of 1973, as amended.

(b) "Calendar year" shall mean the period January 1 through December 31.

(c) "Delta" shall mean the Sacramento-San Joaquin Delta as defined in Section 12220 of the California Water Code as of the date of the execution of the contract.

(d) "Electrical Conductivity" (EC) shall mean the electrical conductivity of a water sample measured in millimhos per centimeter per square centimeter corrected to a standard temperature of 25° Celsius determined in accordance with procedures set forth in the publication entitled "Standard Methods of Examination of Water and Waste Water", published jointly by the American Public Health Association, the American Water Works Association, and the Water Pollution Control Federation, 13th Edition, 1971, including such revisions thereof as may be made subsequent to the date of this contract which are approved in writing by the State and the Agency.

(e) "Federal Central Valley Project" (FCVP) shall mean the Central Valley Project of the United States.

(f) "Four-River Basin Index" shall mean the most current forecast of Sacramento Valley unimpaired runoff as presently published in the California Department of Water Resources Bulletin 120 for the sum of the flows of the following: Sacramento River above Bend Bridge near Red Bluff; Feather River, total inflow to Oroville Reservoir; Yuba River at Smartville; American River, total inflow to Folsom Reservoir. The May 1 forecast shall continue in effect until the February 1 forecast of the next succeeding year.

(g) "State Water Project" (SWP) shall mean the State Water Resources Development System as defined in Section 12931 of the Water Code of the State of California.

(h) "SWRCB" shall mean the State Water Resources Control Board.

(i) "Water year" shall mean the period October 1 of any year

through September 30 of the following year.

2. **Water Quality.**

(a) (i) The State will operate the SWP to provide water qualities at least equal to the better of: (1) the standards adopted by the SWRCB as they may be established from time to time; or (2) the criteria established in this contract as identified on the graphs included as Attachment A.

(ii) The 14-day running average of the mean daily EC at the identified location shall not exceed the values determined from the Attachment A graphs using the Four-River Basin Index except for the period February through March of each year at the location in the Sacramento River at Emmaton for which the lower value of the 80 percent probability range shall be used.

(iii) The quality criteria described herein shall be met at all times except for a transition period beginning one week before and extending one week after the date of change in periods as shown on the graphs of Attachment A. During this transition period, the SWP will be operated to provide as uniform a transition as possible over the two-week period from one set of criteria to the next so as to arrive at the new criteria one week after the date of change in period as shown on the graphs of Attachment A.

(b) While not committed affirmatively to achieving a better water quality at interior points upstream from Emmaton than those set forth on Attachment A, the State agrees not to alter the Delta hydraulics in such manner as to cause a measurable adverse change in the ocean salinity gradient or relationship among the various monitoring locations shown on Attachment B and interior points upstream from those locations, with any particular flow past Emmaton.

(c) Whenever the recorded 14-day running average of mean daily EC of water in the Sacramento River at Sacramento exceeds 0.25 mmhos, the quality criteria indicated on the graphs of Attachment A may be adjusted by adding to the value taken therefrom the product of 1.5 times the amount that the recorded EC of the Sacramento River at Sacramento exceeds 0.25 mmhos.

3. **Monitoring.** The quality of water shall be measured by the State as needed to monitor performance pursuant to Article 2 hereof with equipment installed, operated, and maintained by the State, at locations indicated on "Attachment B". Records of such measurements shall at regular intervals be furnished to the Agency. All monitoring costs at North Fork Mokelumne River near Walnut Grove, Sacramento River at Walnut Grove, and Steamboat Slough at Sutter Slough incurred by the State solely for this contract shall be shared equally by the Agency and the State. All monitoring costs to be borne by the Agency for monitoring at the above locations are included in the payment under Article 10.

4. **Emergency Provisions.**

(a) If a structural emergency occurs such as a levee failure or a failure of an SWP facility, which results in the State's failure to meet the water quality criteria, the State shall not be in breach of this contract if it makes all reasonable efforts to operate SWP facilities so that the water quality criteria will be met again as soon as possible. For any period in which SWP failure results in failure of the State to meet the water quality criteria, the State shall waive payment under Article 10, prorated for that period, and the amount shall be deducted from the next payment due.

(b) (i) A drought emergency shall exist when all of the following occur:

(1) The Four-River Basin Index is less than an average of 9,000,000 acre feet in two consecutive years (which occurred in 1933-4 and 1976-7); and

(2) An SWRCB emergency regulation is in effect providing for the operation of the SWP to maintain water quality different from that provided in this contract; and

(3) The water supplied to meet annual entitlements of SWP agricultural contractors in the San Joaquin Valley is being reduced by at least 50 percent of these agricultural entitlements (it being the objective of the SWP to avoid agricultural deficiencies in excess of 25 percent) or the total of water supplied to meet annual entitlements of all SWP contractors is being reduced by at least 15 percent of all entitlements, whichever results in the greater reduction in acre feet delivered.

(ii) A drought emergency shall terminate if any of the conditions in (b) (i) of this Article ceases to exist or if the flow past Sacramento after October 1 exceeds 20,000 cubic feet per second each day for a period of 30 days.

(iii) Notwithstanding the provisions of Article 2 (a), when a drought emergency exists, the emergency water quality criteria of the SWRCB shall supersede the water quality requirements of this contract to the extent of any inconsistency; provided, however, that the State shall use all reasonable efforts to preserve Delta water quality, taking into consideration both the limited water supply available for that purpose and recognizing the priority established for Delta protection referred to in Recital (g).

(iv) When a drought emergency exists, and an overland supply is not available to an individual water user comparable in quality and quantity to the water which would have been available to the user under Attachment A, the State shall compensate the user for loss of net income for each acre either (A) planted to a more salt-tolerant crop in the current year, (B) not planted to any crop in the current year provided such determination not to plant was reasonable based on the drought emergency, or (C) which had a reduced yield due to the drought emergency, calculated on the basis of the user's average net income for any three of the prior five years for each such acre. A special contract claims procedure shall be estalished by the State to expedite and facilitate the payment of such compensation.

5. **Overland Water Supply Facilities.**

(a) Within the general objectives of protecting the western Delta areas against the destruction of agricultural productivity as a result of the increased salinity of waters in the Delta channels resulting in part from SWP operation, the State may provide diversion and overland facilities to supply and distribute water to Sherman Island as described in the report entitled "Overland Agricultural Water Facilities Sherman Island" dated January 1980. Final design and operating specifications shall be subject to approval of the Agency and Reclamation District No. 341. The Agency or its transferee will assume full ownership, operation, and maintenance responsibility for such facilities after successful operation as specified. After the facilities are constructed and operating, the water qualitry criteria for the Sacramento River at Emmaton shall apply at the intake of the facilities in Three Mile Slough.

(b) The State and the Agency may agree to the construction and operation of additional overland water supply facilities within the Agency, so long as each landowner served by the overland facilities receives a quality of water not less than that specified in Attachment A for the upstream location nearest to his original point of diversion. The design and operation of such facilities and the cost sharing thereof are subject to approval of any reclamation district which includes within its boundaries the area to be served. The ownership, operation, and maintenance of diversion works and overland facilities shall be the subject of a separate agreement between the Agency or its transferees and the State.

6. **Flow Impact.** The State shall not convey SWP water so as to cause a decrease or increase in the natural flow, or reversal of the natural flow direction, or to cause the water surface elevation in Delta channels to be altered, to the detriment of Delta channels or water users within the Agency. If lands, levees, embankments, or revetments adjacent to Delta channels within the Agency incur seepage or erosion damage or if diversion facilities must be modi-

fied as a result of altered water surface elevations as a result of the conveyance of water from the SWP to lands outside the Agency after the date of this contract, the State shall repair or alleviate the damage, shall improve the channels as necessary, and shall be responsible for all diversion facility modifications required.

7. **Place of Use of Water.**

(a) Any subcontract entered into pursuant to Article 18 shall provide that water diverted under this contract for use within the Agency shall not be used or otherwise disposed of outside the boundaries of the Agency by the subcontractor.

(b) Any subcontract shall provide that all return flow water from water diverted within the Agency under this contract shall be returned to the Delta channels. Subject to the provisions of this contract concerning the quality and quantity of water to be made available to water users within the Agency, and to any reuse or recapture by water users within the Agency, the subcontractor relinquishes any right to such return flow, and as to any portion thereof which may be attributable to the SWP, the subcontractor recognizes that the State has not abandoned such water.

(c) If water is attempted to be used or otherwise disposed of outside the boundaries of the Agency so that the State's rights to return flow are interfered with, the State may seek appropriate administrative or judicial action against such use or disposal.

(d) This article shall not relieve any water user of the responsibility to meet discharge regulations legally imposed.

8. **Scope of Contract.**

(a) During the term of this contract:

(i) This contract shall constitute the full and sole agreement between the State and the Agency as to (1) the quality of water which shall be in the Delta channels, and (2) the payment for the assurance given that water of such quality shall be in the Delta channels for reasonable and beneficial uses on lands within the Agency, and said diversions and uses shall not be disturbed or challenged by the State so long as this contract is in full force and effect.

(ii) The State recognizes the right of the water users of the Agency to divert from the Delta channels for reasonable and beneficial uses for agricultural, municipal and industrial purposes on lands within the Agency, and said diversions and uses shall not be disturbed or challenged by the State so long as this contract is in full force and effect, and the State shall furnish such water as may be required within the Agency to the extent not otherwise available under the water rights of water users.

(iii) The Agency shall not claim any right against the State in conflict with the provisions hereof so long as this contract remains in full force and effect.

(b) Nothing herein contained is intended to or does limit rights of the Agency against others than the State, or the State against any person other than the Agency and water users within the Agency.

(c) This contract shall not affect, bind, prejudice, impair, restrict, or limit vested water rights within the Agency.

(d) The Agency agrees to defend affirmatively as reasonable and beneficial the water qualities established in this contract. The State agrees to defend affirmatively as reasonable and beneficial the use of water required to provide and sustain the qualities established in this contract. The State agrees that such use should be examined only after determination by a court of competent jurisdiction that all uses of water exported from the Delta by the State and by the United States, for agricultural, municipal, and industrial purposes are reasonable and beneficial, and that irrigation practices, conservation efforts, and groundwater management within areas served by such exported water should be examined in particular.

(e) The Agency consents to the State's export of water from the Delta so long as this contract remains in full force and effect and the State is in compliance herewith.

9. **Term of Contract.**

(a) This contract shall continue in full force and effect until such time as it may be terminated by the written consent and agreement of the parties hereto, provided that 40 years after execution of this contract and every 40 years thereafter, there shall be a six-month period of adjustment during which any party to this contract can negotiate with the other parties to revise the contract as to the provisions set out in Article 10. If, during this period, agreement as to a requested revision cannot be achieved, the parties shall petition a court of competent jurisdiction to resolve the issue as to the appropriate payment to be made under Article 10. In revising Article 10, the court shall review water quality and supply conditions within the Agency under operation of the FCVP and SWP, and identify any reimbursable benefits allocated to water users within the Agency resulting from operation of the FCVP and SWP, offset by any detriments caused thereby. Until such time as any revision is final, including appeal from any ruling of the court, the contract shall remain in effect as without such revision.

(b) In the event this contract terminates, the parties' water rights to quality and quantity shall exist as if this contract had not been entered into.

10. **Amount and Method of Payment for Water.**

(a) The Agency shall pay each year as consideration for the assurance that an adequate water supply and the specific water quality set forth in this contract will be maintained and monitored, the sum of one hundred seventy thousand dollars ($170,000.00). The annual payments shall be made to the State one-half on or before January 1 and one-half on or before July 1 of each year commencing with January 1, 1982.

(b) The payment established in (a) above shall be subject to adjustment as of January 1, 1987, and every fifth year thereafter. The adjusted payment shall bear the same relation to the payment specified in (a) above that the mean of the State's latest projected Delta Water Rate for the five years beginning with the year of adjustment bears to $10.00 per acre foot; provided that, no adjusted payment shall exceed the previous payment by more than 25 percent.

(c) The payments provided for in this article shall be deposited by the State in trust in the California Water Resources Development System Revenue Account in the California Water Resources Development Bond Fund. The trust shall continue for five years (or such longer period as the State may determine) but shall be terminated when the United States executes a contract as provided in Article 11 with the State and the Agency at which time the proportion of the trust fund that reflects the degree to which the operation of the FCVP has contributed to meeting the water quality standard under this contract as determined solely by the State shall be paid to the United States (with a pro rata share of interest). In the event that the United States has not entered into such a contract before the termination of the trust, the trust fund shall become the sole property of the State.

11. **Participation of the United States.** The Agency will exercice its best efforts to secure United States joinder and concurrence with the terms of this contract and the State will diligently attempt to obtain the joinder and concurrence of the United States with the terms of this contract and its participation as a party hereto. Such concurrence and participation by the United States in this contract shall include a recognition ratified by the Congress that the excess land provisions of Federal reclamation law shall not apply to this contract.

12. **Remedies.**

(a) The Agency shall be entitled to obtain specific perfor-

mance of the provisions of this contract by a decree of the Superior Court in Sacramento County requiring the State to meet the standards set forth in this contract. If the water quality in Delta channels falls below that provided in this contract, then, at the request of the Agency, the State shall cease all diversions to storage in SWP reservoirs or release stored water from SWP reservoirs or cease all export by the SWP from Delta channels, or any combination of these, to the extent that such action will further State compliance with the water quality standards set forth in this contract, except that the State may continue to export from Delta channels to the extent required to meet water quality requirements in contracts with the Delta agencies specified in Section 11456 of the California Water code.

(b) To the extent permitted by law, the State agrees to forego the use of eminent domain proceedings to acquire water rights of water users within the Agency or any rights acquired under this contract for water or water quality maintenance for the purpose of exporting such water from the Delta. This provision shall not be construed to prohibit the utilization of eminent domain proceedings for the purpose of acquiring land or any other rights necessary for the construction of water facilities.

(c) Except as provided in the water quality assurances in Article 2 and the provisions of Article 6 and Article 8, neither the State nor its officers, agents, or employees shall be liable for or on account of:

(i) The control, carriage, handling, use, disposal, or distribution of any water outside the facilities constructed, operated and maintained by the State.

(ii) Claims of damage of any nature whatsoever, including but not limited to property loss or damage, personal injury or death arising out of or connected with the control, carriage, handling, use, disposal or distribution of any water outside of the facilities constructed, operated and maintained by the State.

(d) The use by the Agency or the State of any remedy specified herein for the enforcement of this contract is not exclusive and shall not deprive either from using any other remedy provided by law.

13. **Comparable Treatment.** In the event that the State gives on the whole substantially more favorable treatment to any other Delta entity under similar circumstances than that accorded under this contract to the Agency, the State agrees to renegotiate this contract to provide comparable treatment to the Agency under this contract.

GENERAL PROVISIONS

14. **Amendments.** This contract may be amended or terminated at any time by mutual agreement of the State and the Agency.

15. **Reservation With Respect to State Laws.** Nothing herein contained shall be construed as estopping or otherwise preventing the Agency, or any person, firm, association, corporation, or public body claiming by, through, or under the Agency, from contesting by litigation or other lawful means, the validity, constitutionality, construction or application of any law of the State of California.

16. **Opinions and Determinations.** Where the terms of this contract provide for action to be based upon the opinion, judgment, approval, review, or determination of either party hereto, such terms are not intended to be and shall never be construed as permitting such opinion, judgment, approval, review, or determination to be arbitrary, capricious, or unreasonable.

17. **Successors and Assigns Obligated.** This contract and all of its provisions shall apply to and bind the successors and assigns of the parties hereto.

18. **Assignment and Subcontract.** The Agency may enter into subcontracts with water users within the Agency boundaries in which the assurances and obligations provided in this contract as to such water user or users are assigned to the area covered by the subcontract. The Agency shall remain primarily liable and shall make all payments required under this contract. No assignment or transfer of this contract, or any part hereof, rights hereunder, or interest herein by the Agency, other than a subcontract containing the same terms and conditions, shall be valid unless and until it is approved by the State and made subject to such reasonable terms and conditions as the State may impose. No assignment or transfer of this contract or any part hereof, rights hereunder, or interest herein by the State shall be valid except as such assignment or transfer is made pursuant to and in conformity with applicable law.

19. **Books, Records, Reports, and Inspections Thereof.** Subject to applicable State laws and regulations, the Agency shall have full and free access at all reasonable times to the SWP account books and official records of the State insofar as the same pertain to the matters and things provided for in this contract, with the right at any time during office hours to make copies thereof, and the proper representatives of the State shall have similar rights with respect to the account books and records of the Agency.

20. **Waiver of Rights.** Any waiver at any time by either party hereto of its rights with respect to a default, or any other matter arising in connection with this contract, shall not be deemed to be a waiver with respect to any other default or matter.

21. **Assurance Relating to Validity of Contract.** This contract shall be effective after its execution by the Agency and the State. Promptly after the execution and delivery of this contract, the Agency shall file and prosecute to a final decree, including any appeal therefrom to the highest court of the State of California, in a court of competent jurisdiction a special proceeding for the judicial examination, approval, and confirmation of the proceedings of the Agency's Board of Directors and of the Agency leading up to and including the making of this contract and the validity of the provisions thereof as a binding and enforceable obligation upon the State and the Agency. If, in this proceeding or other proceeding before a court of competent jurisdiction, any portion of this contract should be determined to be constitutionally invalid, then the remaining portions of this contract shall remain in full force and effect unless modified by mutual consent of the parties.

22. **Notices.** All notices that are required either expressly or by implication to be given by one party to the other shall be deemed to have been given if delivered personally or if enclosed in a properly addressed, postage prepaid, envelope and deposited in a United States Post Office. Unless or until formally notified otherwise, the Agency shall address all notices to the State as follows:

Director, Department of Water Resources
P.O. Box 388
Sacramento, California 95802

and the State shall address all notices to the Agency as follows:

North Delta Water Agency
333 Forum Building, 1107 - 9th Street
Sacramento, California 95814

IN WITNESS WHEREOF, the parties hereto have executed this contract on the date first above written.

Approved as to legal form and sufficiency:

By /s/ [illegible]
Chief Counsel
Dept. of Water Resources

STATE OF CALIFORNIA

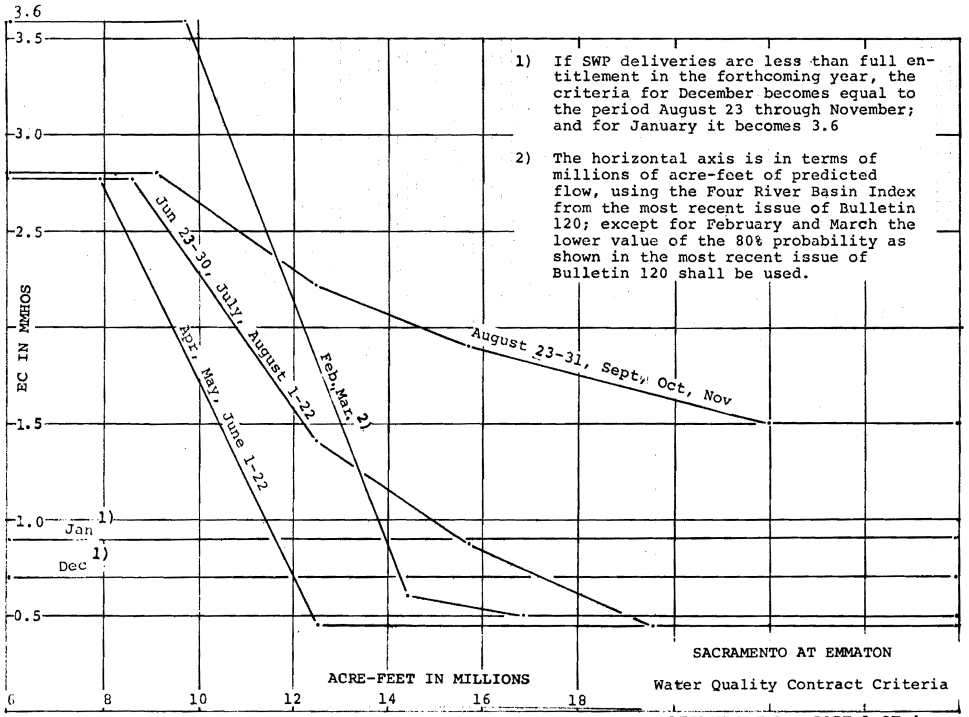
By /s/ RONALD B. ROBIE
Dept. of Water Resources

Approved as to legal form and sufficiency:

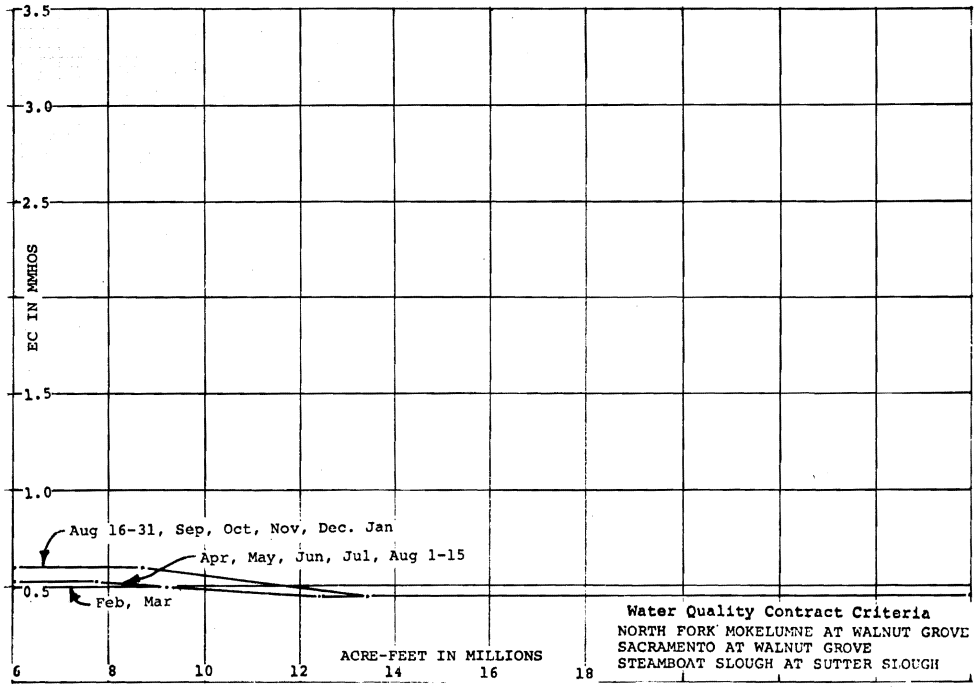
By /s/ [illegible]
General Counsel
North Delta Water Agency

NORTH DELTA WATER AGENCY

By /s/ W. R. DANIEL
Chairman
Board of Directors



ATTACHMENT A - PART 1 OF 4



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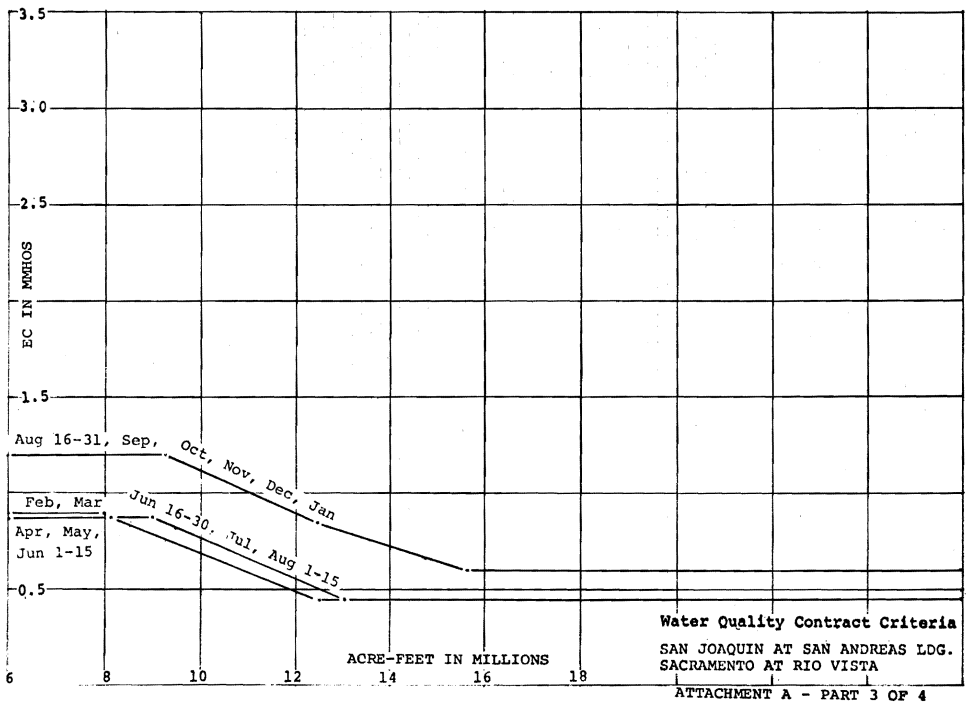

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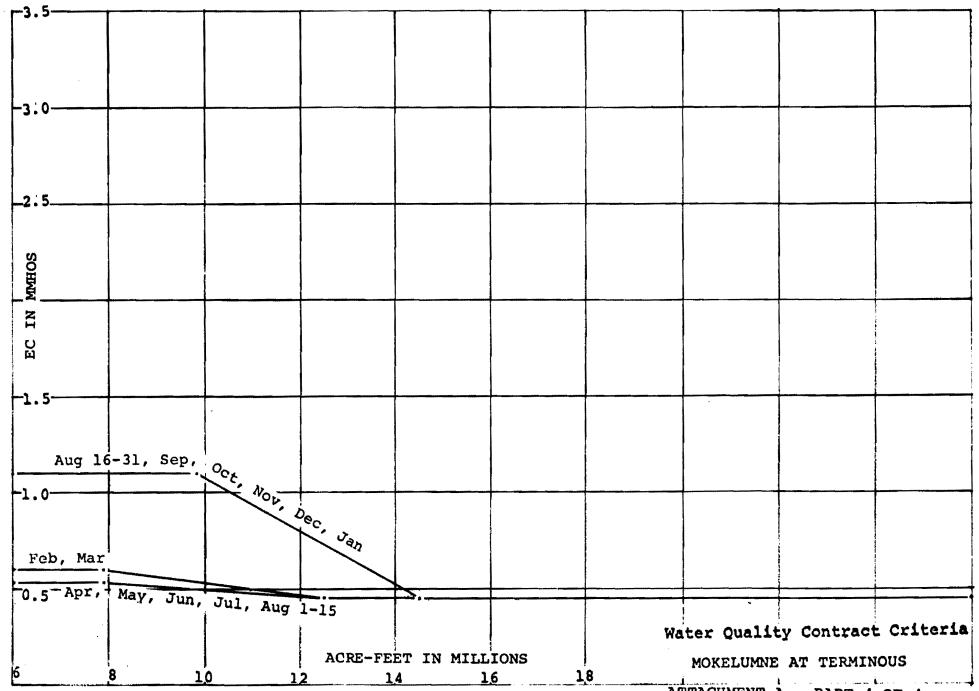
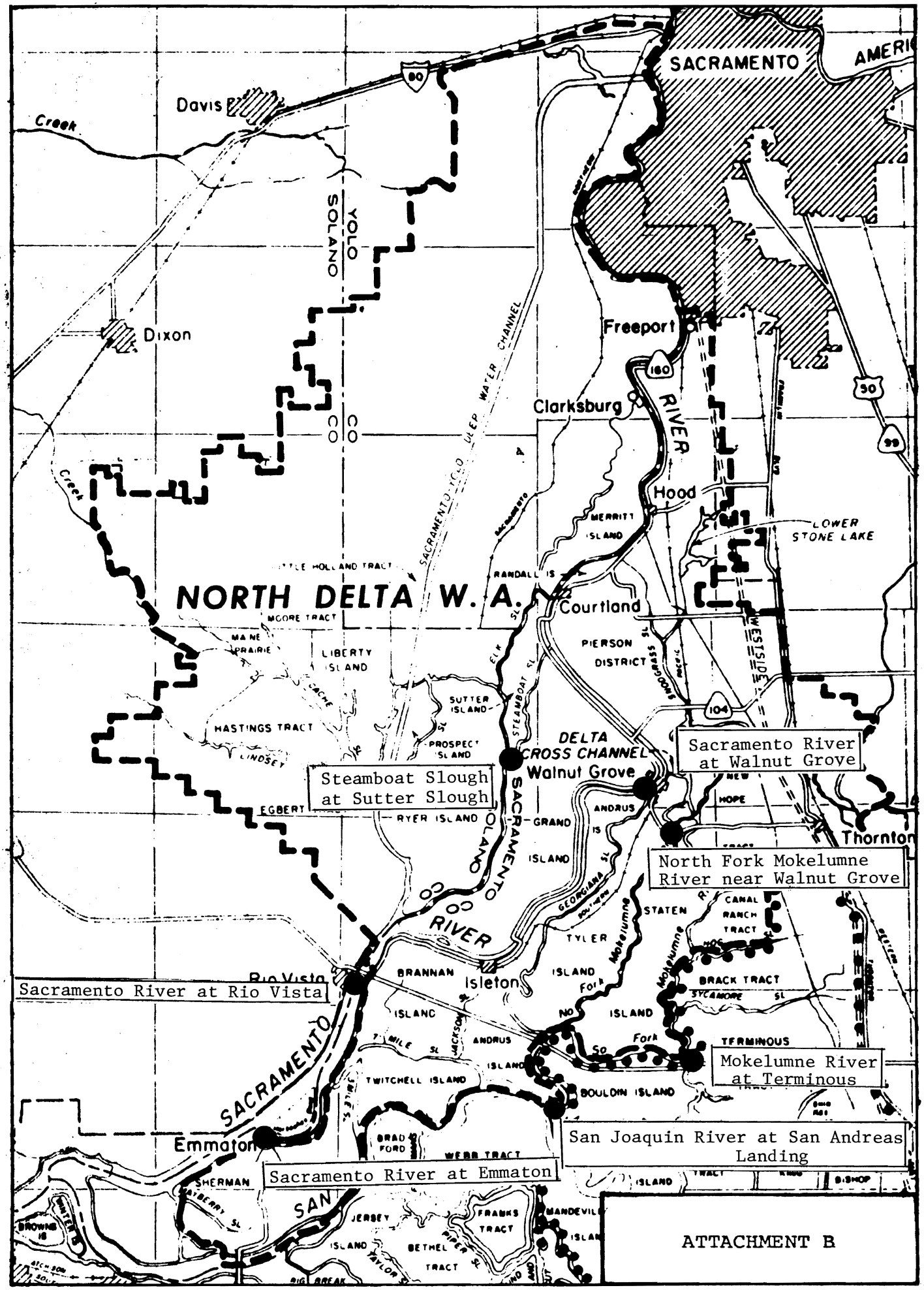


ATTACHMENT A - PART 4 OF 4



ATTACHMENT B

AGREEMENT

WHEREAS, The State of California, through its Department of Water Resources (DWR), and the North Delta Water Agency entered into a Contract for the Assurance of a Dependable Water Supply of Suitable Quality on January 28, 1981 under which, inter alia, the State agreed to operate the State Water Project to provide water qualities at least equal to the better of (1) standards adopted by the State Water Resources Control Board, or (2) criteria identified on the graphs included as Attachment A;

WHEREAS, Article 5 of the 1981 Contract permits a shift of Attachment A water quality criteria for the Sacramento River at Emmaton to a location on Three Mile Slough upon completion of an overland facility to supply and distribute water to Sherman Island;

WHEREAS, with the concurrence of landowners on Sherman Island and NDWA, DWR commenced a program of land acquisition on Sherman Island in lieu of building the overland facility described in Article 5;

WHEREAS, DWR presented plans to Reclamation District 341 for an overland facility to service lands remaining in private ownership and R.D. 341 approved the plans;

WHEREAS, DWR presented the same plans to NDWA; but prior to NDWA reaching a decision to approve or disapprove the plans, DWR

reached agreement in principle with the remaining landowners to purchase their lands on Sherman Island, making an overland facility unnecessary;

WHEREAS, DWR and NDWA wish to amend the 1981 Contract to change the monitoring station at Emmaton to Three Mile Slough for the reason that DWR is pursuing its land acquisition program in lieu of the overland facility;

WHEREAS, the parties disagree on whether DWR should pay assessments on land it owns within NDWA's jurisdiction, and wish to resolve the issue herein;

IT IS HEREBY AGREED:

The State of California acting by and through its Department of Water Resources, hereinafter "State," and the North Delta Water Agency, hereinafter "NDWA," agree to amend the 1981 Contract Between State of California Department of Water Resources and North Delta Water Agency for the Assurance of a Dependable Water Supply of Suitable Quality ("the 1981 Contract") as follows:

1. Subject to the terms and conditions set forth in this agreement, NDWA approves the State's plans for acquisition of agricultural lands on Sherman Island and agrees that such acquisition is in lieu of the overland facility described in Article 5 of the 1981 Contract.

2. NDWA agrees that the water quality criteria for the Sacramento River at Emmaton shall apply at the monitoring station at Three Mile Slough, as shown on Exhibit A, attached hereto and incorporated herein by reference.

3. State agrees that NDWA's approval in paragraph 1 is contingent, and paragraph 2 shall only be effective, upon State's acquiring fee title to, or a water quality easement or similar waiver on, those agricultural lands on Sherman Island which are specified in the draft report entitled "Overland Agricultural Facilities Sherman Island" dated January 1980. The parties agree that the 1981 Contract imposes no obligation relating to the quality of water for domestic uses on Sherman Island.

4. State agrees to hold harmless from all costs, defend and indemnify NDWA for any claim or action brought by any person or entity based on this agreement, including any claim or action based on the change in water quality criteria for the Sacramento River under the 1981 Contract.

5. State agrees to reimburse NDWA for engineering costs paid for review of the plans for the overland facility, based on invoices received for work performed between May 12, 1995 and July 3, 1996, inclusive.

6. State agrees that NDWA may permanently reduce its annual payments due under Article 10 of the 1981 Contract by a percentage equal to the percentage of acreage of land owned or

hereafter acquired by the Department of Water Resources within NDWA's jurisdiction compared to all lands within NDWA's jurisdiction. NDWA agrees not to assess or assert any right to assess DWR-owned lands. In all other respects, payment obligations imposed by the 1981 Contract shall remain the same.

7. The term of this agreement is concurrent with that of the 1981 Contract.

8. This agreement shall be effective immediately after it is both signed by DWR and approved by the NDWA Board of Directors. NDWA agrees to deliver to DWR a copy of the resolution authorizing NDWA to enter into this agreement.

9. NDWA shall promptly notice a hearing on this amendment pursuant to California Water Code Appendix section 115-7.8 and hold a hearing pursuant to Water Code Appendix section 155-7.6. If a substantial written protest is received, NDWA shall promptly hold an election on this amendment pursuant to Water Code appendix section 115-7.6. If an election is held and the majority of the votes cast do not approve this amendment, the term of the agreement (as defined in paragraph 8), shall be changed to a one-year term as an interim agreement pursuant to Water Code Appendix section 115-7.1, and all other terms of this agreement shall remain valid for the one-year interim period.

10. Promptly after the execution and delivery of this contract, NDWA shall file and prosecute to a final decree,

including any appeal therefrom to the highest court of the State of California, in a court of competent jurisdiction a special proceeding for the judicial examination, approval, and confirmation of the proceedings of the NDWA Board of Directors and of NDWA leading up to and including the making of this contract and the validity of the provisions thereof as a binding and enforceable obligation upon the State and the NDWA. If, in this proceeding or other proceeding before a court of competent jurisdiction, any portion of this contract should be determined to be invalid, then the remaining portions of this contract shall remain in full force and effect unless modified by mutual consent of the parties.

NORTH DELTA WATER AGENCY

W.R. Darsie, Chairman
Board of Directors

Dated: 12-24-96

Approved as to legal form and sufficiency:

Steve Saxton
Attorney for North Delta Water Agency

Dated: 12/27/96

STATE OF CALIFORNIA, DEPARTMENT OF WATER RESOURCES

David N. Kennedy
Director

Dated: 1-21-97

Approved as to legal form and sufficiency:

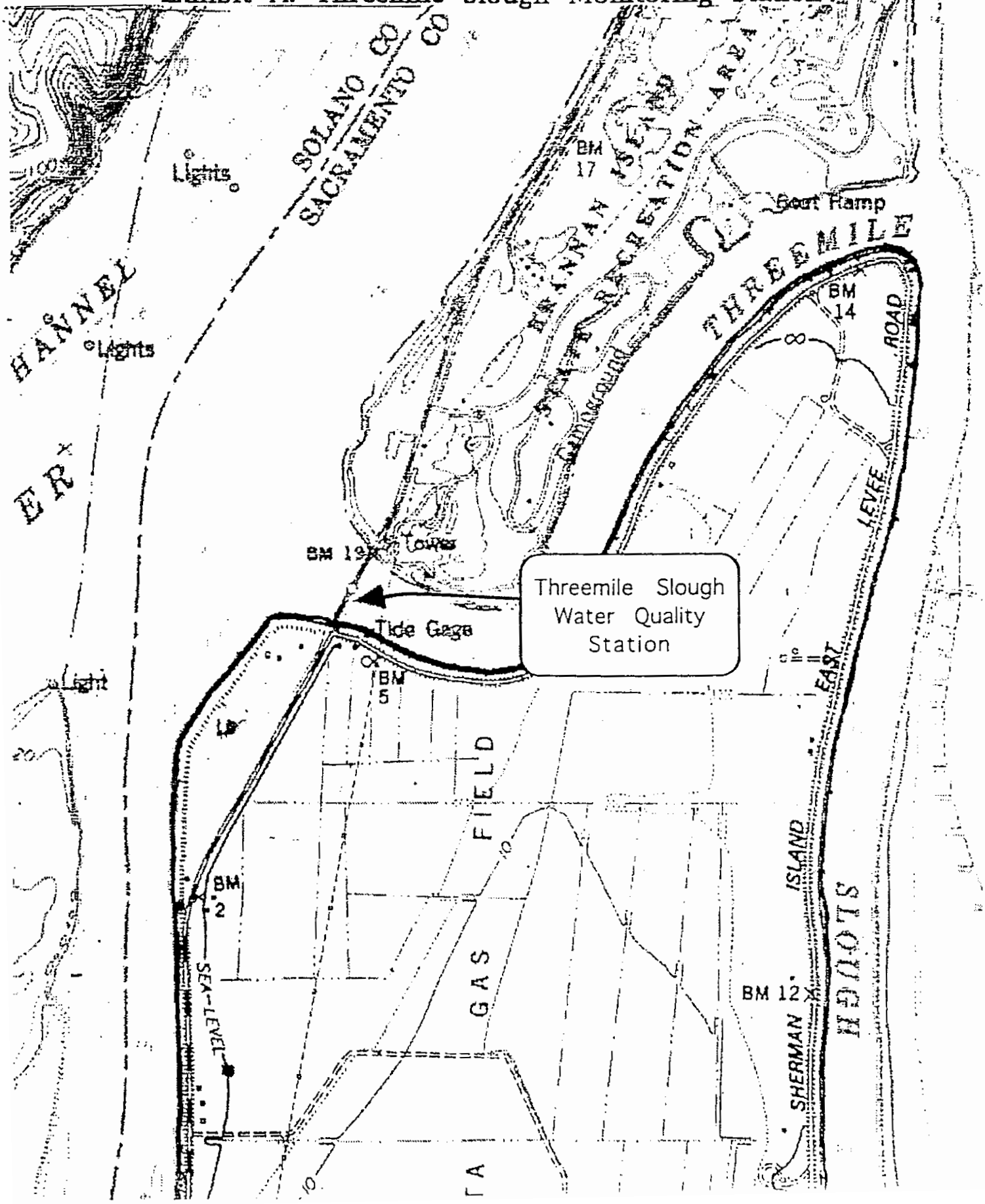
for Susan N. Weber
Chief Counsel

Dated: 1/17/97

agmtndwa 12-18-96

CONTRACT BETWEEN STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES AND NORTH DELTA WATER AGENCY
FOR THE ASSURANCE OF A DEPENDABLE WATER SUPPLY OF SUITABLE QUALITY
Amended, 1996

Exhibit A: Threemile Slough Monitoring Station



MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding is entered into this 26th day of May, 1998, by and between North Delta Water Agency (hereinafter "Agency") and Department of Water Resources, State of California (hereinafter "DWR").

RECITALS

A. In 1981, DWR entered into a contract (hereinafter "1981 Contract") with Agency under which Agency agreed to make certain payments to DWR in exchange for DWR making water of a specified quality and adequate quantity available for the use of diverters within the boundaries of Agency. The 1981 Contract remains in full force and effect.

B. The State Water Resources Control Board ("State Board") has initiated a water right proceeding in order to allocate the obligation to implement water quality objectives contained in the Bay-Delta Water Quality Control Plan adopted by the State Board on May 22, 1995 (hereinafter "1995 Plan").

C. The purpose of this Memorandum of Understanding is to set forth the joint position of Agency and DWR as to the legal effect of the 1981 Contract with respect to the obligation of water users within Agency, if any, to implement water quality objectives contained in the 1995 Plan.

UNDERSTANDINGS

1. DWR agrees that any obligation to curtail or modify diversions in order to assist in achieving any flow or salinity objective of the 1995 Plan imposed upon the use of water within Agency is entirely in the scope of the existing obligation of DWR under the 1981 Contract to provide water from the State Water Project supply, subject to the

limitations of reasonable and beneficial use. During the term of this Memorandum of Understanding, no party shall assert, before the State Board or in any court, that any other party must reduce or eliminate any of its direct diversions, diversions to storage or re-diversion of stored water, or release any previously stored water so long as the other party's method of use and method of diversion are reasonable under Article X, Section 2 of the California Constitution.

2. The parties agree that the payments made by Agency to DWR pursuant to the 1981 Contract constitute full and adequate consideration for the obligation of DWR described in paragraph 1 of this Memorandum of Understanding.

3. The parties agree that the assurances contained in the 1981 Contract, including the obligation of DWR to provide water to Agency users from State Water Project supplies, and in paragraph 1 of this Memorandum of Understanding, do not apply to any transfer of water outside Agency. The parties agree that the 1981 Contract does not affect any underlying rights the water users within the Agency may have to transfer water to the extent that such a transfer would be permissible under California law in the absence of the 1981 Contract.

4. Nothing in this Memorandum of Understanding constitutes an admission by Agency, express or implied, that the State Board has authority to limit or otherwise modify any right to divert water for use within Agency.

5. Nothing in this Memorandum of Understanding constitutes an amendment of the 1981 Contract as it presently exists.

6. This Memorandum of Understanding shall be effective only for the purposes of the currently pending SWRCB water right hearings to allocate the obligation to implement the 1995 Plan's water quality objectives, and for no other purpose.

THE NORTH DELTA WATER AGENCY

By: Dennis Leary

Date: 4/20/98

Title: Chairman

COUNSEL:

THE DEPARTMENT OF WATER RESOURCES

By:

Title: Director

Date: 5/26/98

APPROVED FOR LEGAL FORM & SUFFICIENCY:

Susan N. Weber
Chief Counsel

C:\OFFICE\WPWIN\DAVID\BDHRG.19

BDCP1674

EXHIBIT B:

Comments on the Public Draft Bay-Delta Conservation Plan (BDCP) and Draft BDCP Environmental Impact Report/Environmental Impact Statement

Vogel, D.,

June 6, 2014

June 6, 2014

Comments on the Public Draft Bay-Delta Conservation Plan (BDCP) and Draft BDCP Environmental Impact Report/Environmental Impact Statement

Dave Vogel
Senior Scientist[1]
Natural Resource Scientists, Inc.
P.O. Box 1210
Red Bluff, CA 96080
dvogel@resourcescientists.com

GENERAL OVERVIEW

On an overall basis, the Public Draft Bay-Delta Conservation Plan (BDCP) and the Draft BDCP Environmental Impact Report/Environmental Impact Statement (EIR/EIS) (collectively, BDCP documents) are unreasonably voluminous, poorly structured, highly fragmented, extremely repetitive, nearly incomprehensible, and replete with contradictory statements and logic.

The BDCP is based on a premise that purports to provide an alternative or supplemental means to export northern California water past the Delta[2] to supposedly reduce impacts on fishery resources as compared to sole use of the existing federal and state south Delta water export facilities. The linchpin of this concept is to build three large water diversions on the lower Sacramento River. Many major design features and critical operational criteria have not been determined. As such, the proposed north Delta water diversions are an unprecedented, extremely high-risk experiment with a very high probability of failure for fish protection and an irreversible commitment of resources. Adverse impacts to anadromous fish could potentially be catastrophic.

These comments primarily focus on the potential effects of the BDCP on Sacramento River basin anadromous salmonids and the following key issues:

1) Oversimplification of salmonid behavior and BDCP impacts on salmonids. Salmonid fry, parr, and smolt behaviors are highly complex and variable but are not adequately incorporated into the BDCP analyses. For example, the BDCP used simplified, composite estimates in its analyses of juvenile salmon emigration into the Delta that does not account for very important inter-annual variability in outmigration timing caused by upstream precipitation events and hydrologic conditions. Due to the nature of how the north Delta intakes would operate, there is an unaccounted for variability in salmon exposure to the intakes, Fremont Weir, and downstream flow splits (e.g., Georgiana

[1] A copy of my current resume is attached hereto as Exhibit 1.
[2] Conflicting statements on the topic of water supply are in the BDCP documents: "It is not intended to imply that increased quantities of water will be delivered under the BDCP." (EIR/EIS Page 2-5) "The BDCP is intended to minimize entrainment levels, while also *increasing water supply* and water supply reliability (emphasis added)." (BDCP Page 5.B-2)

Slough) that significantly compromises the ability to compare BDCP alternatives and assess potential effectiveness of its conservation measures.

2) Extensive unresolved uncertainties concerning impacts on salmonids associated with the BDCP and its various elements. The effects of every BDCP conservation measure associated with salmon are characterized as "uncertain" or "highly uncertain". In turn, the BDCP sequentially builds upon each uncertainty with the end product revealing the project's purported benefits for salmon to be untenable.
3) Conclusive statements strongly suggesting positive effects for salmonids that have no legitimate foundation. For example, the BDCP's proposed use of non-physical barriers throughout the Delta to guide fish, predator control at the north Delta intakes, and fish screen refugia lack reliable supporting basis and justification but are promoted as beneficial actions. Worse, some actions may actually cause more harm than good.
4) Consistent pattern of overstatement of potential benefits and understatement of potential adverse impacts to salmonids. Despite caveats primarily dispersed in BDCP appendices, the BDCP analyses and conclusions in the main body of the BDCP display a trend where favorable fish model outputs are overstated and unfavorable outputs are downplayed. For reasons described in these comments, the BDCP models, in reality, have a very low sensitivity for adequately providing the necessary comparative analyses to estimate benefits.
5) Frequent erroneous or invalid assumptions in the analyses of effects on salmonids. For example, the BDCP fish models' estimates of salmon survival and fish route selection used to evaluate various BDCP alternatives are unreliable for making management decisions among BDCP scenarios and conservation measures. Some of the salmon survival estimates used for BDCP models were undoubtedly inflated, but also possessed highly questionable and unknown variance in estimated salmon route selection at critical Delta flow splits, reach-specific survival, and overall survival through the Delta.
6) Propagation of errors in BDCP fish models resulting from faulty BDCP CalSim II water supply and water operations modeling (BDCP Model). Much of the BDCP fish modeling efforts relied on CalSim II model outputs but a recent independent review of the BDCP Model revealed numerous significant flaws (MBK 2014) that were, unfortunately, carried through to the BDCP fish models. The BDCP's inaccurate depiction of changes in water storage in upstream reservoirs, reservoir releases, and water exports in the north and south Delta would undoubtedly significantly alter analyses of the BDCP effects on salmonids and other fish species. The BDCP Model errors result in an adverse cascading affect on the reliability of the BDCP fish models and, therefore, the BDCP effects on salmonids were obviously mischaracterized by an unknown, but probably very severe, degree. Given the limitations and errors of the BDCP fish models described in these comments, the fish models' reliance on faulty BDCP Model outputs at the outset further adds to the undependably modeled and unknown BDCP effects.
7) Lack of essential details on key BDCP elements. For example, numerous critical design features and fish protective criteria of the north Delta intakes are not described or have not yet been developed, Fremont Weir fish passage options are unclear or undeveloped, and many conservation measures (e.g. in-Delta habitat alterations) lack any relevant supportive details as to their efficacy.
8) Improper complete reliance on ill-defined passive adaptive management without explicitly describing how future problems may be resolved. Recent, prominent examples

are provided in these comments to clearly demonstrate that there has been a strong, consistent legacy in the Central Valley and Delta of *not* implementing adaptive management for the protection of fishery resources, even for relatively simple actions. The BDCP is entirely dependent on so-called adaptive management to attempt correction of deficiencies in the plan after it is implemented. Recent experience indicates otherwise and statements in the BDCP documents lack reliability and do not inspire confidence that anticipated future problems for salmon caused by the BDCP would be resolved.

9) Misuse or lack of use of the best available science.[3] Among other examples, the BDCP failed to utilize the basic tenets of protective criteria for effective fish screen design (e.g., sweeping velocities and fish exposure time), misapplied data from juvenile salmon studies in the Delta, displayed a faulty understanding of juvenile salmon and predatory fish behavior and habitat preferences, misinterpreted past fish screen research projects, and omitted substantial relevant data for evaluative fish models.

The BDCP documents are severely biased in the ultimate conclusions because they are predicated on information that is highly tenuous, speculative, and substantially misleading. The documents frequently overlooked highly relevant scientific facts and instead chose to rely upon sparse information that was outdated or incorrect. The BDCP documents appear to selectively "pick and choose" reports and opinions that support its rationale while ignoring science that points to the opposite. The BDCP derived numerous conclusions from limited or erroneous information. For example, when modeling results suggested positive effects for fish, they were embellished and overemphasized, and when results indicated negative impacts on fish, they were downplayed and deemed insignificant. To summarize, the BDCP's effects analyses lack scientific objectivity.

As described in detail later in these comments, the BDCP has questionable benefits and feasibility, and is built upon invalid or extremely dubious assumptions. Major uncertainties are sequentially built upon major uncertainties throughout the BDCP documents, but the many caveats sprinkled throughout the EIR/EIS and BDCP do not carry through to the conclusions. A main concern is that the BDCP documents have relied extensively on assumptions about juvenile salmonids that are either incorrect or unfounded, and are full of highly speculative assertions and oversimplification regarding how BDCP actions may or may not affect these fish. Those assumptions are then used as a foundation for conclusions that are unsupported.

BDCP's So-Called "Best Available Science"

The BDCP claims to be based on the "best available science", directly implying to an uninformed reader that the document is "correct" in its analyses and interpretation. The BDCP provides the following statements in this regard:

> "The effects analysis is built on and reflects an extensive body of monitoring data, scientific investigation, and analysis of the Delta compiled over several decades, including the results and findings of numerous studies initiated under the California Bay-Delta Authority Bay-Delta Science Program, the long-term

[3] Due to the enormity and poor readability of the documents, comments not provided here on any particular statement or element in the BDCP do not imply agreement.

> monitoring programs conducted by the Interagency Ecological Program, research and monitoring conducted by state and federal resource agencies, and research contributions of academic investigators. It provides the fish and wildlife agencies with the information that they will need to make their regulatory findings and issue incidental take permits and authorizations for the BDCP." (BDCP Executive Summary Page 19)
>
> "The conservation strategy was informed by the collective experiences of professionals working in the Delta over the course of several decades, monitoring results and conceptual models developed over time through prior scientific efforts (e.g., those conducted by the California Bay-Delta Authority [CALFED] Science Program), and supplemented by data and analysis developed through the BDCP process. The conservation strategy is based on the best available science …" (BDCP Page 1-2)
>
> "The Bay Delta Conservation Plan (BDCP or the Plan) is built upon and reflects the extensive body of scientific investigation, study, and analysis of the Delta compiled over several decades, …" (BDCP Page 10-1)
>
> "Those conclusions are reached through a systematic, scientific evaluation of the Plan's potential adverse, beneficial, and net effects." (BDCP Page 5.1-1)

Such assertions (and a voluminous number of others throughout the BDCP documents containing similar wording), imply that the BDCP's foundation, models, findings, and conclusions are indisputable and beyond reproach. On the contrary, however, my review indicates that, in the BDCP much of the available scientific information was misused and/or misinterpreted and substantial quantities of some critically important scientific information were incorrect, outdated, overlooked, or perhaps purposefully not included. Many of the assumptions concerning anadromous salmonids are in error.

Overstatement of Potential Benefits

The BDCP has clearly overstated potential benefits to salmonids. For example:

> "Increasing the through-Delta survival of juvenile salmonids will be accomplished by maximizing survival rates at the new north Delta intakes, increasing survival rates at the south Delta export facilities, reducing mortality at predation hotspots, increasing habitat complexity through restoration actions along key migration corridors, guiding fish originating in the Sacramento River away from entry into the interior Delta, and ensuring pumping operations do not increase the occurrence of reverse flows in the Sacramento River at the Georgiana Slough junction." (BDCP Page 3.3-140)
>
> "Operation of the north and south Delta intakes provides the operational flexibility to achieve the following improvements." (BDCP Page 3.2-7)

- "Improve passage of fish within and through the Delta by improving hydrodynamic and water quality conditions that can create barriers to movement and high susceptibility to predators." (BDCP Page 3.2-7)

- "Reduce the risk of entrainment of covered fishes by conveying water from either the north or south Delta, depending on the seasonal distribution of their sensitive life stages." (BDCP Page 3.2-7)

> "The combination of moving water through a new isolated tunnel/pipeline facility in conjunction with the existing south Delta facilities—referred to as dual conveyance—is expected to provide flexibility sufficient to substantially reduce the entrainment of covered fish species while providing the desired average water supply." (BDCP Page 3.2-8)

> "DWR will construct new diversion and conveyance facilities that will be designed and operated to improve conditions for fish by conveying water from the Sacramento River in the north Delta to the existing water export pumping plants in the south Delta. This new tunnel/pipeline conveyance facility will allow for reductions in diversions at the existing SWP and CVP south Delta facilities, thereby minimizing reverse flows and reducing entrainment of covered fish species by the SWP and CVP in the south Delta." (BDCP Page 4-7)

Notably lacking in the BDCP documents are clearly articulated objective and impartial analyses and balanced statements concerning the project's potentially serious impacts (both positive and negative) to fish. This is discussed further below.

SPECIFIC COMMENTS

BDCP Conservation Measures

The BDCP proposes a suite of largely general, non-specific actions (conservation measures) to meet regulatory requirements for implementation of the plan.

> "The conservation strategy has been developed to meet the regulatory standards of Sections 7 and 10 of the federal Endangered Species Act (ESA), the Natural Community 7 Conservation Planning Act (NCCPA), and the California Endangered Species Act (CESA)." (BDCP Page 3.1-1)

Generalized statements are provided to suggest that the proposed conservation measures in the plan will result in a net improvement for conditions for fish and other species:

> "Landscape-scale conservation measures are designed to improve the overall condition of hydrological, physical, chemical, and biological processes in the Plan Area. These measures include improving the method, timing, and amount of flow and quality of water into and through the Delta for the benefit of covered species and natural communities." (BDCP Page 3.1-3)

However, as described below, some of the prominent proposed conservation measures and interrelated elements are non-specific, based on limited or no supporting data, have highly questionable benefits, and may actually create worse conditions for salmonids than the existing environmental baseline.

Conservation Measure 1 (CM1): Water Facilities and Operation

Fundamentally, it is not at all clear why CM1 is deemed a "conservation measure". The primary purpose of conservation measures is to offset adverse impacts *caused by* the water facilities and operations. There is no question that the proposed three massive north Delta water diversions, fish screens, and indirect effects of operations will have some degree of negative consequences to salmonids, possibly very severe. It is important to remember that the majority of Chinook salmon in the Sacramento Valley—the most important spawning and rearing habitat for salmon in California—would need to migrate past the proposed north Delta diversions. Indeed, some of the most prominent other conservation measures are specifically proposed to counterbalance the anticipated adverse impact of the north Delta diversions on salmon (e.g., CM2, CM6, CM15, and CM16).

The BDCP proposes to construct new fish screen facilities in front of each of three new, large (3,000 cfs) intake facilities with a 9,000-cfs-capacity pumping facility[4] on the Sacramento River upstream of Sutter Slough. The size of the proposed fish screen structures will be massive, greatly exceeding the size of existing fish protective facilities currently in use on the Sacramento River: "A number of potential intakes were investigated and those selected were numbers 2, 3, and 5, with screen lengths of 1,800 feet, 1,900 feet, and 1,950 feet, respectively."(BDCP Page 5.B-7) One of the most perplexing aspects of the BDCP is the proposal to add three or more extremely large diversions in the north Delta without any factual understanding of how those diversions and the corresponding structures would impact juvenile salmon. For example, the BDCP goes to considerable effort to downplay associated risks of predation associated with the intakes and promotes the ability to "control" predation in the future (e.g., BDCP Executive Summary, Page 60, BDCP Page 3.4-39, BDCP Page 4-75). With lack of that empirical knowledge, the BDCP relies on highly speculative opinions on the topic to derive definitive (but unsupported) conclusions. Worse, many of those convictions are one-sided and fail to adequately recognize alternative scientific views indicating that the water diversions and associated structures may have major adverse impacts to young salmon.

In terms of hydraulic and physical conditions for fish protection, the proposed north Delta intakes are sited in some of the worst locations. As stated by Fish Facilities Technical Team (FFTT) (2011), "There is *a high level of uncertainty as to the type and magnitude of impacts* that these diversions will have on covered fish species that occur within the proposed diversion reach

[4] On BDCP Page 5.B-7, the BDCP states "The 15,000 cfs-capacity tunnels would allow gravity-driven transport of water from the three new 3,000 cfs intakes on the left bank of the Sacramento River …". Presumably, this is an incorrect statement and was not altered since the BDCP was changed from a 15,000-cfs facility to a 9,000 cfs facility; this should be corrected.

(emphasis added).[5]" Based on decades of experience in the design and evaluation of fish screens and water diversions, I partially agree with this statement but would characterize the effects differently and as follows: There is *a high level of certainty the diversions will adversely impact salmonids, but the type and magnitude of those impacts are uncertain*. The following describes some of the primary limitations and problems associated with the proposed three north Delta diversions.

Fish Screen Sweeping Velocities

For fish screens of the nature described in the BDCP documents, high sweeping flows and velocities are critically necessary to protect juvenile salmon because it reduces exposure time to not only the screen face [lessening the likelihood of impingement against the screens (BDCP Page 5.B-5)] but to predatory fish that will certainly harbor around the facilities. Based on my prior work, the BDCP itself states that the new diversions "would be likely predator hotspots." (BDCP Page 3.4-300.) However, the BDCP provides numerous conflicting and confusing statements concerning how the three new fish screen intakes would be operated to meet the fishery resource agencies' [National Marine Fisheries Service (NMFS), California Department of Fish and Wildlife (CDFW), and the U.S. Fish and Wildlife Service (USFWS)] criteria for fish protection. For example:

> "The positive-barrier fish screens will be designed and operated in accordance with design criteria (e.g., screen mesh size, approach velocity) *currently used* by the fish and wildlife agencies (emphasis added)." (BDCP Page 3.2-8)
>
> "CM1 calls for the North Delta intake structure to be constructed *to meet and exceed current NMFS criteria for approach and sweep velocities*, as discussed in more detail for winter-run Chinook salmon (emphasis added)." (BDCP Page 5.5.4-16)
>
> "The sweeping velocity of water passing the intakes should be greater than the approach velocity under the NMFS (1997) criteria, and *at least double the approach velocity* per the CDFW (2000) criteria (emphasis added)." (BDCP Page 5.B-7)
>
> "These self-cleaning, positive- barrier fish screens will be designed to the established protection standards for salmonids and delta smelt, and *will comply with CDFW, NMFS, and USFWS fish screening criteria* as discussed in Appendix 5.B, *Entrainment* (emphasis added)." (BDCP Page 4-9)
>
> "The intakes would be sized to provide screen area, in accordance with federal and state standards, sufficient to prevent entrainment and impingement of salmonids and delta smelt." (EIR/EIS Page 3-87)

[5] The FFTT (2011) report was written at the time when five diversion intakes were proposed for the BDCP; at the present time, three intakes are proposed.

It is important to note that the criteria currently used by NMFS and CDFW requires that the sweeping velocities be two times or greater than the approach velocities into the screens. With the mandated maximum through-screen approach velocities of 0.33 ft/s for juvenile salmon, the sweeping velocity criteria must be 0.67 ft/s or greater.

However, elsewhere in the BDCP, the documents perplexingly state that *fish screen criteria have not been finalized*. In the BDCP Appendix 5B, Entrainment, it reads: "… actual criteria for the fish screens have not been finalized" and that the BDCP analysis of the fish screens is simply "a general discussion because specific operational criteria and fish screen lengths have not been finalized". (BDCP Page 5.B-58) Other conflicting examples in the BDCP include:

> "Approach and sweeping velocity criteria for the north Delta intake screens have not been finalized, but approach velocity will be 0.33 foot per second (fps) (the criterion for salmonid fry) or less, …" (BDCP Page 5.5.1-31)
>
> "As noted for other species, approach and sweeping velocity criteria for the north Delta intake screens have not been finalized, but approach velocity will be less than or equal to 0.33 fps (the criterion for salmonid fry) and may at times be limited to 0.2 fps (the existing criterion for juvenile delta smelt)." (BDCP Page 5.5.3-23)

The BDCP acknowledges (in an appendix) that higher sweeping velocities are beneficial for young salmon but does not carry the critically important information forward in its analyses and conclusions:

> "Final specifications have not been established fully for the screens but laboratory studies show that salmonid screen passage time would be expected to be facilitated by greater sweeping velocity." (BDCP Page 5.B-387)

Adding more confusion to the topic, the BDCP indicates elsewhere that the sweeping velocities would be in the range of 0.4 ft/s, not 0.67 ft/s or greater (thereby violating existing criteria):

> "The detailed DSM2 tidal modeling of the intakes included a downstream sweeping velocity criteria of 0.4 foot per second; the intakes were not operated when the tidal velocity was less than 0.4 foot per second, as measured downstream of the intake." (BDCP Page 5.3-7)
>
> "DSM2 modeling of tidal velocities at the north Delta intakes indicated that these bypass rules would be compatible with a downstream sweeping velocity of 0.4 ft/sec that was assumed protective for reducing juvenile fish impingement on the screens." (BDCP Page 5C.A-114)
>
> "Compliance Monitoring Action: Confirm screen operation produces sweeping velocities greater than or equal to approach velocities." (BDCP Page 3.D-3)

The existing CDFW requirement[6] is that fish screen sweeping velocity should be at least two times the allowable approach velocity (or ≥ 0.67 ft/s) and that fish exposure time to the fish screen shall not exceed 15 minutes. The NMFS (1997) states that large stream-side installations may require intermediate bypasses along the screen face to prevent excessive exposure time to avoid fry impingement. A variance to that requirement was developed for the 1,000-ft long GCID screens, but only because of the very high sweeping flows at the facility. Some agencies outside California prefer that the sweeping velocities be at least 2 ft/s (USBR 2006). Emphasizing the importance and benefits of high sweeping velocities, Swanson et al. (2004b) state:

> "For young Chinook salmon subjected to prolonged exposure at a single large screened diversion or repeated exposures to multiple screens in their habitat or along their migratory route, the cumulative energetic costs could be substantial. … Collectively, the results indicate that, for juvenile Chinook salmon, optimal fish screen design should be guided by the objective of minimizing screen exposure duration, largely through balancing screen size (or length) with prevailing or engineered sweeping velocities."

The proposed BDCP intakes screens would possess insufficiently low sweeping velocities passing three extremely long screens positioned in close proximity causing very high, and therefore harmful, fish exposure time to the screens (discussed in more detail later in these comments).

The BDCP frequently cites a July 2011 Technical Memorandum by the FFTT to justify various components of the proposed new large fish screens. An examination of that document provides some revealing information relevant to the facilities' unsuitable locations. In reality, the FFTT was provided with poor options for fish protection due to the unique, unfavorable sites for water withdrawal from the north Delta. It is evident that the team had no choice but to recommend only general criteria that were severely constrained by the site-specific conditions of the various intakes, and not criteria necessary to protect fish. The FFTT (2011) stated that the proposed north Delta intake fish screens "… make it challenging to literally apply sweeping velocity criteria …". It is evident from the EIR/EIS that all of the numerous sites put forth for the intakes are poor for fish protection. The sites selected to carry forth from the EIR/EIS to the BDCP (Intakes 2, 3, and 5) were not chosen because those locations would provide good protection for fish but, instead, viewed as more favorable (but still bad) among the worst sites.

The BDCP modeling exercise for evaluating sweeping velocities at the proposed north Delta intakes utilized results of DSM2 modeling.

> "DSM2 modeling of tidal velocities at the north Delta intakes indicated that these bypass rules would be compatible with a downstream sweeping velocity of 0.4 ft/sec that was assumed protective for reducing juvenile fish impingement on the screens." (BDCP Page 5C.A-114)

[6] http://www.dfg.ca.gov/fish/Resources/Projects/Engin/Engin_ScreenCriteria.asp

> "The salient point from these detailed modeling assumptions is that the north Delta intake operations largely were governed by cross-section-averaged sweeping velocity (unadjusted for the velocity at the screen face) downstream of each intake, as opposed to further downstream. There was no explicit consideration of tidal state (e.g., "do not pump during flood tides"), although tidal state would influence the criteria expressed in the modeling assumptions. Multi-dimensional modeling will be necessary to refine estimates of potential diversions." (BDCP Page 5C.4-92)

As an initial matter, an average channel velocity of 0.4 ft/s is not reflective of water velocities near the river banks where the fish screens would be located. The FFTT recognized this problem:

> "For an on-bank screen, there may be a significant difference between the average channel velocity and the sweeping velocity along the screen face due to the boundary effect of the river channel. This can be addressed to some degree by selecting screen sites on or just below the outside of river bends and modeling the flow past the screen to optimize the alignment of the screen." (FFTT 2011)

Additionally, in a BDCP appendix, the same problem is identified:

> "However, velocities in CALSIM/DSM2 are channel cross-section averages, and therefore would not represent the range of velocities that would occur across the channel, with lower velocities expected at the channel margins where the on-bank intakes would be (Pandey and Smith 2010)." (BDCP Page 5.B-88)

This issue is conceptually illustrated in cross-sectional profiles of a river (Figure 1). Scenario A depicts a relatively straight reach of river where the highest water velocities are near the center of the channel and the lowest near the channel margins thereby providing unfavorable locations to site long, flat-plate fish screens. However, in Scenario B, a bend in the river offers the highest water velocities on the outside of the river bend and, therefore, are preferred locations to position long, flat-plate fish screens and reduce fish exposure time.

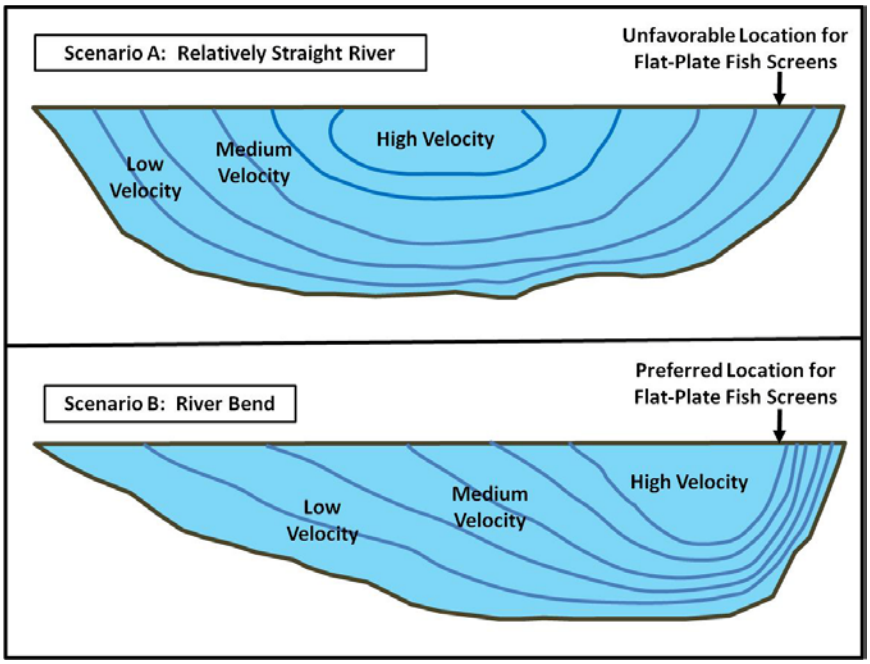


Figure 1. Conceptual diagrams of river cross sections showing locations of highest and lowest water velocities in a relatively straight river reach (Scenario A) and at a river bend (Scenario B).

These riverine hydraulic attributes are empirically demonstrated for cross-sectional profiles in Figures 2 and 3. Note that these examples are located in the Sacramento River upstream of the Delta where river gradient is much steeper, the channel is narrower, and overall water velocities are higher than the locations where the three north Delta intakes are proposed; however, the foregoing principles remain the same.

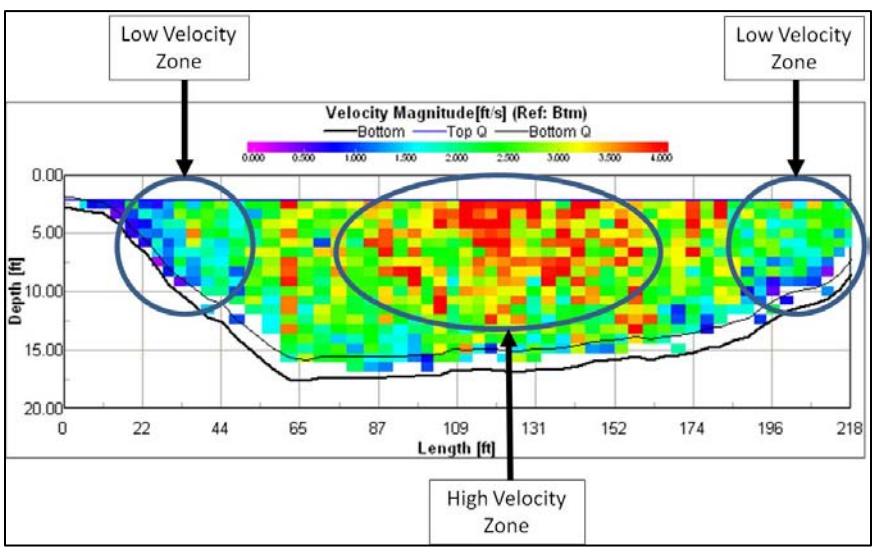


Figure 2. An Acoustic-Doppler Current Profiler (ADCP) cross-sectional transect of a relatively straight reach of the Sacramento River upstream of Knights Landing (from Vogel 2008a).

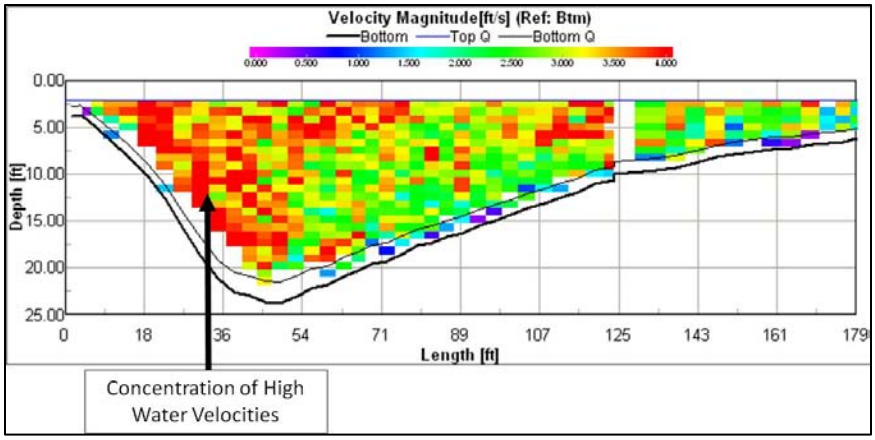


Figure 3. An Acoustic-Doppler Current Profiler (ADCP) cross-sectional transect of a river bend in the Sacramento River upstream of Knights Landing (from Vogel 2008a).

As pointed out by FFTT (2011), this problem for flat-plate fish screen siting to improve sweeping flows can be partially alleviated by locating the fish screens on the outside bends of the river channel. Existing examples of large Sacramento River flat-plate fish screens demonstrate how that measure has been successfully implemented (e.g., Figures 4 - 6).

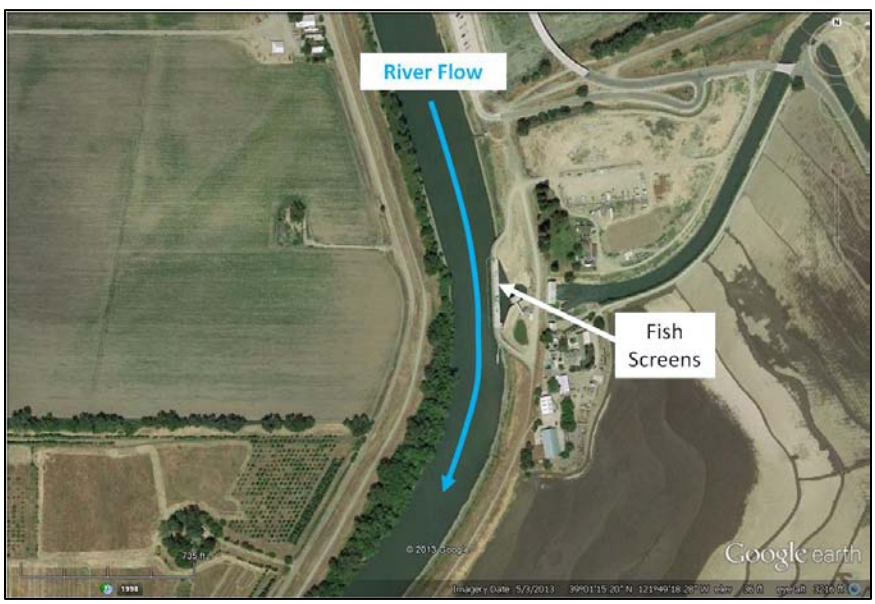


Figure 4. Aerial photograph of an example of an existing Sacramento River flat-plate fish screen located on an outside river bend to maintain high sweeping velocities.

Figure 5. Aerial photograph of an example of an existing Sacramento River flat-plate fish screen located on an outside river bend to maintain high sweeping velocities. Water velocities passing the screen typically range between 2 to 4 feet/second (USBR 2006).

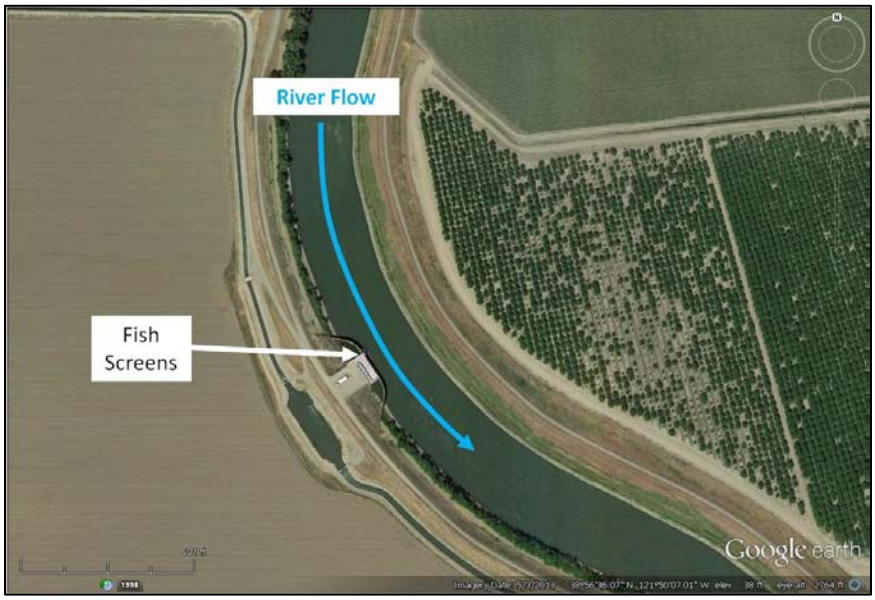


Figure 6. Aerial photograph of an example of an existing Sacramento River flat-plate fish screen located on an outside river bend to maintain high sweeping velocities.

In sharp contrast to these real-world examples, the three proposed north Delta intakes would be positioned in only *very slight* (or "gentle"[7]) river bends or relatively straight sections of the river channel (Figures 7 - 9) and lower gradient reaches of the river. (BDCP EIR/EIS, Page 3F-15, BDCP EIR/EIS Chapter 3, Appendix 3H)

[7] Adjective used in the BDCP documents.

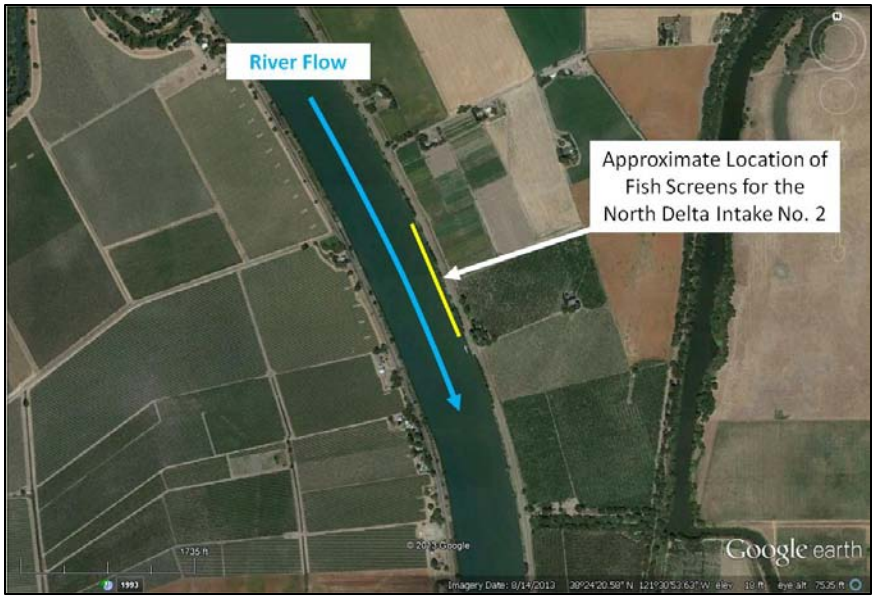


Figure 7. Aerial photograph of the approximate location of the proposed north Delta intake alternative no. 2.

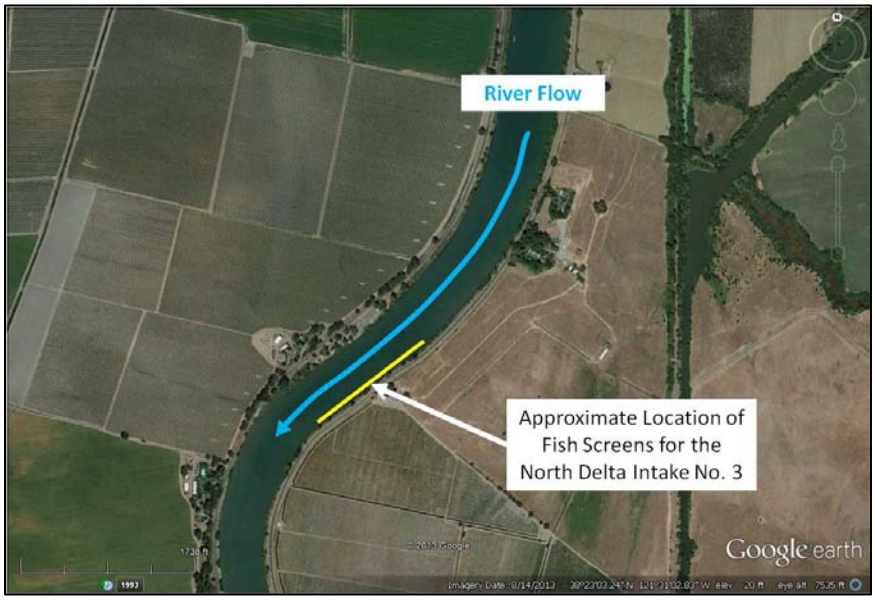


Figure 8. Aerial photograph of the approximate location of the proposed north Delta intake alternative no. 3.

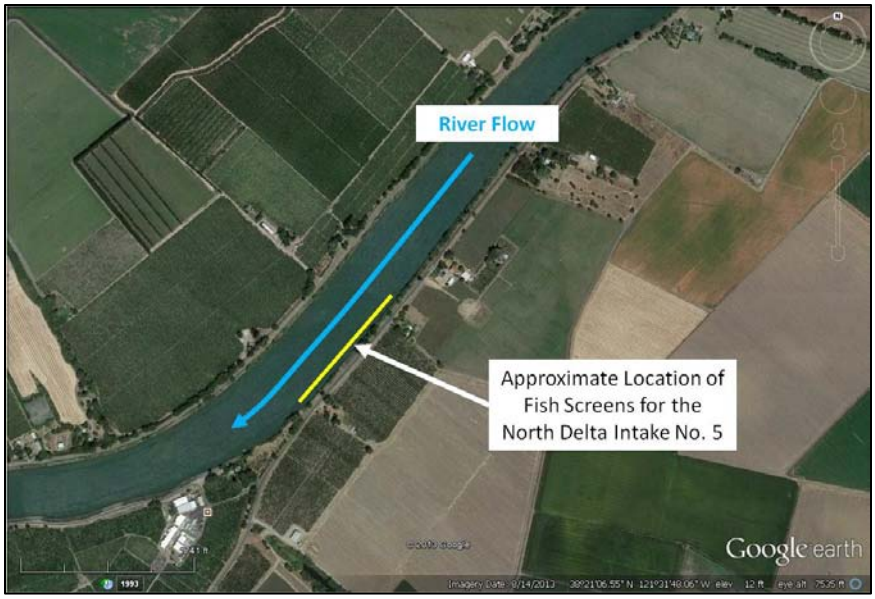


Figure 9. Aerial photograph of the approximate location of the proposed north Delta intake alternative no. 5.

These sites will not provide the near-screen sweeping velocities necessary to protect downstream-migrating salmon. The salient point is that past experience has clearly demonstrated that maintaining high sweeping velocities in front of large riverine flat-plate fish screens requires one of following to take place:

1) Alter river channel geometry and create channel constrictions to control the hydraulic conditions at the fish screens.
2) Position the fish screens on the outside sharp (not "gentle") bend of the river channel where high water velocities are naturally present (e.g., Figures 4 - 6).
3) Angle the fish screen out into the river channel in a downstream direction or jut the entire structure out into the channel in deeper, swifter water to maintain sweeping flows.

The locations of the north Delta intakes, as presently envisioned in the BDCP, do not possess any of those conditions. Of the options above, only number 3 could be implemented, in theory, to maintain high sweeping velocities on the face of the fish screens. However, doing so will create significant hydraulic controls in the river channel causing back-water effects and could produce unacceptable flood risks in the region. Additionally, this alternative would also create ideal predatory fish habitats. As shown in the schematic in Figure 10, ideal predator habitats are created by jutting the screen out into the river channel causing slack water and/or back eddies. Predatory areas are also generated adjacent to sheet pile walls upstream and downstream of the fish screens by eliminating laminar flow and causing hydraulic turbulence and eddies near the walls favoring predatory fish holding habitats and reducing predatory fish energy expenditure. As a result, juvenile salmon moving downstream past these locations are greatly subjected to predation. This problematic scenario is seen in Figure 10 at location "B" where fish become concentrated by reduced flow entrained through the fish screens. When migrating past the screens, the fish sequentially become more and more concentrated until reaching the lower-most portion of the structure where the small salmon can become easy prey for predators residing in

the back eddies or slack water. Furthermore, even during periods when the north Delta intakes are not diverting water, young salmon would still be exposed to the predatory fish habitat in locations "A" and "B". Such problematic areas to avoid in fish screen designs have been described by others (e.g., Odenweller and Brown 1982, Vogel and Marine 1995, NMFS 1997, USBR 2006, CDFW 2010). These serious problems are not adequately described in the BDCP documents or are downplayed.

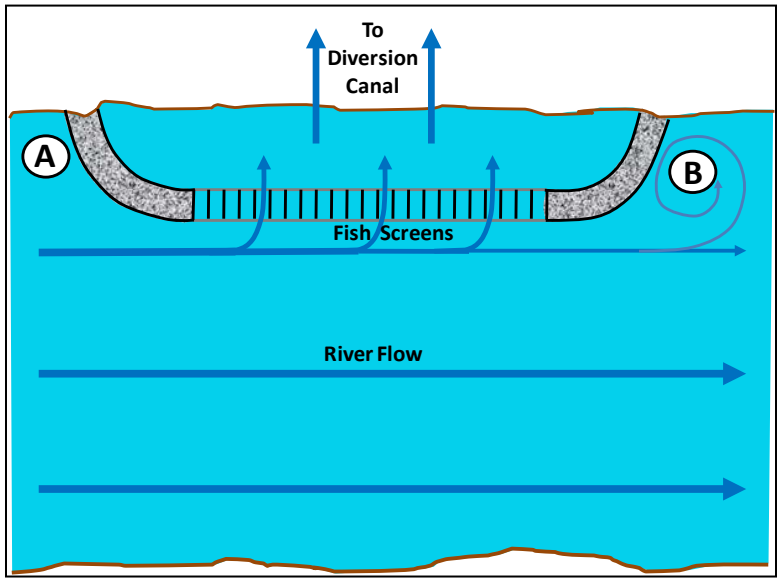


Figure 10. Top view schematic showing predatory fish habitats ("A" and "B") upstream and downstream of a hypothetical fish screen at a proposed north Delta water intake.

Notably, the BDCP portrays the positioning of the three large north Delta intakes as essentially flush with the riverbank (Figures 11 and 12). This is deceiving and makes the intake facilities look more benign than in reality. It would not be possible to construct and operate these types of facilities while subsequently providing protection for fish because of the previously- and later-described reasons. Among other problems, these configurations would not provide sufficient screen area and sweeping flows to protect salmon. The conceptual configurations displayed in Figures 11 and 12 would be unacceptable and not capable of meeting criteria for fish protection. It is not clear why the BDCP documents provide such misleading graphics when it is well known through technical details provided in NMFS (1997), USBR (2006), and CDFW (2010) such designs would fail to meet the fishery resource agencies' protection criteria for young salmonids. This is particularly disturbing because so much depends on the specific, yet undisclosed, design details of the intake facilities. The BDCP is extremely murky in regard to the critically important features of the facilities, and implies that many additional BDCP elements also lack transparency and have not used the best available scientific information. Additional fallacies in the facilities' basic designs are described elsewhere in these comments.

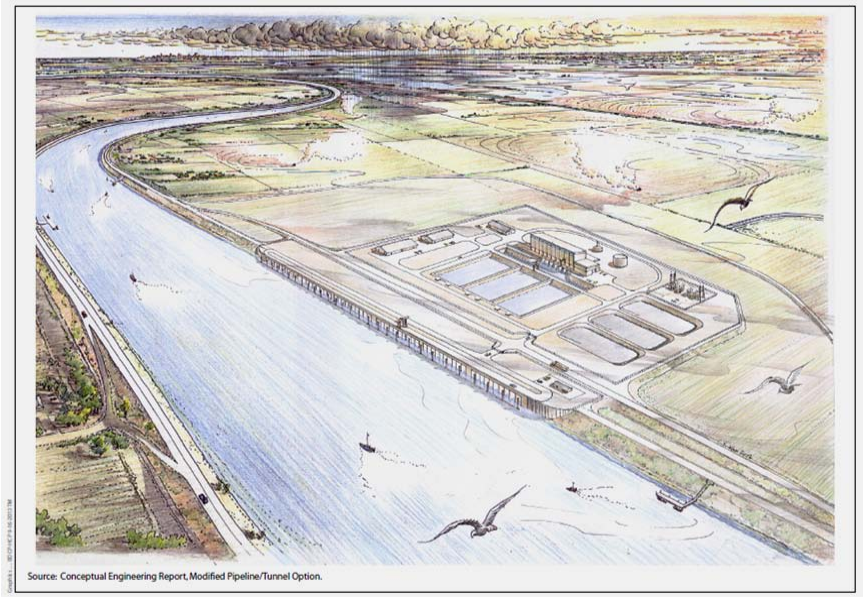


Figure 11. Conceptual rendering of a north Delta intake structure (BDCP Figure 4-7).

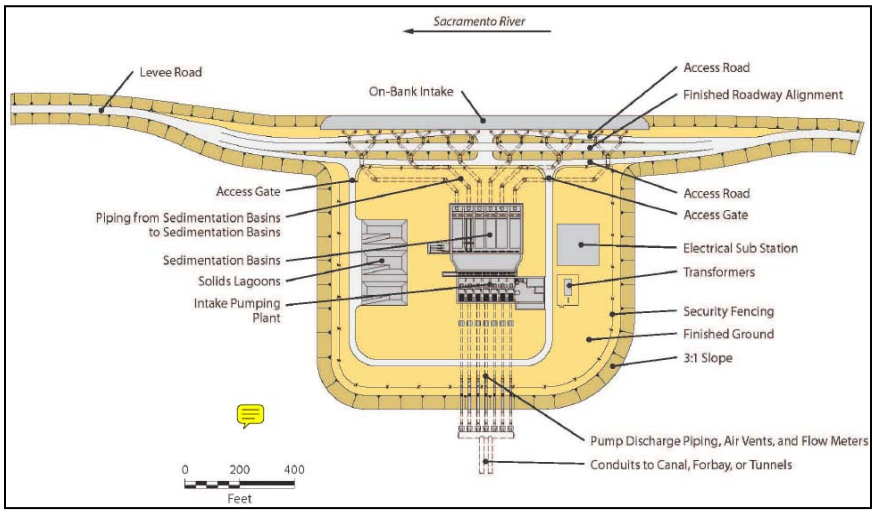


Figure 12. Conceptual intake structure for a 3,000 cfs proposed north Delta diversion (From BDCP figure 5.B.3-1 Source: Adapted from TM 20-2 Rev 0 Proposed North Intake Facilities for the Draft EIS, Figure O-5. Note that length differs from actual proposed intakes.)

The BDCP documents do not provide any information on how these serious limitations would be overcome and how negative results to fish can be avoided (other than "predator removal" and "adaptive management" discussed later in these comments). The puzzling part of the BDCP is that the river channel velocities near the proposed water intakes could have easily been empirically measured using an ADCP (e.g., Figures 2 - 3) during flow conditions when the diversions would operate in the future; theoretical modeling would not have been necessary. This deficiency is unexplained in the BDCP, and the information was not provided in the BDCP documents.

It must be emphasized that large, long fish screens of the type contemplated for the north Delta diversions using a criterion of such an exceptionally low sweeping velocity only

equal to the approach velocities through the screens have never been constructed in the Central Valley. The proposed north Delta screen would be very long [up to 1,800 feet in length (BDCP Page 4-9)], greatly exceeding the length of existing screens. The estimated fish exposure times are extreme and vastly inferior to fish protection measures designed and implemented at other fish screens throughout the Central Valley (e.g., the 1,000-foot-long GCID facility described later in these comments), and would certainly result in adverse effects on salmon. No logical basis is provided in the BDCP to support viable protection resulting from such long fish exposure times and associated substandard conditions. To the contrary, the exposure times contemplated in the BDCP strongly suggest this will be a major problem for young salmon. Fish impingement and injury can result when exposure time to the screens is too long (USBR 2006). As cited by USBR (2006), a study by Smith and Carpenter (1987) evaluated duration of exposure for salmon fry and found that over 98 percent of the salmon fry tested were able to swim for at least 1 minute (and up to 3 minutes) before impinging on the screen with a screen operating at the NMFS approach velocity criterion of 0.33 ft/s. Those findings led to the NMFS criterion that salmon fry maximum exposure to fish screens should not exceed 60 seconds (USBR 2006). Because very large numbers of salmon fry will be exposed to the expansive north Delta intake screens and exposure times will be very long (discussed below), impingement will almost certainly occur and be high.

It is also important to note that fry impingement will likely be greater during periods of high water turbidity because of significantly reduced visual stimuli to avoid screen contact. For example, Swanson et al. (2004b) indicated that young salmon impingement rates on fish screens could increase with low water visibility, including high turbidity. Existing Sacramento River intakes utilizing long, flat-plate fish screens divert water during periods of relatively high water clarity in the spring, summer, and fall irrigation seasons. In sharp dissimilarity, the BDCP intakes will operate only when flows are very turbid following significant precipitation events in the upper watershed (generally during the winter months). To summarize, the expectation is that high rates of fry impingement will occur, not only because of low sweeping velocities (and associated very long transit times past the screens – discussed below), but also because of very low water clarity when the diversions would be in operation.

The BDCP discussion concerning the estimated enormous juvenile fish exposure times along the face of new fish screens positioned in front of the proposed large water diversion structures is particularly disturbing from a fish-protection standpoint. The BDCP provides extremely important, but very brief, illustrations of the severity of adverse conditions for young salmon at the proposed north Delta intakes. This information demonstrates the high degree of significance for adequate sweeping velocities past the extremely long proposed fish screens. Experimental trials at the University of California – Davis (UCD) Fish Treadmill facility suggest that juvenile salmon would experience very long passage times past the proposed north Delta intakes because of low sweeping velocities and long screen lengths (Figures 13 and 14). As described in the BDCP, the equations of Swanson et al. (2004a), upon which Figures 13 and 14 are based, estimate that with an approach velocity of 0.33 ft/sec <u>and sweeping velocity of at least twice this</u>[8], screen passage time would range from around 30 minutes (4.4-cm fish passing an 800-foot

[8] The BDCP actually proposes a much-less protective criterion.

screen[9] during the night) to nearly 5 hours (7.9-cm fish passing a 2,000-foot screen during the day) (BDCP Page 5.B-304). Compare those estimates to the 1,000-foot-long GCID fish screens possessing higher than 2 ft/s sweeping velocities (CH2M HILL 2002) and salmon passage times of only about 10 minutes. The 225-foot-long RD 108 Wilkins Slough screen has sweeping velocities ranging from 2 to 4 ft/s (USBR 2006). The estimated fish passage times for the north Delta intakes are excessive, far exceeding values for existing Sacramento River fish screens, and will likely result in impingement and predation. Importantly, many of the salmonids encountering the north Delta fish screens will be even smaller (i.e., weaker swimmers) than the size of salmon used in the UCD tests, further exacerbating the problem. This obvious adverse impact to salmon is remarkably downplayed in the BDCP documents. As discussed below, the BDCP has suggested a major relaxation of that criterion to sweeping velocities being only equal to or greater than the approach velocities, making passage times far longer (i.e., more severe) for juvenile salmon than depicted in Figures 13 - 14. Although empirical evidence indicates adverse impacts to salmon are probable, the BDCP states that the effects are "uncertain" and would be addressed *after the screens are constructed* by "monitoring and targeted studies" and, yet again, "adaptive management" (BDCP Pages 3.4-31, BDCP Appendix 3D). This proposed BDCP approach and poor, unreasoned analyses clearly did not use the best available science.

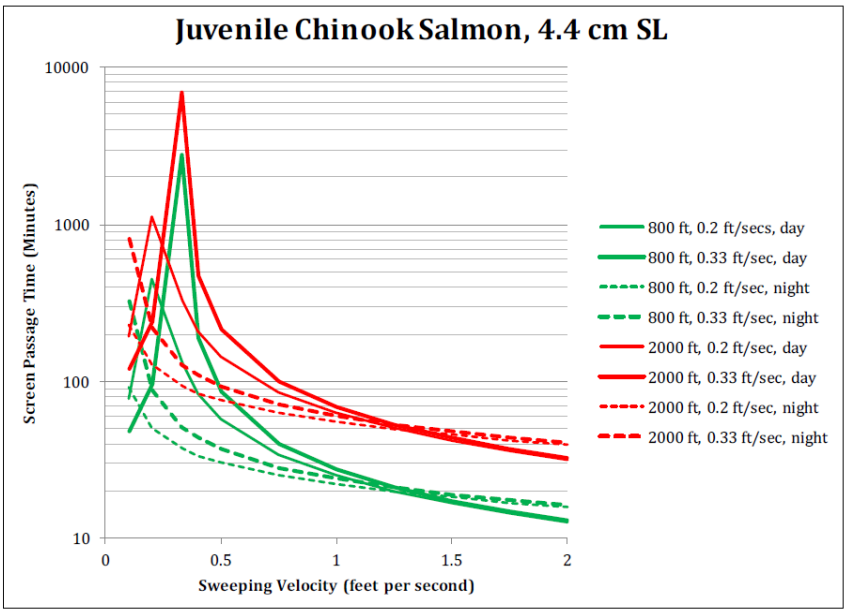


Figure 13. Estimate screen passage time for juvenile Chinook salmon (4.4 cm standard length) encountering an 800- or 2000-foot-long fish screen at approach velocities of 0.2 or 0.33 feet per second during the day and night. (from BDCP Figure 5.B.6-43)

[9] Note that the shortest proposed north Delta intake screen is 1,800 feet.

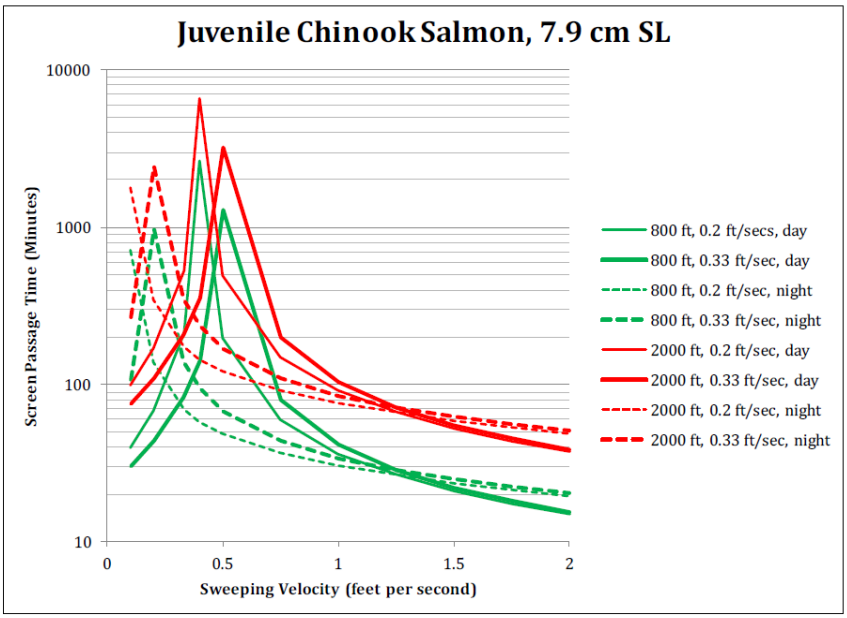


Figure 14. Estimate screen passage time for juvenile Chinook salmon (7.9 cm standard length) encountering an 800- or 2000-foot-long fish screen at approach velocities of 0.2 or 0.33 feet per second during the day and night. (from BDCP Figure 5.B.6-44)

The BDCP ignores these basic tenets of fish screen designs that have been formulated from years of extensive research and empirical studies and, instead, have used the following as a basis for the design of the fish screens:

> "North Delta intakes screening effectiveness analysis. Assessed potential for direct entrainment loss and impingement at screens for different sizes of fish based on literature and professional judgment." (BDCP Page 5.B-iii)

Although entrainment loss of salmon at the north Delta intakes would be expected to be very low, the literature and professional judgment should have indicated that impingement of salmon fry to likely be very high. The BDCP provides no scientific justification to support this serious discrepancy. It is not clear why the BDCP did not use the widely available best science concerning this critical element (e.g., Fisher 1981, NMFS 1997, Swanson et al. 2004a, Swanson et al. 2004b, USBR 2006, CDFW 2010).

It must be emphasized that all large fish screens constructed on the Sacramento River over the past 17 years were designed to meet the existing fishery resource agencies' criteria for high sweeping flows past the screens (NMFS 1997, CDFW 2010[10]). This measure was specifically implemented to protect juvenile anadromous salmonids, particularly fry (the weakest swimming life stage). Although the BDCP provides conflicting statements concerning exactly what the criteria would be for the proposed north Delta intakes, it appears that a major relaxation in that standard may be contemplated, primarily prompted by the serious physical constraints of the north Delta intake sites and ignoring protection for salmon. Based on questionable logic, the BDCP documents suggest that such a relaxation (if it does occur) is to protect small numbers of

[10] Note that CDFW updated the agency's criteria in 1997 (Petrovich 1997) to the present-day standards.

Delta smelt, not salmon (e.g., EIR/EIS Pages 3F-2, -3, -5, -7, -8, -13, -15 and BDCP Pages 5.B-311-313, 5-B-387). If the criteria are relaxed, it will likely have major adverse impacts on salmon fry originating *throughout* the Sacramento River basin. Except when the Yolo Bypass is flooding, the entire production of all runs and species of anadromous salmonids (unlike Delta smelt) must pass in front of each of the three proposed north Delta intakes (all positioned in close proximity). Impacts on salmonids could be disastrous.

Predation

The FFTT (2011) recommended that the new fish screens be designed to avoid creation of predatory fish habitat or increased vulnerability of prey. The BDCP claims that the three new fish screens at intakes on the Sacramento River will "minimize hydrodynamic conditions suitable for predatory fish". (BDCP Page 5.B-7) However, nowhere in the BDCP or EIR/EIS is it described how that near certainty will be avoided. The BDCP admittedly states:

> "… there is potential for an increase in predation risks at the north Delta intakes if they create holding habitat for piscivorous fish." (BDCP Page 5.B-303)
>
> "The north Delta export facilities on the banks of the Sacramento River likely will attract piscivorous fish around the intake structures." (BDCP Page 5.F-iii)
>
> … the proposed BDCP is expected to create new [predation] hotspots: North Delta water diversion facilities – Large intake structures have been associated with increased predation by creating predator ambush opportunities and flow fields that disorient juvenile fish." (EIR/EIS Page 3-157)

Unfortunately, the fish screen structures contemplated in the BDCP will create ideal conditions for predation on juvenile salmon and the documents provide no details on how that major problem can be avoided.

Furthermore, in the worst possible scenario for salmon, all three north Delta water intakes are to be located on the same side of the Sacramento River and in close proximity; water (and therefore fish) will be drawn toward the east riverbank. Apparently, this choice was not based on fish protection but, instead, for advantageous tunneling considerations (EIR/EIS Page 3F-15). Up to 3,000 cfs will be removed from the river at each of the three intakes but the fish will remain in the river channel. Downstream-migrating juvenile salmon will become more and more concentrated along the east bank of the river as the fish traverse the long length of each individual screen structure and arrive (if the fish do not perish from impingement or predation in transit) at the downstream end (Figure 15). This sequence of events will create a compounding concentration of fish. Predatory fish will undoubtedly become very accustomed to these ideal "feeding stations" at the lower end of each fish screen and the resultant impacts on juvenile salmon could be catastrophic. The BDCP does not describe how this serious dilemma can be avoided other than some undefined form of "predator removal" and "adaptive management" that are likely to fail (discussed later in these comments).

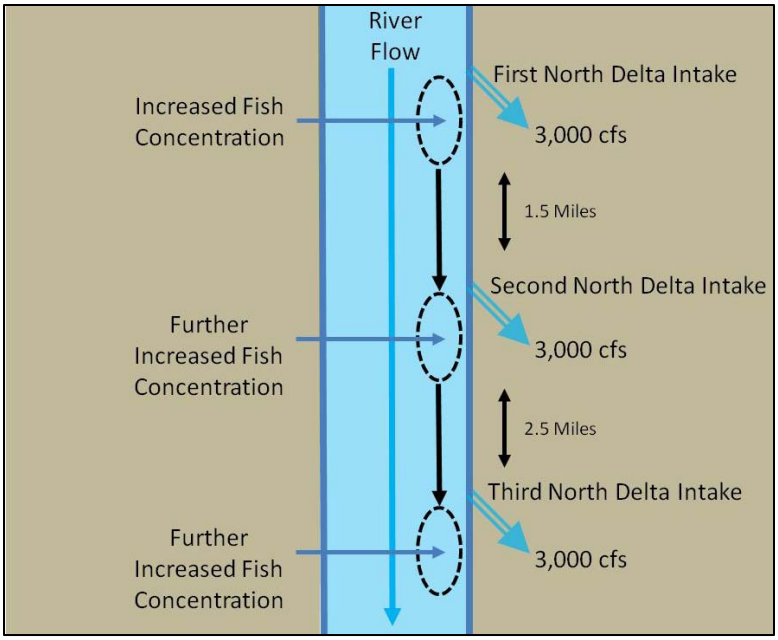


Figure 15. Conceptual plan-view schematic (not-to-scale) of the three proposed north Delta intakes on the Sacramento River and the concentrating effect on downstream migrating salmon toward the east or left bank (facing downstream).

Again, although the BDCP acknowledges this issue, no proven remedial measures are proposed to prevent it.

> "The vulnerability of covered fish to predation at the new north Delta intake structures is, to a large extent, dependent on the physical characteristic of each structure, whether fish would be concentrated or disoriented, and areas of turbulence and lower velocity refuge habitat that attract predatory fish." (BDCP Page 5.F-5)

It is important to note that the predation problem for salmon will not just exist at the lower end of the screens, but also across the entire length of the structures where salmon will experience an unquestionably long transit time and high exposure to predation. Predatory fish swimming in front of existing Sacramento River screens is already known to occur, even when sweeping velocities past the screens are very high (e.g., Figure 16). Predatory fish (e.g., striped bass) can easily swim in high velocity zones when prey (e.g., salmon) are abundant and vulnerable. This problem will be intensified with the very low sweeping velocities at the proposed north Delta fish screens where predatory fish can easily swim back and forth in front of the screens with minimal expenditure of energy. Indeed, the screen design, as presently contemplated, will provide additional "feeding grounds" for predatory fish such as striped bass and Sacramento pikeminnow that will "patrol" back and forth along the screen face. In that environment, salmonids have no protection from predation. In a very real sense, the three north Delta intakes will constitute three major gauntlets for salmon. In addition, the cumulative length of screens salmon may traverse will be nearly 1.1 miles of high vulnerability. The BDCP suggests that such structures should first be constructed, then monitored to determine if there are problems for fish. The BDCP appears to advocate the approach: "Build it and hope the fish survive."

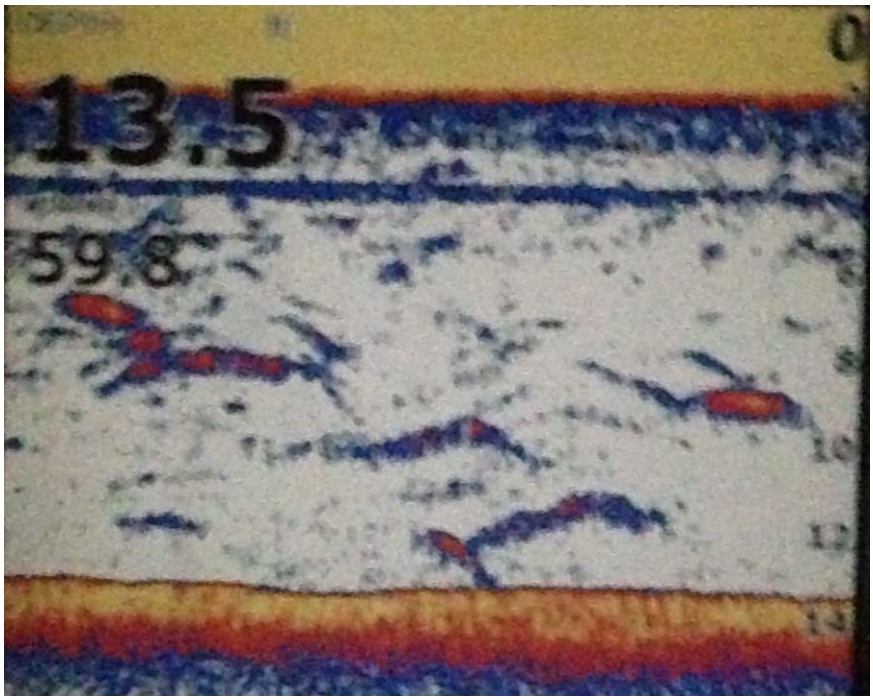


Figure 16. Depth sounder ("fish finder") image of numerous large striped bass swimming in front of a large Sacramento River fish screen. Species determined by hook and line angling. Photo by Dave Jacobs.

The BDCP states:

> "After intake structure construction is complete, the cofferdam will be flooded and the sheet pile walls in front of the intake structure removed. Sheet pile wall removal will be performed by underwater divers using torches or plasma cutters to trim the sheet piles at the finished intake structure slab grade. After removing the cofferdams, the riverbed in front of the intakes will be dredged to provide smooth hydrologic conditions along the face of the intake screens." (BDCP Page 4-10)

The last sentence of the preceding statement is very misleading and inaccurate. Dredging the riverbed in front of the cut off cofferdams will have minimal effect on hydraulic conditions along the face of the fish screens. Furthermore, the sheet pile areas described (upstream of the fish screens, along the cut off cofferdam near the base of the length of the screens, and downstream of the screens) are known areas where predatory fish may accumulate (e.g., Vogel and Marine 1995, USBR 2006). The BDCP does not explain remedial actions to avoid these problem areas for young salmon.

In addition to the convoluted sheet piles upstream, downstream, and along the base of the screens, each structure will possess additional complexities that create predatory fish holding habitat hazards for juvenile salmon. These include piles and floating booms in front of the screens and numerous large vertical wiper blades along the face of the screens. Based on an extensive literature review by Odenweller and Brown (1982), those hazards are described as follows:

> "The literature offers some assistance for minimizing and discouraging predation at the intakes and fish facilities. Piers, pilings, other supportive structures, and corners or other irregularities in a channel are referred to as structural complexities. Such structures may cause uneven flows and can create shadows and turbulent conditions. A structurally complex environment should be avoided. Corners, interstices, or other structural components that create boundary edges contribute to maximum foraging efficiency of large predatory fishes and the highest populations of predators will occur where structural boundary edges are present. Structural complexity can increase predation by providing locations for waiting predators (shadows, interstices, corners, etc.). The risk of prey to predation is a function of exposure, often directly related to the structural complexity of the system." (Odenweller and Brown 1982, at p. 48.)

Again, the BDCP does not address those known problems for salmon and, furthermore, why the readily available science on the topic was not utilized (e.g., NMFS 1997, USBR 2006, CDFW 2010).

Most importantly, the BDCP documents do not describe valid or proven remedial actions that would be undertaken to rectify predation problems when they would likely surface after the facilities are constructed. Instead, the BDCP states that it will use "adaptive management" to "inform" this predation uncertainty:

> "The uncertainty associated with predation at the north Delta intakes will be addressed with targeted research and adaptive management during implementation of the BDCP, and will also be informed by early implementation studies currently in the planning stage." (BDCP Pages 5.5.3-28 and -29)

Such ambiguous statements are inappropriate for such a potentially serious problem. The BDCP must provide descriptions of much more definitive measures for remedial actions.

Refugia Areas

In recognition of the probable adverse impacts to young salmon at the north Delta intakes from impingement and predation along the long face of the flat-plate fish screens, the BDCP recommends that fish "refugia" be incorporated into the design of the new screens (e.g., BDCP Pages 3.4-31-33, 3D-3, -10, - 28 and -29). The refugia are intended to be small resting areas along the fish screens behind racks that juvenile salmon could enter, yet would exclude predatory fish. This hypothetical concept evolved years ago from my personal underwater observations at a Sacramento River fish screen intake structure where large numbers of juvenile salmon were seen between the trash racks and fish screens: http://www.youtube.com/watch?v=kxzDCtTRiVo The FFTT (2011) report recommended that the refugia "panels" be the same length and height of a typical screen panel (15-ft wide) and be positioned approximately 100 feet apart along the entire length of each of the three new fish screens. If incorporated into the screen design, each screen would be considerably longer than without refugia. This concept is in its very early stages of experimental application and has been integrated into only one fish screen to date; it has yet to be field tested and it is entirely unknown if it will work. However, based on the one

Tehama-Colusa Canal (TCC) screen installation, the configuration (in this author's opinion) is unlikely to be favorable for salmon because of the sizing, spacing, and orientation of the racks in front of the refugia and shallow impression into the fish screen structure. The FFTT (2011) report recommended that the refugia concept be thoroughly evaluated prior to incorporation into the proposed north Delta fish screens. With such an untested theory that has enormous bearing and ramifications for fish protection, the BDCP should not be so reliant on this potential measure for salmon survival.

Because the designs of such refugia are unknown and untested, the BDCP proposes to:

> "Develop a physical hydraulic model to measure hydraulics and observe fish behavior in a controlled environment. Size/shape of refugia areas can be modified to optimize fish usage. Predators can be added to examine predation behavior near refugia (same as preconstruction study 3, *Refugia Lab Study* [Fish Facilities Technical Team 2013])." (BDCP Page 3.4-32)

and,

> "Perform field evaluation of one or more existing (or soon-to-be-completed) fish screening facilities using fish refugia. Use these data to develop understanding of expected effectiveness of fish refugia and to identify areas for improvement (same as preconstruction study 4, *Refugia Field Study* [Fish Facilities Technical Team 2013])." (BDCP Page 3.4-33)

Scale models are highly unlikely to provide useful information and data. It is this author's understanding that the one scale model of a refugia device used for the design of the new, untested TCC intake screens was conducted in clear water and artificially lighted conditions. Even when the TCC refugia are eventually evaluated, those screens are generally operated during clear-water conditions; applicability of those study results to the proposed BCDP intakes will be highly questionable. How salmon will respond to real-world conditions at the proposed BDCP north Delta intakes, with turbid water, poor (low) sweeping velocities, at night, and very long transit times along the screens are all unknown. For example, given that the BDCP intakes would be primarily operated during high Sacramento River flows when water clarity is very low, how would salmon have any visual stimuli to find and enter the so-called refugia?

Also, as mentioned previously, the BDCP failed to recognize that the north Delta intake screens will primarily operate during far different seasonal periods than when other large Sacramento River agricultural diversion flat-plate screens operate. Agricultural diversions operate in the spring, summer, and fall when water clarity is often high and the presence of anadromous fish is generally low. In contrast, the north Delta intakes would mainly be operated during the winter when water clarity is low and the presence of anadromous fish is very high. Debris loading on the fish screens and on the louvered fish refugia will be massive and unprecedented. My personal research and experience has demonstrated that Sacramento River flows during the winter possess enormous quantities of fine particulate material that could easily clog the screens and refugia. During such high river flow and debris-loading conditions, existing flat-plate screens either do not divert water or operate at only very low diversion rates. The north Delta

intakes' operations will be just the opposite, and the maintenance problems could be insurmountable. The BDCP documents provide no specific insights, guidance, and analyses on this important issue.

With so much ambivalence in the BDCP documents due to a lack of empirical data to back up these decisions, how can one determine effects on fish? Because of all the unresolved uncertainties associated with the BDCP intakes, the FFTT (2011) report recommended that the effects of phasing construction of the north Delta intakes be analyzed in the EIR/EIS. The EIR/EIS subsequently did so (EIR/EIS Appendix 3F) and found that it would not be feasible to phase the construction as advocated in FFTT (2011). The inability to phase the construction greatly increases the risk to fishery resources because if the entire three-diversion facilities are completed and post-project evaluations determine critical design features have failed, impacts on salmonids could be ruinous. Building the massive facilities is an irretrievable commitment of physical and financial resources and, by their nature, significant structural modifications are implausible. It is improbable that the multi-billion dollar facilities would be removed if harmful effects on fish were discovered at a later date.

Sedimentation

The BDCP's description of the effects of the intake structures due to suspended sediment in the river and sedimentation within the facilities lacks supporting detail that will be integral to the efficacy of the project. The brief description of the facilities downplays the likely major problem that will be experienced with heavy sediment loading behind the screens. As mentioned previously, unlike most existing Sacramento River water diversions, the BDCP's three intakes will only be operated during high-flow conditions when suspended sediment in the water column will be very elevated. As a result, the three north Delta intakes will entrain enormous quantities of sediment. However, the description of the intake facilities provides an over-optimistic portrayal of how heavy sediment loads will be accommodated:

> "Water will travel in pipelines from each intake bay to a sedimentation basin and thence to intake pumping plants." (BDCP Page 4-8)
>
> "The planned operation of proposed intakes will help mitigate sediment deposition within the intake bays and conveyance conduits." (BDCP Page 4-19)

In this regard, based on my long experience and familiarity with evaluations of the 2,700 cfs Tehama-Colusa Canal (TCC) and 3,000 cfs GCID intakes, BDCP Figure 5.B.3-1 (Figure 17 below) is misleading and the portrayed design's feasibility is questionable. I participated in evaluations of sediment depositions at the TCC and GCID intakes and water velocity distributions at the GCID intake. Based on that experience, I believe that the "footprint" of the north Delta intake facilities would probably need to be much larger than illustrated in the BDCP documents. It is debatable that the extremely small sedimentation basins shown in the conceptual diagram and very briefly described in the EIR/EIS[11] could efficiently accommodate the large quantities of entrained sediment. With up to 3,000 cfs passing through the intakes, the

[11] "The sedimentation basin would be approximately 120 feet long by 40 feet wide by 55 feet deep, and would have interior concrete walls to create separate sedimentation channels." (EIR/EIS Page 3-87)

distribution of flow into the small basins would cause high water velocities that would not allow much of the sediments to settle out of the water column; the basins appear to be too short and narrow. Likewise, the spacing between the screens and the pump intakes is extremely short and may not provide sediment-settling effects. To achieve the salmon protection criteria of approach- or through-screen velocities of ≤ 0.33 ft/s, the piped intakes' design, as presented, could create numerous irregularities causing "hot spots" of high approach velocities and prevent uniformity regardless of use of flow-control baffling behind the screens. Additionally, I have conducted many dozens of underwater inspections of fish screens and have observed large sediment accumulations immediately behind the screens (upstream of forebays and sediment basins) that have proven to be problematic. To summarize, the actual footprint of the each of the three intake facilities would appear to require a larger area than implied by the BDCP.

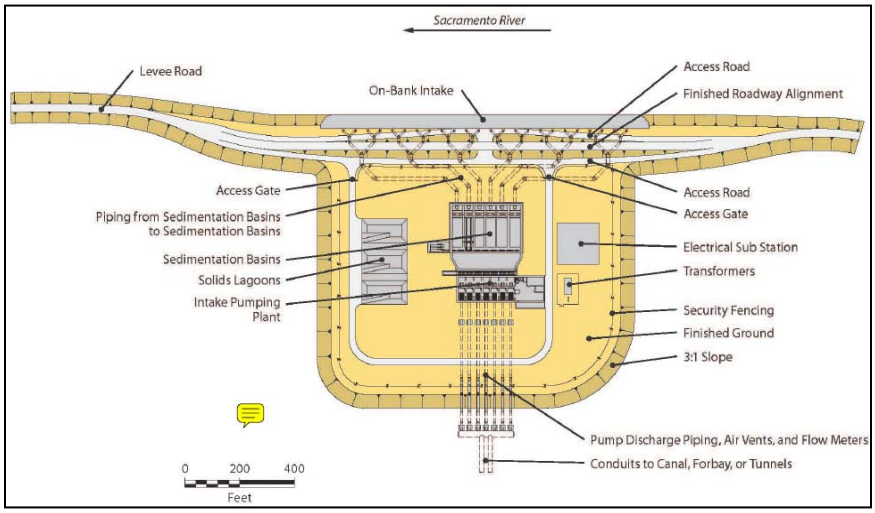


Figure 17. Conceptual intake structure for a 3,000 cfs proposed north Delta diversion (BDCP figure 5.B.3-1 Source: Adapted from TM 20-2 Rev 0 Proposed North Intake Facilities for the Draft EIS, Figure O-5. Note that length differs from actual proposed intakes.)

The following provides two empirical examples to demonstrate the foregoing concern. First, the design for the original TCC, a 2,700 cfs diversion on the Sacramento River located at the Red Bluff Diversion Dam, included a very large desilting basin at the headworks to prevent sediments from being deposited in the spawning channels of the Tehama-Colusa Fish Facilities located in the initial segments of the TCC downstream of the headworks (Figure 18). The upper portion of the TCC was designed to allow the conveyance of irrigation water and provide spawning habitats in a dual-purpose canal (which has since been abandoned) (Vogel 1983). This desilting basin was designed to settle out particles 50 microns and larger and is 0.45 miles long. Periodically, the TCC basin was dredged and the sediment was deposited into adjacent basins (Figure 18). Even with this enormous settling basin, large quantities of silt were nevertheless passed though the basin and deposited in the dual-purpose canal. The second example is a large forebay behind the GCID fish screens on the Sacramento River near Hamilton City. This design feature functions both as a settling basin to reduce silt entering the GCID main canal and provides sufficient area to accommodate uniform approach velocities through the 1,000-foot-long fish screens that include flow-control baffles (Figure 19). In both cases, the forebays are very large to accommodate less sediment loading than the north Delta intakes would experience. In sharp contrast, the design of the proposed three 3,000 cfs north Delta intakes does not

accommodate any large forebays behind the fish screens to 1) contain the certain heavy silt loads or 2) have the ability to provide uniformity in screen approach velocities (Figure 17). These anticipated major problems with the north Delta intake facilities are not described in the BDCP documents nor do the documents describe how the problems would be rectified after the facilities are built. The design deficiencies and misleading information must be reconciled and corrected in the BDCP.

Figure 18. Aerial photograph of the Tehama-Colusa Canal headworks showing the 0.45-mile long desilting basin.

Figure 19. Aerial photograph of the GCID fish screens showing the large forebay behind the fish screens and upstream of the GCID pumping plant.

Also, there is insufficient spatial orientation for flow baffles behind the screens to perform the intended function of providing uniformity of flow distribution through the screens. This circumstance will undoubtedly produce hot spots of unacceptably high through-screen water

velocities thereby creating additional hazards for young salmon by impingement. Clearly, if there is any promise of designing the north Delta intake facilities with some semblance of feasible operational capabilities, a much greater footprint for each intake may be required.

Furthermore, although the BDCP documents admit the north Delta intakes will remove large quantities of suspended sediment from the river, the documents do not adequately analyze and describe the resulting adverse impact on native fish in the Delta. Over the past three decades, there has been a reduction of turbidity (a surrogate of suspended sediment concentration) in the Delta (Hestir et al. 2010). A recent Delta Science Program workshop indicated that suspended sediment in the Delta provides significant benefits to fish. There appears to be consensus that even further reduction in turbidity and sediment in the Delta would have deleterious effects on native fish. Additionally, reduced sediment input to the Delta would also adversely impact planned fish habitat restoration projects (e.g., restoration of shallow-water habitats, wetlands restoration, etc.).

Bypass Flows

The BDCP has not adequately addressed the reduced flow in the Sacramento River downstream from the proposed multiple, large-scale water diversions positioned a short distance upstream of Sutter and Steamboat Sloughs, the Delta Cross Channel, and Georgiana Slough. When the diversions are in operation, flows in downstream areas will unquestionably be affected. And yet the BDCP provides the following incongruous statements:

> "Migration flows. Ensure that north Delta intake operations do not increase the incidence of reverse flows in the Sacramento River at the Georgiana Slough junction." (BDCP Page 3.3-139)
>
> "Operations will be managed at all times to avoid increasing the magnitude or frequency of flow reversals in Georgiana Slough." (BDCP Page 4-18)
>
> "At this point, implement Level III post-pulse bypass rule (BDCP Table 3.4.1-2) so that bypass flows are sufficient to prevent any increase in duration, magnitude, or frequency of reverse flows at two points of control: Sacramento River upstream of Sutter Slough and Sacramento River downstream of Georgiana Slough. These points of control are used to prevent upstream transport toward the proposed intakes and to prevent any more upstream transport into Georgiana Slough than under existing conditions." (BDCP Page 3.4-17)

These BDCP assertions are counter-intuitive and it is not at all clear how these measures will be accomplished.

Elsewhere in the BDCP, the documents acknowledge the physical reality of reduced flows:

> "Operation of the proposed north Delta diversions under the BDCP has the potential to adversely affect juvenile winter-run Chinook salmon through near-field (physical contact with the screens and aggregation of predators) and far-field

> (reduced downstream flows leading to greater probability of predation) effects." (BDCP Executive Summary Page 48)
>
> "Salmonids migrating down the Sacramento River generally will experience lower migration flows because of the north Delta diversions compared to existing conditions, which is a far-field effect of the north Delta diversions." (BDCP Page 5.5.3-24)
>
> "The principal BDCP effects on the mainstem Sacramento River in the Plan Area will be associated with the reductions of flow caused by operation of the new north Delta diversions. The adverse effect of this flow reduction on covered species will be minimized by maintaining minimum instream flows past the intakes, called bypass flows."
>
> "These results indicate that residence time will increase by 3 to 4 days (9 to 19%) as a result of the lower Sacramento River flow downstream of the north Delta intakes and the lower south Delta pumping under ESO for the hydrologic modeling scenarios used in the DSM2 analyses (WY 1976 through 1991)." (BDCP Page 5.3-36)

In more conflicting rationale, the BDCP suggests that reduced flow in reaches downstream of the north Delta intakes would supposedly result in more salmon entering Sutter and Steamboat Sloughs as favorable migration routes:

> "Providing an alternative migration route for salmonids (Perry and Skalski 2008) and possibly splittail, sturgeon, and lamprey that circumvents the Delta Cross Channel and Georgiana Slough, thereby reducing the likelihood of covered fish species moving into the interior Delta where they may be exposed to higher predation pressure and entrainment into the south Delta pumps.
>
> Providing high-value juvenile rearing habitat. Both slough channels support substantially more woody riparian vegetation and greater habitat diversity (e.g., water depths, velocities, in-channel habitat) than is present along the mainstem Sacramento River between Courtland and Rio Vista." … (BDCP Page 3.4-9)

Despite these purported benefits, the BDCP goes on elsewhere to provide even more conflicting statements:

> "Despite these anticipated benefits, Perry and Skalski (2009) and Perry et al. (2010) indicate that survival rates of juvenile Chinook salmon in Sutter and Steamboat Sloughs are highly variable relative to the mainstem Sacramento River. They have found that survival has been higher than, lower than, and similar to survival rates in the mainstem Sacramento River rates." (BDCP Page 3.4-9)

Therefore, how can one conclude there are benefits to salmon resulting from increased entrainment into Sutter and Steamboat Sloughs?

Adding more confusion to the topic, the BDCP states that the timing and magnitude of bypass flows for the north Delta intakes are still under consideration:

> "The magnitude of bypass flows that may be required to limit adverse effects on juvenile salmonids remains under examination by the BDCP proponents and fish and wildlife agencies." (BDCP Page 5.5.3-25 and similar statement on BDCP Page 5.5.3-20)

> "The exact triggers and responses for [Real-Time Operations] RTO at the north Delta diversions are still under development." (BDCP Page 3.4-28)

Additional confusion is added by the following statement:

> "The CALSIM model assumed that there would be some south Delta exports in all months and the monthly pattern of north Delta diversions is not fully explained by the bypass rules; there were many months when the north Delta diversion could have been higher than CALSIM estimated." (BDCP Page 5C.A-114)

It is unclear what this statement means. It suggests that impacts are likely greater than that modeled by the CALSIM model.

Given the foregoing circumstances, the BDCP documents fail to provide for meaningful review a comment on impacts to fish. In this case and many others, it appears that release of the BDCP documents was premature.

BDCP Effects on Tidal Prisms in the Delta

On an overall basis, it appears that the BDCP documents acknowledge that the three north Delta intakes will adversely impact flows and salmon distributions in areas downstream from the intakes. However, the discussion of DSM2-HYDRO model analyses provides confusing information that appears to suggest that the north Delta diversions would not adversely affect flows, in relation to salmon migration, in the Sacramento River at Georgiana Slough (BDCP Appendix 5.C, Part 3). It is unclear how detrimental flow conditions for salmon would not occur with reduced flows resulting from the upstream north Delta intakes. Elsewhere in the documents, it appears that the BDCP is reliant on future habitat restoration in the Delta to offset potential flow distribution perturbations (including reverse flows) by altering tidal prisms which would subsequently result in no significant net change in flow characteristics at areas such as the Sacramento River/Georgiana Slough flow split[12] but would alter flows into Sutter and Steamboat Sloughs (e.g., BDCP Page 3.2-3). The underlying assumptions appear to be on shaky grounds. The entire discussion on this topic in Appendix 5.C, Part 3 is ambiguous, confusing, and full of uncertainties. Furthermore, the BDCP states that this topic is the subject of "ongoing research"

[12] E.g., "However, it is concluded, based on the currently available information presented above, that changes that may occur under the BDCP because of the North Delta Diversion and tidal restoration would result in neither a greater frequency of reverse flows nor a greater percentage of flow (and fish) entering the Interior Delta at this location, compared to EBC2_ELT and EBC2_LLT conditions." (BDCP Page 5C.5.3-331)

and stresses the need for improved model calibrations. Much of the existing discussion appears to be based on speculative information, considerable modeling uncertainties[13], and, perhaps, flawed model inputs and outputs. Much more specificity is necessary to adequately describe exactly where habitats would be changed, how much impact those habitat alterations would have on tidal prisms, and exactly how flow characteristics would change at Georgiana, Sutter, and Steamboat Sloughs.

The Proposed Three New North Delta Intake Fish Screens Compared to the GCID Fish Screens

The proposed north Delta intakes would have large, flat-plate screens (not facilities) similar to those used at GCID's intake farther north on the Sacramento River near Hamilton City. Notably, the physical nature of the actual screens would be similar, but the overall facilities' designs and operations would be radically different. Much of the justification for the design of the BDCP screens was ostensibly based on knowledge acquired from experience and research at the GCID screens. However, the BDCP erroneously applied and misrepresented the findings at GCID causing serious errors in the BDCP's analyses. Those fallacies were propagated throughout the BDCP resulting in fatal flaws in the BDCP's conclusions concerning effects on juvenile salmon. The following are examples.

First, the BDCP suggests that the proposed BDCP screens and the existing GCID screens would be similar:

> "The GCID fish screens are large, on-bank diversions comparable to the diversions proposed as part of the conservation strategy." (BDCP Page 5.F-20)

However, elsewhere, the BDCP states the structures are dissimilar:

> "…the north Delta diversion design and siting are considerably different [than the GCID screens]." (BDCP Page 5.F-iii)

Nevertheless, the BDCP frequently refers to the GCID screens for comparisons of features and salmon survival estimates as a basis for the north Delta intake facilities. For example:

> "The GCID screen is the closest correlate in size to the proposed north Delta intakes, and the Vogel (2008) study represents the only known observational study of Chinook salmon predation loss associated with large water diversion structures in a lotic system." (BDCP Page 5.F-22)

[13] E.g., "There are a number of uncertainties related to large-scale restoration of tidal natural communities and transitional uplands within the Plan Area. For example, it is unknown whether the presently limiting conveyance capacity of a number of Delta channels for tidal flows may become enlarged by scouring in response to Plan Area changes in geometry resulting from habitat restoration. These factors may have consequences for the hydrodynamics at the Sacramento River-Georgiana Slough divergence and other locations." (BDCP Page 5C.5.3-331)

> "Estimates of predator abundance and predation rates [at the three proposed BDCP intakes] were developed from fish screen studies conducted at GCID (Vogel 2008)." (BDCP Page 5.F-86)

Therefore, it is highly instructive and necessary to more-accurately describe the GCID fish protective facility in comparison to the proposed BDCP intakes to clarify serious misunderstandings and misconceptions within the BDCP documents. The following provides pertinent, clarifying information.

The GCID Sacramento River pumping station is located approximately 100 miles north of the city of Sacramento on the west side of the main stem Sacramento River and 206 river miles upstream from San Francisco Bay. It is located on a side channel off the main river channel with fish screens positioned upstream of the pumping plant (Figures 20 and 21). A Fish Screen Improvement Project (Project) was constructed at the site which included (among other features):

1) an extension of the existing flat-plate screens;
2) an upgrade to the existing facility;
3) an internal fish bypass system (which was closed in 2007) to route fish through pipes and back to an oxbow outlet channel a short distance downstream of the new screens;
4) a rock training wall on the river bank opposite the screens to enhance sweeping velocities past the screens,
5) a flow-control weir in the oxbow channel (which was removed in 2007); and
6) configuration of the oxbow outlet channel to route fish back to the Sacramento River.

Additionally, a large-scale, river gradient-control structure was constructed on the main stem Sacramento River near the diversion site to ensure long-term reliability of the fish protective facilities (Figure 20) (Vogel 2008b).

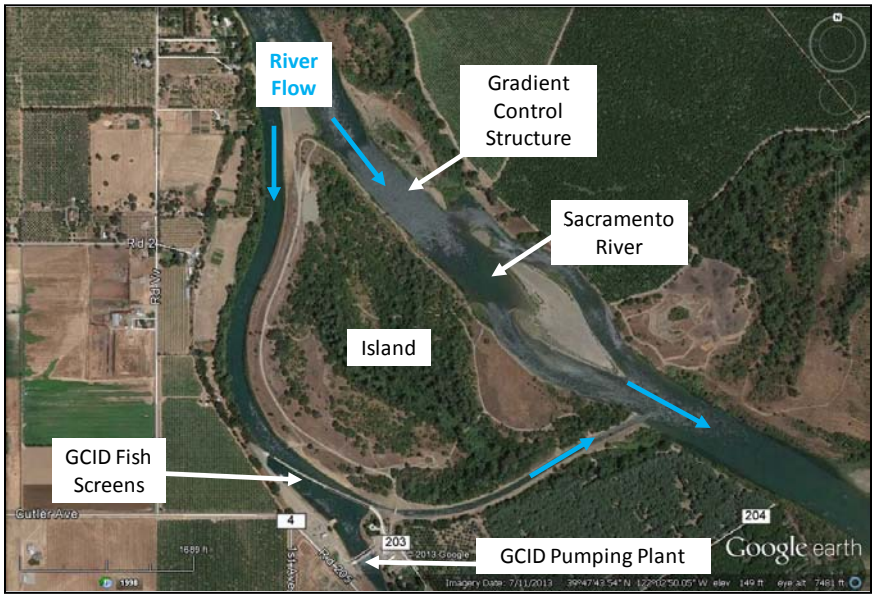


Figure 20. The GCID Hamilton City Pumping Plant and associated features of the Fish Screen Improvement Project.

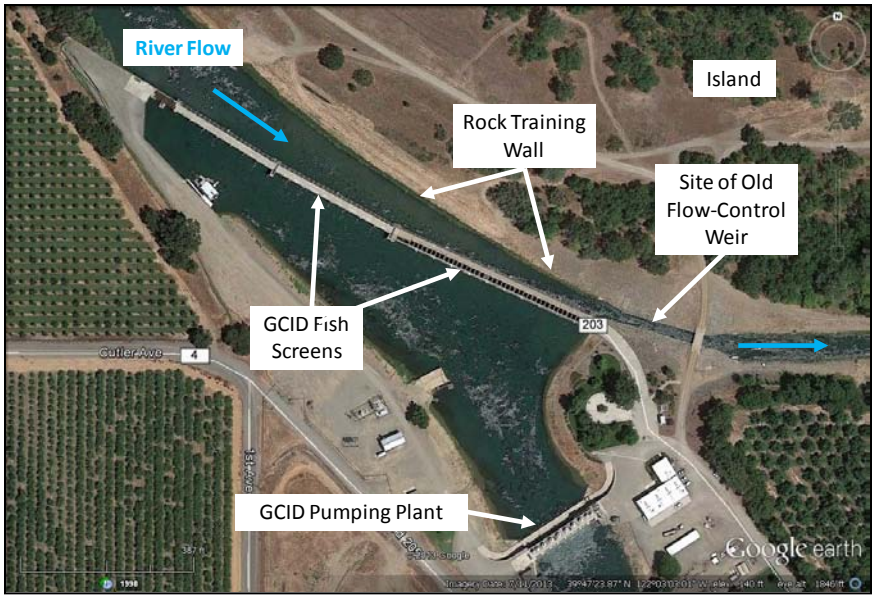


Figure 21. A close-up view of the GCID Hamilton City Pumping Plant and associated features of the Fish Screen Improvement Project.

A Fish Protection Evaluation and Monitoring Program (FPEMP) was established prior to completion of the GCID Project. A Guidance Manual was developed for the FPEMP to identify the experimental design, field methods, and equipment necessary to evaluate the biological performance of the new fish screen structure and gradient facility. The FPEMP was overseen and peer reviewed by a Technical Oversight Committee, including the California Department of Fish and Wildlife, National Marine Fisheries Service, U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, U.S. Army Corps of Engineers, GCID and other cooperating agencies. The Guidance Manual outlined extensive studies to evaluate overall fish survival at the screens, assess fish passage at the gradient facility, and determine relative abundance and distribution of predatory fish at the gradient site and nearby areas. Specifically, field tests were structured to provide empirical data in determining the effectiveness of the fish screen improvements. Biological field testing at the site (using live juvenile salmonids) was performed under a range of riverine and pumping conditions to ensure the Project provides sufficient protection for fish under future, naturally occurring conditions.

The BDCP provides misleading and inaccurate statements concerning the GCID studies:

> "The assumed 5% loss term is based on observations of acoustically tagged hatchery-raised juvenile salmon released at the GCID screens (Vogel 2008). Approximately 5% of acoustically tagged juvenile salmon migrating past the GCID fish screen were not detected downstream of the screen, presumably because they were consumed by predators. There is uncertainty in this estimate of predation loss because the lack of detections can also be due to malfunctioning of the acoustic tags or receivers, or by juvenile salmon swimming upstream out of detection of the acoustic-tag receiver." (BDCP Page 5.F-22)
>
> "In addition, a fixed estimate of 5% predation loss at each screened intakes was used, based on predation assumptions from the Glenn Colusa Irrigation District

> (GCID) facility on the upper Sacramento River (Vogel 2008)." (BDCP Page 5.F-14)

The origin of these statements is unknown but the assertions are incorrect. Vogel (2008b) used numerous salmonid mark/recapture studies as the primary method to estimate fish survival at the GCID screens, not acoustic-tagged salmon. Although acoustic telemetry was one of the many analytical methods to evaluate the fish screens, 237 fish mark/recapture experiments using several hundred thousand juvenile salmonids were conducted over a six-year period (2002 – 2007) by releasing experimental and control groups of marked salmonids; those tests were the principal basis for developing salmonid survival estimates at the GCID screen facility in Vogel (2008b). Additionally, the BDCP and its analyses failed to report the fact that the principal source of fish mortality at GCID discussed in Vogel (2008) was attributable to a flow-control weir that had been used to provide hydraulic head differential to operate the internal fish screen bypasses. In 2007, using true adaptive management resulting from the studies, the weir was removed, the bypasses were closed, and that source of fish mortality was eliminated (Vogel 2008b).

The BDCP provides additional misleading, inaccurate, and distorted statements concerning the GCID studies:

> "Uncertainties exist for striped bass densities associated with structures. Estimates of predator abundances are based on a few underwater pictures of predators observed holding around the GCID fish screens (Vogel 2008) and extrapolated to estimate predator abundances at north Delta intakes. These predators may be Sacramento pikeminnow, not striped bass, based on Vogel's (1995) review of GCID studies." (BDCP Pages 5.F-15 and -16)

The statement referencing a few underwater pictures by Vogel (2008b) is inaccurate and a mischaracterization. Additionally, the suggestion that striped bass observed at GCID were actually Sacramento pikeminnow is also erroneous and misleading. Unfortunately, the BDCP analyses used incorrect information in its attempts to model potential striped bass predation on salmon at the proposed new north Delta intakes (discussed later in these comments). To be clear, the extensive research at GCID was conducted over many years and high numbers of both striped bass and Sacramento pikeminnow were observed countless times by numerous individuals using multiple field methods including electrofishing, angling, fish traps, direct underwater SCUBA observations and underwater hand-held videography, surface-deployed underwater videography, surface observations, and extensive use of a dual-frequency identification sonar camera (DIDSON™).

The concentration of striped bass in the vicinity of the north Delta screens will undoubtedly be far greater and over longer seasonal durations than observed at GCID, the latter of which is much farther upstream of the Delta. Although striped bass seasonally migrate upstream of GCID, the vast majority of the population is in the Delta, the fish's principal freshwater habitat. High concentrations of striped bass are known to accumulate in the lower Sacramento River near structures such as a pipeline on the riverbed at Freeport just upstream of the proposed north Delta intakes (e.g., sonar camera footage showing striped bass at the pipeline:

http://www.youtube.com/watch?v=jOvjjx_10KM). Therefore, the BDCP assumptions and corresponding model results are invalid.

Although the BDCP gives confusing and conflicting information concerning how salmon survival/mortality were estimated for the proposed three north Delta intakes, those estimates were, nevertheless, based on the GCID studies (albeit, incorrectly):

> "The fixed 5% per intake loss assumption provides an upper bound of estimated losses at the north Delta diversion. Of the Sacramento Basin population of Chinook salmon smolts that reach the Delta, an estimated 3 to 10% (depending on the run) would migrate via the Yolo Bypass and would thus avoid exposure to the north Delta intakes. An estimated 12.0 to 12.8% of the migrating smolt population is assumed lost to predation, impingement, or injury as smolts emigrate past the three north Delta diversion intakes. This loss assumption, based on the Glenn Colusa Irrigation District (GCID) diversion, likely overestimates the mortality rates because the north Delta diversion design and siting are considerably different." (BDCP Page 5.F-iii)

Actually, mortality estimates at the north Delta intakes would be expected to be much higher than that observed at GCID, or just opposite of the BDCP's assumption. Because the GCID screens are located in a side channel of the Sacramento River, only a portion of the downstream migrating fish pass the screens. For example, if the side channel flow constitutes one third of the Sacramento River flow and fish are uniformly distributed with flow, only one third of the downstream migrating fish would pass the GCID fish screens. Also, downstream migrating fish originating from tributaries such as Butte Creek, Feather River, and American River are located downstream of GCID and those fish never encounter the GCID screens. Furthermore, for those salmonids passing GCID, most fish pass the site when pumping plant is not in operation or pumping is very low. Most naturally-produced salmon pass GCID's intake during the winter whereas GCID's primary diversion season is in the spring, summer, and fall.

Conversely, for the north Delta intakes, *all* of the downstream migrating fish in the entire Sacramento River basin would pass the north Delta intake screens, except during periods when the Yolo Bypass floods. Unlike GCID, most of the salmonids passing the north Delta intakes will likely do so when the diversions are in operation. Most importantly, in sharp disparity to the GCID fish screens, the north Delta intake fish screens do not possess the critically important features to control hydraulic conditions and many other features for safe salmon passage.

Because the BDCP analyses relied so heavily on the GCID studies and inaccurately portrayed that research, the entire discussion relative to the GCID screens must be rewritten to accurately represent the research findings. Furthermore, the BDCP analyses would be informed and benefit from much of the additional relevant research at GCID that was not used by the BDCP in analyzing potential effects of the north Delta intakes on salmon. Again, the BDCP has not used the readily available best available science on a topic critically essential for the BDCP analyses; this serious deficiency is not disclosed in the documents. Although the sites are significantly different, the research at GCID, spanning 14 years, provides valuable information on the topic of

fish protection at large fish screens. The following technical reports, most of which have been peer reviewed, are examples:

- Vogel, D.A. and K.R. Marine. 1995. 1994 biological evaluation of the new fish screens at the Glenn-Colusa Irrigation District's Sacramento River pump station. Natural Resource Scientists, Inc. February 1995. 77 p. plus appendices.

- Vogel, D.A. and K.R. Marine. 1995. 1995 evaluation of juvenile Chinook salmon transport timing in the vicinity of the new fish screens at the Glenn-Colusa Irrigation District's Sacramento River pump station. Natural Resource Scientists, Inc. Prepared for Glenn-Colusa Irrigation District, Willows, California. November 1995. 34 p.

- Vogel, D.A. and K.R. Marine. 1995. A technical memorandum on 1995 predation evaluations near the GCID Sacramento River pump station. Natural Resource Scientists, Inc. Prepared for Glenn-Colusa Irrigation District, Willows, California. December 1995. 17 p.

- Vogel, D.A. and K.R. Marine. 1997. Fish passage and stress effects on juvenile Chinook salmon physiology and predator avoidance abilities. Technical report prepared as supporting research for the proposed Glenn-Colusa Irrigation District fish screens. Natural Resource Scientists, Inc. February 1997. 32 p. plus appendices.

- Vogel, D.A. 1998. Riverine habitat monitoring data in the Glenn-Colusa Irrigation District's oxbow bypass channel on the Sacramento River. Report prepared for the multi-agency Technical Oversight Committee. Natural Resource Scientists, Inc. 55 p.

- Vogel, D.A. 2000. Fish monitoring in the vicinity of the future Glenn-Colusa Irrigation District gradient facility on the Sacramento River, 1998 - 1999. Report prepared for the multi-agency Technical Oversight Committee. Natural Resource Scientists, Inc. September 2000. 29 p. plus appendices.

- Montgomery Watson, Natural Resource Scientists, Inc., and Jones and Stokes Associates. 2000. Guidance Manual for the Glenn-Colusa Irrigation District Fish Protection Evaluation and Monitoring Program. Prepared for the multi-agency Technical Oversight Committee. October 2000.

- Vogel, D.A. 2003. Fish monitoring in the vicinity of the Glenn-Colusa Irrigation District Sacramento River gradient facility, 1998 – 2001 (pre- and post-construction). Report prepared for the multi-agency Technical Oversight Committee. Natural Resource Scientists, Inc. February 2003. 45 p. plus appendices.

- Vogel, D.A. 2003. 2002 biological evaluation of the fish screens and gradient facility at the Glenn-Colusa Irrigation District's Sacramento River pump station. Report prepared for the multi-agency Technical Oversight Committee. Natural Resource Scientists, Inc. October 2003. 27 p.

- Vogel, D.A. 2005. 2003 biological evaluation of the fish screens at the Glenn-Colusa Irrigation District's Sacramento River pump station. Report prepared for the multi-agency Technical Oversight Committee. January 2005. Natural Resource Scientists, Inc. 37 p.

- Vogel, D.A. 2005. 2004 biological evaluation of the fish screens at the Glenn-Colusa Irrigation District's Sacramento River pump station. Report prepared for the multi-agency Technical Oversight Committee. May 2005. Natural Resource Scientists, Inc. 24 p.

- Vogel, D.A. 2006. 2005 biological evaluation of the fish screens at the Glenn-Colusa Irrigation District's Sacramento River pump station. Report prepared for the multi-agency Technical Oversight Committee. Natural Resource Scientists, Inc. May 2006. 40 p.

- Vogel, D.A. 2007. 2006 biological evaluation of the fish screens at the Glenn-Colusa Irrigation District's Sacramento River pump station. Report prepared for the multi-agency Technical Oversight Committee. Natural Resource Scientists, Inc. June 2007. 24 p.

- Vogel, D.A. 2008. Biological evaluations of the fish screens at the Glenn-Colusa Irrigation District's Sacramento River pump station, 2002 – 2007. Final Report prepared for the multi-agency Technical Oversight Committee. Natural Resource Scientists, Inc. April 2008. 48 p.

- Vogel, D.A. 2008. Technical memorandum prepared for the multi-agency Technical Oversight Committee for the GCID Fish Protection Evaluation and Monitoring Plan Biological Evaluations. Natural Resource Scientists, Inc. December 8, 2008. 5 p.

Additionally, the following peer-reviewed technical reports provide informative material for the BDCP concerning fish protection at Sacramento River diversions.

- Vogel, D.A. 1995. Losses of young anadromous salmonids at water diversions on the Sacramento and Mokelumne rivers. Report prepared for the U.S. Fish and Wildlife Service Anadromous Fish Restoration Program. January 1995. 34 p.

- Vogel, D.A. 2013. Evaluation of fish entrainment in 12 unscreened Sacramento River diversions, Final Report. Report prepared for the CVPIA Anadromous Fish Screen Program (U.S. Fish and Wildlife Service and U.S. Bureau of Reclamation) and Ecosystem Restoration Program (California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, NOAA Fisheries). Natural Resource Scientists, Inc. July 2013. 153 p.

Fish Survival Rates at the North Delta Intakes

The estimates of juvenile salmon mortality at the three north Delta intakes have errors that likely underestimate impacts on salmon. The principal adverse effects to young salmon at the intake screens are described in the BDCP as likely attributable to predation:

> "The north Delta export facilities on the banks of the Sacramento River likely will attract piscivorous fish around the intake structures. Predation losses at the intakes were estimated using striped bass bioenergetics modeling of salmon and splittail predation, and a fixed 5% per intake assumed loss of Chinook salmon smolts migrating past the facilities. While bioenergetics modeling predicted high numbers of juvenile Chinook consumed (tens of thousands), the population level effect is minimal (less than 1% of the annual Sacramento Valley production). The bioenergetics model likely overestimates predation of juvenile salmon and splittail because of simplified model assumptions, further indicating potential predation losses at the north Delta would be low." (BDCP Page 5.F-iii)

> "Potential predation losses are estimated using two methods: bioenergetics modeling and estimates based on a presumed 5% loss per intake." (BDCP Page 5.F-75)

As an initial matter, the discussion of the percentage of juvenile salmon mortality at the north Delta intakes is very confusing and conflicting. On one hand, the predation mortality is assumed to be 5% for each intake based on assumptions buried in the appendices (e.g., BDCP Pages

5.5.3-28 and -29). This would be equal to an overall salmon mortality of 14.3% past all three intakes.[14] On the other hand, in the main body of the BDCP, overall salmon mortality in the river reach past all three intakes is assumed to be only 5% (or only 1.7% per intake) and is used as the final estimate in the modeling effort (e.g., BDCP Page 3.3-139, BDCP Page 3.3-151, BDCP Page 4-18). For reasons described in comments on CM1, such a low, optimistic mortality estimate is unlikely.

It appears that the BDCP chose the lowest estimate of salmon mortality because assumptions of higher salmon mortality would not allow BDCP fish benefits to "pencil out". This very large discrepancy is not explained or justified in the BDCP. In order to provide a more-balanced portrayal of estimated salmon mortality, it is recommended that the calculations be bracketed from a low to high[15] estimate per intake. For example, the BDCP could model the mortalities with estimates of 1%, 5%, and 10% per intake or overall mortality through river reach of intakes of 3%, 14.3%, and 27.1%, respectively.[16] Also, there is reason to believe that there may be considerable variability in salmon mortality among the three intakes. For example, the highest mortality would likely occur at the downstream-most screen because the fish would be more concentrated with river flow due to the upstream water withdrawals from the other two intakes (discussed previously).

Also, the BDCP must assume that predation mortality at the north Delta intakes would occur even when the diversions are not in operation. It does not appear that impact on salmon was taken into account. Although impingement and entrainment would not occur during non-diversion periods, predation mortality on salmon would still be evident for the previously-described reasons.

Unequal Transfer of Adverse Impacts to Sacramento River Basin salmonids from the south Delta to the North Delta

It seems that the premise of the purported BDCP benefits for Sacramento River salmonids resulting from the three north Delta diversions is to alleviate present-day adverse impacts caused by the south Delta diversions (e.g., EIR/EIS Page 31-5). The BDCP concept is to reduce south Delta diversions in wet years by diverting more water in the north Delta and then in dry years, rely on the south Delta diversions instead of the north Delta diversions (e.g., BDCP Page 5.B-11). Unfortunately, this is just opposite of favorable conditions for Sacramento River basin salmonids. In wet years, Sacramento River salmonids have a higher survival rate than in dry years. Reducing Delta inflow during wet years as a result of the north Delta diversions would be expected to reduce survival rates for Sacramento River basin salmonids, not increase them. Furthermore, under existing conditions, only a portion of the Sacramento River basin salmonids are adversely impacted by south Delta exports whereas the north Delta diversions will influence a far greater portion of the salmonids resulting in disproportionate impacts. Misleading statements in the BDCP suggest overall benefits to salmon resulting from reduced entrainment as

[14] The BDCP apparently mistakenly assumed the cumulative survival as 12% (BDCP Pages 5.5.3-28 and -29).
[15] "High" is used only as a relative comparison among three scenarios postulated here. For example, actual mortality could be higher than 10%.
[16] **Scenario 1:** $.99^3$ x 100% = 99% survival or 1% mortality. **Scenario 2:** $.95^3$ x 100% = 85.7% survival or 14.3% mortality. **Scenario 3:** $.90^3$ x 100% = 72.9% survival or 27.1% mortality.

a result of the BDCP. Entrainment reduction, as portrayed in the BDCP, is linked to the south Delta export facilities, not north Delta intakes. Entrainment reduction at the south Delta facilities does not offset the higher adverse impacts caused by impingement and predation anticipated at the north Delta intakes.

These problems are alluded to in the BDCP documents but they are not expanded upon at appropriate, more-prominent places. For example:

> "Improved flow management will be achieved primarily through relocation and operation of the primary point of diversion to the north Delta. This change in water operations is expected to reduce entrainment in the south Delta but may increase impingement and predation-related losses in the north Delta depending upon water- year type and model used to evaluate these elements (Appendix 5.B, *Entrainment*)." (BDCP Page 3.3-148)

New North Bay Aqueduct Diversion Impacts

The BDCP also proposes to provide a new, alternative intake for the North Bay Aqueduct:

> "Combined operations of a new intake on the Sacramento River and the existing intake at Barker Slough will be included under covered activities for future peak demand of up to 240 cfs." (BDCP Page 4-29)
>
> "Changes to the North Bay Aqueduct's Barker Slough Pumping Plant and its proposed alternative intake on the Sacramento River will represent no change to this attribute for salmonids because the intake is currently screened and will remain so in the future, at both locations." (BDCP Page 5.5.3-18)

It is not clear if the effects of this new intake on Sacramento River salmonids were evaluated. If not, there should be analyses of the effects of that intake resulting from potential impingement, predation, and reduced bypass flows downstream of the new diversion.

Conservation Measure 2 (CM2): Yolo Bypass Fisheries Enhancement

Conservation Measure 2 is described in the BDCP as a key element of the strategy to improve survival of covered fish species. However, as described in Appendix 3D, Monitoring and Research Actions, a primary incertitude with this measure is, "Do the modifications at Yolo Bypass function as expected, and if so, how effective are they?" (BDCP Page 3.D-30). To address this, the BDCP identifies 10 main "Potential Research Actions". Despite having no idea of the level of success, the BDCP advances this measure under the strong assumption it will bring about major benefits to fishery resources. Although inundation of the Yolo Bypass under certain conditions may generate favorable conditions for salmon, it is important for the BDCP to

not overstate the currently unknown benefits and portray the potentially positive effects on salmon with a high degree of confidence.[17] For example, the BDCP states:

> "Growth and survival of larval and juvenile fish can be higher within the inundated floodplain compared to those rearing in the mainstem Sacramento River (Sommer et al. 2001b)." (BDCP Page 3.4-41, BDCP Page 3.4-42, EIR/EIS Page 3-122
>
> "However, an increase in the frequency, duration, and extent of inundation of the Yolo Bypass will be achieved and will contribute to an increase in the extent of suitable rearing habitat and the abundance of food available to juvenile salmonids, which is expected to contribute to an increase in survival." (BDCP Page 3.3-143)
>
> "Shallow-water habitat of floodplains provides for higher abundances of food and warmer temperatures which promote rapid growth. This results in larger out-migrants (Sommer et al. 2001a, 2001b), which presumably have higher survival rates in the ocean compared to mainstem Sacramento River out-migrants." (BDCP Page 5.5.3-1)
>
> "The Yolo Bypass provides a relatively high survival migration route through the lower Sacramento River." (BDCP Pages 5.5.4-3 and -4)
>
> "Sommer and coauthors (2001) examined the survival issue during 1998 and 1999 studies by conducting paired releases of tagged juvenile salmon into the Yolo Bypass and the Sacramento River. They found that the Yolo Bypass release groups had somewhat higher survival indices than the Sacramento River." (BDCP Page 5.F-80)
>
> "Other studies indicate that the relative survival of Chinook fall-run fry migrating through Yolo Bypass to Chipps Island was on average 50% higher than fish passing over the comparable section of the Sacramento River (Sommer, Harrell, et al. 2001)." (BDCP Page 3.3-143)

An examination of the original source document reveals the prior statements are incorrect in the level of conviction:

> "Sommer et al. (2001) examined the survival issue by doing paired releases of juvenile coded-wire-tagged salmon in Yolo Bypass and Sacramento River to obtain comparative data. They found that the Yolo Bypass release groups had somewhat higher survival indices than Sacramento River fish in both 1998 and 1999, but the sample size (n=2 paired releases) was too low to demonstrate statistical significance." (Sommer et al. 2001)

[17] This discussion is not intended to refute the assumption of potential importance of salmon rearing in the Yolo Bypass, but rather point out that the BDCP should be more cautious and scientifically objective in its discussion and analyses of the topic.

Also, the BDCP did not report the differing salmon survival information available in a more-recent report by Sommer et al. (2005). In a comparison of the survival of groups of coded-wire tagged salmon released into the Yolo Bypass with salmon released into the Sacramento River downstream of the Bypass, Sommer et al. (2005) found that estimated survival of fish released in the Yolo Bypass was higher in 1998, similar in 1999, and lower in 2000 (Table 1). This pattern of overstating positive results and downplaying negative results is prevalent in the BDCP documents and analyses.

Table 1. Number of coded-wire tags recovered in the ocean sport and commercial fisheries for Chinook salmon released in the Yolo Bypass and Sacramento River. The total number of tagged fish released in each location for each year is shown in parentheses. The survival ratio is calculated as the number of Yolo Bypass recoveries divided by the number of Sacramento River recoveries. (Table from Sommer et al. (2005)

Release Group	1998 (53,000)	1999 (105,000)	2000 (55,000)
Yolo Bypass	75	136	27
Sacramento River	35	138	47
Survival Ratio	2.14	0.99	0.57

In yet another example of the BDCP overemphasizing or mischaracterizing potential benefits of the BDCP, it states:

> "In the Yolo Bypass, Sommer et al. (2005) found the potential stranding losses are offset for juvenile Chinook salmon by the improvement in rearing conditions." (BDCP Page 5C.5.4-7)

In fact, the authors of that source document did not make that conclusive statement:

> "In the case of highly variable seasonal environments such as floodplains, stranding losses might cause excessive mortality in some years, but the risks ***may be*** offset by increased rearing habitat and food resources in other years (Sommer et al. 2001b, Brown 2002) (emphasis added)."

This is another example of the BDCP overstating potential fish benefits and understating possible detriments.

Although the BDCP CM2 is portrayed as one of the largest benefits to juvenile salmon that may result from the BDCP, obscure, contrary information buried throughout the BDCP documents indicates the benefits may be unsubstantial or could be offset by negative impacts at the north Delta intakes. For example, BDCP Table 5.F.6-5 (below) suggests overall negative outcomes for salmon, but downplays those impacts elsewhere in the BDCP.

Table 5.F.6-5. Average Proportion of Chinook Salmon Smolts Reaching the North Delta that Enter Yolo Bypass or Survive to the North Delta Diversion Reach, and the Average Proportion Smolts Lost at the North Delta Intakes

Race	ESO_ELT			ESO_LLT		
	% Enter Yolo Bypass[1]	% Survival to NDD[2]	% Loss at NDD Complex[3]	% Enter Yolo Bypass[1]	% Survival to NDD[2]	% Loss at NDD Complex[3]
Winter-run	12%	93.07%	11.69%	12%	93.07%	11.67%
Spring-run	9%	93.12%	12.10%	9%	93.12%	12.09%
Fall-run	4%	93.17%	12.80%	4%	93.17%	12.82%
Late fall–run	4%	93.08%	12.80%	4%	93.08%	12.81%

Notes:

[1] Proportion of emigrating Sacramento River Basin smolt population entering Yolo Bypass.

[2] Proportion of migrating smolts surviving to north Delta intakes (survival between Fremont Weir to north Delta Intake reach) estimated by the Delta Passage Model (DPM).

[3] Proportion lost at the north Delta intakes based on NMFS assumption of 5% loss per intake (3 intakes total) for the group that passes the north Delta diversion complex.

> "In summary, the DPM results for winter-run Chinook salmon demonstrate that survival under the ESO scenarios generally was similar to, or slightly lower than, that of the EBC scenarios because there was a balance between elements contributing to higher survival (greater use of the Yolo Bypass and lower south Delta exports under ESO scenarios) and elements contributing to lower survival (lower survival in the Sacramento River mainstem and Sutter-Steamboat Sloughs because of the north Delta diversions under ESO scenarios)." (BDCP Page 5C.5.3-66)

The BDCP documents suggest that a primary benefit of CM2 is to "route" more salmon through the Yolo Bypass to avoid potentially negative effects resulting from exposure to the three north Delta intakes. For example:

> "The proportion of the population that may use the Yolo Bypass as an alternate migration corridor, as opposed to the mainstem Sacramento River, may be relatively small, but those fish that do migrate through the Yolo Bypass will not be exposed to the north Delta intakes." (BDCP Page 3.3-141)
>
> "*CM2 Yolo Bypass Fisheries Enhancement* intends to improve passage at the Fremont Weir and increase Yolo Bypass inundation, which may reduce predation risk on migrating covered fish by providing a migration route with potentially lower predation and entrainment risk (i.e., avoiding the north and south Delta diversions)." (BDCP Page 5.F-6)

These assumptions may ultimately be true if the Fremont Weir facilities are built. However, it is not clear if the BDCP analyses and modeling efforts accounted for the fact that, because of reduced flows in the Sacramento River downstream of Fremont Weir, the salmon remaining in the river will be more concentrated and may suffer higher mortality rates compared to the existing environmental baseline. If this circumstance was not analyzed, it should be addressed. If the scenario was addressed, the description of the analyses should be made clearer.

The BDCP documents should re-examine the specific spatial-temporal distribution of fry and juvenile salmon (all runs) and steelhead that may enter the Yolo Bypass under different water-

year types. There appear to be discrepancies at different locations in the documents. This is important because those errors would carry through to subsequent analyses of potential benefits or detriments to the different runs and species. In this regard, an excellent database on the emigration of juvenile salmon has been developed by CDFW in the lower Sacramento River. CDFW operates two eight-foot-diameter rotary screw traps a half mile downstream of Knights Landing at Sacramento River mile 89.5. Among other purposes, the CDFW fish monitoring program is conducted to determine the timing and relative abundance of juvenile anadromous salmonids emigrating from the upper Sacramento River system (Vincik and Bajjaliya 2008). While the BDCP documents mention this sampling program and used some of the data in part, it is not clear if the BDCP fully utilized the appropriate data for the CM2 analyses and fish models (discussed later in comments on the BDCP fish models).

Juvenile salmon downstream migrations tend to occur in groups and pulses; these pulses may correspond to increased flow events and turbidity (Vogel 2011a, 2012b). For example, USFWS salmon research by Kjelson *et al.* (1982) and Vogel (1982, 1989) reported increased downstream movements of Chinook fry corresponding to increased river flows and turbidity, respectively. Young Chinook salmon may migrate downstream from the mainstem Sacramento River and its tributaries into the Sacramento-San Joaquin Delta as pre-smolts (fry and parr) or as smolts. The majority of the salmon emigration during wet winter conditions occurs during January through March (Vogel and Marine 1991). Storm events increase river flow and turbidity which causes many salmon to either volitionally or non-volitionally move from the upper river to the Delta. A later emigration of juvenile salmon occurs during spring as smolts, if the fish have not already left the primary rearing grounds in the upper river (Vogel 2013). Those characteristics are clearly demonstrated in detail by the CDFW fish sampling program. It appears that the BDCP documents used a more-generalized, composite type of analysis (including the sections on fish modeling) instead of a more-detailed scrutiny of salmon run emigration variability (using the CDFW database) in relation to specific hydrologic and riverine conditions (e.g., BDCP Pages 5C.4-46-47). Again, this should be clarified in the BDCP documents and checked for consistency.

Fremont Weir Fish Passage

CM2 is not possible without remedial fish passage measures at Fremont Weir in the northern Yolo Bypass. There are two primary issues with Fremont Weir fish passage:

1) The blockage of upstream migrating adult anadromous fish (salmon and sturgeon) at the weir when flows over the weir cease.
2) The passage of juvenile salmon over the weir into the Yolo Bypass.

The BDCP has largely tied these two issues together, making it difficult to evaluate the topics independently. For example, it is unclear what specific measure or suite of measures would be implemented at Fremont Weir to improve fish passage. At different locations in the BDCP documents, there are discussions of “notching” the weir, lowering a portion of the weir, modifying the weir, installing an operable gate facility, installing new weir gates, installation of a gated seasonal floodplain inundation channel, adding new adult salmon ladders, adding new adult sturgeon ladders, evaluating experimental sturgeon ramps, adding “auxiliary” fish ladders,

etc. The BDCP appears to throw a hodgepodge of fish passage concepts at this issue, confusingly juxtaposing different jargon, with little regard as to the feasibility or practicality of the potential measures and how the different concepts would be integrated or used independently. Making the topic even more difficult to assess is that the BDCP provides no details on the designs, operations, or effectiveness of the various measures:

> "The efficacy of the passage improvements at the Fremont Weir and other locations in the Yolo Bypass (e.g., Lisbon Weir) cannot be estimated but will be monitored, and adjustments will be made through adaptive management." (BDCP Page 3.3-145)
>
> . .. should improve [sturgeon] passage over Fremont Weir, although there is low certainty that this will occur because those attributes have not yet been identified." (BDCP Page 5C.5.3-343)
>
> "Evaluations of the impacts of improvements to the Fremont Weir to increase inundation of the Yolo Bypass and reduce passage delays at the Fremont Weir have shown positive and negative effects." (BDCP Page 3.3-153)

The entire discussion of Fremont Weir fish passage should be reorganized to clarify (in a logical, sequential format), exactly what is being proposed with details on each separate proposal, including the pros and cons, and how the different measures would work independently or in concert.

Importantly, rectifying the problem of adult salmon blockage at Fremont Weir should (and likely will) occur independent of the BDCP. There is no reason why this dilemma for fish cannot be pursued absent the BDCP. This predominant problem for salmon has been known for many decades. The existing so-called Fremont Weir fish ladder is really nothing more than a solitary, very small, rectangular notch in the weir (Figure 22). A variety of non-controversial measures could be implemented to significantly reduce this problem, but no progress has been made. The 2009 NMFS Biological Opinion requires DWR and USBR to improve salmon passage at the site[18]. Progress has languished and ongoing destructive impacts to salmon continue. Other fish restoration programs (e.g., CVPIA) could employ actions to improve fish passage at the weir separate from the BDCP implementation.

[18] Reasonable and Prudent Alternative Action I.7 (Reduce Migratory Delays and Loss of Salmon, Steelhead, and Sturgeon at Fremont Weir and Other Structures in the Yolo Bypass).

Figure 22. The Fremont Weir "fish ladder". Photo by Dave Vogel.

Additionally, adult fish stranding has been known to occur in a deep pool just downstream of the weir for many years (Figures 23 and 24). This site is on California State land and could easily be filled in to eliminate stranding, but no progress has been made.

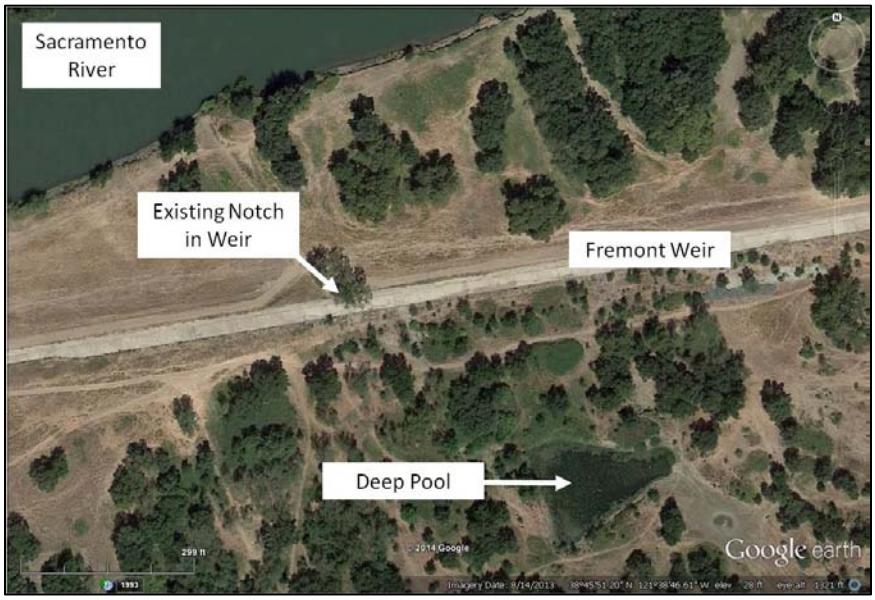


Figure 23. Aerial photograph of the deep pool just downstream of Fremont Weir where adult fish have been stranded.

Figure 24. Deep pool just downstream of Fremont Weir where adult fish have been stranded (see Figure 23). Photo by Dave Vogel.

Furthermore, there are culverts or unimproved road crossings on the northeast side of the Yolo Bypass in the Tule Canal that can trap juvenile salmon when flood flows recede in the Bypass (Figure 25 and 26). When entrapped upstream of these culverts or crossings, salmon perish from eventual warm water temperatures or predation, unless subsequent flooding of the Bypass occurs the same season. Timing of the flooding events cannot be controlled but physical features in the Tule Canal can be altered. These areas can be easily fixed at relatively low cost and are non-controversial. For example, operable gates combined with new road crossings would allow salmon to emigrate and still maintain the integrity of the crossings.

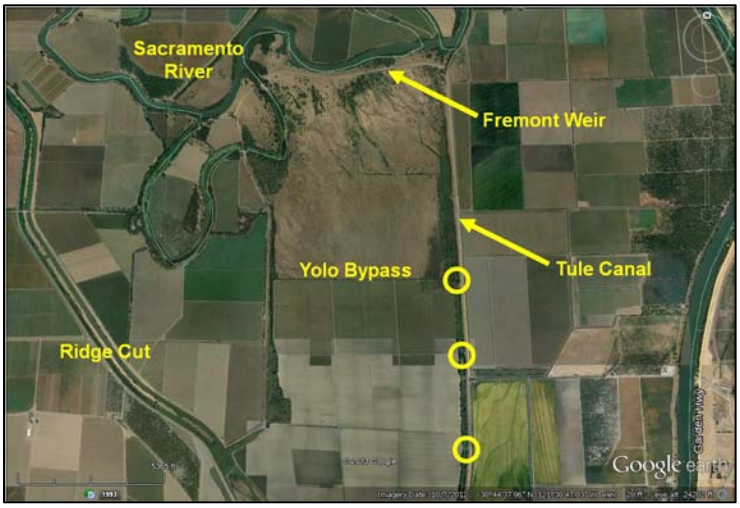


Figure 25. The northern portion of the Yolo Bypass showing the locations (circles) where new structures would be installed in the Tule Canal to improve juvenile salmon survival.

Figure 26. A culvert and unimproved road crossing in the Tule Canal. Photo by Dave Vogel.

Despite the 2009 NMFS Biological Opinion, there does not appear to be sufficient incentive by appropriate agencies to rectify these significant problems at this time. Remedial actions do not have to wait for the BDCP and could begin now in an incremental fashion. This false dichotomy presents CM2 as an all-or-none package which delays significant fishery restoration actions. If these problems, and others discussed in these comments, are fixed in advance of the BDCP, the potential fish benefits of the BDCP become less positive.

Adult Salmon Straying into the Colusa Basin Drain (CBD)

An important issue that continues to be unresolved in the BDCP is the serious problem with straying of adult salmon into the CBD. For those salmon that are attracted to flows exiting the southern portion of the Yolo Bypass in northern Cache Slough, some apparently enter the Ridge Cut and end up stranded in the CBD and perish. With increased flows into the Yolo Bypass resulting from the "notch" in Fremont Weir, more adult salmon may end up straying into the CBD without corrective measures. First, with increased flow entering Cache Slough, more adult fish would be expected to be attracted into the Bypass and if those fish are attracted to flows exiting the Ridge Cut and not the Fremont notch, those fish cannot re-enter the Sacramento River. Second, even with a notch in the weir, when flows subsequently recede to elevations lower than the notch, there still will be a threshold when fish passage has to be accommodated to prevent fish stranding. The BDCP does not provide any specific recommended solution for this problem even though increased frequency of Yolo Bypass inundation may exacerbate the problem. Instead, the documents recommend constructing and testing un-described, flood-neutral fish barriers "to prevent fish from straying into Knights Landing Ridge Cut and the Colusa Basin Drain." (EIR/EIS Page 3-127). Here again, much like the remedial actions described above, this action could be undertaken currently, and need not be delayed for the BDCP.

Relationship to the NMFS (2009) Biological Opinion (BiOp)

It is unclear why the BDCP apparently believes that DWR and USBR need not pursue the reasonable and prudent alternatives (RPAs) in the 2009 NMFS Biological Opinion related to upstream and downstream fish passage in the Yolo Bypass separately from the BDCP. The BDCP in fact argues that the Yolo Bypass RPAs will only be done through the BDCP and not taken up independently as indicated by the actuality that those RPAs were not included in the BDCP environmental baseline and other statements in the BDCP documents (e.g., EIR/EIS Pages 3-44 and 3-45). The BDCP largely claims the CM2 measures will provide bigger and better benefits for fish and, therefore, it makes more sense to only follow those measures collectively through the BDCP and not the 2009 NMFS RPAs. Additionally, with the advent of an EIR/EIS specific to Yolo Bypass fisheries enhancements, the BDCP suggests that process will take many years and cannot be accommodated through the 2009 NMFS RPAs. A progress report on the Yolo Bypass Salmonid Habitat and Fish Passage EIR/EIS at a March 20, 2014 meeting of the Yolo Bypass Fishery Enhancement Planning Team indicated that process is still in its infancy and substantial delays are expected even beyond that indicated in the BDCP. The BDCP also asserts that regulatory permits for the Yolo Bypass RPAs and the BDCP will take many years, and therefore, the agencies may as well pursue those permits under just one time frame: the BDCP's.

The BDCP evidently has inextricably linked BDCP CM2 to the 2009 NMFS BiOp Yolo Bypass RPAs such that DWR and USBR have no intention of pursuing those actions independently of the BDCP. It begs the question: What if the BDCP is not implemented? Many years will (and already) have passed without pursuit of beneficial actions for anadromous fish (particularly threatened and endangered fish) (e.g., reduced blockage of salmon at Fremont Weir and fish stranding discussed previously). There is nothing to prevent DWR and USBR from pursuing incremental beneficial actions on the NMFS RPAs such as those described above. The prominent step of "notching" the Fremont Weir to provide up to 6,000 cfs into the Yolo Bypass is the one measure that appears to be holding up progress toward implementation of all the other beneficial actions that are lower in cost, could be implemented in a more-rapid time frame, are much less controversial, and have unquestionable, immediate benefits to salmon. There is no need to link all of the associated actions within CM2 into a single package. The BDCP appears to be claiming credit for many Fremont Weir/Yolo Bypass improvements that are supposed to occur under the NMFS BiOp.

Conservation Measure 6 (CM6): Channel Margin Enhancement

BDCP CM6, channel margin habitat improvements, show promise for juvenile salmon rearing in the Delta, but it is not presently known exactly how to accomplish that objective. The BDCP touts admirable advocacy for providing benefits for salmon, but also acknowledges the lack of confidence on exactly how to do so:

> "There is uncertainty, however, about the effectiveness of channel margin restoration to increase the survival of juvenile salmonids passing through the Delta. Enhancement of 20 linear miles of channel margin was deemed to be

> sufficient to determine the effectiveness of enhancing channel margin habitats to increase survival." (BDCP Page 3.A-37)

The BDCP suggests adding woody debris at channel margins in the Delta as a means to increase rearing habitat quantity and quality for salmonids:

> "Install large woody debris (e.g., tree trunks, logs, and stumps) into constructed benches to provide physical complexity. Use finely branched material to minimize refuge for aquatic predators. Large woody debris will be installed to replace debris lost during enhancement; woody debris also is expected to increase or be replaced over time through recruitment from adjacent riparian vegetation." (BDCP Page 4-40)

Although such measures have demonstrated to work well for juvenile salmon in upstream riverine habitats, those practices have yet to prove success in the Delta. Such measures may actually create ideal conditions for predatory fish and worsen conditions for salmon in the Delta. The BDCP acknowledges this concern:

> "Because actions under CM6 have the potential to provide habitat for nonnative predatory fish, monitoring will evaluate the use of enhanced channel margin sites and associated woody debris by predators." (BDCP Page 4-40)

It is recommended that pilot projects on this measure be implemented and evaluated soon in the Delta; it should not wait for the BDCP.

Alternatively, the BDCP ought to provide more emphasis on the measure to increase the quantity and quality of salmon rearing habitats in the Delta channel margins through set-back levees and shallow-water habitats that are presently severely lacking in the region. As mentioned by Lindley et al. (2009): "One of the most obvious alterations to fall Chinook habitat has been the loss of shallow-water rearing habitat in the Delta." In Delta studies where fish sampling to compare shallow beaches with rip-rapped zones was achieved, salmon fry densities were higher in shallow beach areas (McLain and Castillo 2009). An obvious restoration measure which should be pursued to a larger degree because of its high probability of success is the re-creation of shallow, near-shore water habitats that juvenile salmon favor in the Delta (as contrasted to flooded islands). Importantly, these sites must be designed to avoid creation of predatory fish habitats and established in locations likely to be utilized within the principal fish migration corridors (Vogel 2011a, 2012a).

Creation of new shallow-water rearing habitats would likely have considerable merit toward salmon restoration. The Golden State Salmon Association has proposed such projects that could be incorporated into the BDCP process or other fishery restoration programs (Figure 27).

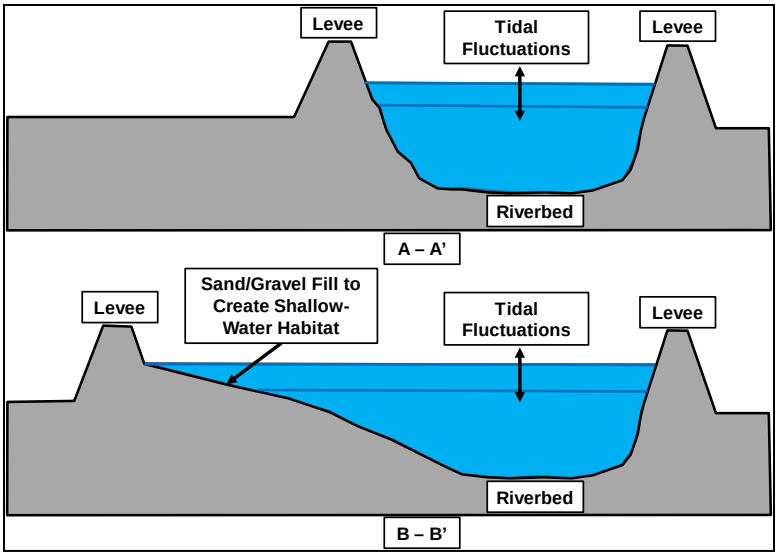


Figure 27. Conceptual before and after cross-sectional channel profiles of a shallow-water habitat restoration site with a set-back levee. Figure from Golden State Salmon Association Project Proposal D.15: Re-create shallow-water rearing habitats for salmon in the primary Delta migration routes while minimizing predatory fish habitat.

By its own admission, the BDCP states that salmon fry and smolts need safe habitats on the edge of the river channel to reduce exposure to predators.

> "However, enhanced channel margins are expected to facilitate safe downstream migration by increasing the habitat complexity that is needed for both smolts and fry to escape predators." (BDCP Page 3.3-45)

That admission in the BDCP is a counter-argument against the supposed benefit of the three new, large fish screen facilities (CM1). The above BDCP statement could be re-worded for CM1 to state: "However, worse channel margins caused by CM1 are expected to impede safe downstream migration by decreasing the habitat complexity that is needed for both smolts and fry to escape predators". CM1 will eliminate long reaches of upstream edge habitats important for salmon but CM6 is promoted to create edge habitats in downstream areas. Again, this points to the question why CM1 is proposed as a conservation measure because it appears that CM6 is proposed, in part, to offset the adverse impacts caused by CM1.

Conservation Measure 15 (CM15): Localized Reduction of Predatory Fishes

The BDCP CM15 is an unorthodox approach to a so-called conservation measure. By first implementing the plan, then exploring ways to control predator problems afterwards is highly unusual and not credible. The fact remains that there are numerous areas in the Delta where localized predation "hot spots" have long been known to occur, yet no actions have been taken to fix those problem areas. From a practical, logical standpoint, CM15's proposed effectiveness must first be demonstrated by: 1) initially working on alleviating predation problems at existing areas and 2) learning from those actions prior to building massive new structures. For example, the severe predation problem areas in front of the Tracy Fish Facilities and immediately behind the Clifton Court Forebay gates have been known for decades. It should be proven that those

areas can be fixed prior to building the north Delta intakes. The lack of progress in addressing known predation problems at existing export facilities does not inspire confidence that predation problems at the proposed north Delta diversions would be handled effectively. The credibility of the BDCP could only be enhanced by showing in-place success of such actions instead of simply proposing untested, unspecified actions that would be attempted at some future date after the north Delta intakes become operational.

In the consistent pattern presented throughout the BDCP documents of overstating fish benefits, CM15 is also postulated as an action that will provide positive results. For example:

> "CM15 Localized Suppression of Predatory Fishes *will reduce* the local effects of predators on covered fish species by removing structures that host predatory nonnative fishes, conducting predator control at hotspot locations, conducting an extensive research program to evaluate alternative predatory fish control strategies, and implementing those strategies in an adaptive management context (emphasis added)." (BDCP Executive Summary, page 12)
>
> "In particular, CM15 Localized Reduction of Predatory Fishes *will reduce* local abundance of predatory fish and eliminate or modify holding habitat for predators at selected locations of high predation risk ("predation hotspots") (emphasis added)." (BDCP Page 5.F-3)
>
> "*It is concluded* that lowered predation under the BDCP through CM15 Localized Reduction of Predatory Fishes, in addition to other factors discussed above, has the potential to increase productivity and offset the potential for greater predation at some locations such as the north Delta intakes (emphasis added)." (BDCP Page 5.5.3-37)
>
> "Localized Reduction of Predatory Fishes (Predator Control) (CM15) – Actions implemented under this conservation measure *would reduce populations* of predatory fishes at specific locations and eliminate or modify holding habitat for predators at selected locations of high predation risk (emphasis added)." (EIR/EIS Pages 3-68 and 3-157

Also, in the recurring pattern of providing inconsistent and contradictory logic of the BDCP effects on fish, the documents elsewhere state:

> "The BDCP *could reduce* losses of juvenile winter-run Chinook salmon at existing localized areas where predation is intense (emphasis added)." (BDCP Executive Summary Page 48)
>
> "The primary purpose of CM15 is to contribute to biological goals and objectives related to abundance and passage of covered salmonids by locally reducing nonnative predatory fishes, which *it is hoped* will increase the survival of migrating salmonids (emphasis added)." (BDCP Page 4-74)

"At the local scale, the benefits of targeted predator removal are likely to be localized spatially and of short duration unless efforts are maintained over a long period of time. *These benefits are highly uncertain, as the long-term feasibility and effectiveness of localized predator reduction measures are not known* (emphasis added)." (BDCP Page 5.F-iv)

"*Because of the high degree of uncertainty* regarding predation/competition dynamics for covered fish species and the feasibility and effectiveness of safely removing large fractions of existing predator populations, the proposed predator reduction program is envisioned as an experimental pilot program within an adaptive management framework (emphasis added)." (BDCP Page 4-75)

"Additionally, these restored areas may be targeted for predator removal during key occurrence of covered species in these areas, which may also reduce this effect, although *outcomes of localized predator removal are uncertain* (emphasis added)." (BDCP Page 5.F-iv)

"*These benefits are highly uncertain, as the long-term feasibility and effectiveness of localized predator reduction measures are not known* (emphasis added)." (BDCP Page 5.F-iv)

"*Predator removal treatments would likely have only have a short-term effect*, as the Delta is an open aquatic system and recolonization of treated areas by new fish predators may be rapid (emphasis added)." (BDCP Page 5.F-83)

"*The effectiveness of a predator removal program is uncertain, as illustrated by the mixed results achieved by other programs* (emphasis added)." (BDCP Page 5.F-84)

"*Actions to remove predators have a high degree of uncertainty* (emphasis added)." (BDCP Page 5.F-101)

CM15 is described in the BDCP as having major ambiguities as to its effectiveness and recommends an enormous amount of potential future unspecified research in an attempt to address that deficiency (BDCP Pages 3.D-33 and 3.D-34). However, most of the identified research in the BDCP should be more narrowly defined and conducted prior to embarking on a highly tenuous plan. Even simple actions such as performing literature reviews and interviews on the topic of predator control are identified as future activities (e.g., BDCP Pages 3.4-311, 3.D-34), but could have been performed and details included prior to the release of the BDCP. Indeed, many decades have passed since predator problems in the Delta were known, but no effective actions to address the topic have been implemented in those decades. After 50+ years of no progress, all of a sudden the BDCP now states that it will greatly reduce the predation problems at areas such as Clifton Court Forebay and other known, suspected, or future areas (i.e., north Delta intakes) in the Delta. It is incongruous to believe that suddenly the BDCP would now effectively address and resolve this complex issue.

The Delta Science Program sponsored a "State of the Science Workshop on Fish Predation on Central Valley Salmonids in the Bay-Delta Watershed" which convened a panel of six experts in July 2013 to examine the problem with predation on juvenile salmon in the Delta. Notably, the panel's final report lacked pragmatic advice on how to address the predation issue and provided no new or useful ideas for executable actions to alleviate predation. To a large degree, the panel simply threw up their hands and concluded that the predation dilemma in the Delta is an extremely complex problem and that much more research on the topic is needed. In fact, the primary emphasis of the panel's report focused on recommendations to conduct much more extensive standardized research and monitoring throughout the Delta. Based on my experience as a Principal Scientific Investigator for more than 100 fishery resource field research studies, most of the suggested studies would be extremely difficult to implement, exorbitantly expensive, highly questionable to achieve significant or valid results, logistically impractical, and very unlikely to lead to meaningful management actions. While the panel did not estimate the cost of implementing such studies, it would likely be in the neighborhood of several hundred million dollars. Given these conclusions, how and why would predator control and removal aspects of CM15 be deemed an effective conservation measure? Without known benefits for salmon, a highly debatable feasibility, past record of ineffective and non-actions, and the need to conduct many years of research, the predator control component of CM15 should be removed from the BDCP. Instead, the measure should focus on altering Delta habitats to favor juvenile salmon and reduce those areas where salmon are highly vulnerable to non-native predatory fish.

Conservation Measure 16 (CM16): Nonphysical Fish Barriers (NPB)

A key conservation measure proposed for the BDCP is the installation of NPBs (CM16) under the highly questionable ability to divert juvenile salmon from selecting unfavorable outmigration routes through the Delta. This conservation measure is confounding because of the BDCP's apparent faith in the success of future, yet-to-be-designed NPBs as a proposed measure to benefit salmonids. The specific type of NPBs proposed is the combination of a bubble curtain, sound, and lights in an attempt to deter juvenile salmon away from poor-survival migration pathways and toward higher-survival migration pathways. The most-prominent location proposed by the BDCP for NPBs is in the north Delta at Georgiana Slough in Walnut Grove, California, although numerous other sites are recommended (i.e., the Sacramento River at Fremont Weir, the Delta Cross Channel, the San Joaquin River at the head of Old River, Turner Cut, Columbia Cut, channels leading to Clifton Court Forebay and the Tracy Fish Facilities). The basic concept portrayed in the BDCP is as follows: If one assumes that juvenile salmon die at the three proposed intakes in the north Delta, installation of NPBs at fish migration route flow splits farther downstream and in the Delta will potentially help offset those fish losses. This conclusion, however, is at best speculative because of:

1) the highly experimental nature of NPBs,
2) the mixed results from studies of the NPBs (including failures),
3) the exorbitant costs for the type and locations of NPBs in the BDCP,
4) the very questionable practicality and feasibility of such a massive, infrastructure program throughout the Delta,
5) the potentially detrimental impacts on salmon and other native fish, and
6) NPBs have recently been abandoned in the Delta.

The BDCP nevertheless (and astonishingly) concludes:

> **"**Nonphysical Fish Barriers *will improve* the survival of outmigrating juvenile salmon and steelhead by using nonphysical barriers (underwater lights, sound, and bubbles) to encourage juvenile fish to avoid channels and river reaches in which survival is lower than in alternate routes (emphasis added)." (BDCP Executive Summary Page 12)
>
> "CM16 Nonphysical Fish Barriers *will be employed* to discourage juvenile salmonids from entering channels/migration routes that are known to have high predator abundance and/or predation rates, *further reducing predation rates within the Plan Area and contributing to an increase in survival* (emphasis added)." (BDCP Page 3.3-142)
>
> "Salmon, steelhead, and splittail *are expected to be effectively deterred* (emphasis added)." (BDCP Page 5.F-v)

Such barriers remain unproven for overall fish protection and should not be proposed as a positive remedial action for salmon to offset deleterious BDCP effects on salmon.[19] If and when testing of such behavioral barriers are shown to be effective at the sites proposed, then the BDCP could recommend those measures, but not before.

Because the BDCP relied so heavily on the potential benefits of NPBs and the BDCP fish models utilized some aspects of preliminary results of NPBs, the topic warrants closer scrutiny. Recently, a concept for a NPB in the lower San Joaquin River was introduced by Vogel (2009). The concept was to install a bubble curtain at the head of Old River in the San Joaquin River to determine if outmigrating juvenile salmon would behaviorally avoid entry into Old River. The goal was to increase the proportion of salmon migrating down the lower San Joaquin River where fish survival was assumed to be higher than the Old River migration route through the Delta. The California Department of Water Resources (DWR) decided to test the concept at the head of Old River in the spring of 2009, but with the use of not only bubbles, but sound and strobe lights. The BDCP cites the following results of those experiments:

> "Preliminary evidence suggests that a three-component barrier was effective in deterring, or discouraging acoustically tagged Chinook salmon juveniles from entering the head of Old River during a 2009 pilot study (Bowen et al. 2009)." (BDCP Page 3.4-314)
>
> "The three-component Nonphysical Barrier Test Project at the divergence of Old River from the San Joaquin River (head of Old River) in the Delta successfully deterred 81% of acoustically tagged Chinook salmon smolts from entering Old River (Bowen et al. 2009)." (BDCP Page 3.4-314)

[19] "The effectiveness of nonphysical barriers and their interaction with predators is based on limited testing; thus, outcomes for salmonids remain uncertain." (BDCP Page 5.F-102)

Notably, the BDCP mentions (but does not adequately discuss) the significant fact that the head of Old River NPB was evaluated again in 2010 with mixed results and poor deterrence efficiency (SJRGA 2011). More importantly, on an overall basis, the predation impacts on juvenile salmon presumably caused by the physical presence of the NPB were believed to be so severe that the barrier is no longer considered a viable deterrent device at that location. For example:

> "A 2009 study found the deterrence rate to be as high as 81% (Bowen et al. 2009) while a follow-up study in 2010 found the deterrence rate to be 23%. … In fact, while the nonphysical barrier deterrence rate was 81% in 2009, the predation rate was so high that the juvenile salmon survival rate was not statistically different whether the barrier was on or off (Bowen et al. 2009)." (BDCP Page 5.F-85)

Yet the BDCP promotes installation of the <u>same type</u> of NPB at the head of Old River despite the fact that the best available scientific information indicates harmful effects on salmon; the illogical rationale is not disclosed in the BDCP. Confusingly, the BDCP also states that an operable gate (physical barrier) would be installed at the head of Old River to protect migrating fish (BDCP Page 5.3-11 and EIR/EIS Page 3-101). Then elsewhere, it is suggested that a traditional rock barrier may be installed at the site (EIR/EIS Page 3-119). What is the prevailing BDCP recommendation: a NPB, operable gates, or a rock barrier?

By far, the BDCP's greatest reliance on data used to support the concept of installation of NPBs, not only at Georgiana Slough, but throughout the Delta, is based on the results of a DWR pilot study at Georgiana Slough in 2011. However, the BDCP did not adequately describe the limitations and caveats of the study and, furthermore, did not disclose the fact that the use of a NPB at the site has since been abandoned. This is extremely important because the BDCP analyses, fish models, and resultant conclusions relied so heavily on that single study. The extrapolation of results from that study into BDCP fish models highly skewed model outputs and resultant conclusions of the BDCP effects on salmon.

DWR installed and evaluated a Bio-Acoustic Fish Fence (BAFF) (a form of a NPB advocated for use in the BDCP) at the entrance to Georgiana Slough in the winter and spring of 2011 and reported those results in 2012. A study was repeated in 2012 but those results are not yet available. Given the strong emphasis in the BDCP, closer examination of DWR's pilot study report (DWR 2012) is warranted to determine how accurately the BDCP portrays those results and how applicable they are to the BDCP's promotion for installation of NPBs <u>throughout</u> the Delta. The fish sizes used for the NPB experiment at Georgiana Slough ranged from 110 to 140 mm fork lengths (DWR 2012) which are larger than fall-, winter- and spring-run Chinook typically migrating past Georgiana Slough. The first fish releases occurred on March 16 and the last on May 15, 2011 (DWR 2012). Unfortunately, the 2011 experiments were conducted during abnormally high flow conditions (Figure 28) that complicated execution of the study.

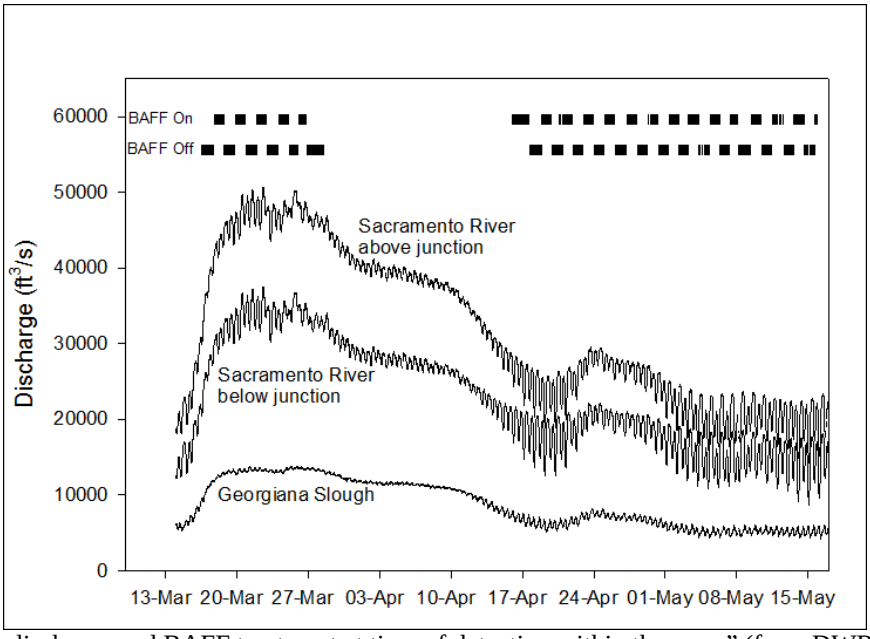


Figure 28. "River discharge and BAFF treatment at time of detection within the array" (from DWR 2012).

The BDCP failed to disclose that the 2011 Georgiana Slough experiment results varied depending on flow conditions at the time of the study. During higher flows, the NPB was not as effective in deterring salmon away from the entrance into Georgiana Slough compared to lower flows during the study. Importantly, the 2011 experiments were all conducted during abnormally high and strong unidirectional flows in the region and no experiments could be conducted during flood tides when Sacramento River flows are reversed and water can enter Georgiana Slough from both upstream and downstream of the Slough. Radio-telemetry studies at Georgiana Slough have demonstrated that juvenile salmon can initially safely pass the Slough and remain in the Sacramento River only to be subsequently advected back upstream during flood tide conditions and into Georgiana Slough (Vogel 2001a, 2002a, 2003a, 2011b). A NPB is unlikely to provide any significant protection for salmon under those conditions. This suggests that diversions through the upstream north Delta intakes would make salmon survival even worse by reducing Sacramento River outflows in this region of the Delta. The BDCP failed to adequately disclose or account for those foregoing circumstances.

Although the 2011 DWR study appeared to be well done, there nevertheless remains significant ambiguity in interpretation of study results. Some of the conclusions as to the effectiveness of the NPB in deterring salmon away from Georgiana Slough appeared subjective, allowing different interpretations. An example is shown in the following Figure 29 from the DWR (2012) report.

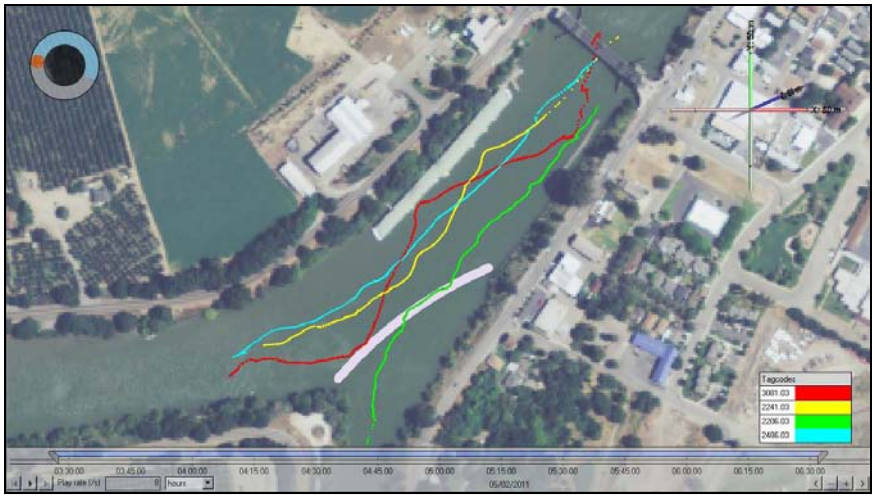


Figure 29. "Two-dimensional tracks of Chinook salmon smolts in the Sacramento River. Notes: All four smolts were released May 2, 2011 at 00:00 hours. All four tracks passed by the divergence of the Sacramento River and Georgiana Slough on May 2, 2011 between 03:17 and 03:44 hours. 2206.03 was undeterred and entered Georgiana Slough. 3081.03 and 2241.03 were deterred into the Sacramento River. 2486.03 was determined to be undeterred because it made no movement away from the BAFF." (from DWR 2012) Note that the curved white line is the location of the BAFF (NPB) and the entrance to Georgiana Slough is at the bottom of the figure." (from DWR 2012)

In this example, DWR (2012) assumed that fish no. 2241.03 (yellow line) was deterred from entry into Georgiana Slough. However, an alternative interpretation is that the fish was simply following the main flow of the Sacramento River and the NPB had no meaningful effect. In fact, this salmon behaved similarly to radio-tagged salmon observed during prior research at Georgiana Slough when no NPB was in place (Vogel 2002a, 2011b). Fish 3081.03 (red line) was also assumed by DWR (2012) to have been deterred from entry into Georgiana Slough; it may have been. However, the migration pattern for this fish was very unusual and uncharacteristic of smolt behavior seen in other telemetry studies. Note that this fish traversed diagonally (zigzagged) across the Sacramento River several times in a very short linear distance under exceedingly high flow conditions (>20,000 cfs). There are two alternative scenarios for this fish which are different than that postulated in DWR (2012). First, with the very high flows present at the time, when originally reaching the BAFF, the fish may have been simply following the main flow of the Sacramento River past Georgiana Slough. Second, based on prior research I conducted on the behavior and movements of radio-tagged salmon past Georgiana Slough, the behavior was not reflective of normal smolt migration. This unusual migration pattern may have actually been a result of the acoustic-tagged salmon being inside a predatory fish, not a live salmon (discussed later in these comments). In fact, the study could not determine if any of the fish approaching the barrier were live acoustic-tagged salmon or dead acoustic tagged salmon inside predatory fish. If these data interpretations are indicative of the study, significant differences of opinion on the study results are probable. The BDCP's discussion on NPBs did not disclose this considerable uncertainty.

Notably, the BDCP downplayed or largely dismissed the potential for the Georgiana Slough NPB to attract predatory fish over time even though it admits there is "considerable uncertainty" about potential predation (BDCP Page 5.B-57). As mentioned previously, the predator "magnet" problem caused by the NPB at the head of Old River was deemed to be too severe and risky for

salmon so the barrier has not been pursed at that location. For Georgiana Slough, DWR (2012) states:

> "It is important to note that if the BAFF is used as a long-term management tool, predators could become conditioned to the BAFF On mode and may prey on salmon to a greater extent than under experimental operational conditions (BAFF On/BAFF Off). In addition, the habitat selected by and movement patterns of predators in the Sacramento River adjacent to the BAFF may vary within and among years in response to factors such as river flow and velocities, water temperatures, and recreational harvest. These factors, in combination with possible conditioning to BAFF operations, could result in different predation rates than those observed during the 2011 study." (DWR 2012)

Importantly (as it relates to the BDCP), since the 2011 and 2012 experiments at Georgiana Slough, DWR has abandoned plans to continue experimentation of the NPB at that location. That decision was made, in part, because of local landowners' complaints concerning the noise created by the generators used at the site to operate the NPB (notes from a March 4, 2014 meeting concerning USBR experiments on an electrical barrier in Deadhorse Cut). Instead, DWR has installed and is evaluating a floating shallow-draft metal-plate boom in front of Georgiana Slough to determine its efficacy in diverting juvenile salmon away from the Slough (Figures 30 and 31). This surface deflector wall currently under evaluation at Georgiana Slough may pose significant predation hazards for juvenile salmon. It could actually increase overall salmon mortality by providing ideal predator holding habitats and prey ambush sites. Although this predation topic was discussed previously in comments on CM2, it warrants repeating here:

> "The literature offers some assistance for minimizing and discouraging predation at the intakes and fish facilities. Piers, pilings, other supportive structures, and corners or other irregularities in a channel are referred to as structural complexities. Such structures may cause uneven flows and can create shadows and turbulent conditions. A structurally complex environment should be avoided. Corners, interstices, or other structural components that create boundary edges contribute to maximum foraging efficiency of large predatory fishes and the highest populations of predators will occur where structural boundary edges are present. Structural complexity can increase predation by providing locations for waiting predators (shadows, interstices, corners, etc.). The risk of prey to predation is a function of exposure, often directly related to the structural complexity of the system." (Odenweller and Brown 1982)

Again, the BDCP does not address those known problems for salmon and, again, overlooked the readily available science on the topic.

Additionally, the BDCP has not integrated the fact that salmon will be more concentrated in a lesser volume of water at the Sacramento River – Georgiana Slough flow split when the north Delta diversions are in operation (up to 9,000 cfs diverted from the river) and if the Fremont Weir "notch" is being utilized (up to 6,000 cfs diverted from the river). The result will be a higher proportion of salmon (and therefore numbers of fish) entering Georgiana Slough. Those

adverse impacts do not appear to be described in the BDCP documents. If the detrimental effects were addressed, the accompanying description should be prominent and explicit. If those impacts were not accounted for in the analyses, this is an enormous shortcoming.

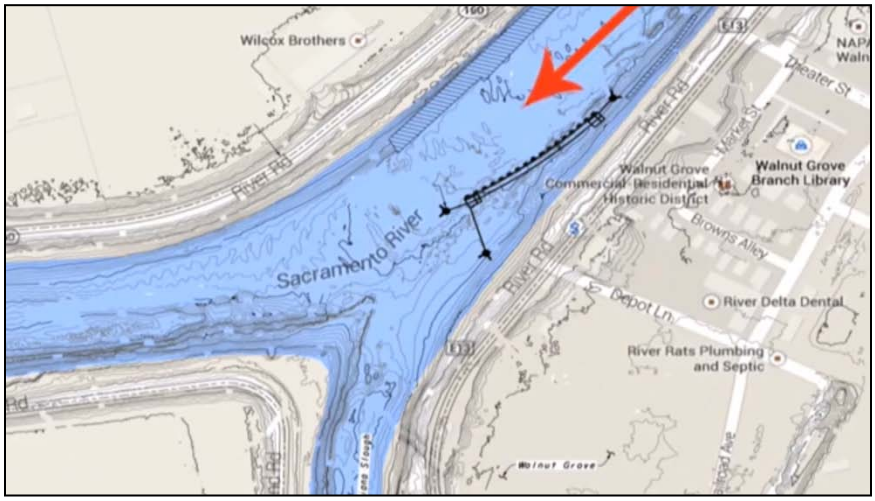


Figure 30. Plan-view diagram of the location of a floating defector wall installed near the entrance to Georgiana Slough on the Sacramento River. Georgiana Slough is at the bottom of the figure. Screen capture from: http://www.youtube.com/watch?v=937bXx9QMn8&feature=youtu.be

Figure 31. Floating wall being installed near the entrance to Georgiana Slough in 2014 (screen capture from: http://www.youtube.com/watch?v=937bXx9QMn8&feature=youtu.be

Despite the fact that the effectiveness of NPBs remains unproven for fish protection, and that experimentation of the device has been abandoned at Georgiana Slough and failed at the head of Old River, the BDCP nevertheless has proposed installing these devices at a total of seven sites in the Delta[20]: Delta Cross Channel, the Sacramento River at Fremont Weir, Turner Cut, Columbia Cut, head of Old River, Georgiana Slough, and the entrances to the south Delta export facilities (Clifton Court Forebay and the Delta-Mendota Canal intake). It is noteworthy that the BDCP provides no information on the efficacy of installing NPBs at these additional sites. Information is readily available to clearly demonstrate that some of those areas are not feasible

[20] BDCP Page 4-80.

and would provide no protection for salmon. In yet another example of promoting benefits to salmon without supporting information and not using the best available science, the BDCP states: "Barriers at these locations have a high potential to deter juvenile salmonids from using specific channels/migration routes that may contribute to decreased survival …" (BDCP Page 4-80). Some of the proposed sites are absurd. For example, the BDCP suggests installation of bubble curtains or log booms in the Sacramento River to shunt downstream migrating salmon into the Yolo Bypass at Fremont Weir:

> "If deemed necessary to enhance the attraction of juveniles into Yolo Bypass through the gated seasonal floodplain inundation channel (described above), construct and operate nonphysical or physical barriers in the Sacramento River. Examples of such barriers include bubble curtains or log booms (Phase 2 or 3, Category 3 Action)." (BDCP Page 3.4-53, BDCP Page 4-32, and EIR/EIS Page 3-127)

Figure 32 shows a hypothetical location for such a barrier north of Fremont Weir. Although the BDCP provides no details on this concept, it does not require an engineering analysis to determine it is infeasible and has no merit. During the period when salmon are emigrating past the weir and Sutter and Yolo Bypasses are flooding, the Sacramento River is a hostile environment for static in-river structures. Large trees and debris would destroy a structure positioned in this location. Furthermore, with extremely high channel velocities and low water clarity, there is no reason to believe that young salmon would behaviorally respond to such a barrier. The best available science indicates the fish would not respond favorably.

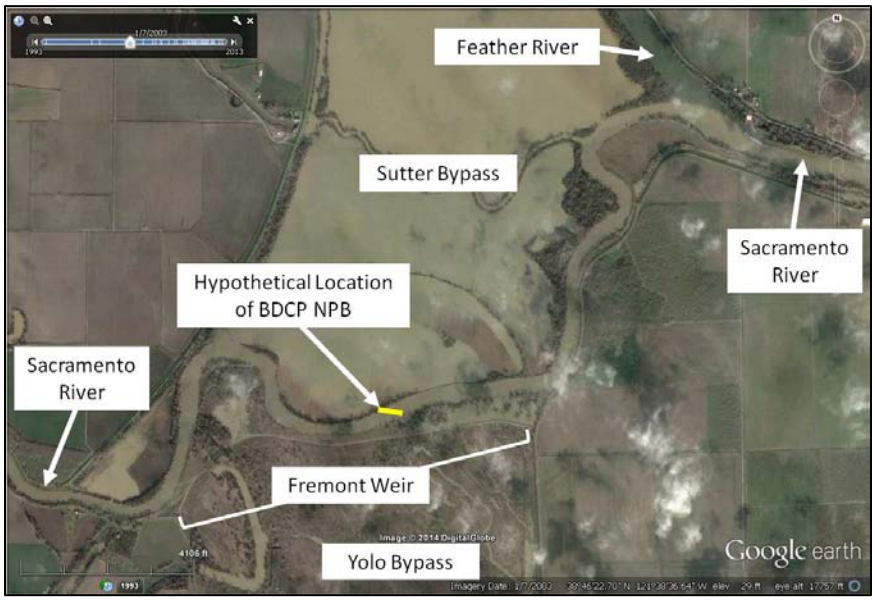


Figure 32. Aerial photo of the northern Yolo Bypass, Fremont Weir, and southern Sutter Bypass showing a hypothetical location of a bubble curtain or log boom suggested in the BDCP.

If the NPB at Georgiana Slough is deemed unacceptable (which apparently it already has), the BDCP, astoundingly, proposes construction of a flat-plate fish screen in front of the Slough:

> "Because about 25% of the Sacramento River water is diverted into the central Delta, additional consideration for screening Georgiana Slough may be warranted. If the non-physical barrier (bubble, light and sound) being investigated by DWR and Reclamation for the 2009 NMFS BiOp does not prove effective, a flat wedge-wire fish screen, similar to what is proposed for the north Delta intakes could be designed and constructed. The likely fish benefits and possible fish impacts could be investigated under the BDCP adaptive management process. (emphasis added)" (BDCP Pages 5C.A-121 and -122

This measure is also illogical and doesn't require an engineering analysis to know it is not feasible and would violate existing fishery resource agencies' criteria for fish protection. Clearly, the BDCP has not used the best available science that demonstrates negative impacts on fish would certainly occur. A positive barrier at that location would be disastrous for salmon. The sheer magnitude of flow entering the Slough would create extremely high through-screen velocities that would certainly impinge and kill young salmon and other species such as Delta smelt. Also, flow reversals under certain conditions occur in that vicinity (as described previously) and there is no bypass flow to route fish past the screens; enormous numbers of fish would be impinged. Furthermore, it is readily apparent from discussions in the EIR/EIS that some of the primary reasons for selecting the north Delta intake locations farther upstream was to avoid adverse impacts on Delta smelt and the lower sweeping flows present at locations farther downstream. The unreasoned and inconsistent logic is not described in the BDCP documents.

Other locations where the BDCP recommends installing NPBs are in the channels leading to Clifton Court Forebay (CCF) and the Delta-Mendota Canal:

> "Nonphysical barriers would be installed at the south Delta entrance canals leading to CCF and the Delta-Mendota Canal." (BDCP Page 5.B-57)

> "Nonphysical barriers at the entrances to Clifton Court Forebay (CCF) and the Delta-Mendota Canal (DMC) have the best potential to reduce entrainment of juvenile Chinook salmon and steelhead … The effectiveness of nonphysical barriers will depend on the water velocity characteristics in the vicinity of the barrier and on the extent to which predatory fish occur along the barrier. There is also uncertainty as to whether preventing entrainment into CCF and the DMC will enhance survival given the prevailing hydrodynamics in the area, i.e., if net reverse flows are present that may not allow fish to move away from the area and make them more susceptible to entrainment. Such uncertainties necessitate study to assess the effectiveness of nonphysical barriers at these locations." (BDCP Page 5.B-387)

As with the previously described sites, NPBs in the south Delta recommended in the BDCP are already known to be infeasible. The BDCP states that there is "considerable uncertainty" about velocities in the vicinity of proposed NPB locations (BDCP Page 5.B-57). Large amounts of existing data are readily available to demonstrate this is not true. Flow and channel velocities leading to the south Delta water export facilities are commonly high and there is no biological

reason to expect juvenile salmon to behaviorally respond in the manner suggested in the BDCP. All the best available data and science demonstrates otherwise. For example, extensive historical ADCP channel velocity data available through the California Data Exchange Center for Old River leading to the export facilities clearly demonstrate that southerly water velocities can commonly be as high as 3 to 5 ft/s. Young salmon cannot swim against such high velocities for extended periods (Fisher 1981, Swanson et al. (2004a, 2004b). During an evaluation of radio-tagged Chinook salmon movements in the south Delta during December 2000 (Vogel 2002b), it was determined that salmon moved rapidly with direction of flow toward the export facilities, not against it (Figure 33). With south Delta exports, flow in northern Old River is often negative, very high, and salmon are forced to move southerly with the flow (Vogel 2005, telemetry data from Vogel 2010). Under those conditions, there is no bypass flow and salmon would move rapidly and unidirectionally into and through the NPBs. Note that even with high bypass flows during experiments with a NPB at the head of Old River, high flow through the NPB reduced its effectiveness.[21] With no bypass flow, why would NPBs be expected to work at the canals leading to CCF and the Delta-Mendota Canal? Again, the BDCP assumptions are not well reasoned and the documents do not explain such illogical conclusions.

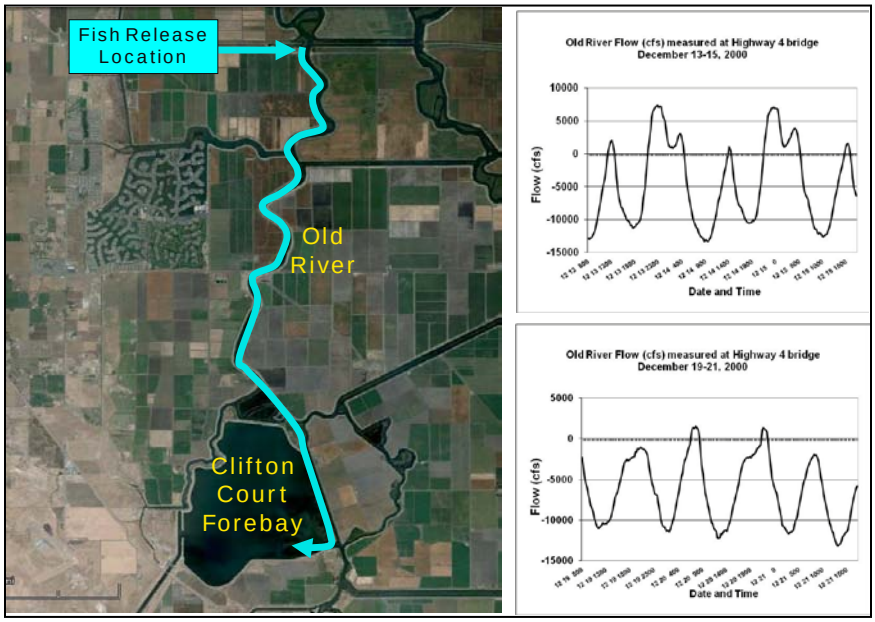


Figure 33. Migration route for some radio-tagged juvenile Chinook salmon released in northern Old River and flow measured at the Highway 4 bridge in northern Old River in December 2000 (adapted from Vogel 2002b, 2011b).

Recommendations for the installation of NPBs at sites already known to be infeasible should be removed from the BDCP. As pointed out later in the comments on the use of the BDCP fish models, the speculative assumptions on very high benefits for salmon resulting from NPBs should be changed to reflect more-realistic assumptions and balanced analyses.

[21] "Higher flows in 2010 resulted in reduced effectiveness [of the nonphysical barrier] in deterring juvenile salmonids, as juveniles may have lacked the swimming ability to avoid the barrier and be effectively deterred from entering the Old River (Bowen et al. 2009; Bowen and Bark 2010)." (BDCP Page 5.B-83)

The BDCP also provides no evidence that the installation of NPBs would not adversely impact the upstream migration of anadromous fish (not only adult salmon, but adult sturgeon). The BDCP gives short shrift to this important topic by indicating it was only qualitatively evaluated:

> "In addition, a qualitative analysis of the potential impeding effects of such barriers [on upstream migrating anadromous fish] was conducted that evaluated the relative position of the barriers in relation to species' position in the water column and the hearing and escape abilities of the species in relation to the acoustic deterrent provided by the barriers." (BDCP Page 5C.4-36)

This potentially serious problem must be investigated prior to reliance on NPBs. Even if NPBs are eventually found to provide benefits for salmon, those measures could be pursued independently of the BDCP. Here again, it appears that the BDCP is attempting to demonstrate fish benefits for actions that could be implemented separately from construction and operation of the north Delta water diversions.

In summary, CM16, like CM15, is yet another proposed action within the BDCP with highly tenuous outcomes in which purported fish benefits are assumed, but the BDCP identifies numerous uncertainties as to the potential effectiveness of this measure. The BDCP also recommends installation of NPBs at locations where it is already known the barriers would not be feasible. Additionally, it is unknown why the BDCP did not disclose highly relevant information that was contrary to the documents' assumed benefits to fish. Clearly, the BDCP has not used the best available science. Here again, answers to the numerous key uncertainties, such as those identified in BDCP Appendix D, should be pursued prior to implementation of the BDCP, not after; the risk of failure and severe impacts to salmon are too great.

Use of Fish Models for the BDCP Analyses

The BDCP used a variety of models to evaluate potential effects on salmon resulting from measures proposed for the BDCP. Although models are never perfect in predicting effects on salmon, those used for the BDCP were particularly constrained because of a lack of empirical data, incorrect data, and very low reliability and confidence in the models' outputs. Unfortunately, some of the fish models related to salmon survival and behavior are based on faulty data rendering model run outputs invalid and incapable of comparing BDCP alternatives. Some of the models' documentation aptly point out that the intent of the modeling exercises was not to estimate absolute fish survival, but instead to provide relative comparisons among BDCP scenarios (e.g., EIR/EIS Page 4-13). However, in many instances, inputs to the models were based on inflated and biased fish survival estimates (described below) that would not provide valid comparisons of the BDCP scenarios. Although the BDCP claims, "The methods used reflect the best available tools and data regarding fish abundance, movement, and behavior." (BDCP Page 5.B-i), that premise is simply not correct. It is also readily apparent that when the models suggested unfavorable results (i.e., adverse impacts on salmonids), they were downplayed or not used. Conversely, when the models suggested favorable results (i.e., beneficial impacts on salmonids), they were overplayed and used. Because there was so much reliance on models for the BDCP analyses, it is important to understand the limitations of those models. The documentation for various models describes some of the limitations, but those

discussions are fragmented and buried in the voluminous appendices and commonly not carried forward into the main body of the BDCP document. In many instances, the models' documentation overlooked some serious limitations. The following discussion provides several example details on why many of the fish models are very limited or invalid for application to the BDCP.

Although large numbers of salmon fry enter the Delta each year, none of the fish models were capable of modeling the BDCP effects on this smaller-sized life stage salmon. This critical deficiency is an enormous shortcoming of the BDCP and leaves a tremendous amount of uncertainty in estimating the impacts of the BDCP on salmon. Some of the models attempted to evaluate BDCP effects only on the larger-sized, smolt life stage. For example, in use of the Delta Passage Model (DPM):

> "Many of the model assumptions are based on results from large, hatchery-reared fall-run Chinook salmon that may not be representative of smaller, wild-origin fish. Model is applicable only to migrating fish and not to those rearing in the Delta. Equations for estimating salvage have relatively low explanatory power for the data upon which they were derived." (BDCP Page 5.B-57)

> "Many of the model assumptions are based on results from large, hatchery-reared fall-run Chinook salmon that may not be representative of smaller, wild-origin fish. Model is applicable only to migrating fish and not to those rearing in the Delta. Model is mostly limited to operations-related effects on flow. Model only accounts for smolts and not other migrating juvenile life stages." (BDCP Page 5C.4-6)

> "Unfortunately, survival data are lacking for small (fry-sized) juvenile emigrants because of the difficulty of tagging such small individuals. Therefore, the DPM should be viewed as a smolt survival model only, with its survival relationships generally having been derived from larger smolts (>140 mm), with the fate of pre-smolt emigrants not incorporated into model results." (BDCP Page 5C.4-40)

Furthermore, the fish models were not capable of predicting BDCP effects on salmon because empirical data used for the input were based on existing (or more aptly, past) Delta conditions. Implementation of the BDCP would fundamentally change large-scale hydrodynamic, bathymetric, and fish habitat conditions in the Delta. These circumstances present an enormous dilemma for the BDCP analyses. Flow patterns (e.g., tidal and circulation) and physical habitats for salmonids would be substantially altered and the ultimate response of salmon to those conditions would change, probably significantly. The models used were based on data collected during conditions that would not be representative of future, altered conditions in the Delta. This major limitation is pointed out in BDCP Appendix 5.G:

> "The [life cycle] models are fundamentally constrained in that they are based on species–habitat relationships that have been established for the existing configuration of the San Francisco Bay/Sacramento–San Joaquin River Delta (Bay-Delta) and therefore do not incorporate the substantial changes in the

> landscape proposed to occur with proposed habitat restoration. This is a critical limitation because large-scale habitat restoration is a core component of the BDCP that is intended to produce significant ecological benefits." (BDCP Page 5.G-1)

This same limitation would also be applied to the DPM.

Additionally, it seems that some of the models are incomplete:

> "The DPM results presented here reflect the current version of the model, which continues to be reviewed and refined, and for which a sensitivity analysis is underway to examine various aspects of uncertainty related to the model's inputs and parameters." (BDCP Page 5C.4-40)

There also appears to be conflicting assumptions between some of the fish models. For example, the ISI growth model accounts for salmon emigration timing differences between years (which is accurate) whereas the DPM looks to assume a uniform distribution between years (which is not accurate).

Furthermore, some of the fish models are out of date and used incorrect information. For example, documentation on the Oncorhynchus Bayesian Analysis (OBAN) model states:

> "The current operation of RBDD makes counts of winter-run Chinook salmon after closing the gates on May 15. On average, 15% of the winter run passed RBDD by May 15, but the specific percentage in a given year was as low as 3% or as high as 48% (Snider et al. 2000). Egg abundance is calculated by assuming that each adult spawner produces 2,000 eggs (Williams 2006)." (BDCP Page G-22)

The fecundity of winter-run Chinook of 2,000 eggs per female is greatly underestimated. For instance, Hallock and Fisher (1985) reported an average of 3,353 eggs per female. More recently, Poytress and Carrillo (2012) reported an average of 5,277 eggs per female based on spawning records at the Livingston Stone National Fish Hatchery for the nine-year period from 2002 through 2010. The underestimate for the OBAN model would likely generate serious errors in the model outputs. Also, the information on winter run passage at RBDD is outdated. Since 2012, the RBDD gates have been removed year-round, resulting in unimpaired salmon passage (Vogel 2012a). The resultant change in passage timing (temporal shift to earlier passage) would affect OBAN model results, adding even more mistakes in the model outputs. Additionally, it is not clear if historical RBDD gate operations and effects on winter-run Chinook delay and blockage were included as a covariate in the OBAN model. If not, it would likely significantly change the integrity of the model. RBDD gate operations had a major adverse impact on annual runs of winter-run salmon and was a primary reason the dam gates were eventually raised (removed).

The OBAN model incorporated a covariate of the <u>number of days</u> during December through March with minimum flows of 100 cfs over the Fremont Weir (BDCP Page 5.G-23) and <u>not flow</u>

rates (e.g., 1,000 cfs, 5000 cfs, etc). The OBAN model assumes that *any increase* in Yolo Bypass inundation will increase through-Delta winter-run Chinook survival (BDCP Page 5.G-80), an assumption that is unlikely to be valid as indicated by statements elsewhere that flows of greater than 4,000 cfs would be necessary (BDCP Page 5.G-23). This limitation likely greatly overestimated beneficial effects on salmonids. Also, there did not appear to be any incorporation of the consecutive daily effects of Yolo Bypass inundation in the BDCP analyses. The BDCP model approach seems counter-intuitive. Higher flow rates over more consecutive days would presumably be more beneficial to salmon than sporadic, very low levels of flow over the Fremont Weir; furthermore, the flow/benefits relationships would likely be non-linear.
There is a very confusing discussion concerning the OBAN model results where it suggests that the BDCP would adversely impact winter-run Chinook because of higher water temperatures and lower flows in the upper Sacramento River (BDCP Page 5.G-54, BDCP Page 5.G-58, BDCP Page 5.G-60). For example:

> "In the Sacramento River spawning reaches, modeled water temperatures at Bend Bridge were higher (Figure 5.G-3) and minimum flow rate were lower (Figure 5.G-4) under the ESO compared to EBC2 scenarios, particularly during the ELT. These differences in Sacramento River conditions cause lower survival in ESO scenarios relative to EBC2 scenarios in the alevin and fry stages and are ultimately reflected in lower escapement under ESO." (BDCP Page 5.G-54)

> "Therefore, the OBAN model analysis suggests that the results are driven by modeled flow modifications in the upper Sacramento River and associated effects on water temperature conditions experienced by alevins on and near the spawning grounds. However, as noted above, the BDCP does not include Shasta Reservoir operational criteria changes, and therefore does not affect how cold water pool and flows in the upper Sacramento River are managed." (BDCP Page 5.G-60)

This discussion seems to conclude that model's results demonstrate that the BDCP scenarios will adversely impact winter-run Chinook due to deleterious effects on eggs caused by reduced reservoir releases and elevated water temperatures. But then the BDCP discussion suggests those impacts will not actually take place. In other words, it sounds like the conclusion is: "Modeling results predicted adverse impacts to winter run from the BDCP, but trust us, we won't allow that to occur." This begs the question as to whether there was any utility to the modeling exercise.

Additionally, water temperature modeling indicated that there would be a 5% increase in the number of years under ESO-ELT that would be classified as a "red" level of concern for winter-run Chinook egg incubation relative to EBC2_ELT. However, those impacts are deemed insignificant because it is considered within the range of "modeling error" (BDCP Page 5C.5.2-62). Water temperature modeling is far more sophisticated, accurate, and reliable than the fish models used for the BDCP. Notably, when the BDCP fish models suggest slightly positive or negative results for salmon, the caveat of "within the range of modeling error" is not discussed in context. For example, the statement is made: "Overall, the DPM results for late fall–run Chinook salmon demonstrated that survival under the ESO scenarios generally was similar to or slightly higher than that of the EBC scenarios." (BDCP Page 5C.5.3-96). However, as can be

seen from examination of BDCP Table 5C.5.3-49 (below), the incremental differences in survival between scenarios are very small. The average difference in survival between EBC2_LLT versus ESO_LLT is only 0.2 or 1%. Given all the caveats on the model limitations described in the BDCP (and others described later in these comments), the relative differences (both positive and negative) in salmon survival among the BDCP scenarios are commonly very small and should have been characterized as within modeling error.

Table 5C.5.3-49. Differences[a] between EBC and ESO Scenarios in Percentage of Late Fall–Run Chinook Salmon Smolts Surviving through the Delta, Based on Delta Passage Model

Water Year[b]	Scenarios[c]					
	EBC1 vs. ESO_ELT	EBC1 vs. ESO_LLT	EBC2 vs. ESO_ELT	EBC2 vs. ESO_LLT	EBC2_ELT vs. ESO_ELT	EBC2_LLT vs. ESO_LLT
1976 (C)	-1.3 (-6%)	0.2 (1%)	-6.4 (-26%)	-5.0 (-20%)	-4.7 (-20%)	-3.0 (-13%)
1977 (C)	0.6 (4%)	2.2 (14%)	1.4 (9%)	3.0 (20%)	0.7 (4%)	1.7 (10%)
1978 (AN)	0.0 (0%)	1.0 (5%)	0.2 (1%)	1.2 (7%)	0.4 (2%)	1.0 (5%)
1979 (BN)	1.7 (10%)	2.2 (13%)	-1.0 (-5%)	-0.5 (-3%)	-1.1 (-5%)	-1.0 (-5%)
1980 (AN)	-1.9 (-9%)	1.9 (9%)	-1.2 (-6%)	2.6 (12%)	-0.9 (-4%)	2.4 (11%)
1981 (D)	0.6 (3%)	1.6 (8%)	-0.4 (-2%)	0.6 (3%)	-0.8 (-4%)	0.3 (1%)
1982 (W)	0.5 (2%)	0.8 (3%)	0.4 (1%)	0.8 (3%)	0.7 (2%)	0.6 (2%)
1983 (W)	-7.8 (-20%)	-8.4 (-21%)	-6.7 (-17%)	-7.3 (-19%)	-4.9 (-13%)	-3.6 (-10%)
1984 (W)	-5.0 (-12%)	-5.1 (-12%)	-4.8 (-12%)	-4.8 (-12%)	-2.3 (-6%)	-1.9 (-5%)
1985 (D)	-2.1 (-7%)	-1.9 (-7%)	-3.8 (-13%)	-3.7 (-12%)	-3.9 (-13%)	-2.9 (-10%)
1986 (W)	0.3 (2%)	1.1 (6%)	0.3 (1%)	1.1 (5%)	0.4 (2%)	1.4 (7%)
1987 (D)	3.1 (18%)	4.8 (28%)	0.2 (1%)	1.8 (9%)	-0.1 (-1%)	0.7 (3%)
1988 (C)	-1.0 (-4%)	0.2 (1%)	0.4 (2%)	1.6 (8%)	0.6 (3%)	1.4 (7%)
1989 (D)	0.7 (4%)	1.2 (7%)	0.7 (4%)	1.1 (7%)	0.7 (4%)	0.6 (3%)
1990 (C)	2.4 (14%)	3.4 (20%)	2.3 (14%)	3.3 (19%)	0.9 (5%)	2.0 (11%)
1991 (C)	1.6 (11%)	3.1 (21%)	1.2 (8%)	2.7 (18%)	1.6 (11%)	2.7 (18%)
Average	-0.5 (-2%)	0.5 (2%)	-1.1 (-5%)	-0.1 (0%)	-0.8 (-3%)	0.2 (1%)
Median	0.4 (2%)	1.2 (6%)	0.2 (1%)	1.1 (5%)	0.2 (1%)	0.7 (3%)

[a] Negative values indicate lower survival under ESO scenarios than under EBC scenarios.
[b] Water-year types: W = wet; AN = above normal; BN = below normal; D = dry; C = critical.
[c] See Table 5C.0-1 for definitions of the scenarios.

In this latter regard, the BDCP analyses display a disturbing trend where favorable fish model outputs are overstated and the unfavorable outputs are downplayed. For example, the Interactive Object-Oriented Simulation (IOS) Model results suggest that the BDCP would result in negative effects to winter-run Chinook salmon (Figures 34 and 35), but those results were downplayed:

> "In general, the BDCP scenarios resulted in slightly lower through-Delta survival rates overall, with the survival rates for each scenario varying over a similar range. … The lower BDCP scenario survival rates were the result of increased flow-related mortality in specific model reaches in the Delta." (BDCP Page 5.G-68)

> "IOS estimated lower escapement of winter-run Chinook under the ESO, HOS and LOS scenarios over the ELT, with the modeled decreased through-Delta survival being the primary driver of these effects, although only flow-related effects were included in the model." (BDCP Page 5.G-81)

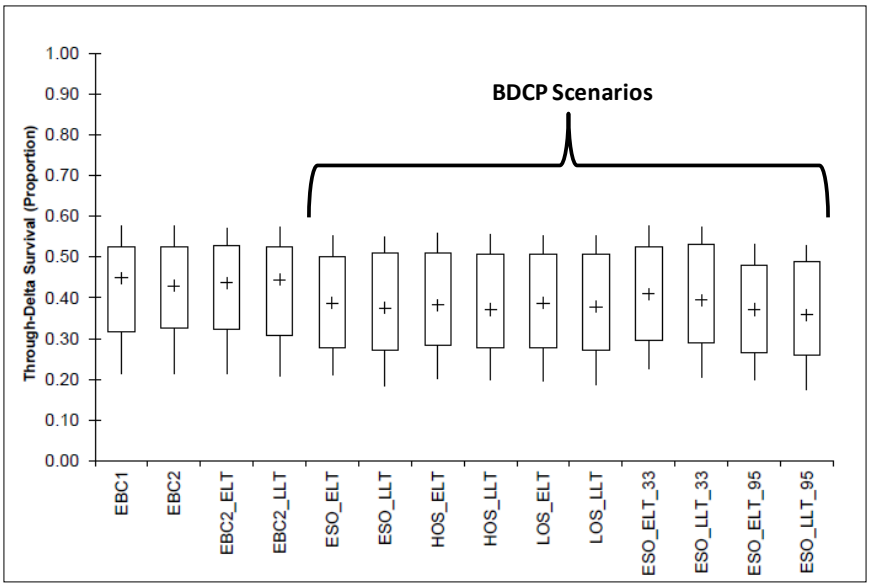


Figure 34. Box plots of Sacramento winter-run Chinook salmon smolt survival through the Delta for each model scenario (adapted from BDCP Page 5.G-69).

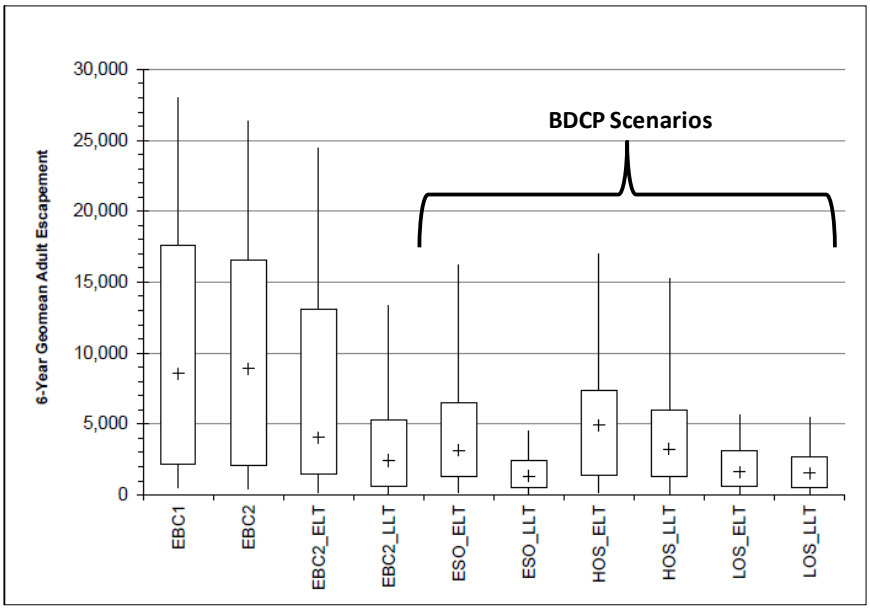


Figure 35. Box plots of 6-year geometric mean Sacramento winter-run Chinook salmon adult escapement for each model scenario (adapted from BDCP Page 5.G-74).

BDCP modeling also indicated that the BDCP would adversely impact winter-run Chinook redd dewatering:

> "The number of years with poor redd dewatering conditions would be 11% and 8% higher under ESO_ELT and ESO_LLT relative to EBC2_ELT and EBC2_LLT, respectively." (BDCP Page 5C.5.2-67)

But the BDCP concluded:

> "These results indicate that there would be a small adverse effect of the ESO on winter-run Chinook salmon". (BDCP Page 5C.5.2-67)

Normally, dewatering of winter-run Chinook redds has been considered a very serious concern by the fishery resource agencies. For example, in 2013, small numbers of winter-run redds began dewatering during the fall and USBR was required to maintain higher than normal Keswick Dam water releases until winter-run fry could emerge from the redds. As a consequence, large numbers of early-spawning fall-run Chinook laid eggs during relatively high-flow conditions on elevated benches of the riverbed. When flows subsequently and abruptly declined, it was estimated that millions of fall-run salmon eggs perished. At a May 3, 2014 Golden Gate Salmon Association Task Force meeting, a USFWS employee announced that if just five winter-run salmon redds were to begin to become dewatered during declining Sacramento River flows, it could "trigger" the need to maintain or increase reservoir releases. Apparently, the BDCP has a different opinion as to what constitutes a "small adverse effect".

However, although unfavorable consequences on winter-run Chinook are indicated on several fronts, the BDCP discounts the model outputs by providing numerous caveats suggesting the models do not reflect anything from which meaningful conclusions can be made. Furthermore, when negative impacts on fish are indicated, the BDCP adds speculative statements suggesting those impacts could be offset by unproven conservation measures such as the use of NPBs discussed previously. This points to fallacies in the BDCP analyses by assuming that proposed conservation measures with highly untenable and uncertain effects on salmon will be beneficial. The problem is then compounded when the BDCP extrapolates questionable presumed beneficial results from uncertain conservation measures to other, also uncertain, conservation measures concluding positive benefits for salmon, all the while lacking empirical foundation. In other words, the BDCP should not extrapolate the effects of one uncertain CM as an indicator for other uncertain CMs. For example:

> "These results indicate that IOS is sensitive to the beneficial effects of conservation measures like CM 16 [non-physical barriers] indicating that other conservation measures could have a similarly large effect on model outcomes if they could be incorporated into IOS or another similar life cycle model. Given this limitation, IOS results alone do not provide a sufficient basis for drawing conclusions about the overall effect of the BDCP on winter-run Chinook salmon." (BDCP Page 5.G-78)
>
> "Therefore IOS is likely underestimating the performance of the BDCP scenarios." (BDCP Page 5.G-80)
>
> "Therefore IOS results must be interpreted with caution when evaluating the potential effects of the BDCP because this analysis did not consider the beneficial effects of Delta habitat restoration or several other potentially beneficial conservation measures." (BDCP Page 5.G-81)

Overall, it seems that OBAN modeling suggests that higher mortality of winter-run Chinook occurs with the BDCP as compared to existing conditions due to egg mortality in the upper river

whereas IOS modeling implies higher in-Delta mortality with the BDCP as compared to existing conditions. But then both are portrayed as not reasonable representations when it comes to negative impacts:

> "While both models predict lower overall performance for most BDCP scenarios relative to EBC2, these results must be viewed as incomplete. Neither model is fully representative of the conditions experienced by winter-run Chinook across their entire life history. Importantly, neither model considers the entire range of beneficial effects likely to occur under the BDCP." (BDCP Page 5.G-82)

None of the modeling adequately accounted for salmon fry mortality attributable to impingement on the north Delta intakes. As described previously, although it is reasonable to conclude that entrainment mortality will be zero or negligible, the opposite would be true for impingement mortality. The high certainty of adverse impacts should not be simply ignored. The BDCP provides conflicting assumptions of the sources of mortality; in some cases, the documents suggest the mortality would solely be attributable to predation and, in other cases, it is assumed to encompass predation, impingement, and entrainment. Here again, it would be useful for the BDCP to parse out and bracket potential impingement mortality with low, medium, and high estimates.

The bioenergetics modeling actually only accounted for striped bass predation which would greatly underestimate salmon losses. Salmon predation losses attributable to Sacramento pikeminnow and black bass would undoubtedly be expected. For example, Nobriga and Feyrer (2007) state: " Striped bass, largemouth bass, and Sacramento pikeminnow are three of the major predators of juvenile and small adult fishes in the Delta." Even though the BDCP mentions the fact that Sacramento pikeminnow are common in the Delta, the implication is put forth that the species is not a predator on salmon in the region[22]. However, Sacramento pikeminnow is considered a potential predator species on fish exiting the fish salvage release sites in the Delta (Odenweller and Brown 1982); DIDSON™ sonar footage has documented that occurrence (Miranda et al. (2010). Notably, Odenweller and Brown (1982) concluded that Sacramento pikeminnow is one of the most important potential predatory fish species at future fish facilities on the lower Sacramento River. The BDCP also incorrectly states: "There is, however, a bounty fishery in the upper Sacramento River to reduce predation by these fish on emigrating salmonids (Nobriga and Feyrer 2007)." A factual check of the source document did not make that statement. Several decades ago, there was a targeted sport fishery for pikeminnow, mostly associated with the Red Bluff Diversion Dam (Moyle 2002), but that has long since ended. Pikeminnow are common and a well-known predator on salmon in the Sacramento River and Delta, especially in altered environments that would be created by the north Delta intakes. Here again, the BDCP has not used the best available science.

A considerable amount of error was likely introduced when the bioenergetics modeling evidently only accounted for small striped bass predation on larger-sized juvenile salmon and not small and large striped bass predation on smaller-sized salmon:

[22] "Sacramento pikeminnow predation on salmonids has been documented upstream (Vogel et al. 1998) but not in the Delta (Nobriga et al. 2006) …" (BDCP Page 5.F-68)

> "Loboschefsky and Nobriga (2010) provide estimates of striped bass predation rates on "small prey" and "large prey." This bioenergetics analysis incorporates only the large prey equation, although smaller salmon fry would fall under the small prey category. The large prey predation regression was based on data for small striped bass (69 to 478 millimeters [mm]); thus they mainly reflect responses of juvenile striped bass. Therefore, they are not as applicable for larger striped bass and for larger sized prey fishes." (BDCP Page 5.F-16)

Therefore, that modeling effort undoubtedly and substantially underestimated striped bass predation on salmon because high numbers of small and large striped bass can consume very large numbers of salmon fry.

The BDCP analyses apparently greatly underestimated salmon losses attributable to the south Delta water export facilities by not accounting for high prescreen predation mortality:

> "However, expanded salvage loss estimates used for analysis here [Delta Passage Model salvage juvenile salmon estimates for the SWP/CVP south Delta export facilities] do not include prescreen predation mortality, for which a multiplier of several times may be necessary." (BDCP Page 5.B-81)

The actual multiplier would be much higher than "several times". The best available information has clearly demonstrated that the prescreen predation mortality can be up to an order of magnitude greater than the direct salvage loss estimates. With such an extremely wide range of unaccounted mortality, it is not clear how the BDCP analyses would allow a useful comparison among BDCP alternatives. Here again, it would be practical for the BDCP analyses to provide a range of total mortality estimates (salvage plus predation losses) (e.g., low, medium, high) to permit more-meaningful comparisons among BDCP scenarios.

A significant error in the assumption of the timing of salmon smolt entry into the Delta for the DPM model was introduced when the model did not account for the substantial inter-annual variability in emigration timing for each salmon run. The DPM assumed the timing would be the same regardless of water year type and upstream hydrologic conditions (Figure 36). Although the documentation acknowledges the model is used only for smolts, not fry, there nevertheless are substantial differences in emigration timing of smolts between years. It appears that the DPM used a summed composite of data across different years but did not account for the variability in inter-annual salmon emigration and interrelationships with naturally occurring hydrologic conditions. This limitation is important because of how CM1 and CM2 operations would vary substantially between different water types and hydrologic variability and the resultant timing and interaction of salmon smolts with those operations. For example, the emigration of winter-run and late-fall-run Chinook salmon smolts (both of which have a more-protracted smoltification period than fall-run salmon) from the upper river to the Delta is influenced to a large degree by timing and magnitude of precipitation and consequential accretions in the upper watershed. This variability in smolt emigration timing is not captured in DPM model outputs and makes it highly problematic to use those outputs to compare alternative BDCP scenarios.

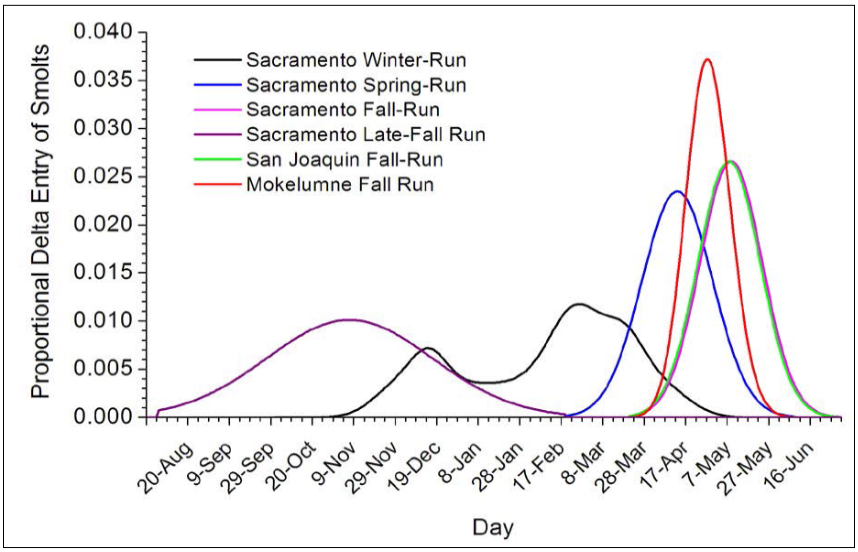


Figure 36. Delta entry distributions for Chinook salmon smolts applied in the Delta Passage Model for Sacramento River winter-run, Sacramento River spring-run, Sacramento River fall-run, Sacramento River late fall–run, San Joaquin River fall-run, and Mokelumne River fall-run Chinook salmon. (BDCP Figure 5.C.4-7)

The DPM has a significant erroneous assumption that installation of a NPB in front of the Delta Cross Channel would result in a large reduction of salmon entrainment:

> "As noted in the DPM methods, the assumption of a 67% proportional reduction in entry into the Interior Delta for late fall–run Chinook salmon actually involves assuming that there would be deterrence not only from entering Georgiana Slough but also the Delta Cross Channel, as the latter is largely open during the assumed late fall–run August-February migration period." (BDCP Page 5C.5.3-102)

There is no scientific basis to assume deterrence would be the same for the DCC as Georgiana Slough and the best available science indicates otherwise. Past telemetry studies on salmon movements at the DCC and Georgiana Slough and the areas' hydrodynamic conditions clearly demonstrate there are large differences in flow and fish entrainment at the two sites (Vogel 2002a, 2003a, 2008b, 2011a, 2011b). Discussion on the topic of non-physical barriers was previously provided within these comments (pages 53 – 63).

All of the fish models reliant on "through-Delta" salmon survival should be re-examined for consistency as to the specific salmon migration reach used for the survival estimates. Some modeling calculations used Chipps Island as the measurement end point whereas others used the Golden Gate Bridge as the end point. There are approximately 45 miles between those two end points and Michel (2010) found that there is a surprisingly high salmon mortality between Chipps Island and the Golden Gate Bridge.

Also, the BDCP fish models should be closely re-examined in an unbiased manner to assess if the models are actually rudimentary and incapable of predicting probable changes to salmon survival with the various BDCP scenarios and conservations measures. With so many questionable or erroneous assumptions built into the models based on incomplete, incorrect, or

highly speculative information, one is led to believe the models, in reality, have a very low sensitivity for adequately providing the necessary comparative analyses.

Biased BDCP Analyses Based on Juvenile Salmonid Telemetry Studies in the Delta

The BDCP analyses relied heavily on outputs from a juvenile salmon "Delta Passage" computer model (DPM) to evaluate a variety of alternatives for water management in the Delta (BDCP Appendix 5C, Part 1). This dominant BDCP fish model relied on juvenile salmon acoustic-telemetry study results of Perry (2010) and a few other telemetry studies that provided estimates of acoustic-tagged juvenile salmon route selection and survival through the Delta. However, we now have a high degree of confidence that the accuracy and precision of the salmon survival estimates in those telemetry studies are not believable and, therefore, the DPM model and other models'[23] use of those study results for the BDCP analyses are unreliable.

To explain this assertion and demonstrate that the BDCP did not use the best available science, the following provides a background foundation and necessary amplification and clarification. This discussion is important to explain how the BDCP misused some past telemetry research on salmon, thereby resulting in misinterpretation of fish behavior and survival within the BDCP documents, and failed to build upon and use more-appropriate study findings. It is also essential because the BDCP indicates it will rely on future telemetry studies for its adaptive management program without disclosure of critical limitations discussed below.

Brief Background of the Use of Juvenile Salmon Telemetry in the Delta

Until the 1990s, detailed, empirical data on juvenile salmonid behavior and survival in the Delta's discrete reaches were largely unknown or severely lacking. There were widely-varying, speculative ideas on how juvenile salmonids behaved in the region's complex tidal environment. Opinions abounded, but all-important supportive data were unavailable until the mid-1990s when the first successful use of telemetry on juvenile salmonids in the Central Valley took place. Past efforts using traditional coded-wire tagging (CWT) did not, and could not, answer those critically important questions. Ultimately, from 1996 through 2010, I served as the principal scientific investigator for 22 separate research projects on juvenile salmon (including four studies of predatory fish) in the Delta using radio or acoustic telemetry as a means to acquire detailed data on fish behavior, fish movements with the tides, fish route selection at flow splits, migration through complex channels, migration rates, and estimates of fish survival (Vogel 2010a). As a result, comprehension of fish behavior has improved substantially in recent years due to breakthroughs in the creation, application and analysis of miniaturized telemetry technology for small fish. These readily-available tools have subsequently produced a proliferation of juvenile salmonid telemetry studies in the Delta.

Technological breakthroughs in miniaturization of radio transmitters allowed attachment or surgical implantation in juvenile salmonids (Figure 37). These transmitters could be

[23] For example, these errors were even propagated to particle tracking model PTM results for BDCP analyses: "For all other reaches (Geo/DCC and Yolo), reach survival is assumed to be unaffected by Delta conditions and is informed by means and standard deviations of survival from acoustic-tagging studies." 5C.4-52

programmed for individually-identifiable frequencies to discriminate between tagged fish released and monitored throughout the Delta channels. Radio signals emitting underwater can break the water/air surface interface and be detected by land- or boat-based radio receivers. Triangulation of radio signals provided locations of the migrating salmon. These initial studies quickly determined that the fish did not move as a school, but instead, dispersed, exhibiting a wide range in migratory behaviors in the complex Delta environment. Numerous revealing findings were derived from these first telemetry investigations. Salmon moved many miles back and forth each day with the ebb and flood tides and the side channels (where flow was minimal) were largely unused. Site-specific hydrodynamic conditions present when telemetered fish arrived at channel flow splits had a major affect in initial route selection. Importantly, relevant to the BDCP models, some of the juvenile salmonids were believed to have been preyed upon based on aberrant telemetry patterns (Vogel 2003b, 2004, 2010a, 2011a, 2012b). An example was a sudden attenuation in the radio signal that was caused by a salmon being eaten by a predator. These observations lead to the first documentation of predation on telemetered salmon in the Delta.

Figure 37. A radio-tagged juvenile Chinook salmon one week after surgery.

Studies in the highly complex regions of the Delta Cross Channel and Georgiana Slough in 2000 and 2001 provided some of the most extensive, detailed fish behavior (in real-time and on a micro-scale). Results of this research established the first empirical evidence showing how juvenile salmon are entrained into the DCC and Georgiana Slough. It also demonstrated how juvenile salmon may migrate past those two flow splits during ebb tide conditions only to be subsequently advected back upstream during flood tide conditions and then entrained into the DCC and Georgiana Slough (Vogel 2001a, 2002a, 2003a, 2011a, 2012b). The research also provided evidence of high entrainment of smolts into Georgiana Slough when the DCC gates were closed which was attributed to a combination of physical and hydrodynamic conditions at that flow split in conjunction with fish positions within the water column and across the river channel (Vogel 2003a). Predation on telemetered salmon was also evident.

Concerns over water management effects on salmon smolt survival in the Delta lead to four separate research projects conducted during the winters of 2000 and 2002 (north Delta), winter of 2001 (south Delta), and the spring of 2002 (central Delta). Salmon were tracked via jet boats for hundreds of miles throughout nearly every conceivable route where salmon could migrate. Triangulating radio-tagged fish locations in real time clearly demonstrated how juvenile salmon moved long distances with the tides and were advected into regions with very large tidal prisms, such as upstream into Cache Slough and into the flooded Prospect and Liberty Islands. Importantly, these studies again found that some telemetered salmon were eaten by predatory fish based on unique characteristics of telemetry data (Vogel 2001b, 2003b, 2004, 2007a, 2010a, 2011a, 2011b). Results found that some radio-tagged salmon were eaten by predatory fish in northern Cache Slough, near the levee breaches into flooded islands and that higher predation occurred in Georgiana Slough as compared to the lower Sacramento River. While past studies utilizing coded-wire tags also found that salmon released into northern Georgiana Slough were found to have a higher mortality rate than fish released in the Sacramento River downstream of the flow split (Brandes and McLain 2001), the reasons for the mortality remained unknown until these telemetry studies were performed.

In 2005, a desire to develop more-quantitative as compared to qualitative data prompted a study using a relatively new miniaturized acoustic tag that could be surgically implanted in juvenile salmon (Figure 38). Unlike radio telemetry, acoustic technology requires underwater signal detection recorded by submerged hydrophones. Based on a series of experiments and field trials in the Sacramento River and Delta, it was determined that the technology had application for fish behavior and survival studies in the Delta (Vogel 2006a). In particular, it was discovered that a unique feature of the technology (through highly detailed and meticulous data processing techniques) allowed detection of predation on salmon smolts as well as accurate depiction of multiple predation events by individual predatory fish (Vogel 2006a, 2006b, 2007a, 2011a, 2011c). The first large-scale acoustic-telemetry study took place in the north Delta in 2006 - 2007 to further expand the understanding of how fish move, not only into the DCC and Georgiana Slough, but Sutter and Steamboat Sloughs as well (Vogel 2008b).

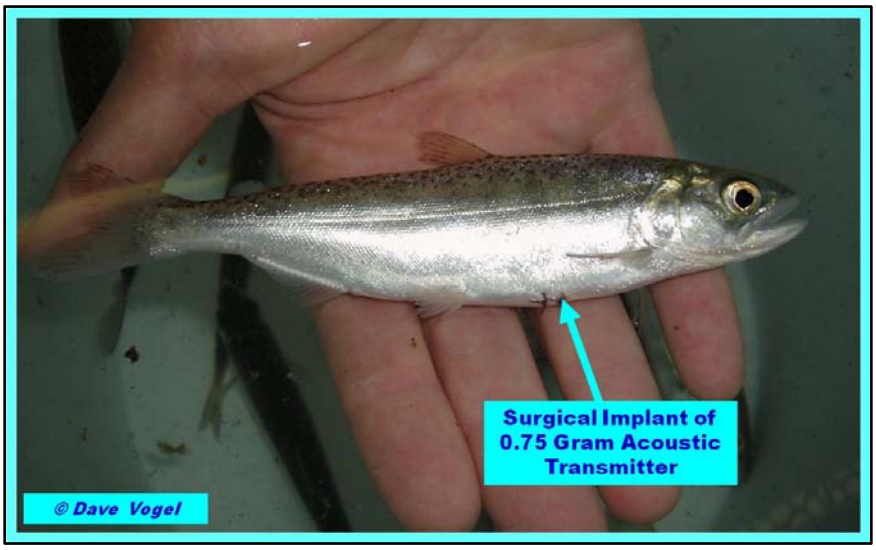


Figure 38. An acoustic-tagged juvenile Chinook salmon.

After it was demonstrated that miniaturized acoustic telemetry yielded valuable insights into juvenile salmon migratory behavior and survival/mortality, the San Joaquin River Group Authority (SJRGA) expressed interest in using the technology to supplement ongoing coded-wire tag studies that were being administered as part of the Vernalis Adaptive Management Program (VAMP). For many years, the VAMP studies were conducted by releasing groups of CWT salmon, but consistently ended in inconclusive results from poor (low) tag returns that could not inform meaningful management decisions. The SJRGA believed that the annually repeated CWT VAMP studies, by themselves, were not providing sufficient data to formulate actions to benefit salmon in the lower San Joaquin River and Delta. However, noting the success of telemetry technology, large-scale studies in the south and central Delta took place over several years (Vogel 2006b, 2007a, 2007b, 2010b, 2010c, 2011c). These latter, most-recent efforts led to a major breakthrough in the interpretation of juvenile acoustic telemetry studies in the Delta applicable to the BDCP flawed analyses and misinterpretation of research results (discussed below).

The Predation Problem and Salmon Survival Models

Limitations of the acoustic telemetry technology for salmon survival models were inadvertently discovered during experiments I conducted in 2005 by releasing acoustic-tagged juvenile salmon upstream of the Delta on the Sacramento River, then electronically recording passage of each fish at fixed-station electronic acoustic dataloggers positioned farther downstream (much like the strategy for later experiments in the Delta). Using simple presence/absence data recorded by the dataloggers (customarily and commonly applied by others in later Delta efforts), initial results indicated 100% survival. In this particular experiment, using the telemetry vendor's hardware and software, much more data than simple presence/absence of tagged fish detection was produced. It allowed close visual examination of the "echograms" or "acoustic signatures" of subtle movements of fish at a fine- or micro-scale within detection range of the dataloggers. Later, highly-detailed, manual post-processing of the study data found that three acoustic-tagged salmon released upstream at different times and locations reached the downstream dataloggers at the exact same second, a probability close to zero. Further, closer examination of the echograms showed that those three tags moved in perfect unison for extended periods (Figure 39). It was therefore confirmed that the three acoustic-tagged salmon had been eaten by a predator and the dataloggers had actually recorded the three dead fish inside the predator's stomach instead of as individual live salmon. Figure 40 depicts this problem. After manual re-examination of the echograms, the original salmon survival estimates using only presence/absence detection data changed from 100% survival to 100% mortality; all fish had been consumed by predatory fish. The findings clearly demonstrated the enormity of potential misinterpretation of telemetry results without thoughtful, careful application of the technology and understanding of fish behavior (which was not brought forth in the BDCP documents).

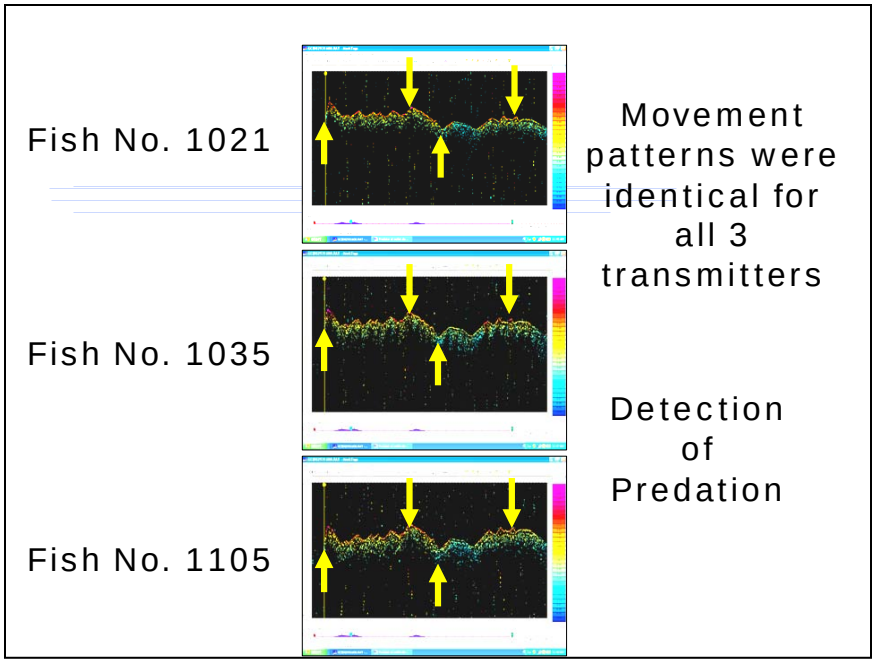


Figure 39. Three individual echograms of three different acoustic-tagged salmon (or the transmitters) during the identical time period showing changes in the amplitude and voltage of the signals (y-axis) over time (x-axis).

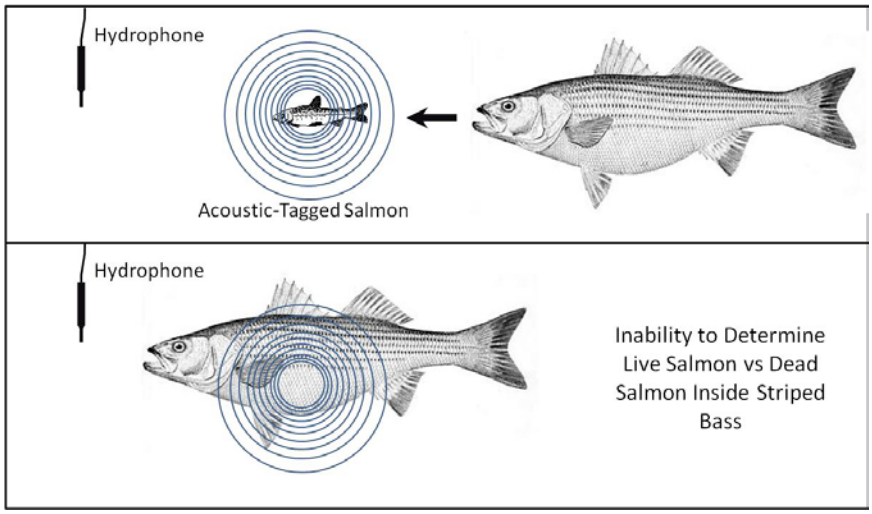


Figure 40. The problem with the inability to determine a live acoustic-tagged salmon versus a dead acoustic-tagged salmon inside a striped bass using only presence/absence tag detection data.

This major technological limitation for estimating juvenile salmon survival and fish route selection dramatically surfaced during the VAMP fish studies. Through detailed analyses of acoustic-tag echograms recorded by a large array of fixed-station dataloggers[24] distributed throughout the Delta, it was found that, in hundreds of instances, we were actually tracking the movements of dead salmon inside predatory fish, not live acoustic-tagged salmon (Vogel 2010c, 2011c). Importantly, a separate, concurrent study using different techniques for evaluating the behavior of migrating acoustic-tagged juvenile salmon during the VAMP study at the head of

[24] We chose to manually examine each and every echogram instead of reliance of simple presence/absence data because of the previously discussed discovery.

Old River estimated that approximately 50% of the tagged salmon were actually dead salmon inside predatory fish. The magnitude of potential misinterpretation of study results would have been enormous if only the usual and customary tag presence/absence data were used. A peer-review workshop of the VAMP telemetry studies stated: "On the predator problem and acoustic tags – the problem should not be understated."[25]

In an attempt to overcome this predation issue with acoustic telemetry studies in the Delta, we developed procedures to estimate whether or not individual acoustic-tagged salmon detected by fixed-station acoustic receivers positioned throughout the Delta had been preyed upon. Highly detailed evaluations of telemetered fish movements were performed which included:

1) A near-field environment within the fish transmitter detection range of telemetry receivers;
2) Medium-field observations of movements in a fine time scale between receivers in close proximity; and
3) Far-field examinations of movements throughout Delta-wide telemetry arrays.

These data were integrated with flow measurements, site-specific characteristics in migration corridors, and, very importantly, knowledge of fish behavior acquired from prior radio- and acoustic-telemetry studies (Vogel 2010c, 2011c). In each year, the severity of the predation problem was demonstrated.

Subsequently, in a recent peer-reviewed journal publication, Buchanan et al. (2013) adopted this "predator filter" technique developed by Vogel (2010c, 2011c) to estimate salmon survival through the Delta (from the San Joaquin River upstream of Mossdale to Chipps Island). For the 2010 VAMP studies, the estimated survival through the Delta without application of the predator filter was 11%. However, with application of the predator filter, salmon survival was estimated at only 5% (Buchanan et al. 2013). These results indicate the magnitude of error that can occur (and unquestionably has occurred) in Delta telemetry studies without accounting for the predator problem. The BDCP did not account for these serious errors and bias in survival estimates used in the fish models. This best available science was completely ignored in the BDCP analyses. Therefore, the accuracy and precision of BDCP modeled estimates of relative salmon survival among the alternative BDCP scenarios are undoubtedly untenable and unusable and is another major shortcoming of the BDCP analyses.

The principal predator creating these primary telemetry study limitation problems in the Delta is non-native striped bass. Some acoustic telemetry study designs performed in the Delta (e.g., Perry 2010) expected that predatory fish would be relatively stationary[26] or not move in a downstream direction (like Columbia River dam studies), and the serious predicament described here would not surface. However, that critical assumption is now known to be invalid (as described previously). In fact, striped bass can exhibit a strong tendency to migrate from the northern, interior, and south Delta regions to the west Delta and showed a strong affinity to the area around Chipps and Mallard Islands (Vogel 2012). Unfortunately, this site is where the

[25] Delta Science Program Workshop Summary, March 2 – 3, 2010.
[26] The studies also assumed that predators would only move in an upstream direction (uncharacteristic of a salmon smolt) and resultant telemetry data could be corrected for anomalous tag behavior.

western-most acoustic dataloggers were positioned as an "end point" in the hope of estimating overall salmon survival through the Delta (e.g., Perry et al. 2012). Some studies, including several in the peer-reviewed literature, have simply chosen to ignore the predation problem by assuming that no predated acoustic-tagged salmon would swim past the receivers in a downstream direction (e.g., Holbrook et al. 2009, Perry 2010, Perry et al. 2010, Perry et al. 2012). Fortunately, Buchanan et al. (2013) provided more-reliable and realistic estimates for San Joaquin River salmon survival through the Delta (accounting for the predation problem) but, to date, Sacramento River salmon studies have failed to do so. A recent study on juvenile steelhead in the Delta recognized the predation problem, but did not attempt to correct for false positive detections because of the uncertainty on how to do so (Delaney et al. 2014). These errors have subsequently been compounded and propagated sequentially through reports, science workshops, and even in peer-reviewed publications. The BDCP and its analyses fall into this category. Although this serious problem with telemetry studies has been ignored or slowly accepted, other researchers have finally acknowledged it (e.g., Michel 2010, Buchanan et al. 2013) and some have attempted to correct for the bias (e.g., Buchanan et al. 2013, Romine et al. 2014). In fact, NMFS now recognizes this major issue as well:

> "However, even acoustic telemetry estimates are not without limitations. For instance, survival measured using acoustic tags can be biased high if tagged fish are eaten by predators that subsequently move past receiver locations. Presently, there is no definitive way of determining if a tag detected at a receiver is in a live target species or in a predator." (BDCP Appendix 3.G, Proposed Interim Delta Salmonid Survival Objectives Page 6)

Unfortunately, the BDCP models and analyses did not use the best available science and ignored this dilemma. Instead, it relied on sparse, misleading information from isolated studies. As described in detail above, some telemetry studies failed to account for the severe technological limitation of the inability to differentiate between a live acoustic-tagged salmon and a dead tagged salmon inside a predator but were used for the BDCP analyses. For example, the Perry (2010) study (used for the DPM) only screened out acoustic tags found to have moved in an upstream direction and did not account for predated tags moving in a downstream direction:

> "The detection records of five tagged fish suggested they had been consumed by piscivorous predators as was evidenced by their directed upstream movement for long distance and against the flow. We truncated the detection record of these fish to the last known location of the live tagged fish. All other detections were considered to have been live juvenile salmon." (Perry 2010).

Additionally, it should be noted that the Perry (2010) study was also greatly hindered by releasing the experimental acoustic-tagged salmon during periods uncharacteristic of when salmon would normally migrate. For four of the five fish releases, river flows were unseasonably low, water turbidity was low, and the natural migration of salmon was essentially non-existent. The BDCP analyses have extrapolated results from a study not reflective of those environmental conditions when the north Delta diversions would operate (i.e., high-flow conditions). This demonstrates that caution must be used when using data that are not

representative of real-world conditions and subsequently expanding those data to circumstances not applicable to how natural fish migration occurs under high riverine flows.

To further exacerbate this problem, the BDCP proposes to use acoustic telemetry in its "adaptive management" program without an understanding of the limitations.[27] Use of the technology to accurately quantify small fish survival and fish route selection in long reaches of the Delta and through the entire Delta is not viable at the present time until the major predation problem previously discussed is resolved. Therefore, the BDCP should not use any data and models derived from prior acoustic telemetry studies that have not been corrected for bias. This also illustrates the problem with a rush to publish research findings on very complex biological issues. Supposed "statistically robust" data are not useful when the underlying raw input data are simply wrong.

Because of the predation problem greatly compromising the integrity of estimates of salmon survival in the Delta (and fish survival models), I recommended that a miniaturized transmitter be developed to detect when an acoustic-tagged salmon has been eaten by a predator (Vogel 2010c). One telemetry vendor has now done so and the technology is currently being evaluated by USBR. The initial results show strong potential (Afentoulis and Schultz 2014). Also, now in recognition of the predation problem, some researchers are beginning to work on evaluative techniques to discriminate between acoustic detections of a live acoustic-tagged salmon versus a dead acoustic-tagged salmon inside a predator (Romine et al. 2014) using alternative techniques than used by Vogel (2010c, 2011c). Unfortunately, the promising methods for doing so described by Romine et al. (2014) require an extremely expensive and elaborate acoustic telemetry array with dozens of hydrophones positioned in close proximity to obtain highly detailed two- or three-dimensional movements of an acoustic transmitter. Even then, Romine (2014) could not determine if they were truly observing live acoustic-tagged salmon in their telemetry array or predators. More fundamentally and importantly, they did not address the much-larger problem with estimating Delta-wide salmon survival estimates which are reliant on single-hydrophone receivers.[28] Nevertheless, they provided further insight and corroboration into the serious nature of how this predation problem can adversely impact and bias salmon survival estimates in the Delta as described by Vogel (2010c, 2011c) that was not accounted for in the BDCP analyses.

In summary, the BDCP fish models' estimates of salmon survival and fish route selection used to evaluate various BDCP alternatives are unreliable for making management decisions among

[27] For example: "Therefore, the level of uncertainty in using results of currently available acoustic-tag studies to establish both existing conditions and metrics within the objectives for wild-origin fall-run and late fall–run Chinook salmon is relatively high and will be the subject of additional experimental survival studies, monitoring, and analyses during the interim period." (BDCP Page 3.3-160)

[28] As an important note, Romine (2014) suggested that their techniques of using an elaborate acoustic-telemetry array could be used as an alternative approach of the "predator filter" developed by Vogel (2010). That comparison is not valid because it is an "apples and oranges" perspective between use of single hydrophones deployed independently over long distances versus dozens of integrated hydrophones deployed in close proximity. With present-day technology, installation and operation of the elaborate 2-D or 3-D telemetry arrays throughout the Delta would be expected to cost in excess of hundreds of millions of dollars and would not be feasible for the BDCP's proposed adaptive management program.

BDCP scenarios and conservation measures. Some of the salmon survival estimates used for BDCP models were undoubtedly inflated but also possessed highly questionable and unknown variance in estimated salmon route selection at critical Delta flow splits, reach-specific survival, and overall survival through the Delta. The negative ramifications of the BDCP assumptions cannot be overstated. The BDCP discussion on the topic and the associated analyses must be redone to appropriately build upon and accurately reflect the best available science.

Propagation of Errors in BDCP Fish Models Resulting from Faulty CalSim II Modeling

Much of the BDCP fish modeling efforts relied on CalSim II model outputs. An earlier version of the CalSim II model (herein after referred to as the "BDCP Model") was used as the primary analytical tool and foundation to model BDCP water project operations and water supply to compare the environmental baseline with various BDCP scenarios. In turn, comparisons of changes in water project operations and water supply were subsequently relied upon to estimate effects on fishery resources. However, a recent independent review of the BDCP Model revealed numerous significant flaws (MBK 2014) that were, unfortunately, carried through to the BDCP fish models. Some highlights of that independent modeling review, as it would undoubtedly affect BDCP fish modeling analyses[29], are summarized here.

- The CalSim II model has been substantially updated since the BDCP analyses were performed to correct technical errors and deficiencies in assumptions but the BDCP Model does not reflect the current CalSim II model.

- The BDCP Model results in impractical or unrealistic CVP and SWP operations.

- The BDCP Model High Outflow Scenario could result in releasing more stored water from upstream reservoirs.

- The BDCP Model significantly underestimates the amount of water diverted at the three north Delta intakes and overestimates the amount of water diverted at the south Delta water export facilities.

- Water diverted from the north Delta intakes could be approximately 680,000 acre-feet more than disclosed in the EIR/EIS.

- The amount of water exported from the Delta may be approximately 200,000 acre-feet/year higher than the amount disclosed in the EIR/EIS and Delta outflow would decrease by that amount.

- The BDCP Model assumed that USBR and DWR would not modify water project operations in response to adverse changes in climate and hydrology, which is an unrealistic assumption.

[29] Analyses of the specific resulting effects on each BDCP fish model would require a substantial undertaking.

The BDCP's inaccurate depiction of changes in water storage in upstream reservoirs, reservoir releases, and water exports in the north and south Delta would undoubtedly significantly alter analyses of the BDCP effects on salmonids and other fish species. Changes in reservoir storage would affect water temperatures in downstream reaches with concomitant effects on salmonid spawning and rearing. Altered timing and magnitude of instream flows would alter salmonid rearing and outmigration, as well as passage through the Yolo Bypass. Variation in the amount and timing of water diverted through the three north Delta intakes would affect factors such as fish sweeping flows, exposure to the fish screens, predation, and impingement. Changes in the amount of flow bypassed at the north Delta intakes would change salmon survival in downstream reaches. Modifications to Delta exports and outflow would alter fish survival. All of these BDCP Model errors result in an adverse cascading affect on the reliability of the BDCP fish models. Therefore the BDCP effects on salmonids were obviously mischaracterized by an unknown, but probably very severe, degree. Given the limitations and errors of the BDCP fish models described in these comments, the fish models' reliance on faulty BDCP Model outputs at the outset further adds to the undependably modeled and unknown BDCP effects.

Old and Middle River Flows

The BDCP provides some misleading statements concerning BDCP effects on Old and Middle River (OMR) flows. For example:

> "Under the evaluated starting operations, average OMR flows generally are more positive in most months under all water-year conditions compared to existing biological conditions (Figure 5.B.4-3)." (BDCP Page 5.B-17)

Based on model results provided in BDCP Appendix 5B Entrainment, it appears that OMR flows will actually be "less negative" instead of "more positive". Most of the time, OMR will stay negative (southerly direction) instead of positive (northerly direction) (BDCP Figure 5.B.4-3 below). The significance of this fact is that juvenile salmon will still move southerly toward the export facilities even with less-negative flows. The zone of influence where juvenile salmonids may be entrained southerly toward the south Delta from export operations has not yet been specifically identified, but it may extend as far north as channels leading off the San Joaquin in the central Delta with stronger influence closer to the export facilities (Vogel 2005). A recent study of juvenile steelhead movements found that high mortality occurred even with less negative OMR compared to more negative OMR (Delany et al. 2014) demonstrating the adverse impact of the south Delta exports. This issue warrants much more description and analyses in the BDCP.

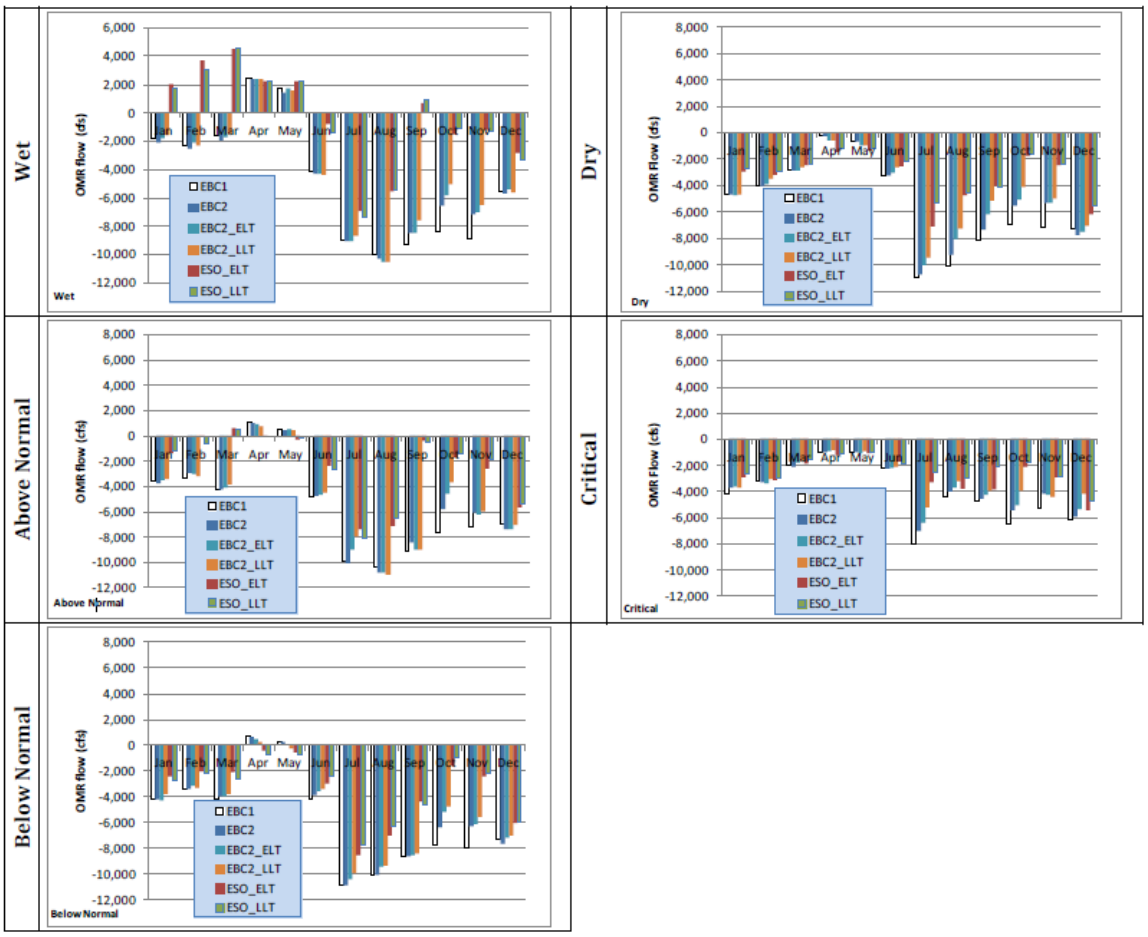


Figure 5.B.4-3. Flow (cfs) in Old and Middle Rivers under existing biological conditions (EBC) and Evaluated Starting Operations (ESO) in the Early Long-Term (ELT) and Late Long-Term (LLT) periods. (Figure from BDCP Appendix 5B, Entrainment.

Propagation of Misleading Information Concerning Salmon Behavior

Misleading information concerning juvenile salmon behavior, migration characteristics, and habitat preferences is permeated throughout the BDCP documents in the various assumptions, models, and conclusions. The popularized recent use of colorful and attractive PowerPoint graphics, computer animations, and other readily-available communication tools have often resulted in over-simplification of highly complex topics such as fish behavior. Those outside the fisheries science discipline have postulated ideas on salmon behavior and movements in the Delta and proposed remedial actions for fish that must be more-appropriately vetted through experts on Delta fishery resources. These forums have exacerbated the problem when only highly selective information is provided by individuals with inadequate training and expertise in the fishery science discipline. The problems and potential solutions "*du jour*" for fish posed by such individuals have become more frequent in recent years and runs the serious risk of erasing progress toward improved fish survival in the Delta. Once incorrect or misleading information is presented, it unfortunately propagates rapidly and widely, making it difficult to rectify; it can misdirect resources away from the most urgent problems. This issue is vital because it adds to scientific uncertainties and has negatively affected the credibility of the BDCP.

BDCP Uncertainties and Adaptive Management

It is readily apparent there is an enormous amount of ambiguity and uncertainty in the BDCP and its conservation measures. Every aspect of the potential impacts of the BDCP on salmonids is either "uncertain" or "highly uncertain". A simple search for the word or words containing "uncertain" found it mentioned *1,008 times* in the BDCP and appendices and *2,303 times* in the EIR/EIS and appendices.

As a result of all the uncertainties, the BDCP advocates the use of "adaptive management" in its implementation. In fact, the BDCP and associated EIR/EIS use the term with so much emphasis that it overwhelms the implementation strategy. Because of the enormous amount of uncertainty in impacts of the BDCP on salmon and the proposed conservation measures, the BDCP repeatedly states that if unanticipated adverse effects are found after plan implementation, adaptive management will be used to inform potential management actions in attempts to correct those defects. A simple phrase search for "adaptive management", "adaptively managed", and "adaptively mange" found it mentioned *1,314 times* in the BDCP and appendices and *2,008* times in the EIR/EIS and appendices. The following are just a few examples:

> "Adaptive management is intended to reduce uncertainty over time through a structured process that incorporates improved scientific understanding into Plan implementation. Information obtained from monitoring and research activities will be used to make recommendations regarding implementation of the conservation measures. This will continually improve the outcomes associated with water resource management and ecological restoration commitments." (BDCP Executive Summary Page 13)

> "The adaptive management and monitoring program has been designed to use new information and insight gained during the course of Plan implementation to assure that strategies employed by the BDCP can achieve the biological goals and objectives." (BDCP Page 3.1-4)

> "The adaptive management program provides a mechanism for making adjustments to avoid or minimize this effect." (BDCP Pages 5.F-iii and –iv)

> "Additionally, should a cause for not achieving a biological goal or objective be identified, adaptive management will be used to change conservation measures, if necessary, to address the cause." (BDCP Page 3.1-5)

> "Such adverse effects would be assessed through the adaptive management process, which could result in changes to the conservation measures to minimize these effects." (BDCP Page 3.2-8)

> "If results of monitoring identify adverse effects that will not support meeting the expected biological outcomes, the existing and future restoration actions will be modified and refined as part of adaptive management. In the event that a restored habitat is found to have substantial adverse effects on the reproductive success,

> growth, survival, or population dynamics of the covered fish, substantial modifications will be made to address and mitigate these adverse effects." (BDCP Page 5.3-32)

Unfortunately, the BDCP's approach to adaptive management lacks substance, credibility, and authenticity. Because the BDCP is so exceedingly reliant on adaptive management, it is highly instructive to examine recent uses of this concept in some relevant Central Valley and Delta salmon programs to determine how reliably adaptive management may actually be implemented for the BDCP. The trustworthiness of BDCP adaptive management is only as good or reliable as how the practice has recently been performed for other fishery resource projects in the Central Valley and Delta. A review of such projects is illustrative of the trustworthiness in statements in the BDCP to predict how well the BDCP will truly attain purported benefits to "achieve biological goals and objectives" and "avoid and minimize effects". The following are just some examples.

Central Valley Project Improvement Act, Anadromous Fish Restoration Program

In 1992, the Central Valley Project Improvement Act (CVPIA) was enacted by Congress and an Anadromous Fish Restoration Program (AFRP) to double the anadromous fish populations in the Central Valley by 2002 was developed. However, after twenty-two years and more than one billion dollars spent, extensive monitoring studies and the use of so-called "adaptive management", the salmon runs have not increased. Additionally, there is no measureable progress toward delisting any of the threatened or endangered anadromous fish, and the fall-run Chinook, the most abundant among the salmon runs, have now declined even further from historical levels. Some individuals have even recently suggested that the fall run may warrant listing as an endangered species (Williams 2012).

In 2008, a peer review of the CVPIA fisheries program was conducted and was highly critical of the government agencies' implementation of the anadromous fish restoration efforts. For example,

> "Yet it is also far from clear that the agencies have done what is possible and necessary to improve freshwater conditions to help these species weather environmental variability, halt their decline and begin rebuilding in a sustainable way. A number of the most serious impediments to survival and recovery are not being effectively addressed, especially in terms of the overall design and operation of the Central Valley Project system." (Cummins et al. 2008)

In particular, the review criticized the failures of implementing an effective, scientifically valid adaptive management program:

> "The absence of a unified program organized around a conceptual framework is one of the reasons the program appears to be a compartmentalized effort that lacks strategic planning and decision-making. As a result the program is unable to address the larger system issues, has a disjointed M&E [monitoring and evaluation] program, exhibits little of the traits expected from effective adaptive

> management, and is unable to effectively coordinate with related programs in the region. An uncoordinated approach also creates boundaries to the free flow of useful information and program-wide prioritization. We observed that most researchers and technicians seemed unclear how or even whether their local efforts related to or contributed to the overall program." (Cummins et al. 2008)
>
> "The CVPIA program does not use basic principles of adaptive management at a program level." (Cummins et al. 2008)

Cummins et al. (2008) provided numerous recommendations to improve implementation of the CVPIA anadromous fish restoration program. Included among those recommendations was development and utilization of an effective adaptive management program. However, it has now been six years since the review panel's report, yet the recommendations remain unimplemented by the involved agencies.

The BDCP provides no supporting rationale or guidance on how the BDCP would use adaptive management any differently than the CVPIA AFRP.

Vernalis Adaptive Management Program (VAMP)

Concluding in 2011, VAMP was a 12-year program implemented in the south Delta to evaluate and protect juvenile fall-run Chinook salmon emigrating from the San Joaquin River. The USFWS, the agency largely responsible for coordinating the salmon evaluations stated: "VAMP employs an adaptive management strategy to use current knowledge of hydrology and environmental conditions to protect Chinook salmon smolts, while gathering information to allow more efficient protection in the future."[30]

However, after spending many millions of dollars in its 12-year run, the VAMP was largely a failure and the San Joaquin salmon runs are now in worse shape than before the program. The collection and quality of data necessary to formulate protective and restorative actions for fish were insufficient. Serious mistakes made in phases of the program (too lengthy to list and describe here) were repeated year after year; lessons were not learned. Despite annual data collection demonstrating very poor salmon survival, remedial actions were not implemented and the responsible agencies simply plowed forward without recognition of the problems and changing the program. Importantly, information that was developed from VAMP that could have been used to benefit fishery resources was not acted upon using adaptive management principles. A recent peer-review of the VAMP was highly critical of the program (Hankin et al., 2010). The failure of VAMP is summarized well by Lund et al. (2011):

> "The much-heralded Vernalis Adaptive Management Program (VAMP), conducted over the past decade, illustrates both[31] of these problems. VAMP paid

[30] www.fws.gov/stockton/jfmp/vamp.asp

[31] "One challenge is that management experiments often involve large changes that affect real stakeholders. If financial compensation is required to individuals or groups who stand to lose land or water resources from the experiments, the costs can be substantial. Another challenge is mustering the resources and political will to conduct the necessary scientific analysis. Often, programs are labeled "adaptive management" if they try something

> farmers on San Joaquin tributaries to release pulses of water to speed young salmon on their way to sea. Because they profited from foregoing the use of this water, participating farmers developed an interest in having this become a long-lived experiment. Fish agencies collected data and avoided regulatory conflict. Water agencies benefitted by not having to make major changes in their own diversions. But in the end, the experiment appears to have been more successful for these various individuals and entities than for the salmon. Millions of dollars were spent, yet little synthetic modeling or experimental design was conducted to evaluate the effects on fish or to improve performance over time (Hankin et al., 2010)."

Interestingly, one aspect of the peer review of the VAMP program was the review panel's praise for trying the new telemetry techniques (previously discussed) to elucidate problems for salmon.

Despite the now-defunct VAMP and the lack of meaningful progress in restoring salmon and fixing known problems, the BDCP boldly states that it will use "adaptive management" to resolve problems for fish in the Delta. The track record from VAMP undermines any confidence in the BDCP utilizing effective adaptive management.

Fish Salvage at the South Delta Federal and State Water Export Facilities

Predation mortality at Tracy Fish Facilities (FF) for the south Delta federal water export facilities is an extremely serious problem for anadromous fish and is mentioned frequently in the BDCP documents. The high juvenile salmon mortality at the site has been known for a long time and is likely much higher than reported in the BDCP (Vogel 2011a). These issues are well-described in a recent peer review of CVPIA restoration program activities, which was highly critical of the lack of significant efforts to correct the problem:

> "… the operation of the Tracy Pumping Plant and Fish Collection Facility is a serious mortality source for salmon and steelhead (and for Delta smelt). All aspects of the pump operations have significant adverse impacts on salmon and steelhead, from the way juveniles are drawn to the pumps and away from the natural migration routes out through the Delta, to predation and other mortality factors in the channels leading to the pumps, to high mortalities at the out-dated louvers screening the pumps, to even higher mortalities likely during the archaic "salvage" collection and transport operation at the pumps, to predation mortality at the point of re-release, and finally to the overall adverse effects on salmon survival and productivity from regulating and diverting that much of the natural Delta outflow. Data on direct and indirect juvenile mortality is uncertain but likely to be high, and may run as high as 50% for spring-run Chinook and steelhead, and possibly 75% for winter-run Chinook." Cummins *et al.* 2008.

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different, even if they lack the significant follow-up analysis required to improve scientific understanding and policy response." Lund et al. (2011)

The serious salmon mortality problems associated with the Tracy FF have been known since the 1950s. USBR and other agency staff have studied and attempted minor, largely unbeneficial modifications to the Tracy FF for many decades. Despite purported adaptive management over many, many years at the Tracy FF, it appears little progress toward significant improvements in fish protection has been made. And yet the BDCP states that now, unlike all the prior decades of studies and activities at the Tracy FF and expenditures of many millions of dollars, the plan will now use adaptive management to fix the facilities' complex, intertwining problems but do not describe how.

The BDCP documents also frequently identify the extremely high salmon mortality associated with Clifton Court Forebay (CCF), part of the state water project south Delta water export facilities (e.g., BDCP Page 3.4-299, BDCP Page 5.B-6). Much like the Tracy FF, the problems for salmon at CCF have been known and studied for many decades. Since the late 1970s, CDFW has been studying this pre-screen loss and attributes the fish mortality to predation, primarily by striped bass (Coulston 1993), which are the primary predator in the Forebay (IEP 1993). Recent studies using acoustic-tagged juvenile salmon and acoustic-tagged striped bass also empirically demonstrated the severe predation problem in Clifton Court Forebay. Specifically, the small area immediately behind the CCF gates was shown to harbor striped bass for extended periods and mortality was severe when salmon passed under the gates and were eaten by predators (Vogel 2010b, 2010c, 2011c). This very small isolated area undoubtedly causes the highest mortality for anadromous fish reaching the south Delta. This predator haven has been, and will continue to be, severe without corrective measures (Vogel 2010c,Vogel 2011a)

Because of the concern about predation in CCF, a workshop was held in 1993 to discuss options to reduce predatory fish in the Forebay. The principal options examined included an increase in recreational fishing opportunities and an aggressive, non-lethal removal and relocation program. Interestingly, two of the primary reasons posed for not pursuing these actions were largely policy related. Water exporters were concerned that predator removal would result in increased numbers of salmon reaching the fish salvage facilities and would penalize exports due to a perceived increase in "take" of winter-run Chinook (unless a relaxation in the NMFS pre-screen loss estimates for winter-run Chinook was initiated) (Coulston 1993). Conversely, recreational fishing interests were opposed to predator removal because of their concern that increased water exports would take place, resulting in greater indirect losses of salmon (Coulston 1993). (from Vogel 2011a)

The BDCP provides statements that specific "stressor reduction targets" at the state and federal water export facilities will be achieved to improve conditions for salmon:

> **"**Reduce predation in Clifton Court Forebay and at the CVP trash-racks to achieve mortality rates across Clifton Court Forebay and past CVP trash-racks equivalent to no more than 40%, as reflected in the Reasonable and Prudent Alternative in the NMFS (2009) BiOp, by year 5. Reduction in predation mortality may be achieved through a variety of actions, including, but not limited to, modification to Clifton Court Forebay operations, modifications to physical habitat conditions within Clifton Court Forebay, as well as removal of predatory fish from Clifton

> Court Forebay and the CVP intake." (BDCP Page 3.3-139, BDCP Page 3.3-151, BDCP Page 3.3-169)

In summary, no significant progress toward alleviating these serious problems at Tracy FF has been accomplished since the 1950s and, similarly, no progress has been accomplished at Clifton Court Forebay since the 1960s. It has now been five years since the 2009 BiOp and no improvements (other than reduced water exports) have been made. Now, however, the BDCP proclaims that it will dramatically reduce these long-standing problems through adaptive management and unspecified or unproven measures. Such statements clearly lack credibility based on extensive past history. Additionally, this BiOp RPA is supposed to be fulfilled anyway, regardless if the BDCP is ultimately implemented.

Coleman National Fish Hatchery Fish Releases

Coleman National Fish Hatchery (CNFH) is a salmon production facility operated by the U.S. Fish and Wildlife Service (USFWS) on Battle Creek in the upper Sacramento River basin that serves as partial mitigation for lost natural salmon production resulting from the construction of USBR's Shasta Dam. It is the largest salmon hatchery in California. CNFH currently produces fall- and late-fall-run Chinook salmon and steelhead. A satellite hatchery facility just downstream of Shasta Dam also produces winter-run Chinook. The USFWS Office in Red Bluff is responsible for planning and scheduling the juvenile fish releases from both fish production facilities. In 2011, the USFWS completed a Biological Assessment (BA) for CNFH's operations to comply with the Endangered Species Act. In that BA, the USFWS states that the agency will use "adaptive management" for the hatchery's operations. As compared to the extremely complex and highly uncertain issues associated with the BDCP's effects on salmon, one would believe that adaptively managing hatchery fish releases would be far simpler. Fish hatcheries have a high degree of control on fish growth, release timing and locations, and good predictive capabilities for riverine conditions where and when salmon are released. These circumstances create fertile ground for the use of adaptive management to increase fish survival. For example, USFWS (2011) states:

> "All artificial propagation practices used at Coleman NFH, including incubation and rearing, are managed adaptively with the goal of producing high quality fish that maximize opportunity to accomplish program goals while reducing negative impacts to natural stocks."

The production of juvenile fall-run Chinook is usually released into Battle Creek during April. Presumably, using adaptive management, the USFWS would time those fish releases with precipitation and flow events when turbidity is high to maximize survival of outmigrating salmon and minimize adverse impacts on wild fish. However, Figure 41 shows a recent example of the release of fall-run salmon from the hatchery in 2013. The hatchery released 6,000,000 fall-run salmon (half of its entire production) shortly *after* precipitation events had occurred and the river flows were dramatically declining and water clarity increased. Prior to this fish release, short-term weather models and river forecasts through the California Data Exchange Center (CDEC) clearly predicted these environmental conditions. The resultant adverse impacts on those fish releases were likely severe with low, clear flows and slow downstream fish transport

timing creating ideal conditions for predation. Reports by sports fishermen in areas downstream of the hatchery in the middle Sacramento River after the hatchery release described "feeding frenzies" by striped bass readily observable from the surface. Some striped bass caught by anglers were found to have stomachs full of juvenile salmon, probably from the hatchery fish release (Figure 42). If the fish release had been made the prior week, riverine conditions would have been ideal. The USFWS claimed the agency did not have any flexibility in the fish release timing, even by several days.[32] This action did not appear to be "adaptively managed" and the hatchery fish likely suffered very high in-river mortality that could have been avoided.

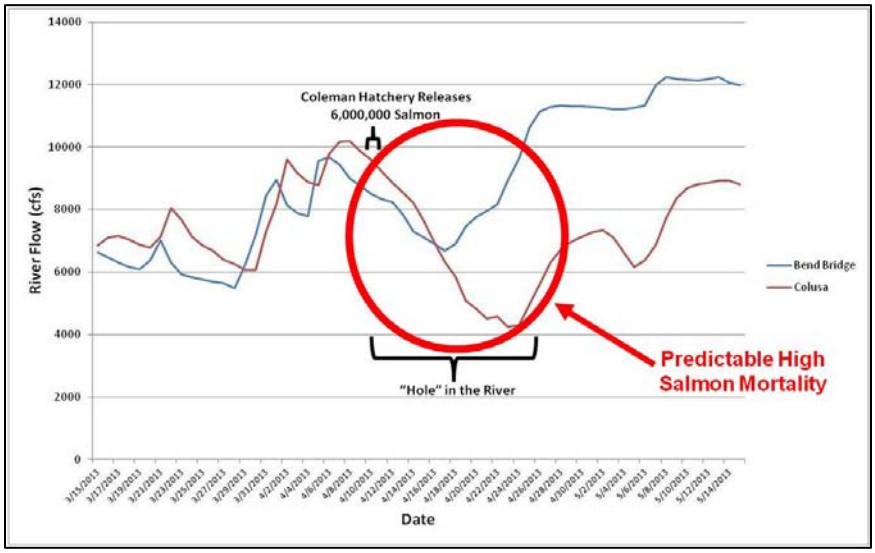

Figure 41. Timing of the release of approximately 6,000,000 juvenile fall-run Chinook salmon from Coleman National Fish Hatchery into Battle Creek on the upper Sacramento River in 2013 and Sacramento River flows downstream of the hatchery at Bend Bridge and Colusa.

[32] Meeting between the USFWS, CDFW, and the Golden Gate Salmon association on February 14, 2014, Sacramento, CA.

Figure 42. Stomach contents of a striped bass caught by an angler in the middle Sacramento River after the CNFH fish release. Most of the contents are assumed to be numerous fall-run Chinook salmon.

In another example of purported adaptive management, the 2011 USFWS BA states:

> "Releases of late-fall Chinook and steelhead from Coleman NFH are timed to coincide with high flow events in Battle Creek and the Sacramento River."

The rationale for doing so is that releasing the larger-sized hatchery salmonids in the upper Sacramento River could have deleterious impacts on wild salmonids if the river is low and clear:

> "Based on the body size of hatchery-origin late-fall Chinook salmon, size ranges of natural-origin salmonid stocks, and predator-prey size constraints (i.e., prey less than half of predator length), hatchery-origin late-fall Chinook could potentially consume natural-origin fall, spring, and winter Chinook juveniles following their release from Coleman NFH." (USFWS 2011)
>
> "Releases [of juvenile late-fall Chinook into Battle Creek] are conducted over the course of one or two days and are timed to coincide with high flow and turbidity events, which promote rapid emigration and afford protection to out-migrating juveniles by discouraging predation."
>
> "The timing of late-fall Chinook releases are scheduled to coincide with winter storm events."

The 2014 water year turned into a near record-breaking drought and provided an excellent opportunity for USFWS to exhibit adaptive management principles in the CNFH late-fall Chinook releases. If the year's hydrologic conditions were normal, Sacramento River flows and turbidity would be naturally high during January due to tributary accretions and the USFWS

strategy of releasing the late-fall-run Chinook in the upper river may be justified. However, this year's unique drought situation resulted in very unfavorable environmental conditions for late-fall salmon released into Battle Creek. In recognition in advance of the adverse impacts not only on the hatchery fish, but primarily on wild salmon stocks rearing in the river downstream of the hatchery, a recommendation was made for the USFWS to transport the fish downstream of the hatchery to the middle Sacramento River where survival would likely be higher and deleterious impacts on wild fish would be ameliorated (Vogel 2014). However, the recommendation was not adopted and no response was even provided by the USFWS. Subsequently, despite the supposed implementation of adaptive management for hatchery releases and the probable impact on wild fish in the river, including the endangered winter-run Chinook, threatened spring-run Chinook, and threatened steelhead, the USFWS released 750,000 large, juvenile hatchery late-fall Chinook into Battle Creek. Those fish experienced unseasonably low flows and extremely clear water. Many of those juvenile salmon were likely unnecessarily eaten by larger predaceous fish and birds after release from the hatchery. However, most importantly, the release of 750,000 late-fall-run Chinook salmon in the upper river likely adversely impacted the endangered winter-run, threatened spring-run, threatened steelhead, and fall-run Chinook salmon. Because the watershed had not yet experienced heavy precipitation events and high river flows that would stimulate large-scale wild salmonid emigration, it is likely that the majority of wild fish still remained rearing in the upper Sacramento River at that time. Releasing high numbers of large-sized hatchery salmon directly into the heart of the rearing grounds of wild salmon undoubtedly caused competition, displacement, and predation. The problem could have been avoided by transporting the fish to a location downstream of the hatchery to decrease the mortality while simultaneously reducing the ultimate straying rate compared to releases even farther downstream. It does not appear that the late-fall salmon releases were adaptively managed.

In yet another opportunity for the USFWS to exhibit adaptive management during this drought year, the releases of juvenile steelhead could also have been managed to avoid adverse impacts on wild salmonids rearing in the river. As stated in the USFWS BA:

> "However, interactions between salmonids from Coleman NFH and natural-origin salmonids in the Sacramento River are potentially greatest for hatchery-origin steelhead because of their comparatively larger body size, a general tendency for piscivory at the time of release, and a proclivity for adopting alternate life-history patterns (e.g., residualization).
>
> "Based on the size of hatchery-origin steelhead, size ranges of natural origin salmonid stocks, and predator-prey size constraints (i.e., prey less than half of predator length), hatchery-origin steelhead could potentially capture and consume young-of-the-year fall, spring, and winter Chinook juveniles."
>
> "Juvenile steelhead are released into the mainstem Sacramento River at Bend Bridge (RM 258) in January" [to minimize combination and predation on wild salmon].

> "Environmental conditions common in the Sacramento River during January likely reduce predation by hatchery-origin steelhead. Steelhead are released from Coleman NFH during early-January, a time of year when winter storm bring high flows, elevated turbidities, and cool water temperatures."

Despite the foregoing statements, the USFWS nevertheless released the entire production of steelhead at Bend Bridge (as they have traditionally done year after year), except now in very low, and clear water thereby violating the agency's original premise. Here again, the USFWS could have released the hatchery steelhead production farther downstream from Bend Bridge (which is within the heart of the primary rearing grounds for wild salmonids) to minimize deleterious impacts on wild fish in the low, clear water, but did not adaptively manage their release procedures.

In this final example of CNFH fish releases using so-called adaptive management, winter-run Chinook salmon from the satellite facility at Livingston Stone Hatchery at the base of Shasta Dam are released with the following USFWS strategy:

> "Releases [of juvenile winter-run Chinook into the upper Sacramento River at Redding] occur generally around late January or early February; however, actual release timing may occur outside of this target window in order to time the release of winter Chinook juveniles to coincide with a high flow and high turbidity event."

The first significant precipitation events of 2014 were clearly predicted by weather forecasts and increased river flows were predicted on CDEC. However, as shown in Figure 43, the USFWS released the winter-run Chinook *after* the precipitation events in the upper Sacramento River at a location where river flows were very low and clear. The river farther downstream was high and turbid. If the USFWS had adaptively managed the fish releases, the winter-run could have been released just a few days earlier and just downstream of some nearby tributaries where accretions increased mainstem flows and turbidity. Adverse impacts to this year's hatchery winter-run Chinook outmigrants likely occurred. Again, adaptive management was not employed.

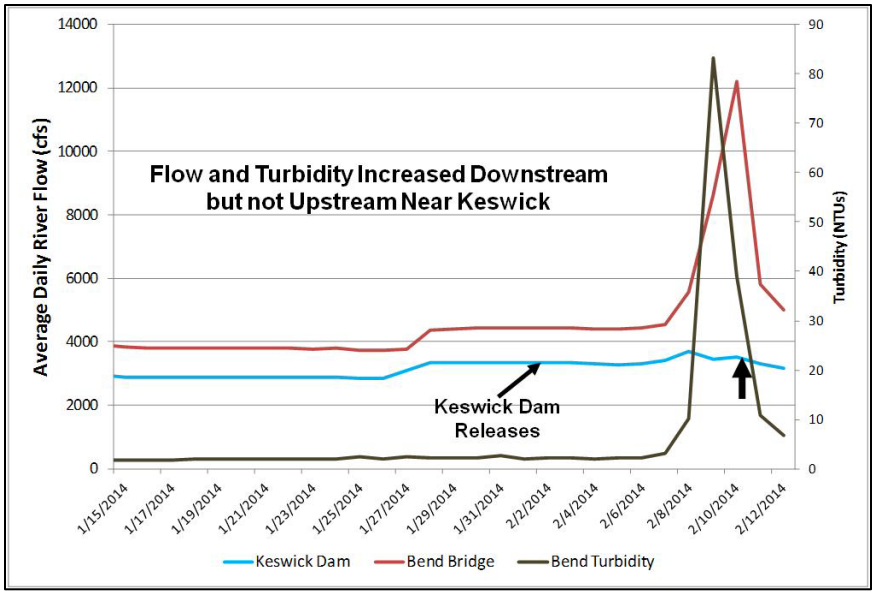

Figure 43. Release timing of juvenile winter-run Chinook salmon in the upper Sacramento River at Redding downstream of Keswick Dam (vertical pointer), Keswick Dam releases (daily cfs) and Sacramento River daily flow (cfs) and turbidity at Bend Bridge gauge 39 river miles downstream of the fish release location.

In summary, as can be seen from these foregoing recent, prominent examples, there has been a strong, consistent legacy in the Central Valley and Delta of *not* implementing adaptive management for the protection of fishery resources, even for relatively simple actions. Why would the BDCP be any different? The BDCP is far more complex and expansive than the examples provided. Again, the BDCP is entirely reliant on so-called adaptive management to attempt correction of deficiencies in the plan after it is implemented. Recent experience indicates otherwise and statements in the BDCP documents lack reliability. The BDCP must be rewritten to clearly articulate specifically how true adaptive management would be implemented during the program and describe all site-specific actions and feasible remedial counter-measures to demonstrate that the BDCP would not fail in this regard.

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EXHIBIT 1

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Education

M.S., 1979, Natural Resources (Fisheries), University of Michigan
B.S., 1974, Biology, Bowling Green State University

Experience

Dave Vogel specializes in aquatic resource assessments and resolution of fishery resource issues associated with water development. His 39 years of work experience in this field includes large-scale assessments in river systems, lakes and reservoirs, and estuaries, mostly associated with restoration of western United States fishery resources. He has designed and conducted numerous projects to determine fish habitat criteria and population limiting factors leading to development and implementation of innovative measures to increase fish populations. Mr. Vogel has worked on California's Central Valley fishery resource issues for the past 33 years. During the 1980s he served as the U.S. Fish and Wildlife Service's (USFWS) Project Leader in northern California and was responsible for expanding a one-person office in Red Bluff into a large-scale, fishery research facility. In this regard, he directed research on Sacramento River basin salmon and steelhead populations and successfully developed measures to increase fish runs.

Dave Vogel has extensive experience in the design and evaluation of large fish screening facilities. He was the project leader of a major evaluation on fish entrainment into the 2,700 cfs Tehama-Colusa Canal and Corning Canal diversions which lead to the design and installation of state-of-the-art fish screening and fish bypass facilities. Mr. Vogel was a key individual in the development of the biological criteria and associated bioengineering design for those facilities. As a member of multi-agency groups which have developed the concepts and designs of new screening facilities, he is thoroughly familiar with modern-day fish screen technologies. Dave Vogel was the Principal Investigator in a study of fish entrainment at the largest unscreened agricultural diversion in Oregon and developed the conceptual design that ultimately led to a fish screen and bypass facility on the A-Canal in the Klamath Irrigation Project. Mr. Vogel also served as the Principal Scientific Investigator for biological evaluations of the largest riverine diversion in the Central Valley at Glenn-Colusa Irrigation District's (GCID) pumping facility and worked on the bioengineering designs of the retrofits for the old and interim screens and ultimate final 3,000 cfs fish screen facility. On behalf of state and federal agencies and GCID, he developed and implemented the pre- and post-project biological evaluations. This multi-year program involved extensive testing of the new fish screens and bypass systems using fish mark-recapture techniques as well as radio- and acoustic-telemetry, electrofishing, angling, juvenile

and adult fish traps, direct underwater SCUBA observations, underwater hand-held videography, surface-deployed underwater videography, surface observations, and extensive use of a dual-frequency identification sonar camera. Additionally, he evaluated the new associated Sacramento River gradient facility by capturing, tagging and monitoring the telemetered movements of adult green and white sturgeon at the site, as well as examining the relative distribution, abundance, and habitats of predatory fish over many years. Dave Vogel has conducted many dozens of underwater inspections of large fish screens, evaluating biological performance, juvenile salmon and predatory fish behavior, characteristics on sedimentation, screen seals, debris loading, and water velocities. Much of his work has led to improved fish screen designs elsewhere.

Dave Vogel has served as a Principal Scientific Investigator for 22 research projects in the north, central, and south Sacramento – San Joaquin Delta. He was the first scientist to successfully employ miniaturized radio- and acoustic-telemetry technology to evaluate juvenile salmon migratory behavior, migration pathways, and survival. He also developed breakthroughs on use of the technology to detect predation on salmon. He served on the Delta Cross Channel Work Team as the principal scientist evaluating the movements of juvenile salmon at the Delta Cross Channel and Georgiana Slough using both radio- and acoustic-telemetry methods. Mr. Vogel was also a Principal Scientific Investigator for the Vernalis Adaptive Management Program from 2006 through 2010 and developed innovative field and analytical techniques toward the end of the program (https://sites.google.com/site/vamp2009team/). He recently conducted four research projects on the behavior and movements of predatory fish in the Delta. Based on his extensive field experience, he has acquired a highly specialized knowledge of the Delta, including fish habitat characteristics, migratory pathways utilized by salmon and fish mortality by reach, juvenile salmon and predatory fish behavior, site-specific sources of fish mortality, and Delta hydrodynamic conditions. He has used a Natural Resource Scientists, Inc. DIDSON™ sonar camera extensively throughout the Delta to study fish habitats, water diversions, agricultural siphons, waste water treatment outfalls, artificial and natural in-channel structures, and predator/prey interactions.

Mr. Vogel served as Task Manager on numerous projects for the U.S. Bureau of Reclamation (USBR), Mid-Pacific Region, to define interrelationships of fishery resources and water project operations. He developed a life history guide for salmon in California's Central Valley to improve interagency coordination and communication concerning fishery and water resource management. He also assessed techniques to estimate the annual run sizes of the endangered winter Chinook salmon to recommend improved methodologies to enhance population restoration. He was the Task Manager for the original Biological Assessment of the federal Central Valley Project and the principal author of biological portions of the original Biological Assessment for the USBR's Klamath Project. Dave Vogel served as the Task Manager to assess options for the disposition of the Tehama-Colusa Fish Facilities. Recently, under contract for the USBR, Mr. Vogel completed a comprehensive in-river survey of all the unscreened water diversions in the Sacramento River between Verona and Red Bluff using a DIDSON® sonar camera and an Acoustic Doppler Current Profiler.

Mr. Vogel has participated in various work teams to evaluate numerous proposed projects in the Delta. He has served on the CALFED Integration Panel and other committees to evaluate and

recommend ecosystem restoration projects. He also worked on the Bay/Delta Oversight Committee's technical team. He has been involved with evaluations of proposed water projects and facilities in the Delta using particle tracking model results and other analytical tools.

Dave Vogel has strong expertise in designing and implementing multifaceted projects to sample entrainment of juvenile fish in small, medium, and large unscreened water intakes. Recently, Mr. Vogel has been serving as the Principal Scientific Investigator on behalf of the State/federal Anadromous Fish Screen Program for multi-year evaluations of fish entrainment in unscreened diversions on the Sacramento River. He is an expert in the design and fabrication of complex fish sampling equipment for installation and operation at challenging field sites capable of withstanding powerful hydraulic forces and heavy debris loading. He personally builds the structures using metal inert gas welding, plasma cutting, and oxyacetylene.

He is an expert SCUBA diver possessing standard, advanced, and research diver world-wide recognized certifications. He is a professional underwater videographer and his footage has been shown on nationwide, prime-time televisions shows, instructional videos, and environmental documentaries. He is a voluntary member of the Tehama County Search and Rescue Team for recovery of drowning victims in northern California rivers and reservoirs. Based on this training and experience, Dave Vogel developed innovative underwater survey techniques to map riverbed substrates on the Sacramento River in deep, swift water. He and his dive team mapped Sacramento River salmon spawning habitats in the three-mile reach downstream of Keswick Dam and in the vicinity of numerous Sacramento River bridges.

Dave Vogel is very knowledgeable of provisions of the federal Endangered Species Act (ESA) having served on the original National Marine Fisheries Service's Winter-Run Chinook Salmon Recovery Team and the U.S. Fish and Wildlife Service's Endangered Lost River Sucker and Shortnose Sucker Working Group. He developed the framework for the original winter-run Chinook salmon restoration program and has worked on projects associated with the endangered monk seal, threatened green sea turtle, bald eagle, and other species. He has given public presentations to a wide variety of groups concerning the ESA including Congressional testimony on three separate occasions. He frequently works on ESA consultations and permitting associated with threatened and endangered fish.

Mr. Vogel previously worked for the U.S. Government in the USFWS's Fishery Research Division and the Fishery Resources Division. He received the "Fishery Management Biologist of the Year" award for six western states and numerous outstanding and superior achievement awards. He served as Chairman of the USFWS SCUBA Diving Control Board for six western states during an eight-year period. Mr. Vogel designed and conducted evaluations of Federal and state fish hatcheries to improve their effectiveness. He was Chairman of the Sacramento River Steelhead Trout Technical Committee for six years. He also developed and directed numerous projects to improve the survival and contribution of hatchery salmon and represented the USFWS on the California Department of Fish and Game's Salmon Smolt Quality Committee during the 1980s.

Mr. Vogel frequently serves as a volunteer for environmental issues. He serves on the Board of Directors for the Fishery Foundation of California. Dave Vogel was a member of the California

4th Senatorial Environmental Advisory Committee and has provided presentations to California legislative committees on several occasions. Mr. Vogel served as a peer reviewer for the Interim and Final reports of the National Academy of Sciences' National Research Council Klamath Committee (Interim Report: Scientific Evaluation of Biological Opinions on Endangered and Threatened Fish in the Klamath River Basin; Final Report: Endangered and Threatened Fish of the Klamath River Basin: Causes of Decline and Strategies for Recovery). He has given many formal presentations on environmental issues to diverse organizations.

Dave Vogel's clients have included municipal, county, state and federal agencies, water districts, water user organizations, universities, Indian tribes, private landowners, engineering and environmental consulting firms, the timber industry, watershed conservancies, resource conservation districts, law firms, and non-governmental environmental organizations. He is presently working for the Golden Gate Salmon Association and northern California water districts to develop a salmon re-building program for the Sacramento River basin in concert with state and federal agencies and non-governmental organizations.

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BDCP 1674

EXHIBIT C:

Report on Review of Bay Delta Conservation Program Modeling

Bourez, Walter

(June 14, 2014)

Report on Review of Bay Delta Conservation Program Modeling

Foreword

Since December 2012, MBK Engineers and Dan Steiner (collectively "Reviewers") have assisted various parties in evaluating the operations modeling that was performed for the Bay Delta Conservation Plan (BDCP). To assist in understanding BDCP and the potential implications, stakeholders[1] requested that the Reviewers review the CalSim II modeling studies performed as part of the BDCP (hereafter "BDCP Studies" or "BDCP Model").

An initial review led the Reviewers to conclude that the BDCP Model, which serves as the basis for the environmental analysis contained in the BDCP Environmental Impact Report/Statement (EIR/S), provides very limited useful information to understand the effects of the BDCP. The BDCP Model contains erroneous assumptions, errors, and outdated tools, which result in impractical or unrealistic Central Valley Project (CVP) and State Water Project (SWP) operations. The unrealistic operations, in turn, do not accurately depict the effects of the BDCP.

The Reviewers revised the BDCP Model to depict a more accurate, consistent version of current and future benchmark hydrology so that the effects of the BDCP could be ascertained. The BDCP Model was also revised to depict more realistic CVP and SWP operations upon which to contrast the various BDCP alternatives. The Reviewers made significant efforts to coordinate with and inform the U.S. Bureau of Reclamation (Reclamation) and the California Department of Water Resources (DWR) managers and modelers, and CVP and SWP operators of the Reviewers' modifications, assumptions, and findings. Where appropriate, the Reviewers also used Reclamation and DWR's guidance and direction to refine the Reviewers' analysis.

This Report summarizes: (1) the Reviewers' independent analysis and review of the BDCP Model, publicly released for the BDCP's Draft EIR/S in December 2013, (2) the Reviewers' updates and corrections made to the BDCP Model, and (3) comparisons between the original BDCP Model and the independent Model as revised by the Reviewers.

[1] The entities who funded this report are Contra Costa Water District, East Bay Municipal Utility District, Friant Water Authority, Northern California Water Association, North Delta Water Agency, San Joaquin River Exchange Contractors Water Authority, San Joaquin Tributaries Authority, and Tehama Colusa Canal Authority.

Contents

1 EXECUTIVE SUMMARY

Purpose of this Report

The CalSim II model is the foundational model for analysis of the BDCP, including the effects analysis in the Draft BDCP and the impacts evaluation in the Draft BDCP Environmental Impact Report/Statement (EIR/S). Results from CalSim II are used to examine how water supply and reservoir operations are modified by the BDCP. The results are also used by subsequent models to determine physical and biological effects, such as water quality, water levels, temperature, Delta flows, and fish response. Any errors and inconsistencies identified in the underlying CalSim II model are therefore present in subsequent models and adversely affect the results of later analyses based on those subsequent models.

The purpose of this Report is to examine the underlying CalSim II model used in support of the BDCP EIR/EIS and to analyze proposed operational scenarios contained in the BDCP. In undertaking the analysis for this Report, the Reviewers examined the model used in support of BDCP, the 2010 version of the CalSim II Model (BDCP Model), as well as the information contained in the Public Review Draft BDCP, released in December 2013. There are three basic reasons why the BDCP Model cannot be used to determine the effects of the BDCP: 1) the no action alternatives do not depict reasonable operations due to climate change assumptions, 2) operating criteria used in the BDCP Alternative 4 result in unrealistic operations, and 3) updates to CalSim II since the BDCP modeling was performed almost 4 years ago alter model results.

Given that it was not possible to determine how the BDCP may affect CVP and SWP operations or water system flows and conditions using the BDCP Model, independent modeling was performed to assess the potential effects of the BDCP. The first phase of this independent modeling effort was development of an updated without project baseline, which is similar to the no action alternative but with current, improved assumptions. The 2010 version of the CalSim II Model was used as the basis for the BDCP Model. The most recent version of CalSim II is the 2013 version used by DWR in its 2013 State Water Project Water Delivery Reliability Report (2013 CalSim II Model), and has undergone significant revision to not only correct errors in the 2010 model, but also to reflect regulatory changes that adversely affect the accuracy and dependability of the 2010 CalSim II Model. The BDCP was developed and analyzed using the 2010 CalSim II Model, and the changes and improvements reflected in the 2013 CalSim II Model were not used for the BDCP. For the purpose of the Reviewers' analysis and this Report, the 2013 CalSim II Model was further modified to incorporate additional updates, assumptions, and fixes. Some of these most recent Reviewer modifications have been accepted by both DWR and Reclamation, and are now incorporated into the CalSim II models that DWR and Reclamation use in conducting their own analyses. The second phase of the independent modeling effort (described in Section 4.2) incorporated the facilities and operations for the BDCP described as Alternative 4 H3 in the Draft EIR/EIS.

The manner in which the CVP and SWP are operated in the "With Project" and "Without Project" modeling scenarios significantly influences the BDCP "effects analysis". Modeling scenarios must depict how the actual system operates or how it might operate so that realistic effects can be determined. Modeling results from CalSim II are used to examine the effects of BDCP on water supply and reservoir operations, and the modeling results are also used by subsequent models to determine physical and biological effects, such as water quality, water levels, temperature, Delta flows, and fish response. If CalSim II modeling does not appropriately characterize operations in both the "With Project" and "Without Project" scenarios, the effects based on CalSim II will also not be appropriately characterized. The independent model provides a more accurate platform to assess the operations of the BDCP and isolates the effects of the BDCP from climate change. Comparing the results of the independent model to those of the BDCP model reveals significant differences in water operations and potential environmental impacts.

Key Conclusions

Assumptions, errors, and outdated tools used in the BDCP Model results in impractical or unrealistic CVP and SWP operations. Therefore, the BDCP Model provides very limited useful information to illustrate the effects of the BDCP.

Methodology used to incorporate climate change contains errors and does not incorporate reasonably foreseeable adaptation measures:

Climate change assumptions were incorrectly applied, yielding non-sensible results.

Climate change hydrology in the Upper San Joaquin River basin was incorporated incorrectly into the BDCP Model. Although inflow to Millerton Lake is expected to *decrease* under future climate scenarios, the error in the BDCP Model causes the amount of stored water in Millerton Lake to *increase* by inappropriately reducing water deliveries to the Friant Division. BDCP erroneously overestimates Millerton Lake storage, which causes an overestimation of reservoir releases and available water downstream. Because overall CVP operations and the San Joaquin River are interconnected, this error causes problems throughout the CVP system. With the coordinated operations of the CVP and SWP, this error can affect the SWP system.

Incorporation of climate change ignores reasonably foreseeable adaptation measures.

The BDCP Model uses assumed future climate conditions that obscure the effects of implementing the BDCP. The future conditions assumed in the BDCP model include changes in precipitation, temperature, and sea level rise. The result of this evaluation is that the modeled changes in water project operations and subsequent environmental impacts are caused by three different factors: (1) sea level rise; (2) climate change; and (3) implementation of the alternative that is being studied.

Including climate change, without adaptation measures, results in insufficient water needed to meet all regulatory objectives and user demands. For example, the BDCP Model results that include climate change indicate that during droughts, water in reservoirs is reduced to the minimum capacity possible. Reservoirs have not been operated like this in the past during extreme droughts and the current drought also provides evidence that adaptation measures are called for long in advanced to avoid draining the reservoirs. In this aspect, the BDCP Model simply does not reflect a real future condition. Foreseeable adaptations that the CVP and SWP could make in response to climate change include: (1) updating operational rules regarding water releases from reservoirs for flood protection; (2) during severe droughts, emergency drought declarations could call for mandatory conservation and changes in some regulatory criteria similar to what has been experienced in the current and previous droughts; and (3) if droughts become more frequent, the CVP and SWP would likely revisit the rules by which they allocate water during shortages and operate more conservatively in wetter years. The modifications to CVP and SWP operations made during the winter and spring of 2014 in response to the drought supports the likelihood of future adaptations. The BDCP Model is, however, useful in that it reveals that difficult decisions must be made in response to climate change. But, in the absence of making those decisions, the BDCP Model results themselves are not informative, particularly during drought conditions. With future conditions projected to be so dire without the BDCP, the effects of the BDCP appear positive simply because it appears that conditions cannot get any worse (i.e., storage cannot be reduced below its minimum level). However, in reality, the future condition will not be as depicted in the BDCP Model. The Reviewers recommend that Reclamation and DWR develop more realistic operating rules for the hydrologic conditions expected over the next half-century and incorporate those operating rules into any CalSim II Model that includes climate change.

The BDCP Model does not accurately reflect reasonably foreseeable conditions and changes in CVP and SWP operations due to the BDCP:

BDCP's "High Outflow Scenario" is not sufficiently defined for analysis.

The effects of many critical elements of the BDCP cannot be analyzed because those elements are not well-defined. The Reviewers recommend that the BDCP be better defined and a clear and concise operating plan be developed so that the updated CalSim II model can be used to assess effects of the BDCP.

The High Outflow Scenario (HOS) requires additional water (Delta outflow) during certain periods in the spring. The BDCP Model places most of the responsibility for meeting this new additional outflow requirement on the SWP. However, the SWP may not actually be responsible for meeting this new additional outflow requirement. This is because the Coordinated Operations Agreement ("the COA") would require a water allocation adjustment that would keep the SWP whole. Where one project (CVP or SWP) releases water to meet a regulatory requirement, the COA requires a water balancing to ensure the burden does not fall on only one of the projects. The BDCP Model is misleading because it fails to adjust project operations, as required by the COA, to "pay back" the water "debt" to the SWP due to these additional Delta outflow requirements. Unless there is a significant revision to COA, the BDCP Model overstates the impacts of increased Delta outflow on the SWP and understates the effects on the CVP.

Furthermore, after consulting with DWR and Reclamation project operators and managers, the Reviewers conclude that there is no apparent source of CVP or SWP water to satisfy both the increased Delta outflow requirements and pay back the COA "debt" to the SWP without substantially depleting upstream water storage. It appears, through recent public discussions regarding the HOS, that BDCP anticipates additional water to satisfy the increased Delta outflow requirement and to prevent the depletion of cold water pools will be acquired through water transfers from upstream water users. However, this approach is unrealistic. During most of the spring, when BDCP proposes that Delta outflow be increased, agricultural water users are not irrigating. This means that there is not sufficient transfer water available to meet the increased Delta outflow requirements and therefore, additional release of stored water from the reservoirs would be required. Releasing stored water to meet the increased Delta outflow requirements could potentially impact salmonids on the Sacramento and American River systems due to reductions in the available cold water pool.

Simulated operation of BDCP's dual conveyance, coordinating proposed North Delta diversion facilities with existing south Delta diversion facilities, is inconsistent with the project description.

The Draft BDCP and associated Draft EIR/EIS specify criteria for how much flow can be diverted by the new North Delta Diversion (NDD) facilities and specify when to preferentially use either the NDD facilities or the existing South Delta diversion (SDD) facilities. However, the BDCP Model contains an artificial constraint that prevents the NDD facilities from taking water as described in the BDCP project description. In addition to affecting diversions from the NDD, this artificial constraint contains errors that affect the No Action Alternative (NAA) operation. This error has been fixed by DWR and Reclamation in the more recent 2013 CalSim II Model; however, the error remains in the BDCP Model. Additionally, the BDCP Model does not reflect the summer operations of the SDD that are described in the Draft EIR/EIS as a feature of the BDCP project intended to prevent water quality degradation in the south Delta. The net effect of these two errors is that the BDCP Model significantly underestimates the amount of water diverted from the NDD facilities and overestimates the amount of water diverted from the SDD. The

further decrease in flows through the Delta, in comparison to what is presented in the BDCP Draft EIR/EIS, would likely result in even greater degradation in Delta water quality than reported.

The BDCP Model contains numerous coding and data issues that significantly skew the analysis and conflict with actual real-time operational objectives and constraints

Operating rules used in the BDCP Model, specifically regarding Alternative 4, result in impractical or unrealistic CVP and SWP operations. Reservoir balancing rules cause significant drawdown of upstream reservoirs during spring and summer months while targeting dead pool level in San Luis from September through December resulting in artificially low Delta exports and water shortages. CVP allocation rules are set to artificially reduce south of Delta allocations during wetter years resulting in underestimates of diversions at the NDD and the SDD. Operating rules for the Delta Cross Channel Gate do not reflect how the gates may be operated in "With Project" conditions.

Operational logic is coded into the CalSim II model to simulate how DWR and Reclamation would operate the system under circumstances for which there are no regulatory or other definitive rules. This attempt to specify (i.e., code) the logic sequence and relative weighting so that a computer can simulate "expert judgment" of the human operators is a critical element to the CalSim II model. In the BDCP version of the CalSim II model, some of the operational criteria for water supply allocations and existing facilities such as the Delta Cross Channel and San Luis Reservoir are inconsistent with real-world conditions.

The BDCP Model, as modified by the Reviewers, corrected some of the inconsistencies between the operational criteria in the BDCP Model and real-world conditions, and confirmed these changes with CVP and SWP operators. By correcting the operational criteria, the modified BDCP model (Independent Model) output is more accurate and consistent with real-world operational objectives and constraints.

Independent modeling of the BDCP revealed differences in CVP and SWP operations and water deliveries from the analysis disclosed for the Draft EIR/EIS.

The independent model provides a more accurate platform to assess the operations of the BDCP and isolates the effects of the BDCP from climate change. Comparing the results of the independent model to those of the BDCP model reveals significant differences in water operations and potential environmental impacts. The independent model "Without Project" baseline was compared to the independent model's version of Alternative 4 H3-ELT of the BDCP. The updated changes in water operations from the independent model are compared to changes in operations reported in the BDCP Draft EIR/EIS for the equivalent alternatives. The difference between the updated independent model results and those reported in the BDCP Draft EIR/EIS are presented below.

- The amount of water exported (diverted from the Delta) may be approximately 200 Thousand Acre-Feet (TAF) per year *higher* than the amount disclosed in the Draft EIR/S. This total represents:
  - approximately 40 TAF/yr more water diverted and delivered to the SWP south of Delta contractors, and
  - approximately 160 TAF/yr more water diverted and delivered to the CVP south of Delta contractors.
- The BDCP Model estimates that, under the No Action Alternative at the Early Long Term (NAA – ELT) (without the BDCP), total average annual exports for CVP and SWP combined are estimated to be 4.73 million acre-feet (MAF) and in the Independent Model Future No Action (FNA) combined exports are 5.61 MAF. The BDCP Model indicates an increase in exports of approximately 540 TAF and the Independent Model shows an increase of approximately 750 TAF in Alt 4.

- Delta outflow would decrease by approximately 200 TAF/yr compared to the quantity indicated in the Draft EIR/S.
    - This lesser amount of Delta outflow has the potential to cause more significant water quality and supply impacts for in-Delta beneficial uses and additional adverse effects on species. To determine the potential effects of the reduced amount of Delta outflow, additional modeling is needed using tools such as DSM2.
- The BDCP Model does not accurately reflect the location of the diversions that the SWP and CVP will make from the Delta.
    - When the errors in the BDCP Model are corrected, the Independent Model reveals that the NDD could divert approximately 680 TAF/yr more than what is disclosed in the BDCP Draft EIR/S.
    - Conversely, the quantity of water diverted through the existing SDD would be approximately 460 TAF/yr less than what is projected in the BDCP Draft EIR/S.
    - This difference in the location of diversions has the potential to reduce water quality in the Central and South Delta in ways that were not analyzed in the BDCP Draft EIR/S

Additional Observations and Recommendations

This review identified and remedied several modeling deficiencies that should be used by others as the BDCP and other projects move forward. However, the work done to date by the Reviewers does not capture all of the improvements necessary to depict the effects of the BDCP accurately. There are many operational uncertainties in the BDCP that require attention and must be addressed. The Reviewers offer several recommendations so that future CalSim II modeling of the BDCP will yield more meaningful results.

1. Ensure model operations of existing facilities are consistent with contemporary real world operations to the extent possible.
    a. Ensure reservoirs are not routinely drawn down to dead pool as part of 'normal' operations.
2. Given the expected changes in hydrologic conditions over the next half century, realistic operating rules for all CVP and SWP facilities, including the BDCP, must be developed.
    a. Develop a 'drought' operations plan that includes adaptations.
    b. Alter reservoir flood release operations to match the assumed shift in precipitation patterns.
    c. Perform a sensitivity analysis using a range of possible future climates.
3. BDCP operations must be defined in a clear and concise manner.
    a. Transfer water required to make an alternative feasible should be identified so the effects of that transfer can be determined.
    b. Adaptive management limits and targets must be better defined
    c. Changes to the existing COA to accommodate the BDCP must be defined.
    d. Modeled export operations spilt between the north and south intakes must be consistent with the project description.
    e. Changes in the DCC operations should be defined.
    f. Refined reservoir balancing rules

The BDCP Model must be revised prior to drawing conclusions regarding the environmental effects of the BDCP. The BDCP Model is an outdated version of the CalSim II model, which contains known errors. Only by incorporating the changes made to date by the Reviewers, incorporating the additional recommended changes above, and potential additional refinements can the effects of the BDCP be determined. Reasonable conclusions can only be drawn once these changes are made to the BDCP Model; therefore, the Reviewers recommend that Reclamation and DWR make these changes.

2 INTRODUCTION

The Public Draft BDCP has been prepared by DWR, with assistance and input from Reclamation and various entities that receive water from the SWP and CVP. The BDCP is being prepared to comply with the federal Endangered Species Act, and certain other federal and state mandates. The BDCP proposes a number of Conservation Measures that, if implemented, are believed to provide some benefit to various species covered by the BDCP in the Delta. The Conservation Measures proposed in the Public Draft BDCP include new conveyance facilities and modified operations of the SWP and CVP, as well as other Conservation Measures addressing water quality, predation, and other habitat-related measures. The BDCP has been in development for several years. DWR also has prepared a Public Draft EIR/EIS in an attempt to satisfy CEQA and NEPA. Both the Public Draft BDCP and the Public Draft EIR/EIS were released for public review and comment in December 2013. This Report analyzes the BDCP as proposed and analyzed in the documents released in December 2013.

The Public Draft EIR/EIS considered several water facility and operational configurations, ultimately identifying "Alternative 4" as the preferred alternative under CEQA. (Public Draft EIR/EIS, Section 3.1.1) In addition to identifying physical facilities, the Public Draft EIR/EIS identifies an operational scenario (Alternative 4, Operation Scenario H) as the proposed operation regime for the new and existing facilities. (Public Draft EIR/EIS, Section 3.1.1, Section 5.3.3.9.) Alternative 4, Operational Scenario H is further divided into four sub-operational scenarios, which vary depending on Fall and Spring Delta outflow requirements. Those sub-scenarios are: Alternative 4 Operational Scenario H1 (Alternative 4 H1); Alternative 4 Operational Scenario H2 (Alternative 4 H2); Alternative 4 Operational Scenario H3 (Alternative 4 H3); and Alternative 4 Operational Scenario H4 (Alternative 4 H4). (Public Draft EIR/EIS, section 5.3.3.9.)

In general the differences between the various operational sub-scenarios are as follows. Alternative 4 H1 does not include enhanced spring outflow requirements or Fall X2 requirements. Alternative 4 H2 includes enhanced spring outflow requirements but not Fall X2 requirements. Alternative 4 H3 does not include enhanced spring outflow requirements but includes Fall X2 requirements. Alternative 4 H4 includes both enhanced spring outflow requirements and Fall X2 requirements. (Public Draft EIR/EIS, section 5.3.3.9.) This Report focuses on Alternative 4 H4 and Alternative 4 H3.

The task of the Reviewers was to review the CalSim II modeling which provides the foundational analysis of the BDCP. Results from CalSim II are used to examine how water supply and reservoir operations are modified by the BDCP, and the results are also used by subsequent models to determine physical and biological effects, such as water quality, water levels, temperature, Delta flows, and fish response. Any errors and inconsistencies identified in the underlying CalSim II model are therefore present in subsequent models and adversely affect the results of later analyses based on those subsequent models.

The model used in support of BDCP is the 2010 version of the CalSim II Model (BDCP Model), as well as the information contained in the Public Review Draft BDCP, released in December 2013. Since its development in 2010, the 2010 version of the CalSim II Model has undergone significant revision to not only correct errors in the model, but also to reflect regulatory changes that adversely affect the accuracy and dependability of the 2010 CalSim II Model. The updated version of CalSim II is the model used by DWR in its 2013 State Water Project Water Delivery Reliability Report (2013 CalSim II Model). The BDCP was developed and analyzed using the 2010 CalSim II Model; the changes and improvements reflected in the 2013 CalSim II Model were not used for the BDCP.

The initial review conducted by the Reviewers led to the conclusion that the BDCP Model provides very limited useful information to illustrate the effects of the BDCP. Assumptions, errors, and outdated tools used in the BDCP Model result in impractical or unrealistic CVP and SWP operations. Because of the unrealistic operations included in the BDCP Model, the Reviewers revised the BDCP Model to depict a more accurate, consistent version of

current and future benchmark hydrology. The BDCP Model was also revised to depict more realistic CVP and SWP operations upon which to contrast the various BDCP alternatives. The Reviewers made significant efforts to coordinate with or inform Reclamation and DWR managers and modelers, and CVP and SWP operators of the Reviewers' modifications, assumptions, and findings. Where appropriate, the Reviewers also used Reclamation's and DWR's guidance and direction to refine the Reviewers' analysis. Although there are many models used to evaluate various effects of BDCP, this analysis and review focused on water operations analysis using the BDCP Model (CalSim II).

Purpose and Use of the CalSim II Model

The CalSim II model is a computer program jointly developed by DWR and Reclamation. CalSim II presents a comprehensive simulation of SWP and CVP operations, and it is used by DWR as a planning tool to predict future availability of SWP water. CalSim II is widely recognized as the most prominent water management model in California, and it is generally accepted as a useful and appropriate tool for assessing the water delivery capability of the SWP and the CVP.

Broadly speaking, the model estimates, for various times of the year, how much water will be diverted, will serve as instream flows (e.g., flow in the rivers at various locations, such as Delta outflow), and will remain in the reservoirs. Within the context of the BDCP, the CalSim II model is also used to estimate the amount of water that will be diverted from BDCP's proposed NDD facilities. Thus, for BDCP, the CalSim II model estimates how much water will be diverted at the NDD facilities, how much flow will remain in the Sacramento River below Hood (the approximate location of the NDD facilities), how much water will be diverted through the existing SDD facilities at Tracy, how much flow will leave the Delta by flowing out to the Bay, and how much water will remain in storage in the reservoirs. The location and timing of the diversion and the amount of water remaining instream are significant because they can cause impacts on species, water quality degradation, and the like.

The coding and assumptions included in the CalSim II model drive the results it yields. Data and assumptions, such as the amount of precipitation runoff at a certain measuring station over time or the demand for water by specific water users over time, are input into the model. The criteria that are used to operate the CVP and the SWP (including current regulatory requirements) are included in the model as assumptions; because of the volume of water associated with the CVP and the SWP, these operational criteria significantly influence the model's results. Additionally, operational logic is coded into the CalSim II model to simulate how DWR and Reclamation would operate the system under circumstances for which there are no regulatory or otherwise definitive rules (e.g., when to move water from upstream storage to south of Delta storage). This attempt to specify (i.e., code) the logic sequence and relative weighting that humans will use as part of their "expert judgment" is a critical element to the CalSim II model.

The model's ability to reliably predict the effects of a proposed action depends on the accuracy of its coding and its representation of operations criteria. In other words, the model's results will be only as good as its data, coding, assumptions, and judgment and knowledge of the modelers. For this reason, a detailed operating plan of existing facilities and the proposed facility is essential to create an accurate model of how a proposed action will change – i.e., affect – existing water operations. In reviewing the BDCP Model it became apparent that coding errors and operating assumptions are inconsistent with the actual purposes and objectives of the CVP and SWP, thus limiting the utility and accuracy of the results. Through collaboration and verification with CVP and SWP operators, the BDCP Model flaws were corrected in the revised BDCP Model (Independent Model) and the potential effects of the BDCP were re-analyzed.

3 REVIEW OF BDCP CALSIM II MODELING

The CalSim II model is the foundational model for analysis of the BDCP, including the effects analysis in the Draft BDCP and the impacts evaluation in the Draft EIR/EIS. Results from CalSim II are used to examine how water supply and reservoir operations are modified by the BDCP, and the results are also used by subsequent models to determine physical and biological effects, such as water quality, water levels, temperature, Delta flows, and fish response. Any errors and inconsistencies identified in the underlying CalSim II model are therefore present in subsequent models and adversely affect the results of later analyses based on those subsequent models.

The Reviewers' analysis of the BDCP Model is summarized in three categories: (3.1) assessment of climate change assumptions, implementation, and effects; (3.2) assessment of general assumptions and operations; and (3.3) assessment of the assumptions and operational criteria for inclusion of the new BDCP facilities. The issues discussed in (3.1) and (3.2) are relevant for all modeling scenarios, both baseline scenarios that do not include BDCP and with project scenarios that evaluate BDCP or the Alternatives. The issues discussed in (3.3) are specific to the inclusion of the BDCP as defined in the Draft Plan and identified as Alternative 4 in the Draft EIR/EIS.

3.1 Climate Change

Implementation of Climate Change

The analysis presented in the BDCP Documents attempts to incorporate the effects of climate change at two future climate periods: the early long term (ELT) at approximately the year 2025; and the late long term (LLT) at approximately 2060. As described in the BDCP documents[2], other analytical tools were used to determine anticipated changes to precipitation and air temperature that is expected to occur under ELT and LLT conditions. Projected precipitation and temperature was then used to estimate runoff into from the watersheds over an 82-year period of variable hydrology; these time series were then used as inputs into the BDCP Model. A second aspect of climate change, the anticipated amount of sea level rise, is incorporated into the BDCP CalSim II model by modifying flow-salinity relationships that estimate salinity within the Delta based on sea level and flows within Delta channels.

This Report does not evaluate the analytical processes by which reservoir inflows and runoff were developed, nor does it evaluate the modified flow-salinity relationships that are assumed due to sea level rise; those items could be the focus of another independent review. This Report is limited to evaluating how the modified flows were incorporated into the BDCP Model and whether the operation of the CVP and SWP water system in response to the modified flows and the modified flow-salinity relationship is reasonable for the ELT and LLT conditions. This work reviews the assumed underlying hydrology and simulated operation of the CVP/SWP, assumed regulatory requirements, and the resultant water delivery reliability.

Assessment of Climate Change Assumptions and Implementation

To assess climate change, the three Without Project (or "baseline" or "no action") modeling scenarios were reviewed: No Action Alternative (NAA)[3], No Action Alternative at the Early Long Term (NAA – ELT), and No Action Alternative at the Late Long Term (NAA –LLT). Assumptions for NAA, NAA-ELT, and NAA-LLT are provided in the Draft BDCP EIR/EIS Appendix 5A, Section B, Table B-8. The only difference between these scenarios is the climate-related changes made for the ELT and LLT conditions (Table 1).

[2] BDCP EIR/EIS Appendix 5A, Section A and BDCP HCP/NCCP Appendix 5.A.2

[3] NAA is also called the Existing Biological Conditions number 2 (EBC-2) in the Draft Plan.

Table 1. Scenarios used to evaluate climate change

	Climate Change Assumptions	
Scenario	**Hydrology**	**Sea Level Rise**
No Action Alternative (NAA)	None	None
No Action Alternative at Early Long Term (NAA-ELT)	Modified reservoir inflows and runoff for expected conditions at 2025	15 cm
No Action Alternative at Early Long Term (NAA-LLT)	Modified reservoir inflows and runoff for expected conditions at 2060	45 cm

The differences between the NAA and NAA-ELT reveal the effects of the climate change assumptions under ELT conditions; similarly, the differences between the NAA and NAA-LLT reveal the effects of the climate change assumptions under LLT conditions. Numerous comparisons between NAA, NAA-ELT, and NAA-LLT are discussed in the Technical Appendix of this report; issues that shaped our conclusions are discussed below.

Climate change implementation is incorrect, yielding non-sensible results.

Climate change hydrology in the Upper San Joaquin River basin (above Friant Dam) was incorporated incorrectly into the BDCP Model, resulting in non-sensible results. Because overall CVP operations and the San Joaquin River are interconnected, this error causes problems throughout the CVP system. With the coordinated operations of the CVP and SWP, this error can affect the SWP system.

Specifically, under climate change, inflow to Millerton Lake is expected to decrease (BDCP DEIR/S, Appendix 29B). However, when climate change was implemented into the BDCP Model, it was done incorrectly such that: (1) the inflow into Millerton Lake *was not adjusted* for climate change and is thus overestimated, and yet (2) the flood control operations and water allocation decisions for Millerton Lake *were adjusted* for climate change as if the inflow was reduced. The net effect is that storage in Millerton Lake is overestimated; in fact, the BDCP model indicates that the amount of water stored in Millerton Lake will actually be increased as a result of climate change even though the inflow to the lake is projected to be reduced (i.e., non-sensible). This error results in the overestimation of Millerton Lake storage causing an overestimation of reservoir releases for flood control purposes and available water downstream at the Mendota Pool; these unreasonably high flood releases are then diverted by CVP exchange contractors in lieu of taking CVP Delta water, which means that either CVP Delta exports are reduced or the water is backed up into San Luis Reservoir (SLR), overestimating SLR storage. Furthermore, any excess water from the Millerton Lake that is not diverted at Mendota Pool would continue downstream and ultimately increase Vernalis flow, which subsequently affects Delta exports. Ultimately, changes in exports have the potential to affect upstream reservoir releases (i.e., from Lake Shasta) as well.

This is a situation where one seemingly minor error cascades through the entire system. This error exists in all BDCP Model scenarios (baselines and project alternatives) that have climate change incorporated at either ELT or LLT conditions. In other words, all model results reported in the BDCP and associated Draft EIR/S contain this error, with the only exception of the Existing Biological Conditions baselines numbers 1 and 2 (EBC1 and EBC2), which are evaluated in the BDCP.

Effects of climate change create unrealistic operations.

Review of the BDCP Model output for the Without Project condition with climate change assumptions for the ELT or LLT (NAA-ELT and NAA-LLT, respectively) reveal that the model is operated beyond its usable range. The purpose of CalSim II is to simulate how the CVP and SWP systems would be operated in order to meet regulatory requirements and water delivery objectives based on a certain amount of precipitation and runoff. When the precipitation patterns and resultant runoff were changed in the BDCP Model for climate change, the logic

regarding how the system is operated to meet the regulatory and water delivery objectives was not changed. The net effect is that neither the regulatory criteria nor the delivery objectives are met.

With rising temperatures and shifting precipitation patterns with less snow, temperature criteria on the Sacramento River will become increasingly more difficult to meet. For instance, the BDCP Model includes an assumption that equilibrium temperatures in the Sacramento River between Shasta and Gerber will increase on an average annual basis by 1.6°F by 2025 (ELT) by 3.3°F by 2060 (LLT). NMFS 2009 Biological Opinion specifies temperature targets of 56°F in the Sacramento River between Balls Ferry and Bend Bridge for the protection of salmon. Because of lower storage conditions in Shasta Lake and the magnitude of temperature increase in the assumptions is so large, the BDCP Model shows that the probability of exceeding the mortality threshold in the Sacramento River at Bend Bridge in August and September increases from approximately 80% in the No Action Alternative to 90% to 95% by 2025 (under ELT conditions) and to 95% to 100% by 2060 (under LLT conditions). This significant difference shows the overwhelming influence that the climate change assumptions have on the BDCP Model results.

Reservoir Storage: Under the climate change scenarios, reservoir storage (particularly in the CVP system) is operated very aggressively so that the reservoirs are drawn down to an extremely low level (termed "dead pool") in approximately 1 of every 10 years, even without the BDCP. At dead pool level, little or no water can be released from the reservoir – not for fish, not for drinking water, not for agriculture. For example, since Folsom Reservoir became operational in 1955, the storage has never been drawn down to reach dead pool (which is approximately 100,000 acre-feet); the lowest storage level on record was 147,000 acre-feet at the end of September 1977. However, the BDCP Model predicts that, under climate change, the reservoir will be about 100,000 acre-feet or about 30% lower than its historical low in 10% of years. Some municipalities, such as the city of Folsom, are entirely dependent on reservoir releases for drinking water. Reaching dead pool would cut municipal deliveries below the level required to maintain public health and safety. In reality, and to avoid such dire circumstances, the CVP and SWP would likely request that regulatory agencies modify standards to conserve storage and would likely mandate conservation (or rationing) by water users. Similar steps were taken in early in 2014 to reduce water diversions and reservoir releases for fishery needs and Delta requirements. Emergency measures such as these are not simulated in the model, so the BDCP Model does not reflect reasonable future operations with climate change.

With the predicted changes in precipitation and temperature implemented in the BDCP Model, there is simply not enough water available to meet all regulatory objectives and water user demands. Yet the BDCP Model continues its normal routine and thus fails to meet its objectives. In this aspect, the BDCP Model simply does not simulate reality. For instance, if the ELT and LLT conditions actually occur, the CVP and SWP would likely adapt to protect water supplies and the environment. Examples of reactions to climate change would likely include: (1) updating operational rules regarding water releases for flood protection; (2) during severe droughts, emergency drought declarations could call for mandatory conservation and changes in some regulatory criteria similar to what has been experienced in the current and previous droughts ; and (3) if droughts become more frequent, the CVP and SWP would likely revisit the rules by which they allocate water during shortages and operate more conservatively in wetter years. The likelihood of an appropriate operational response to climate change is supported by the many modifications to CVP and SWP operations made during the winter and spring of 2014 to respond to the current drought. The BDCP Model is, however, useful in that it reveals that difficult decisions must be made.

Conclusions Regarding Climate Change Assumptions and Implementation

Water Code section 85320, subdivision (b)(2)(C) requires consideration of, among other things, the "potential effects of climate change, possible sea level rise up to 55 inches, and possible changes in total precipitation and runoff patterns on the conveyance alternatives and habitat restoration activities considered in the environmental

impact report". In examining the possible effects of climate change, it is not appropriate to assume that current project operations will remain static and not respond to climate change. The BDCP's simplistic approach of assuming a linear operation of the CVP and SWP produces results that are not useful for dealing with the complex problem of climate change because it does not reflect the way in which the CVP and the SWP would actually operate whether or not the BDCP is implemented. The Reviewers recommend a sensitivity analysis be conducted to develop a better understanding of the range of possible responses to climate change by the CVP and SWP, and the regulatory structures that dictate certain project operations.

Including climate change, without adaptation measures, results in insufficient water needed to meet all regulatory objectives and user demands. For example, the BDCP Model results that include climate change indicate that during droughts, water in reservoirs is reduced to the minimum capacity possible. Reservoirs have not been operated like this in the past during extreme droughts and the current drought also provides evidence that adaptation measures are called for long in advanced to avoid draining the reservoirs. In this aspect, the BDCP Model simply does not reflect a real future condition. Foreseeable adaptations that the CVP and SWP could make in response to climate change include: (1) updating operational rules regarding water releases for flood protection; (2) during severe droughts, emergency drought declarations could call for mandatory conservation; and (3) if droughts become more frequent, the CVP and SWP would likely revisit the rules by which they allocate water during shortages and operate more conservatively in wetter years. The modifications to CVP and SWP operations made during the winter and spring of 2014 in response to the drought supports the likelihood of future adaptations. The BDCP Model is, however, useful in that it reveals that difficult decisions must be made in response to climate change. But, in the absence of making those decisions, the BDCP Model results themselves are not informative, particularly during drought conditions. With future conditions projected to be so dire without the BDCP, the effects of the BDCP appear positive simply because it appears that conditions cannot get any worse (i.e., storage cannot be reduced below its minimum level). However, in reality, the future condition will not be as depicted in the BDCP Model. The Reviewers recommend that Reclamation and DWR develop more realistic operating rules for the hydrologic conditions expected over the next half-century and incorporate those operating rules into the any CalSim II Model that includes climate change.

3.2 General Assumptions and Operations

BDCP CalSim II Assumptions

The assumptions for these runs are defined in the December 2013 Draft BDCP[4] and associated Draft EIR/S.

Each of the no action alternatives assumes the same regulatory requirements, generally representing the existing regulatory environment at the time of study formulation (February 2009), including Stanislaus ROP the National Marine Fisheries Services (NMFS) Biological Opinion (BO) (June 2009) Actions III.1.2 and III.1.3, Trinity Preferred EIS Alternative, NMFS 2004 Winter-run BO, NMFS BO (June 2009) Action I.2.1, SWRCB WR90-5, CVPIA (b)(2) flows, NMFS BO (June 2009) Action I.2.2, ARFM NMFS BO (June 2009) Action II.1, no SJRRP flow modeled, Vernalis SWRCB D1641 Vernalis flow and WQ and NMFS BO (June 2009) Action IV.2.1, Delta D1641 and NMFS Delta Actions including Fall X2 Fish & Wildlife Service (FWS) BO (December 2008) Action 4, Export restrictions including NMFS BO (June 2009) Action IV.11.2v Phase II, OMR FWS BO (December 2008) Actions 1-3 and NMFS BO (June 2009) Action IV.2.3v.

The modeling protocols for the recent USFWS BO (2008) and NMFS BO (2009) have been cited as being cooperatively developed by Reclamation, NMFS, U.S. Fish and Wildlife Service (USF&WS), California Department of Fish and Wildlife (CDF&W), and DWR.

[4] BDCP EIR/EIS Appendix 5A

Each of the BDCP no action alternatives (NAA, NAA-ELT, and NAA-LLT) uses the same New Melones Reservoir and other San Joaquin River operations. At the time of these studies' formulation, the NMFS BO (June 2009) had been recently released. Also, the San Joaquin River Agreement (SJRA), including the Vernalis Adaptive Management Program (VAMP) and its incorporation into D1641 for Vernalis flow requirements were either still in force or being discussed for extension. As a component of study assumptions, the protocols of the SJRA and an implementation of the NMFS BO for San Joaquin River operations (including New Melones Reservoir operations) are included in the studies. These protocols, in particular the inclusion of VAMP which has now expired, are not appropriate as an assumption within either the No Action or Alternative Scenarios within a full disclosure of BDCP impacts. Although appropriate within the identification of actions, programs and protocols present at the time of the NOI/NOP, they are not representative of current or reasonably foreseeable operations. Also, the BDCP Model assumes no San Joaquin River Restoration Program releases in the future operation of the Friant Division of the CVP. While assuming no difference in the current and future operation of the Friant Division avoids another difference in existing and projected future hydrology of the San Joaquin River, the assumption does not recognize the existence of the San Joaquin River Restoration Program. Results of CVP and SWP operations, in particular as affected by export constraints dependent on San Joaquin River flows and their effect on OMR, E/I and I/E diversion constraints, would be different with a different set of assumptions for San Joaquin River operations, in a manner similar to the cascading effect described above in connection with climate change.

Finally, the habitat restoration requirements in the 2008 FWS BO and the 2009 NMFS BO are not included in the NAA baselines. Although the restoration is required to be completed either with or without completion of the BDCP, the restoration was only analyzed as part of the with project scenarios.

Conclusions Regarding General Assumptions and Operations

The benchmark study upon which the BDCP Model was built contains inaccuracies that affect the analysis.

CalSim II is continuously being improved and refined. As the regulatory environment changes and operational and modeling staff work together to improve the model's capability to simulate actual operations, the model is continually updated. The BDCP Model relied upon a version of CalSim II that dates back to 2009, immediately after the new biological opinions (BiOps) from the NMFS and the United States Fish and Wildlife Service (USFWS) significantly altered the operational criteria of the CVP and SWP. In the last 4 to 5 years, DWR, Reclamation, and outside modeling experts have worked together to improve the model. Changes include better (more realistic) implementation of the new BiOps and numerous fixes to the code. Since CalSim II is undergoing continual improvements, there will always be "vintage" issues in that by the time a project report is released, the model is likely slightly out of date. However, in this case - with the major operational changes that have occurred in the new regulatory environment – many issues have been identified and fixed in the last 4 to 5 years that have a significant effect on model results. CalSim II modeling for the DWR 2013 Delivery Reliability Report contains numerous modeling updates and fixes that significantly alter results of the BDCP Model. A key modeling revision in the 2013 DWR modeling was fixing an error regarding artificial minimum instream flow requirements in the Sacramento River at Hood. An "artificial" minimum instream flow requirement had been specified; the requirement is artificial in that it does not represent a regulatory requirement, but rather is a modeling technique to force upstream releases to satisfy Delta needs.

3.3 Assumptions and Operational Criteria for inclusion of proposed BDCP facilities

To evaluate the assumptions and operations of the proposed BDCP facilities, the Reviewers analyzed the output from the BDCP Model and examined the internal workings of the models. This approach allows for evaluation of not only the possible effects of the BDCP, also but whether the assumptions and operational criteria are implemented appropriately to reflect the project description and reasonably foreseeable actions.

Assessment of Assumptions and Operations in coordination with new BDCP facilities

BDCP's Alternative 4 has four possible sets of operational criteria, termed the Decision Tree, that differ based on the "X2" standards[5] that they contemplate:

- Low Outflow Scenario (LOS), otherwise known as operational scenario H1, assumes existing spring X2 standard and the removal of the existing Fall X2 standard;
- High Outflow Scenario (HOS), otherwise known as H4, contemplates the existing Fall X2 standard and providing additional outflow during the spring;
- Evaluated Starting Operations (ESO), otherwise known as H3, assumes continuation of the existing X2 spring and fall standards;
- Enhanced spring outflow only (not evaluated in the December 2013 Draft BDCP), scenario H2, assumes additional spring outflow and no Fall X2 standards.

While it is not entirely clear how the Decision Tree would work in practice, the general concept is that prior to operation of the new facility, implementing authorities would select the appropriate Scenario (from amongst the four choices) based on their evaluation of targeted research and studies to be conducted during planning and construction of the facility.

For this analysis, the Reviewers analyzed the HOS (or H4) scenario because the BDCP[6] indicates that the initial permit will include HOS operations that may be later modified at the conclusion of the targeted research studies. The HOS includes the existing Fall X2 requirements but adds additional outflow requirements in the spring. The model code was reviewed and discussed with DWR and Reclamation, who acknowledged that although the SWP was bearing the majority of the responsibility for meeting the additional spring outflow in the modeling, the responsibility would need to be shared with the CVP[7]. In subsequent discussions, DWR and Reclamation have suggested that the additional water may be purchased from other water users. However, the actual source of water for the additional outflow has not been defined. While not how the projects would actually be operated, since the BDCP Model assumes that the SWP bears the majority of the responsibility for meeting the additional outflow, the Reviewers' analysis of the BDCP Model results for HOS is limited to the evaluation of how the SWP reservoir releases on the Feather River translate into changes in Delta outflow and exports.

Our remaining analysis examines the ESO (or H3) scenario (labeled Alt 4-ELT or Alt 4-LLT in this section) because it employs the same X2 standards as are implemented in NAA-ELT and NAA-LLT. This allowed the Reviewers to focus the analysis on the effects of the BDCP operations independent of the possible change in the X2 standard.

The differences between the without project scenario (NAA-ELT) and the corresponding with project scenario (Alt4 H3-ELT) should reveal the effects of the project under ELT conditions. However, as discussed above, implementation of climate change assumptions and the occurrence of unrealistic operations likely obfuscates the effects of the BDCP. Although the modeling approach may provide a relative comparison between equal foundational operations, the Reviewers are hesitant to place any confidence in the computed differences shown between the NAA-ELT and Alt4-ELT Scenarios. Numerous comparisons between NAA-ELT and Alt4 H3-ELT are discussed in the technical appendix of this report; issues that shaped our conclusions are discussed below.

[5] X2 is a salinity standard that requires outflows sufficient to attain a certain level of salinity at designated locations in the Delta at certain times of year.
[6] Draft BDCP, Chapter 3, Section 3.4.1.4.4
[7] August 7, 2013 meeting with DWR, Reclamation, and CH2M HILL

Assumptions for the "High Outflow Scenario" are unrealistic.

The HOS is one branch of the BDCP Decision Tree, also identified as Alternative 4, operational scenario H4 in the DEIR/EIS. The HOS requires additional water (Delta outflow) during certain periods in the spring, in excess of the current regulatory requirements. The BDCP Model assumes that if the required additional Delta outflow cannot be met by reducing exports, this increased Delta outflow will be met by releases made by the SWP's Oroville Reservoir. The assumptions regarding how much water to release from Oroville to attempt to meet the proposed regulations and how much and when to refill Oroville are unrealistic.

According to the Draft EIR/EIS[8], the HOS will reduce SWP south of Delta water deliveries for municipal and industrial (M&I) water users 7% below the level that they would receive without the BDCP (on average). During dry and critical years, SWP south of Delta water deliveries for M&I and agricultural water users will drop 17% below the level that they would receive without the BDCP. In other words, according to the BDCP Model results SWP Contractors would get less water than they would otherwise get without BDCP.

CVP and SWP obligations for providing flow to satisfy Delta outflow requirements is described in the Coordinated Operations Agreement (COA). Because the CVP and SWP share responsibility for meeting required Delta outflow based on specific sharing in the agreement, it is not reasonable to conclude that CVP water supplies would increase an average of 70 TAF while SWP water supplies decrease on average of 100 TAF under the HOS. The manner in which this alternative is modeled is inconsistent with existing agreements and operating criteria. If the increases in outflow were met based on COA, there would likely be reductions in Shasta and Folsom storage that would likely cause adverse environmental impacts, which have not been modeled or analyzed in the BDCP EIR/S.

Furthermore, there is no apparent source of water to satisfy the increased outflow requirements and pay back the COA debt. It appears, through recent public discussions regarding the HOS that BDCP anticipates additional water to satisfy the increased Delta outflow requirement and to prevent the depletion of cold water pools will be acquired through water transfers from upstream water sources. However, this approach is unrealistic. During most of the spring, when BDCP proposes that Delta outflow be increased, agricultural water users are not irrigating. This means that there is not sufficient transfer water available to meet the increased Delta outflow requirements without releasing stored water from the reservoirs.

San Luis Reservoir operational assumptions produce results that are inconsistent with real world operations.

San Luis Reservoir (SLR) is an off-stream reservoir located south of the Delta and jointly owned and operated by CVP and SWP. The reservoir is used to store water that is exported from the Delta when available and used to deliver water to CVP and SWP Contractors when water demands exceed the amount of water that can be pumped from the Delta. The decision of when to move water that is stored in upstream reservoirs, such as Shasta, Folsom, or Oroville, through the Delta for export to fill SLR is based on the experience and expert judgment of the CVP and SWP operators.

CalSim II attempts to simulate the expert judgment of the operators by imposing artificial operating criteria; the criteria are artificial in the sense that they are not imposed by regulatory or operational constraints but rather imposed as a tool to simulate expert judgment. One such artificial operating criteria is the SLR target storage level: CalSim II attempts to balance upstream Sacramento Basin CVP and SWP reservoirs with storage in SLR by setting artificial target storage levels in SLR, such that the CVP and SWP will release water from upstream reservoirs to meet target levels in SLR. The artificial target storage will be met as long as there is ability to convey

[8] Draft EIR/EIS, Appendix 5A-C, Table C-13-20-2

water (under all regulatory and physical capacity limits) and as long as water is available in upstream reservoirs. SLR target storage criteria are also sometimes described in section 4.2 as the "San Luis rule-curve".

In the BDCP Model, CVP and SWP reservoir operating criteria for Alternative 4 H3 ELT differ from the corresponding without project scenario (e.g. NAA-ELT). The difference in criteria and result is primarily driven by changes to the artificial constraint used to determine when to fill SLR: the SLR target storage. In Alternative 4 H3 ELT, SLR target storage is set very high in the spring and early summer months, and then reduced in August and set to SLR dead pool from September through December. This change in SLR target storage relative to the no action alternative causes upstream reservoirs to be drawn down from June through August and then recuperate storage by cutting releases in September. This change to the artificial operating criteria SLR target storage causes changes in upstream cold water pool management and affects several resource areas.

In addition to changes in upstream storage conditions, changes in SLR target storage cause SLR storage to drop below a water supply concern level (300,000 acre-feet) in almost 6 out of every 10 years under ELT conditions and more than 7 out of every 10 years under LLT conditions for Alternative 4 H3. When storage in SLR drops below this 300,000 acre-foot level, algal blooms in the reservoir often cause water quality concerns for drinking water at Santa Clara Valley Water District. The change in SLR target storage also causes SLR levels to continue to drop and reach dead pool level for the SWP in 4 out of every 10 years and also dead pool level for the CVP in 1 out of every 10 years under the ELT conditions.

Reaching dead pool level in SLR creates shortages to water users south of the Delta. Although some delivery shortages are due to California Aqueduct capacity constraints, the largest annual delivery shortages are a result of inappropriately low SLR target storage. Average annual Table A shortages due to artificially low SLR storage levels increased from 3 TAF in the NAA-ELT scenario to 35 TAF in the Alt4-ELT scenario. Such shortages occurred in 2% of simulated years in the NAA-ELT scenario and 23% of years in the Alt4-ELT scenario. In addition to the inability to satisfy Table A allocations, low storage levels cause loss of SWP Contractors' Article 56 water stored in SLR. Average annual Article 56 shortages were 43 TAF in the Alt4-ELT scenario because of low San Luis storage and 5 TAF in the NAA-ELT scenario. Low San Luis storage causes Article 56 shortages in 27% of simulated years in the Alt4-ELT scenario as compared to 5% of simulated years in the NAA-ELT. Another consequence of low storage levels in SLR is a shift in water supply benefits from Article 21 to Table A.

In summary, the operational assumptions for SLR are unrealistic in Alternative 4 because they create problems in upstream storage reservoirs and create shortages for south of Delta water users that would not occur in the real world. In reaching this conclusion, the Reviewers met with operators from CVP and SWP to review the BDCP Model results and discussed real-time operations. The operators provided guidance in selection of superior assumptions, which results in more realistic operations in the independent model (see Section 4).

Delta Cross Channel operational assumptions overestimate October outflow

When south Delta exports are low due to regulatory limits, and upstream reservoirs are making releases to meet the instream flow objectives at Rio Vista, operators have the ability to close the Delta Cross Channel (DCC) in order to reduce the required reservoir releases (by closing the DCC a greater portion of water released from the reservoirs stays in the Sacramento River to meet the Rio Vista requirements). As long as the Delta salinity standards are met, operators have indicated that they would indeed close the DCC in this manner (as was done in October and November 2013). In the BDCP Model, the DCC is not closed in this manner. The net result is that the BDCP Model overestimates outflow under such circumstances typically occurring in October.

The overestimated outflow leads to incorrect conclusions regarding the effects of BDCP. For instance, an actual increase in fall outflow could be beneficial for the endangered fish species delta smelt (USFWS, 2008). Therefore, by overestimating outflow in October, the BDCP studies likely overestimate the benefit to delta smelt (Mount

et al, 2013). Similarly, an actual increase in fall outflow would reduce salinity in the western Delta, which could be beneficial for in-Delta diverters; therefore, overestimating outflow in October artificially reduces salinity, incorrectly reducing the net impacts on in-Delta diverters.

Conclusions Regarding Assumptions and Operations in coordination with new BDCP facilities

BDCP's "High Outflow Scenario" is not sufficiently defined for analysis.

The HOS requires additional water (Delta outflow) during certain periods in the spring. The BDCP Model places most of the responsibility for meeting this new additional outflow requirement on the SWP. However, the SWP may not actually be responsible for meeting this new additional outflow requirement. This is because the COA, as it is currently being implemented, would require a water allocation adjustment that would keep the SWP whole. Where one project (CVP or SWP) releases water to meet a regulatory requirement, the COA requires a water balancing to ensure the burden does not fall inappropriately among the projects. The BDCP Model is misleading because it fails to adjust project operations, as required by the COA, to "pay back" the water "debt" to the SWP due to these additional Delta outflow requirements. Unless there is a significant revision to COA, the BDCP Model overstates the impacts of increased Delta outflow on the SWP and understates the effects on the CVP.

Furthermore, after consulting with DWR and Reclamation project operators and managers, the Reviewers conclude that there is no apparent source of CVP or SWP water to satisfy both the increased Delta outflow requirements and pay back the COA "debt" to the SWP without substantially depleting upstream water storage. It appears, through recent public discussions regarding the HOS, that BDCP anticipates additional water to satisfy the increased Delta outflow requirement and to prevent the depletion of cold water pools will be acquired through water transfers from upstream water users. However, this approach is unrealistic because during most of the spring, when BDCP proposes that Delta outflow be increased, agricultural water users are not typically irrigating. This means that there is not sufficient transfer water available to meet the increased Delta outflow requirements without releasing stored water from the reservoirs. Releasing stored water to meet the increased Delta outflow requirements could potentially impact salmonids on the Sacramento and American River systems.

Simulated operation of BDCP's dual conveyance, coordinating proposed North Delta diversion facilities with existing south Delta diversion facilities, is inconsistent with the project description.

The Draft BDCP and associated Draft EIR/EIS specify criteria for how much flow can be diverted by the new NDD facilities and specify when to preferentially use either the NDD facilities or the existing SDD facilities. However, the BDCP Model contains an artificial constraint that prevents the NDD facilities from taking water as described in the BDCP project description. In addition to affecting diversions from the NDD, this artificial constraint contains errors that affect the NAA operation. This error has been fixed by DWR and Reclamation in more recent versions of the model; however, the error remains in the BDCP Model. Additionally, the BDCP Model does not reflect the Summer operations of the SDD that are described in the Draft EIR/EIS as a feature of the BDCP project intended to prevent water quality degradation in the south Delta. The net effect of these two errors is that the BDCP Model significantly underestimates the amount of water diverted from the NDD facilities and overestimates the amount of water diverted from the SDD.

BDCP Model contains numerous coding and data issues that skew the analysis and conflict with actual real-time operational objectives and constraints

Operational logic is coded into the CalSim II model to simulate how DWR and Reclamation would operate the system under circumstances for which there are no regulatory or other definitive rules. This attempt to specify (i.e., code) the logic sequence and relative weighting so that a computer can simulate "expert judgment" of the

human operators is a critical element to the CalSim II model. In the BDCP Model, some of the operational criteria for water supply allocations and existing facilities such as the Delta Cross Channel and SLR are inconsistent with real-world conditions.

4 INDEPENDENT MODELING

The Independent Modeling effort originally stemmed from reviews of BDCP Model during which the Reviewers discovered that the BDCP Model did not provide adequate information to determine the effects of the BDCP. There are three basic reasons why the Reviewers cannot assess how the BDCP will affect water operations: 1) NAAs do not depict reasonable operations under the described climate change assumptions, 2) operating criteria used in the BDCP Alternative 4 result in unrealistic operations, and 3) updates to CalSim II since the BDCP modeling was performed almost 4 years ago will likely alter model results to a sufficient degree that conclusions based on the BDCP modeling will likely be different than those disclosed in the Draft EIR/EIS. Given that it is not possible to determine how BDCP may affect CVP and SWP operations or water system flows and conditions with the BDCP model, Independent Modeling was performed to assess potential effects due to the BDCP.

To revise the models, the Reviewers consulted with operators at DWR and Reclamation to improve the representation of operational assumptions. Additionally, the Reviewers consulted with modelers at DWR and Reclamation to share findings, to strategize on the proper way to incorporate the guidance received from the operators, and to present revised models to DWR and Reclamation for their review. This collaborative and iterative process differed considerably from a standard consulting contract where the work product is not shared beyond the client-consultant until a final version is complete. To the contrary, consultations with agency experts were conducted early and repeatedly to ensure the revisions would reflect reasonable operations and to provide an independent review.

The first phase of this Independent Modeling effort (described in Section 4.1) was development of an updated without project baseline (similar to the NAA but with current, improved assumptions). The Independent Modeling does not incorporate climate change because the climate change hydrological assumptions developed by BDCP cause unrealistic operation of the system absent commensurate changes to operating criteria.

After the baseline was complete and reviewed, the second phase of this effort (described in Section 4.2) incorporated the facilities and operations for the BDCP described as Alternative 4 H3 in the Draft EIR/EIS, and otherwise known as the Evaluated Starting Operations (ESO) scenarios in the BDCP. During this phase, the issues that were identified during the Reviewers' initial review were corrected (see Section 3.3) along with corrections made to resolve additional issues that were revealed as improvements were incorporated. Finally, results of the Independent Modeling and potential effects of the BDCP on water supply and instream flows are discussed in Section 4.3.

4.1 Improvements to CalSim II Assumptions

For this effort, the most up to date modeling tools were provided by DWR and Reclamation and further improvements were added to the CalSim II assumptions in coordination with DWR and Reclamation staff. Many of the improvements have since been incorporated into DWR and Reclamation's model and others are under review.

Revisions incorporated by DWR and Reclamation for the 2013 baseline

DWR and Reclamation provided CalSim II models used for the 2013 SWP Delivery Reliability Report (DRR) for use in this Independent Modeling effort. The 2013 SWP DRR, Technical Addendum, and associated models are now available on DWR's website[9]. Assumptions used for this Independent Modeling effort are consistent with the 2013 SWP DRR and are listed in Table 4 of the Technical Addendum.

[9] http://baydeltaoffice.water.ca.gov/swpreliability/

CalSim II is continuously being improved to better represent CVP and SWP operations and fix known problems. The Technical Addendum to the 2013 SWP DRR contains a list of updates and fixes that have occurred since the last SWP DRR was released in 2011. Among these changes and fixes are key items that directly affect operation of facilities proposed in the BDCP Alternative 4; these items are listed on pages 4-6 of the 2013 SWP DRR Technical Addendum.

A key component of this package of modeling revisions was fixing an error regarding artificial minimum instream flow requirements in the Sacramento River at Hood. An "artificial" minimum instream flow requirement had been specified; the requirement is artificial in that it does not represent a regulatory requirement, but rather is a modeling technique.

Additional Revisions to CalSim II Assumptions

As part of the Independent Modeling effort, a number of changes were made to the 2013 SWP DRR version of CalSim II to better represent the existing facilities, regulatory requirements, and water user demands. These revisions are described in the Technical Appendix and summarized here:

- San Joaquin River Restoration Program (SJRRP) was not incorporated. This modification was made to be consistent with the BDCP assumptions, but also allows the identification of the separate effect of the BDCP void of the combined effect with SJRRP flows. Although inclusion of the SJRRP is necessary in the documentation of BDCP, the Independent Modeling did not include it.
- VAMP operations were not incorporated because the VAMP program has expired and is no longer being implemented.
- Tuolumne River basin was updated.
- Folsom Reservoir operations for flood control were updated.
- Additional water demands on the Feather River were incorporated to represent existing agricultural diversions used for rice decomposition.
- Diversions by East Bay Municipal Utility District (EBMUD) from the Sacramento River at Freeport were modified to better represent the EBMUD CVP water service contract.
- Minimum flow requirements for Wilkins Slough and Red Bluff were corrected for September 1933.
- CVP M&I demands are updated to reflect current assumptions used by Reclamation.
- Modifications were made to more accurately reflect refilling of New Bullards Bar Reservoir in coordination with transfers made under the Yuba Accord.
- Los Vaqueros Reservoir capacity was updated to reflect a recent expansion of the reservoir that was completed in 2012.

4.2 Improvements to BDCP Operations

After the baseline was completed and reviewed (as summarized above in Section 4.1), the facilities and operations associated with BDCP Alternative 4 H3 in the Draft EIR/EIS, otherwise known as the Evaluated Starting Operations (ESO) scenarios in the Draft Plan, were incorporated into the model. During this phase, the issues that were identified during the Reviewers' initial review (see Section 3.3) were corrected along with correcting additional issues that were revealed as improvements were incorporated. These revisions are described in the Technical Appendix and summarized here:

- San Luis Reservoir operation
- Delta Cross Channel gate operation in October
- Delivery allocation adjustment for CVP SOD contractors

- Folsom/Shasta balance
- North Delta Diversion bypass criteria
- Wilkins Slough minimum flow requirement

In the Independent Modeling, San Luis rule-curve logic was refined for both SWP and CVP operations. San Luis rule-curve is used to maintain an appropriate balance between San Luis Reservoir (SLR) storage and North of Delta reservoirs. The key considerations in formulating rule-curve are 1) ensuring that sufficient water is available in SLR to meet contract allocations when exports alone are insufficient due to various operational constraints and 2) minimize SLR carryover storage to low point criteria (both CVP and SWP) and Article 56 carryover (only SWP). The basic premise is to maintain SLR storage no higher than necessary to satisfy south of Delta obligations to avoid excessive drawdown of upstream storage.

In the BDCP NAA and the Independent Modeling FNA, the model has a priority to release excess stored water that will likely be released for flood control purposes from Shasta and Folsom storage for export at Jones Pumping Plant to storage in SLR in the late summer and early fall months. The purpose was to get a head start on filling SLR for the coming water year if there is a high likelihood of Shasta or Folsom spilling. This was an assumed CVP/SWP adaptation to the export reductions in the winter and spring months due to the salmon and smelt biological opinions. However, with the NDD facility in Alt 4, winter and spring export restrictions impact CVP exports much less and there is no longer a reason to impose this risk on upstream storage. As such, the weights, or prioritizations, of storage in Shasta and Folsom were raised so that excess water would not be released specifically to increase CVP San Luis storage Reservoir above rule-curve. This was changed in Alt 4 and not the FNA to better reflect how the system may operate under these different conditions.

The BDCP Alt 4 results in significantly more October surplus Delta outflow as compared to the baseline. The cause of this Delta surplus at a time when the Delta is frequently in balance is a combination of proposed through-Delta export constraints Old and Middle River (OMR) flow criteria and no through-Delta exports during the San Joaquin River October pulse period), Rio Vista flow requirements, and DCC gate operations. In DWR's BDCP studies, it was assumed that the DCC gates would be open for the entire month of October thereby requiring much higher Sacramento River flows at Hood in order to meet the Rio Vista flow requirement than if the DCC gates were closed. Whereas in the Independent Modeling of the BDCP it was assumed that the DCC gates were closed for a number of days during the month such that the 7,000 cfs NDD bypass criteria would be sufficient to meet the weekly average Rio Vista flow requirements. The intent was to minimize surplus Delta outflow while meeting Delta salinity standards and maintaining enough bypass flow to use the NDD facility for SDD. This is an approximation of what is likely to occur in real-time operations under similar circumstances. Further gate closures may be possible as salinity standards allow if operators decide to preserve upstream storage at the expense of NDD diversions. This type of operation would require additional model refinements.

CVP SOD Ag service and M&I allocations are limited by both system wide water supply (storage plus inflow forecasts) and Delta export constraints; whereas similar CVP NOD allocations are dependent solely on water supply. This frequently results in SOD water service contractors receiving a lower contract year allocation than NOD water service contractors, especially under the Biological Opinion export restrictions. However, with the NDD facility operations as proposed under Alt 4 H3, the CVP can largely bypass these Delta export restrictions and the export capacity constraint on CVP SOD allocations was determined to be overly conservative. Therefore, the export capacity component of CVP SOD allocations was removed in the BDCP Alternative and both SOD and NOD CVP allocations are equal and based only on water supply.

For the Independent Modeling, CVP operations were refined in the BDCP Alternative to provide maximum water supply benefits to CVP contractors while protecting Trinity, Shasta, and Folsom carryover storage in the drier years. As a whole, this was accomplished with refinements to allocation logic and San Luis rule-curve. However, in the initial study runs, an imbalance between Folsom and Shasta was created; while there was a total positive

impact to upstream storage in dry years, there was a negative impact to Folsom storage. This was resolved by inserting Folsom protections in the Shasta-Folsom balancing logic. With these protections, the positive carryover impacts were distributed to Trinity, Shasta, and Folsom.

The daily disaggregation method for implementing NDD bypass criteria as implemented in DWR's BDCP model was left mostly intact for the Independent Modeling. However, to properly fit the bypass criteria implementation within the latest CalSim operations formulation certain modifications were made. Modifications are as follows:

1. No NDD operations occur in cycles 6 through 9 so that Delta operations and constraints can be fully assessed without NDD interference.
2. Cycles 10 and 11 (Daily 1 and Daily 2 respectively) were added to determine NDD operations given various operational constraints including the NDD bypass criteria.
3. From July to October, bypass criteria are based on monthly average operations (no daily disaggregation). Given the controlled reservoir releases at this time and the constant bypass criteria (5,000 cfs from July to September and 7,000 cfs in October), this was determined to be a reasonable assumption. This also simplified coordination of DCC gate operations with NDD in October which will be discussed later.
4. When warranted by conditions in cycle Daily 1 (cycle 10), the bypass criteria in May and June were allowed to be modeled on a monthly average basis in cycle Daily 2 (cycle 11). This allowed a reduction in the number of cycles necessary to determine the fully allowed diversion under the bypass criteria when the Delta was in balance and additional upstream releases were made to support diversions from the North Delta.

Currently in CalSim II, relaxation of the Wilkins Slough minimum flow requirement is tied to CVP NOD Ag Service Contractor allocations. This does not reflect actual operations criteria where relaxation of the flow requirement is dependent solely on storage conditions at Shasta. From the comparative analysis perspective of our CalSim planning studies, this introduces a potential problem: changes in CVP NOD Ag Service allocations can result in unrealistic changes in required flow at Wilkins Slough, and such changes in Wilkins Slough required flow can result in unrealistic impacts to Shasta storage. To bypass this problem, we assumed that the required flow at Wilkins Slough in the alternative was equal to the baseline.

4.3 Independent Modeling output and analysis of BDCP Effects

Analysis for this effort was focused on BDCP Alt 4 with existing spring and Fall X2 requirements, which corresponds to "Alternative 4 H3" in the Decisions Tree. This modeling is performed without climate change, and includes refined operating criteria for the NDD, CVP and SWP reservoirs, DCC gate closures, and water supply allocations. This modeling includes all Project features that are included in Alt 4 in the BDCP Model. The key Project features incorporated into BDCP are displayed in Figure 1 and summarized as:

- North Delta Diversion capacity of 9,000 cfs
- NDD bypass flow requirements
- 25,000 acres of additional tidal habitat
- Notched Fremont Weir to allow more flow into Yolo Bypass
- Additional positive Old and Middle River flow requirements
- Removal of the San Joaquin River I/E ratio (NMFS 2009)
- Changed location for Emmaton water quality standard in SWRCB D-1641
- Additional Sacramento River flow requirement at Rio Vista

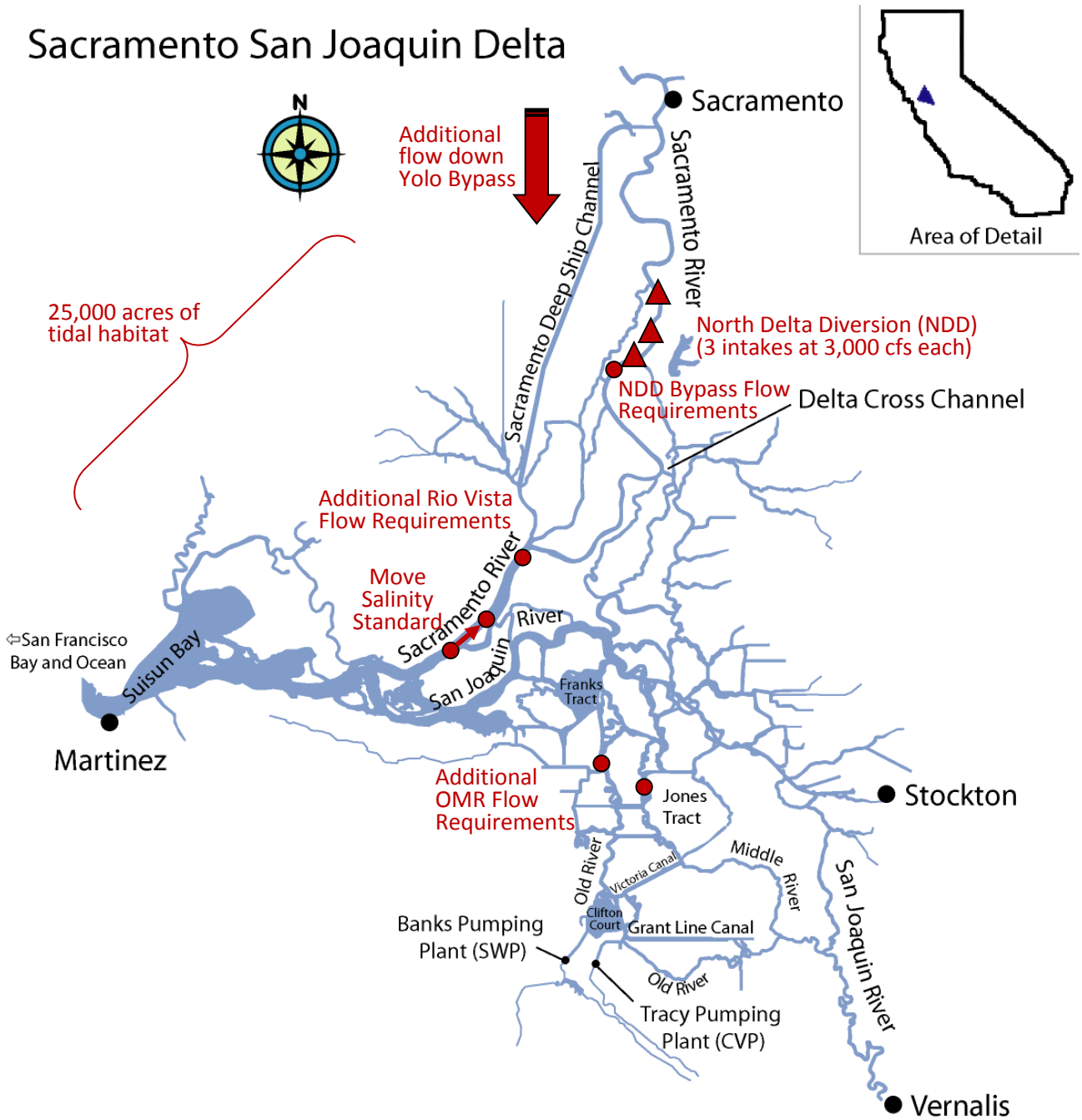

Figure 1. Map of Delta with location of key BDCP facilities and regulatory changes
Annual maximum and minimum storage in San Luis for the (a) CVP and (b) SWP under ELT conditions for the no action alternative (NAA_ELT) and BDCP Alternative 4 H3 (Alt4_ELT).

For the purpose of describing results of the Independent Modeling, the revised baseline scenario without climate change, originally termed No Action Alternative (NAA) in the BDCP Draft EIR/EIS, is referred to as the Future No Action (FNA) in this discussion. Additionally, in the Independent Modeling, Alternative 4 operational scenario H3 without climate change is simply referred to as "Alt 4". The results for the Independent Modeling are illustrated in the Technical Attachment. Key results are presented below.

The change in conditions between FNA and Alt 4 is indicative of the effects of the BDCP on water supply and Delta flows. An effect of the BDCP is an anticipated increase in Delta export and corresponding decrease in Delta Outflow. Table 2 illustrates the estimated change in Delta Outflow by year type, amounting to an average annual 0.76 MAF. Table 3 illustrates the corresponding change in exports by year type, and also illustrates the estimated change in geographical source of export water. With the BDCP it is anticipated that exports from the South Delta (via through Delta conveyance) will decrease by 2.53 MAF. Exports derived from the North Delta (via the tunnels) will amount to 3.28 MAF.

Table 2. Change in Delta outflow due to the BDCP (Alt 4 minus FNA) (Million Acre-Feet)
Reduction in the quantity of water that leaves the Delta by flowing west into San Francisco Bay by water year type.

Water Year Type	FNA Delta Outflow	Change in Delta Outflow
Wet	28.6	-1.2
Above Normal	17.1	-1.0
Below Normal	9.9	-0.68
Dry	7.3	-0.39
Critical	5.1	-0.13
Average	15.6	**-0.76**

Table 3. Change in quantity of water exported due to the BDCP (Alt 4 minus FNA) (Million Acre-Feet)
Reduction in the quantity of water exported from the existing South Delta export facilities and corresponding increase in the quantity exported from the proposed facilities in the North Delta, by water year type.

Water year Type	FNA Total Delta Export	Change in South Delta Exports (through Delta)	Change in North Delta Exports (through tunnels)	Change in Total Exports
Wet	6.0	-3.8	5.0	1.2
Above Normal	5.2	-2.9	4.4	1.5
Below Normal	5.1	-2.4	3.2	0.8
Dry	4.2	-1.8	1.8	0.07
Critical	2.8	-0.7	0.7	0.02
Average	**4.9**	**-2.53**	**3.28**	**0.75**

Table 4. Change in quantity of CVP water exported by SWP facilities (Alt 4 minus FNA) (Thousand Acre-Feet)
Quantity of water exported at Banks Pumping Plant for later use by CVP contractors is increased in all water year types except the driest years (critical designation).

Water Year Type	FNA CVP water exported by SWP	Change in CVP water exported by SWP
Wet	58	229
Above Normal	44	208
Below Normal	66	117
Dry	86	7
Critical	38	-9
Average	60	**123**

The Independent Modeling shows that implementation of the BDCP could shift a portion of the SWP exports from summer to winter and spring because the proposed NDD facilities can export water at times when the existing SDD facilities are constrained due to fishery concerns. As a result of this shift in timing, capacity is available at the SWP facilities during the summer months. The BDCP Model assumes that CVP could utilize the SWP facilities (Table 4) at any time when the CVP facilities are fully utilized; this sharing of diversion facilities is termed "joint point of diversion" or JPOD. Additional criteria to meet specific water quality and water level objectives are defined in response plans required by the State Water Board's water right decision D-1641. BDCP Model assumes that these additional criteria are met; the Independent Modeling continues this assumption without making any judgment as to whether the criteria would be met. An evaluation of this would require additional hydrodynamic modeling.

The Independent Modeling shows higher average annual CVP carryover (end of September) storage than the NAA by about 28 TAF. During dryer years when upstream storage is lower there is an increase in carryover and during wetter years when storage is higher there are storage decreases (Table 5). Upstream SWP storage, Table 6, behaves in a similar manner as CVP storage, there are decreases in wetter years and increased in dryer years.

CVP San Luis Reservoir fills in about 40% of years in Alt 4 compared to about 20% in the FNA. CVP San Luis reaches dead pool in about 25% of years in both the FNA and Alt 4. SWP San Luis Reservoir fills in about 43% of years in Alt 4 compared to about 18% in the FNA. SWP San Luis reaches dead pool in about 25% of years in Alt 4 and about 30% of years in the FNA.

Table 5. Change in CVP upstream carryover storage (Alt 4 minus FNA) (Thousand Acre-Feet)
CVP carryover (end of September) storage decreases in wetter years when FNA storage is highest and increases in dryer years when FNA storage is lowest

Water Year Type	FNA CVP Upstream Storage	Change in CVP Upstream Storage
Wet	5578	-8
Above Normal	5200	-150
Below Normal	4717	-1
Dry	4049	66
Critical	2285	258
Average	4558	**28**

Table 6. Change in SWP upstream carryover storage (Alt 4 minus FNA) (Thousand Acre-Feet)
SWP carryover (end of September) storage decreases in wetter years when FNA storage is highest and increases in dryer years when FNA storage is lowest

Water Year Type	FNA SWP Upstream Storage	Change in SWP Upstream Storage
Wet	2407	33
Above Normal	1934	-150
Below Normal	1517	14
Dry	1194	157
Critical	968	127
Average	1709	**44**

5 COMPARING INDEPENDENT MODELING AND BDCP MODEL

The Independent Modeling effort originally stemmed from reviews of DWR's BDCP Model where the Reviewers through their independent analysis found that BDCP Model does not provide adequate information to determine how BDCP may affect the system. Based on the premise that the Independent Modeling portrays a more accurate characterization of how the CVP/SWP system may operate under Alt 4, this comparison is meant to demonstrate the differences between results of a more accurate and realistic analysis and the BDCP Model. Differences in results between these modeling efforts are believed to provide insight regarding how effects that BDCP will have on the actual CVP/SWP system differ from modeling used to support the Draft EIR/S.

Although thorough comparisons of modeling were performed, only key differences are illustrated for the purpose of this comparison.

Conclusions regarding BDCP effects

Based on the Independent Modeling, the amount of water exported (diverted from the Delta) may be approximately 200 thousand acre-feet (TAF) per year higher than the amount disclosed in the Draft EIR/S. This total represents

- approximately 40 TAF/yr more water diverted and delivered to the SWP south of Delta contractors, and
- approximately 160 TAF/yr more water diverted and delivered to the CVP south of Delta contractors.

The BDCP Model estimates that, under the NAA ELT (without the BDCP), total average annual exports for CVP and SWP combined are estimated to be 4.73 million acre feet (MAF) and in the Independent Modeling FNA combined exports are 5.61 MAF. The BDCP Model indicates an increase in exports of approximately 540 TAF and the Independent Modeling shows an increase of approximately 750 TAF in Alt 4.

The Independent Modeling suggests that Delta outflow would decrease by approximately 200 TAF/yr compared to the amount indicated in the Draft EIR/S.

- This lesser amount of Delta outflow has the potential to cause greater water quality and supply impacts for in-Delta beneficial uses and additional adverse effects on species. To determine the potential effects of the reduced amount of outflow, additional modeling is needed using tools such as DSM2.

The BDCP Model does not accurately reflect the location of the diversions that the SWP and CVP will make from the Delta.

- When the errors in the model are corrected, it reveals that the North Delta intakes could divert approximately 680 TAF/yr more than what was disclosed in the BDCP Draft EIR/S, and
- the amount of water diverted at the existing South Delta facilities would be approximately 460 TAF/yr less than what is projected in the BDCP Draft EIR/S.

Hydrologic modeling of BDCP alternatives using CalSim II has not been refined enough to understand how BDCP may affect CVP and SWP operations and changes in Delta flow dynamics. Better defined operating criteria for project alternatives is needed along with adequate modeling rules to analyze how BDCP may affect water operations. Without a clear understanding of how BDCP may change operations, affects analysis based on this modeling may not produce reliable results and should be revised as improved modeling is developed.

6 GLOSSARY

acre-foot The volume of water (about 325,900 gallons) that would cover an area of 1 acre to a depth of 1 foot. This is enough water to meet the annual needs of one to two households.

agricultural water supplier As defined by the California Water Code, a public or private supplier that provides water to 2,000 or more irrigated acres per year for agricultural purposes or serves 2,000 or more acres of agricultural land. This can be a water district that directly supplies water to farmers or a contractor that sells water to the water district.

annual Delta exports The total amount of water transferred ("exported") to areas south of the Delta through the Harvey O. Banks Pumping Plant (SWP) and the C. W. "Bill" Jones Pumping Plant (CVP) in 1 year.

appropriative water rights Rights allowing a user to divert surface water for beneficial use. The user must first have obtained a permit from the State Water Resources Control Board, unless the appropriative water right predates 1914.

Article 21 water Water that a contractor can receive in addition to its allocated Table A water. This water is only available if several conditions are met: (1) excess water is flowing through the Delta; (2) the contractor can use the surplus water or store it in the contractor's own system; and (3) delivering this water will not interfere with Table A allocations, other SWP deliveries, or SWP operations.

biological opinion A determination by the U.S. Fish and Wildlife Service or National Marine Fisheries Service on whether a proposed federal action is likely to jeopardize the continued existence of a threatened or endangered species or result in the destruction or adverse modification of designated "critical habitat." If jeopardy is determined, certain actions are required to be taken to protect the species of concern.

CalSim-II A computer model, jointly developed by DWR and the U.S. Bureau of Reclamation, that simulates existing and future operations of the SWP and CVP. The hydrology used by this model was developed by adjusting the historical flow record (1922–2003) to account for the influence of changes in land uses and regulation of upstream flows.

Central Valley Project (CVP) Operated by the U.S. Bureau of Reclamation, the CVP is a water storage and delivery system consisting of 20 dams and reservoirs (including Shasta, Folsom, and New Melones Reservoirs), 11 power plants, and 500 miles of major canals. CVP facilities reach some 400 miles from Redding to Bakersfield and deliver about 7 million acre-feet of water for agricultural, urban, and wildlife use.

cubic feet per second (cfs) A measure of the rate at which a river of stream is flowing. The flow is 1 cfs if a cubic foot (about 7.48 gallons) of water passes a specific point in 1 second. A flow of 1 cubic foot per second for a day is approximately 2 acre-feet.

Delta exports Water transferred ("exported") to areas south of the Delta through the Harvey O. Banks Pumping Plant (SWP) and the C. W. "Bill" Jones Pumping Plant (CVP).

Delta inflow The combined total of water flowing into the Delta from the Sacramento River, San Joaquin River, and other rivers and waterways.

exceedence plot For the SWP, a curve showing SWP delivery probability (especially for Table A water)—specifically, the likelihood that SWP Contractors will receive a certain volume of water under current or future conditions.

incidental take permit A permit issued by the U.S. Fish and Wildlife Service or National Marine Fisheries Service, under Section 10 of the federal Endangered Species Act, to private nonfederal entities undertaking otherwise lawful projects that might result in the "take" of an endangered or threatened species. In California, an additional permit is required and take may be authorized under Section 2081 of the California Fish and Game Code through issuance of either an incidental take permit or a consistency determination. The California Department of Fish and Wildlife is authorized to accept a federal biological opinion as the take authorization for a State-listed species when a species is listed under both the federal and California Endangered Species Acts.

riparian water rights Water rights that apply to lands traversed by or adjacent to a natural watercourse. No permit is required to use this water, which must be used on riparian land and cannot be stored for later use. Riparian rights attach only to the "natural" flow in the water course and do not apply to abandoned flows or stored water releases.

State Water Project (SWP) Operated by DWR, a water storage and delivery system of 33 storage facilities, about 700 miles of open canals and pipelines, four pumping-generating plants, five hydroelectric power plants, and 20 pumping plants that extends for more than 600 miles in California. Its main purpose is to store and distribute water to 29 urban and agricultural water suppliers in Northern California, the San Francisco Bay Area, the San Joaquin Valley, the Central Coast, and Southern California. The SWP provides supplemental water to 25 million Californians (almost two-thirds of California's population) and about 750,000 acres of irrigated farmland. Water deliveries have ranged from 1.4 million acre-feet in a dry year to more than 4.0 million acre-feet in a wet year.

SWP Contractors Twenty-nine entities that receive water for agricultural or municipal and industrial uses through the SWP. Each contractor has executed a long-term water supply contract with DWR. Also sometimes referred to as "State Water Contractors."

Table A water (Table A amounts) The maximum amount of SWP water that the State agreed to make available to an SWP Contractor for delivery during the year. Table A amounts determine the maximum water a contractor may request each year from DWR. The State and SWP Contractors also use Table A amounts to serve as a basis for allocation of some SWP costs among the contractors.

urban water supplier As defined by the California Water Code, a public or private supplier that provides water for municipal use directly or indirectly to more than 3,000 customers or supplies more than 3,000 acre-feet of water in a year. This can be a water district that provides the water to local residents for use at home or work, or a contractor that distributes or sells water to that water district.

Water Rights Decision 1641 (D-1641) A regulatory decision issued by the State Water Resources Control Board in 1999 (updated in 2000) to implement the 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta. D-1641 assigned primary responsibility for meeting many of the Delta's water quality objectives to the SWP and CVP, thus placing certain limits on SWP and CVP operations.

water year In reports on surface water supply, the period extending from October 1 through September 30 of the following calendar year. The water year refers to the September year. For example, October 1, 2010, through September 30, 2011 is the 2011 water year.

Review of Bay Delta Conservation Program Modeling

by MBK Engineers and Daniel B. Steiner, Consulting Engineer

Technical Appendix

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Tables

1 INTRODUCTION

Since December 2012, MBK Engineers and Dan Steiner (collectively "Reviewers") have assisted various parties in evaluating the operations modeling that was performed for the Bay Delta Conservation Plan (BDCP). To assist in understanding BDCP and the potential implications, stakeholders[1] requested that the Reviewers review the CalSim II modeling studies performed as part of the BDCP (hereafter "BDCP Studies" or "BDCP Model").

An initial review led the Reviewers to conclude that the BDCP Model, which serves as the basis for the environmental analysis contained in the BDCP Environmental Impact Report/Statement (EIR/S), provides very limited useful information to understand the effects of the BDCP. The BDCP Model contains erroneous assumptions, errors, and outdated tools, which result in impractical or unrealistic Central Valley Project (CVP) and State Water Project (SWP) operations. The unrealistic operations, in turn, do not accurately depict the effects of the BDCP.

The Reviewers revised the BDCP Model to depict a more accurate, consistent version of current and future benchmark hydrology so that the effects of the BDCP could be ascertained. The BDCP Model was also revised to depict more realistic CVP and SWP operations upon which to contrast the various BDCP alternatives. The Reviewers made significant efforts to coordinate with and inform the U.S. Bureau of Reclamation (Reclamation) and the California Department of Water Resources (DWR) managers and modelers, and CVP and SWP operators of the Reviewers' modifications, assumptions, and findings. Where appropriate, the Reviewers also used Reclamation and DWR's guidance and direction to refine the Reviewers' analysis.

This technical appendix summarizes: (1) the independent review of the CalSim II modeling publicly released for the BDCP's Draft Environmental Impact Report/Statement (EIRS), (2) the corrections and revisions made to the assumptions in the CalSim II model, and (3) comparisons between the BDCP and independent modeling results. The detailed information in this appendix is summarized in our main report.

[1] The entities who funded this report are Contra Costa Water District, East Bay Municipal Utility District, Friant Water Authority, Northern California Water Association, North Delta Water Agency, San Joaquin River Exchange Contractors Water Authority, San Joaquin Tributaries Authority, and Tehama Colusa Canal Authority.

2 REVIEW OF BDCP CALSIM II MODELING

2.1 Climate Change

Implementation of Climate Change

The analysis presented in the BDCP Documents attempts to incorporate the effects of climate change at two future climate periods: the early long term (ELT) at approximately the year 2025; and the late long term (LLT) at approximately 2060. As described in the BDCP documents[2], other analytical tools were used to determine anticipated changes to precipitation and air temperature that is expected to occur under ELT and LLT conditions. Projected precipitation and temperature was then used to determine how much water is expected to flow into the upstream reservoirs and downstream accretions/depletions over an 82-year period of variable hydrology; these time series were then used as inputs into the CalSim II operations model. A second aspect of climate change, the anticipated amount of sea level rise, is incorporated into the CalSim II model by modifying a subroutine that determines salinity within the Delta based on flows within Delta channels. The effects of sea level rise will manifest as a need for additional outflow when water quality is controlling operations to prevent seawater intrusion.

This report does not review the analytical processes by which reservoir inflows and runoff were developed, nor does it evaluate the modified flow-salinity relationships that are assumed due to sea level rise; those items could be the focus of another independent review. This review is limited to evaluating how the modified flows were incorporated into CalSim II and whether the operation of the CVP and SWP water system in response to the modified flows and the modified flow-salinity relationship is reasonable for the ELT and LLT conditions. This work reviews the assumed underlying hydrology and simulated operation of the CVP/SWP, assumed regulatory requirements, and the resultant water delivery reliability.

CalSim II Assumptions

To assess climate change, the three without Project (or "baseline" or "no action") modeling scenarios were reviewed: No Action Alternative (NAA)[3], No Action Alternative at the Early Long Term (NAA – ELT), and No Action Alternative at the Late Long Term (NAA –LLT). Assumptions for NAA, NAA-ELT, and NAA-LLT are provided in the Draft EIR[4]. The only difference between these scenarios is the climate-related changes made for the ELT and LLT conditions (Table 1).

Table 1. Scenarios used to evaluate climate change

	Climate Change Assumptions	
Scenario	**Hydrology**	**Sea Level Rise**
No Action Alternative (NAA)	None	None
No Action Alternative at Early Long Term (NAA-ELT)	Modified reservoir inflows and runoff for expected conditions at 2025	15 cm
No Action Alternative at Early Long Term (NAA-LLT)	Modified reservoir inflows and runoff for expected conditions at 2060	45 cm

[2] BDCP EIR/EIS Appendix 5A, Section A and BDCP HCP/NCCP Appendix 5.A.2
[3] NAA is also called the Existing Biological Conditions number 2 (EBC-2) in the Draft Plan.
[4] BDCP EIR/EIS Appendix 5A, Section B, Table B-8

The differences between the NAA and NAA-ELT reveal the effects of the climate change assumptions under ELT conditions; similarly, the differences between the NAA and NAA-LLT reveal the effects of the climate change assumptions under LLT conditions.

Regulatory requirements

Each of the no action alternatives assumes the same regulatory requirements, generally representing the existing regulatory environment at the time of study formulation (February 2009), including Stanislaus ROP NMFS BO (June 2009) Actions III.1.2 and III.1.3, Trinity Preferred EIS Alternative, NMFS 2004 Winter-run BO, NMFS BO (June 2009) Action I.2.1, SWRCB WR90-5, CVPIA (b)(2) flows, NMFS BO (June 2009) Action I.2.2, ARFM NMFS BO (June 2009) Action II.1, no SJRRP flow modeled, Vernalis SWRCB D1641 Vernalis flow and WQ and NMFS BO (June 2009) Action IV.2.1, Delta D1641 and NMFS Delta Actions including Fall X2 FWS BO (December 2008) Action 4, Export restrictions including NMFS BO (June 2009) Action IV.11.2v Phase II, OMR FWS BO (December 2008) Actions 1-3 and NMFS BO (June 2009) Action IV.2.3v.

The modeling protocols for the recent USFWS BO (2008) and NMFS BO (2009) have been cited as being cooperatively developed by Reclamation, NMFS, U.S. Fish and Wildlife Service (USF&WS), California Department of Fish and Wildlife (CDF&W), and DWR.

Each of the BDCP no action alternatives (NAA, NAA-ELT, and NAA-LLT) uses the same New Melones Reservoir and other San Joaquin River operations. At the time of these studies' formulation, the National Marine Fisheries Services (NMFS) Biological Opinion (BO) (June 2009) had been recently released. Also, the San Joaquin River Agreement (SJRA, including the Vernalis Adaptive Management Program [VAMP]) and its incorporation into D1641 for Vernalis flow requirements were either still in force or being discussed for extension. As a component of study assumptions, the protocols of the SJRA and an implementation of the NMFS BO for San Joaquin River operations (including New Melones Reservoir operations) is included in the studies. These protocols, in particular the inclusion of VAMP which has now expired, is not appropriate as an assumption within either the No Action or Alternative Scenarios. Although appropriate within the identification of actions, programs and protocols present at the time of the NOI/NOP, they are not representative of current or reasonably foreseeable operations. Also, modeling of the future operation of the Friant Division of the CVP assumes no San Joaquin River Restoration Program releases. While assuming no difference in the current and future operation of the Friant Division avoids another difference in existing and projected future hydrology of the San Joaquin River, the assumption does not recognize the existence of the San Joaquin River Restoration Program. Results of CVP and SWP operations, in particular as affected by export constraints dependent on San Joaquin River flows and their effect on OMR, E/I and I/E diversion constraints, would be different with a different set of assumptions for San Joaquin River operations.

Finally, the habitat restoration requirements in the 2008 FWS BO and the 2009 NMFS BO are not included in the No Action Alternative baselines. Although the restoration is required to be completed either with or without completion of the BDCP, the restoration was only analyzed as part of the with project scenarios.

Model Results

Inflow and Reservoir Storage in the Sacramento River Basin

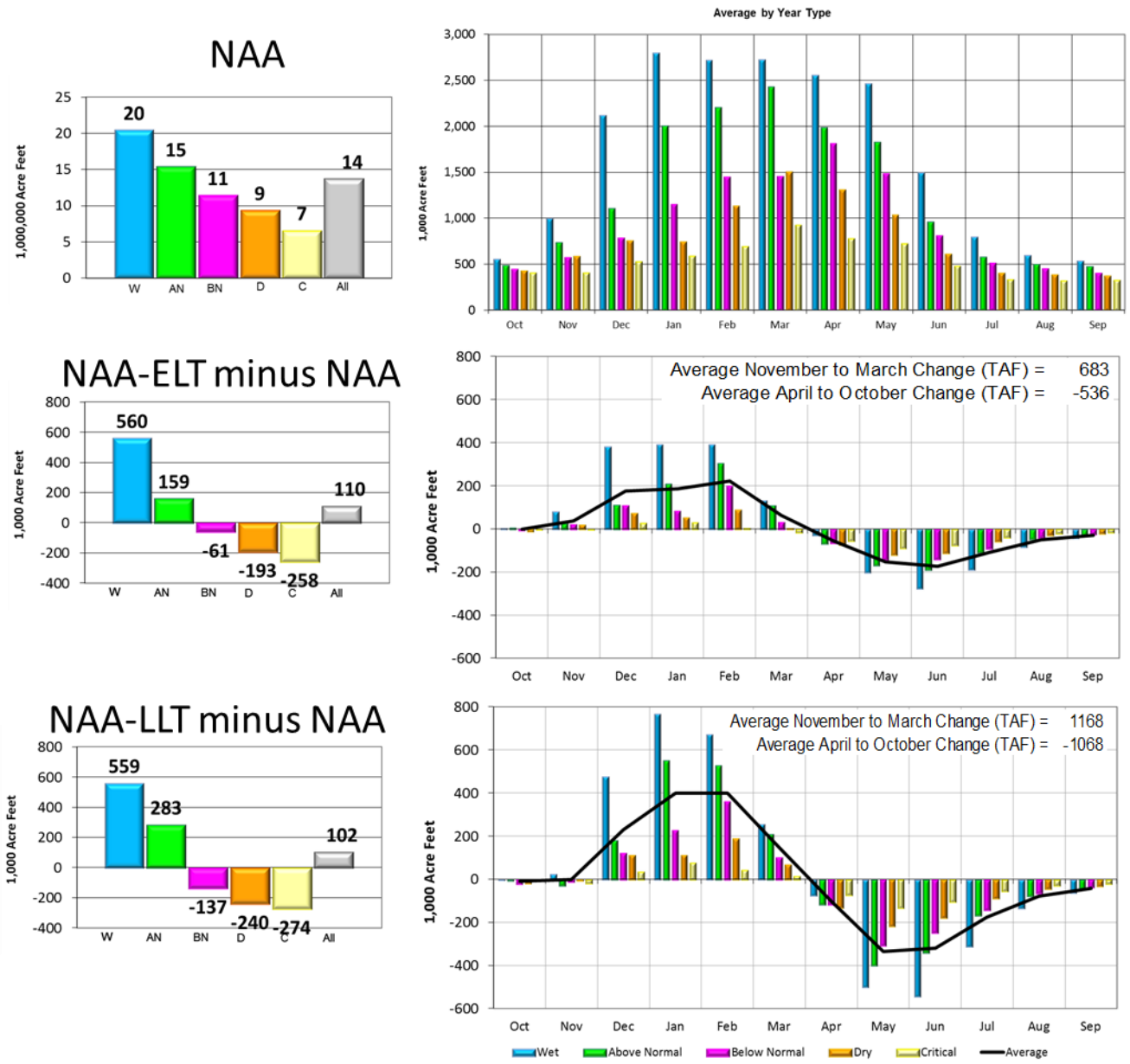
The significance of changed hydrology between the three without project baselines is illustrated in Figure 1 below. The figure illustrates the projected combined inflow of Trinity, Shasta, Oroville, and Folsom Reservoirs under the three NAA baselines. Numerous modeling projections for climate change have been developed, and in this BDCP group of Scenarios Trinity, Shasta, and Oroville inflow are projected to increase overall, but with a

significant shift from spring runoff to winter runoff and increases in wetter years with decreases in dryer years. Folsom Reservoir inflow is projected to remain about the same at the time of the NAA-ELT Scenario but decreases by the time of the NAA-LLT Scenario. The spring to winter shift in runoff is also projected for Folsom Reservoir inflow.

If climate change resulted in such drastic inflow changes, there is argument that certain underlying operating criteria such as instream flow requirements and flood control diagrams would require change in recognition of the changed hydrology. Regarding current environmental flow requirements carried into the NAA Scenarios, we question an assumed operation that continues to attempt to meet temperature targets when flow releases are unlikely to meet the target and thus a sustainable operation plan is not possible. For example, the CVP and SWP are unlikely to draw reservoirs to dead pool as often as the models depict. The NAA-ELT and NAA-LLT model Scenarios show project reservoirs going to dead pool in 10% of years; such operation would result in cutting upstream urban area deliveries below what is needed for public health and safety in 10% of years and would lead to water temperature conditions that would likely not achieve the assumed objectives. Again in short, the Scenarios that include climate change do not provide a reasonable underlying CVP/SWP operation with a changed hydrology from which to impose a Project upon to understand how BDCP Alternatives will affect the water system and water users.

In our opinion, the CalSim II depicted operations that incorporate climate change are not reasonably foreseeable and do not represent a likely future operation of the CVP/SWP. Although an argument is typically made that these study baselines will be used in a comparison analysis with Project Alternatives tiering from these baselines, we believe that the depicted operations do not represent credible CVP/SWP operations and we have no confidence in the results and they are inappropriate as the foundation of a Project Alternative. As such, although the modeling approach may provide a relative comparison between equal foundational operations, we are apprehensive to place much confidence in the computed differences shown between the NAA and Project Alternative Scenarios.

Figure 1. Projected Inflow to Trinity, Shasta, Oroville, and Folsom Reservoirs – NAA, NAA-ELT and NAA-LLT



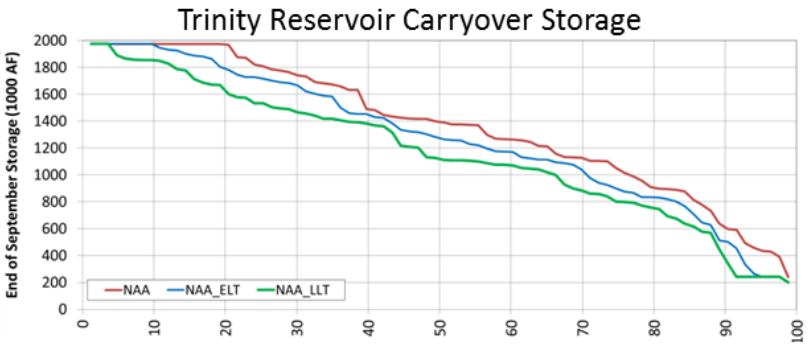
<u>Carryover Storage in the Sacramento River Basin</u>

For upstream CVP and SWP reservoirs the assumed shift of inflows due to climate change (Figure 1) along with a continuing need to satisfy exports demands significantly affects carryover storage. The CVP and SWP simply cannot satisfy water demands and regulatory criteria imposed on them in the NAA-ELT and NAA-LLT modeling scenarios.

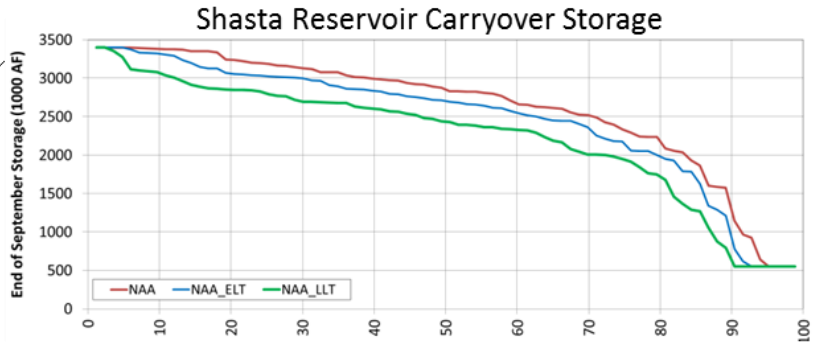
Figure 2 illustrates the typical change in carryover storage as shown for Trinity, Shasta, Oroville, and Folsom Reservoirs. The relatively high frequency (approximately 10% of time) of minimum storage occurring at CVP reservoirs illustrates our questioning of credible operations in the studies.

Figure 2. Projected Shasta Reservoir Carryover Storage, NAA, NAA-ELT and NAA-LLT

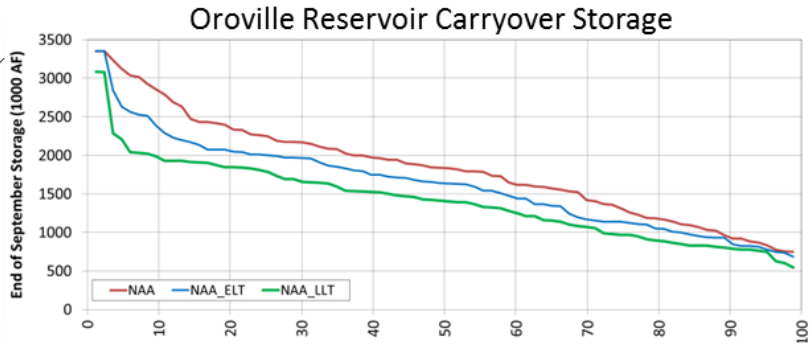
	Year Type	NAA_ELT minus NAA	NAA_LLT minus NAA
Trinity	W	-62	-187
	AN	-79	-198
	BN	-102	-170
	D	-138	-271
	C	-126	-216
	All	-97	-209



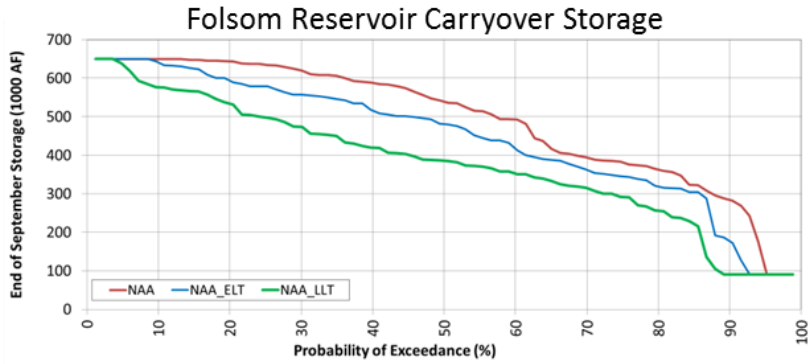
	Year Type	NAA_ELT minus NAA	NAA_LLT minus NAA
Shasta	W	-117	-331
	AN	-199	-452
	BN	-152	-340
	D	-154	-463
	C	-192	-377
	All	-154	-386



	Year Type	NAA_ELT minus NAA	NAA_LLT minus NAA
Oroville	W	-296	-588
	AN	-225	-460
	BN	-229	-513
	D	-180	-296
	C	-54	-159
	All	-213	-430



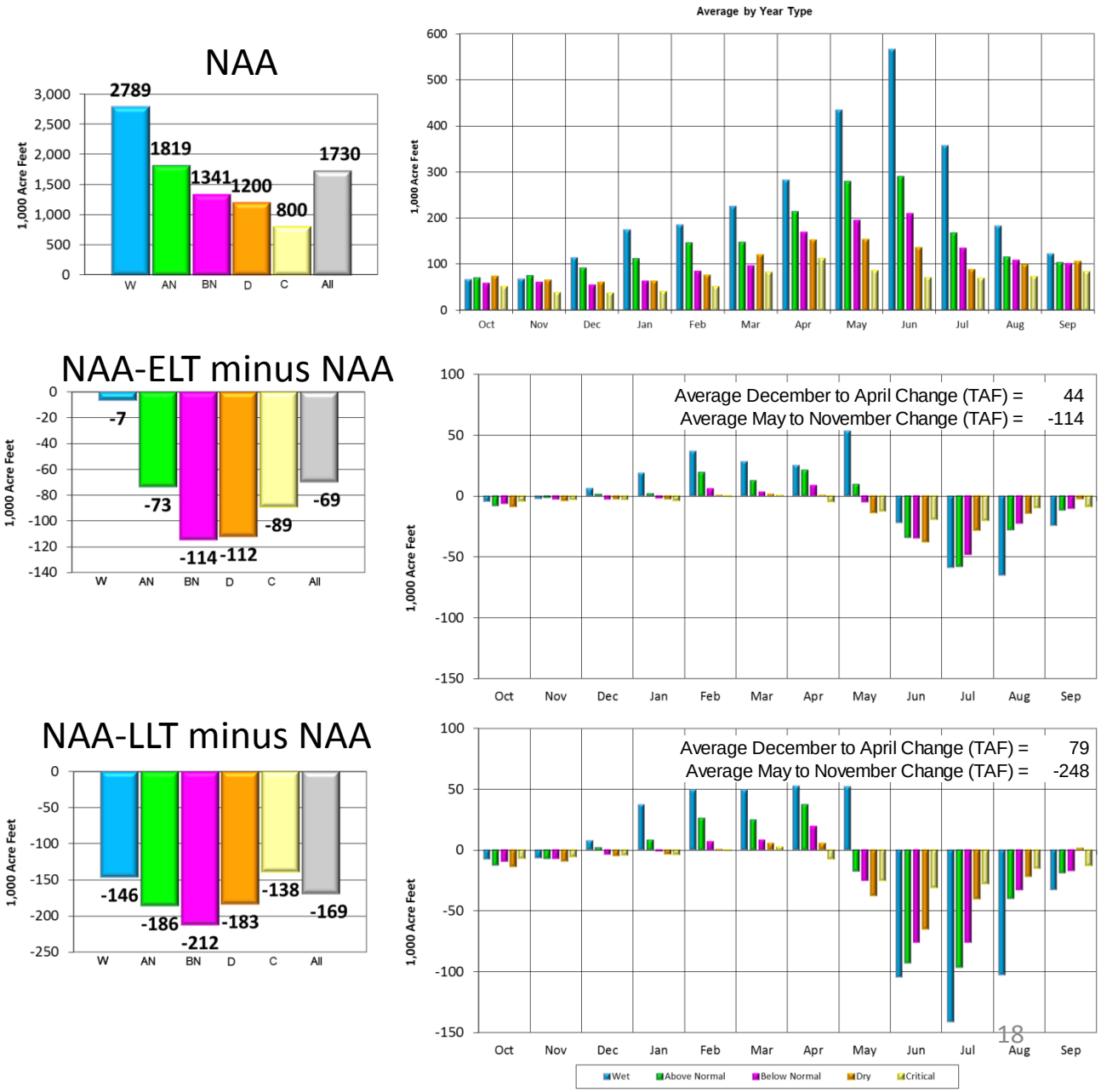
	Year Type	NAA_ELT minus NAA	NAA_LLT minus NAA
Folsom	W	-42	-115
	AN	-54	-128
	BN	-58	-136
	D	-43	-112
	C	-43	-68
	All	-47	-113



Inflow and Carryover Storage in the San Joaquin River Basin

San Joaquin Valley reservoirs are depicted with an overall decrease in annual runoff with some shifting of runoff from spring to winter, but mostly just decreases in spring runoff due to a decline in snowmelt runoff during late spring[5]. Figure 3 illustrates the assumed effects of climate change upon inflow to Millerton Lake.

Figure 3. Projected Inflow to Millerton Lake –NAA, NAA-ELT and NAA-LLT



The hydrology differences imposed in the NAA Scenarios of the Friant Division are described above, and its appropriateness may be subject to additional debate and Alternative assumptions. However, our review found that implementation of Millerton Reservoir inflow as affected by climate change was improperly performed.

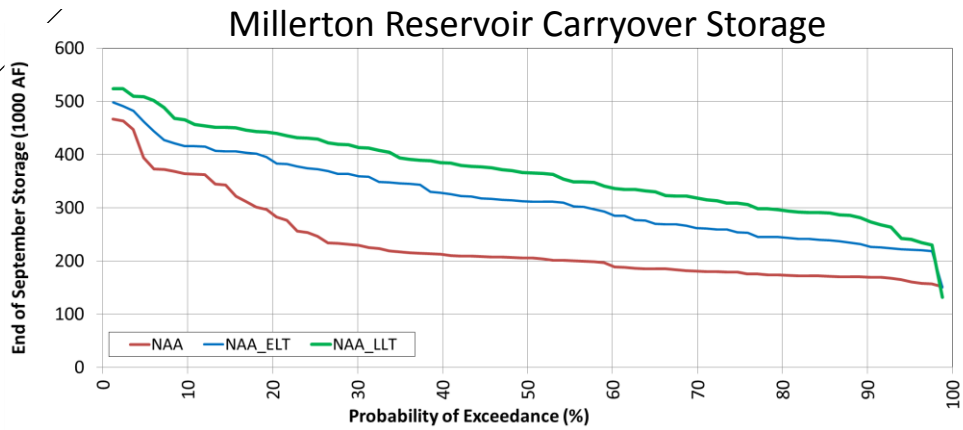
[5] BDCP Appendix 5A.2

Inflow to Millerton Reservoir in this version of CalSim is input in three separate time series for purposes of depicting the hydrology of potential upper basin reservoirs. Climate change hydrology was inconsistently incorporated at Millerton Reservoir and misapplied to the water supply and flood control operations. The result is an unrealistic operation for river releases and canal diversions. Figure 3 illustrates the projected ELT and LLT changes in Millerton Reservoir inflow incorporated in these studies. On face value of the input data, regardless of Friant Dam river release assumptions the effect of climate change at Millerton Lake will affect water deliveries.

Evidence of the inconsistent inflow problem is shown in the result for the comparison of carryover storage of Millerton Reservoir under the NAA, NAA-ELT, and NAA-LLT Scenarios (Figure 4). Carryover storage is higher in the ELT and LLT Scenarios due to climate change effects to inflow incorporated in reservoir operations but not in the computation of water supply deliveries. Thus, water deliveries are suppressed and the reservoir ends the year with greater storage.

Figure 4. Millerton Reservoir Carryover Storage, NAA, NAA-ELT and NAA-LLT Scenarios

	Year Type	NAA_ELT minus NAA	NAA_LLT minus NAA
Millerton	W	56	103
	AN	82	137
	BN	99	161
	D	87	131
	C	131	166
	All	87	136



CVP Water Service Contractor's water allocations are based on available CVP supplies, Figure 5 contains exceedance probability plots of deliveries and allocation percentages to these contractors. Table 2 contains average annual allocation to these CVP Water Service Contractors. Water supplies to these contractors decrease in the ELT and LLT relative to NAA Conditions.

Table 2. CVP Water Service Contractor Allocation Summary

	NAA	NAA-ELT	NAA-LLT
North of Delta Agricultural Service Contractors	61%	53%	46%
South of Delta Agricultural Service Contractors	48%	44%	39%
North of Delta M&I Contractors	85%	81%	77%
South of Delta M&I Contractors	79%	77%	74%

CVP Sacramento River Settlement, San Joaquin River Exchange, and Refuge deliveries are based on Shasta Criteria and are 100% in most years and 75% in "Shasta critical" years[6]. Figure 6 contains exceedance probability charts for annual water deliveries to CVP contractors whose allocations are based on Shasta Criteria. In the NAA-ELT and NAA-LLT modeling scenarios, the Sacramento River Settlement and Refuge deliveries are reduced due to water shortages that occur more often under the climate change assumptions.

SWP Water Supply

Corresponding with the CVP operation is the projected operation of the SWP under No Action Conditions. These illustrations are shown to provide a comparison to SWP storage and exports, particularly during drought. A comparison of SWP exports to CVP SOD deliveries shows that each project exports about the same amount of water during drought.

Average annual SWP Table A water supply allocations are 62% for NAA, 61% for NAA-ELT, and 57% for NAA-LLT. Figure 7 contains an exceedance probability plot summary of SWP deliveries. SWP North of Delta deliveries to the Feather River Service Area in both the ELT and LLT are less than NAA during about 10% of the time.

[6] A "Shasta critical" year is determined when the forecasted full natural inflow into Shasta Lake is equal to or less than 3.2 million acre-feet.

Figure 5. CVP Water Service Contractor Delivery Summary

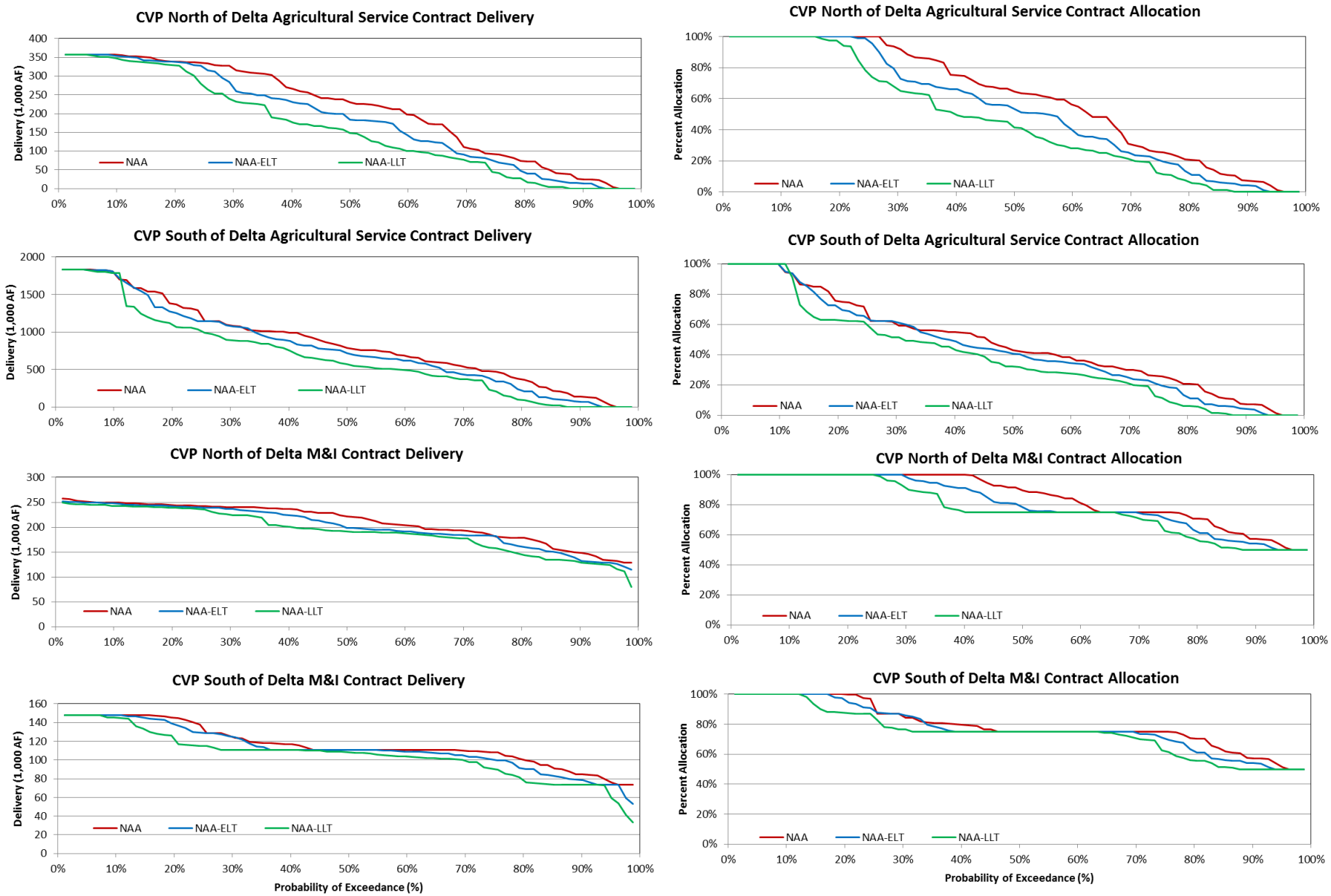


Figure 6. CVP Contractor Delivery Summary for Contractors with Shasta Criteria Allocations

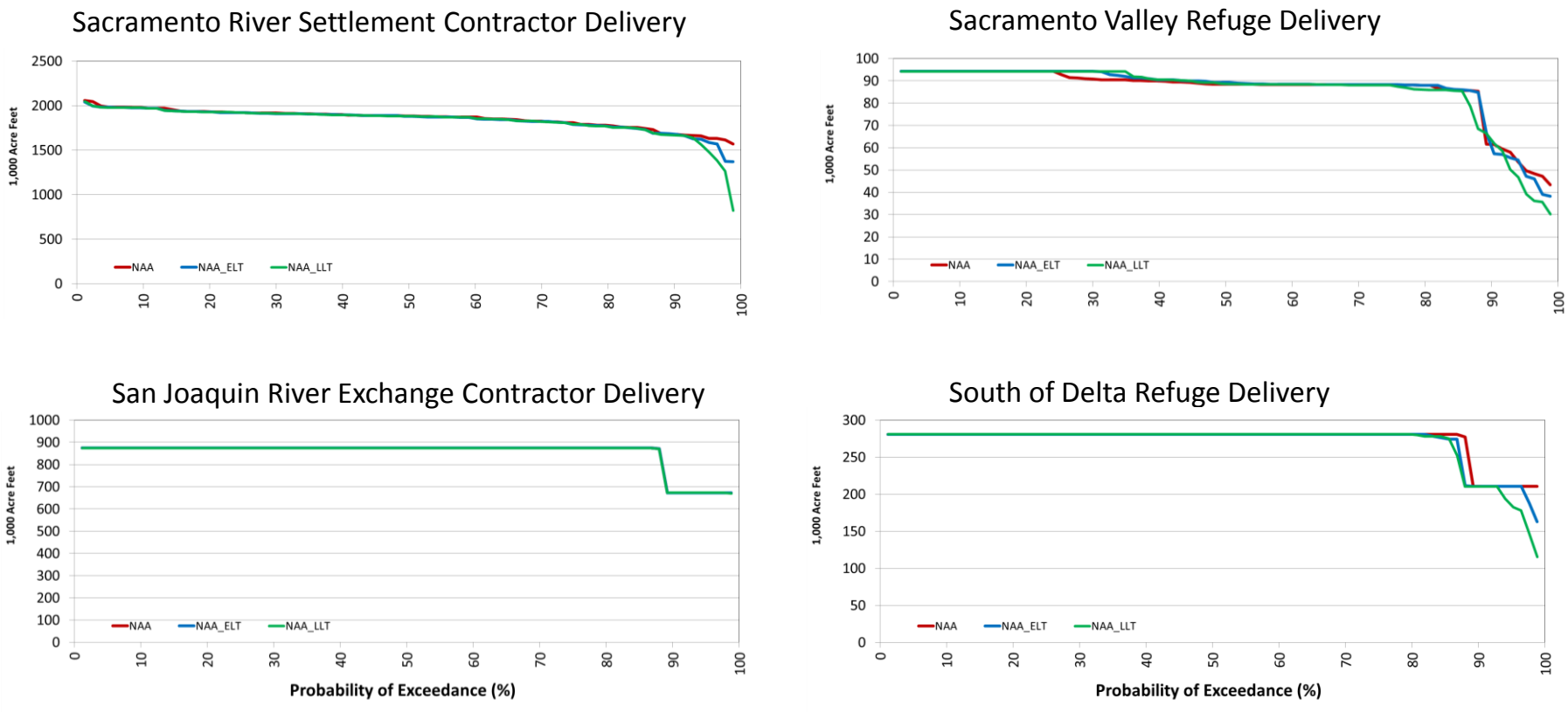
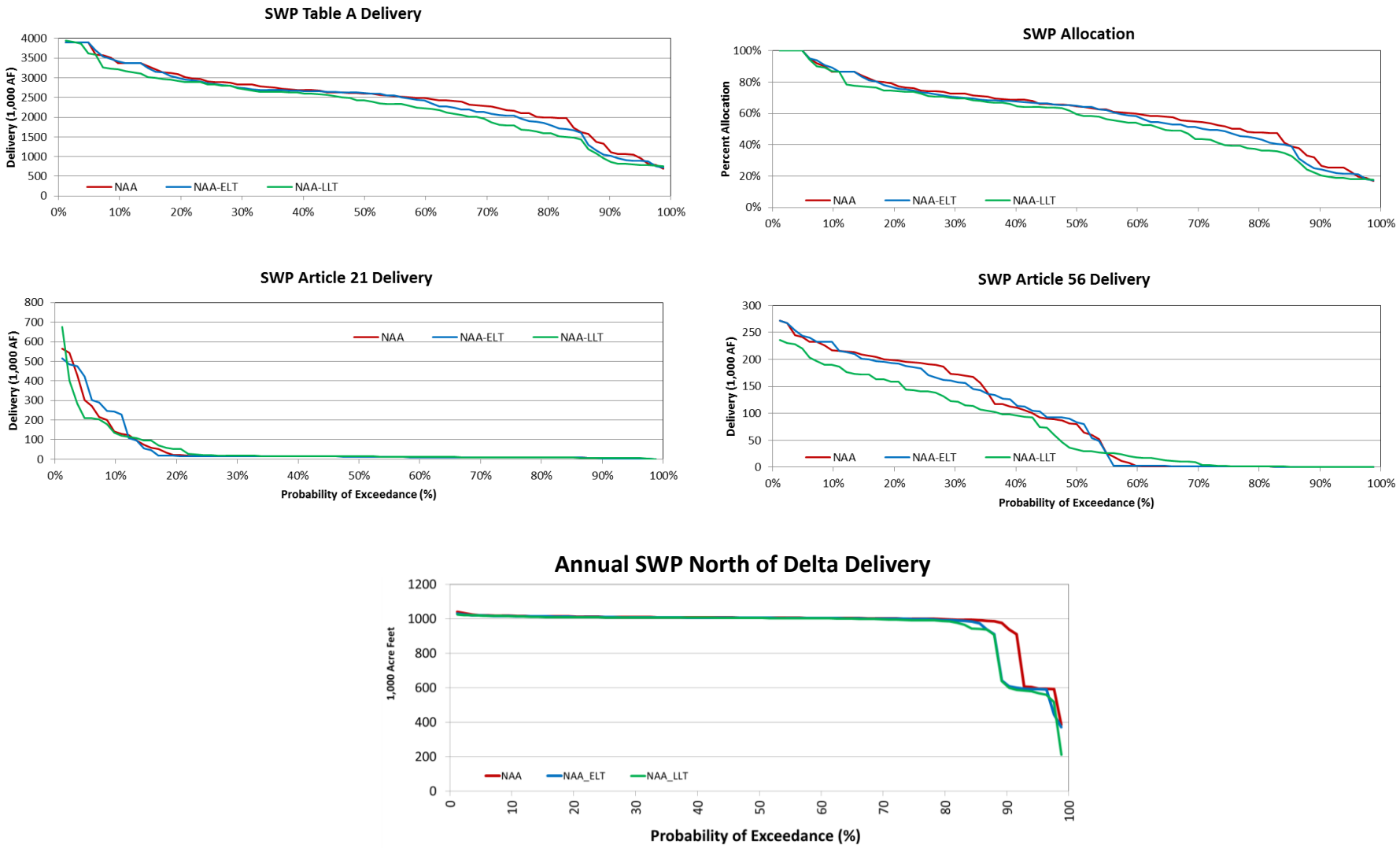


Figure 7. SWP Delta Delivery Summary



CVP/SWP Exports

Exports of the CVP and SWP have been projected to change due to a combination of climate change effects on water availability (primary effect), flow requirements for salinity control (sea level rise), additional in-basin water demands, and to a small extent greater export potential (DMC-CA intertie). Figure 8 illustrates the simulation of CVP exports and combined CVP/SWP exports under NAA, NAA-ELT, and NAA-LLT Scenarios. Under NAA average annual CVP exports are about 2.24 MAF (2.18 at Jones PP) and are about 100 TAF less in the NAA-ELT Scenario and 230 TAF less in the NAA-LLT. Annual average SWP exports are about 2.61 MAF in the NAA and are 68 TAF less in the NAA-ELT and 212 TAF less in the NAA-LLT. Annual average combined CVP/SWP exports are about 4.9 MAF in the NAA modeling (Figure 9) and about 170 TAF and 460 TAF less in the NAA-ELT and NAA-LLT respectively.

Figure 8. CVP Exports at Jones PP, NAA, NAA-ELT and NAA-LLT

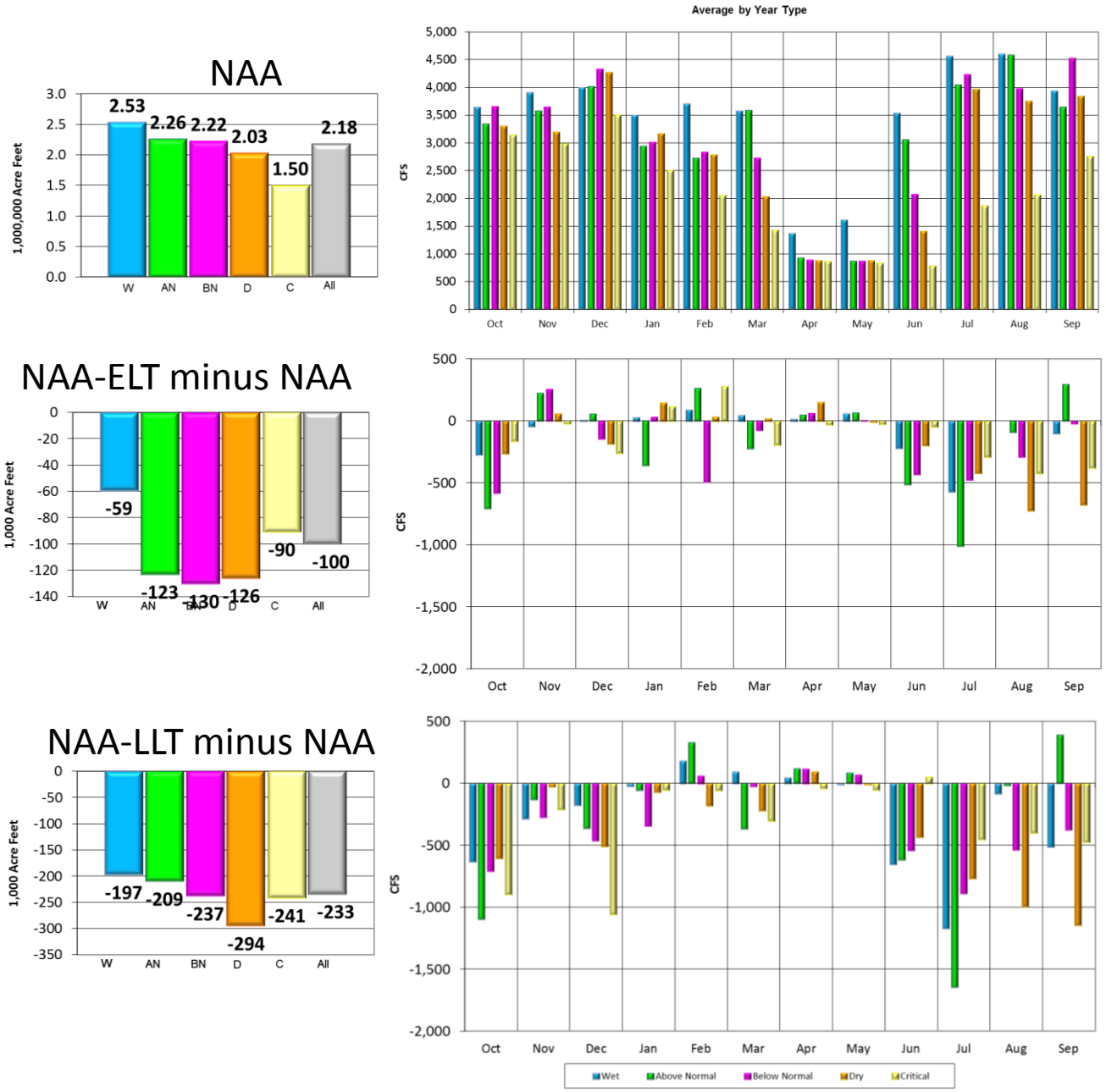
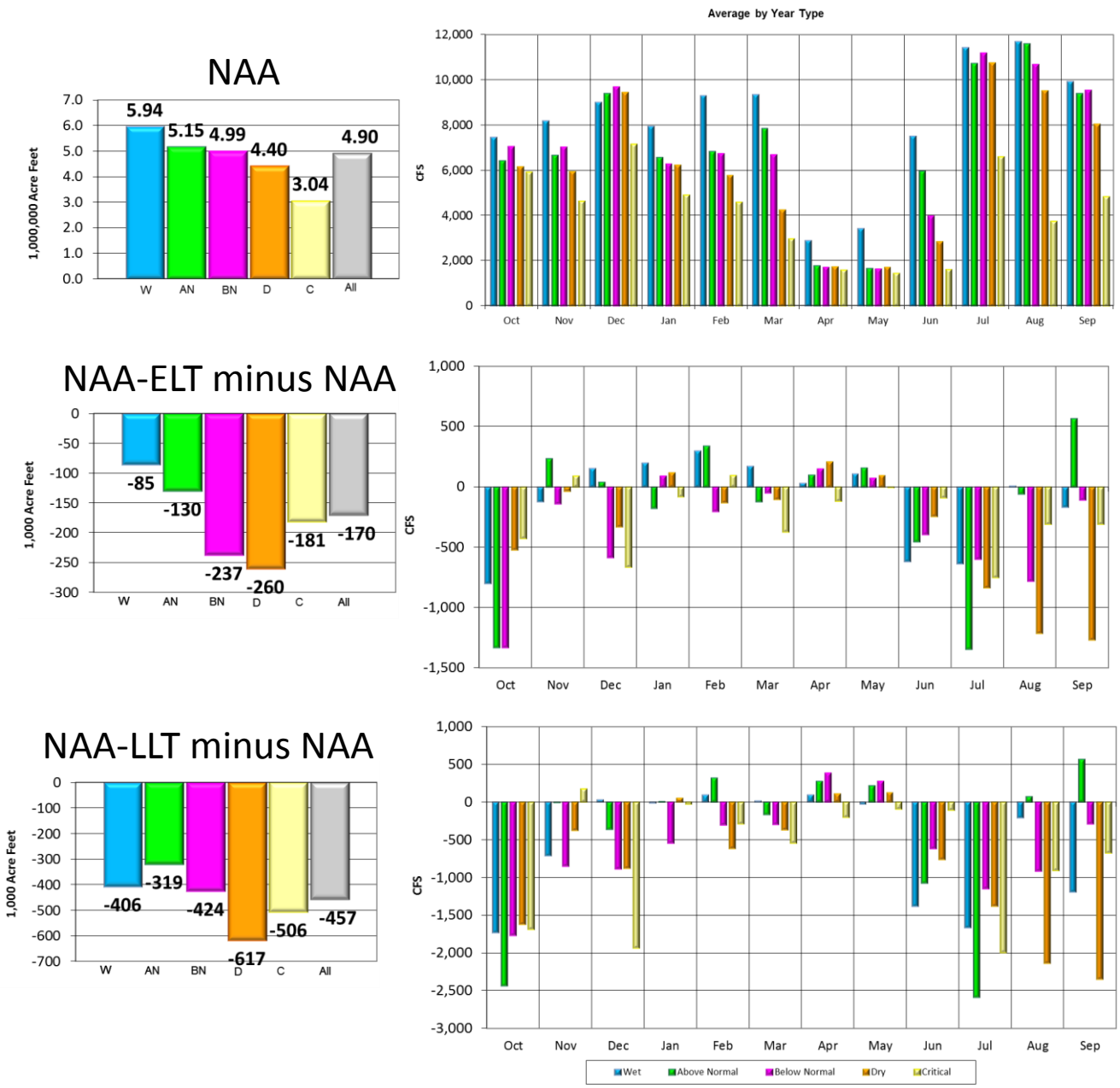


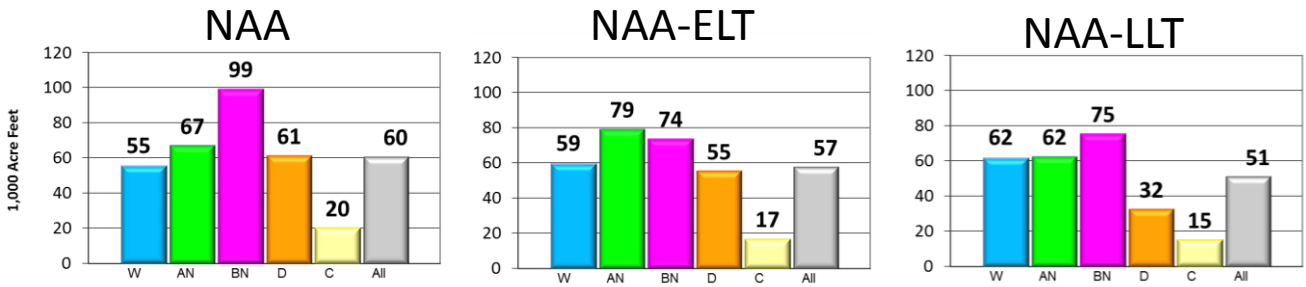
Figure 9. Total CVP/SWP Exports, NAA, NAA-ELT and NAA-LLT



Joint Point of Diversion

The NAA Alternatives do not make use of Joint Point of Diversion (JPOD), however CVP water is pumped at Banks to satisfy the Cross Valley Canal (CVC) contracts. **Figure** 10 shows annual Banks wheeling for CVC for the NAA, NAA-ELT and NAA-LLT.

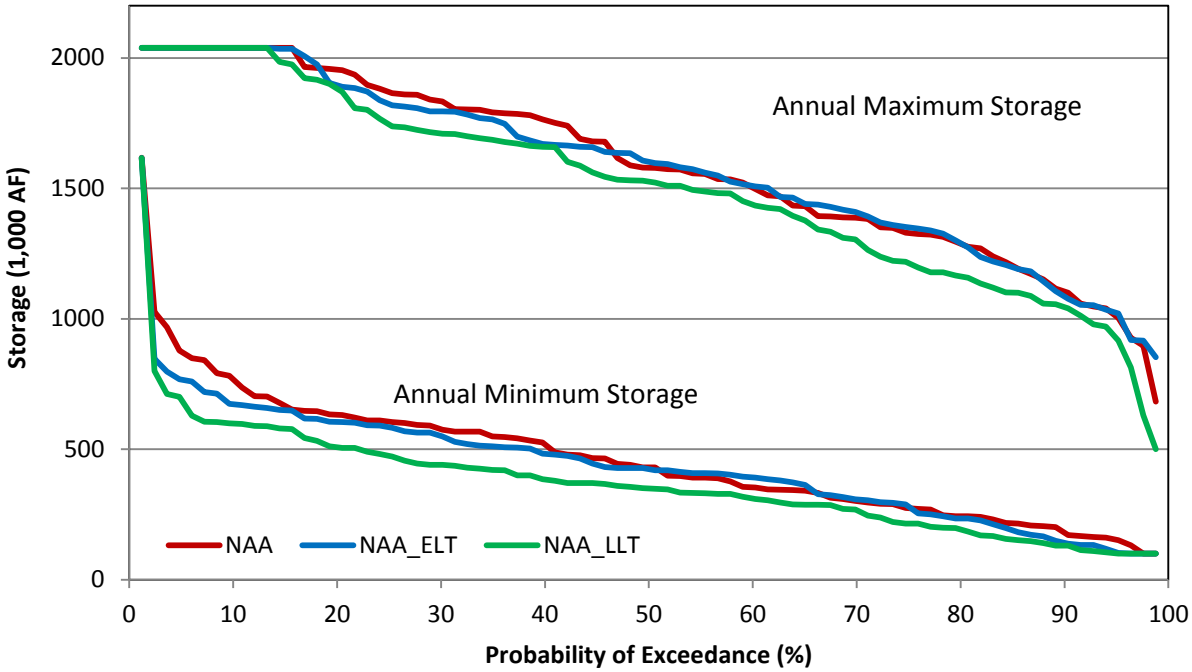
Figure 10. Cross Valley Canal Wheeling at Banks



San Luis Reservoir Operations

Modeling protocols will use San Luis Reservoir to store water when available and provide supply as exports are constrained by hydrology or regulatory constraints. Figure 11 illustrates the projected operation of San Luis Reservoir under the NAA, NAA-ELT, and NAA-LLT Scenarios. The annual maximum storage shows that the ability to fill San Luis Reservoir is somewhat similar for NAA and NAA-ELT but with less ability to fill in the NAA-LLT. The frequency of a low annual low point of San Luis Reservoir is exacerbated in the NAA-LLT Scenario. In all the Scenarios, San Luis Reservoir is heavily exercised. As currently projected, San Luis Reservoir will only fill as the result of very favorable hydrologic conditions including the availability of spill water from Friant or the Kings River system that offsets DMC water demands at the Mendota Pool.

Figure 11. San Luis Reservoir Storage – NAA, NAA-ELT and NAA-LLT



Sacramento River Temperature

CalSim II results, along with meteorological data, are used in temperature models that simulate reservoir temperature and river temperature. The BDCP modeling provided by DWR for review included the Sacramento

River temperature model and results for the No Action and Alternatives. Each BDCP Alternative used temperature target criteria for the upper Sacramento River as is used for the Existing Conditions modeling scenario. Equilibrium temperatures, a calculated model input that approximately depicts the effective air temperature for interaction with water temperature in the model, between Shasta and Gerber are increased by an annual average of 1.6°F for the ELT Scenarios and by 3.3°F for LLT Scenarios. Figure 12 contains monthly exceedance probability charts of temperature at Bend Bridge in the Sacramento River for April through October for the Existing Conditions and NAA-ELT Scenarios. There is about a 1 degree increase in average monthly temperature for the April through October period. Figure 13 contains similar information as Figure 12, but compares modeling results for the NAA-LLT and Existing Conditions Scenarios, there is often a 2°F increase in the NAA-LLT relative to Existing Conditions.

The increase in equilibrium temperatures combined with decreases in storage would lead to water temperature conditions that would likely not achieve the assumed objectives. Figure 12 and Figure 13 illustrate an increase in the probability that a water temperature target of 56°F would be exceeded at Bend Bridge under both the NAA-ELT and NAA-LLT Scenarios. The probability of exceedance increases approximately 5% to 20% depending on the month for the NAA-ELT Scenario and approximately 10% to 40% for the NAA-LLT Scenario.

Figure 12. Temperature Exceedance Sacramento River at Bend Bridge Existing, No Action Alternative, ELT

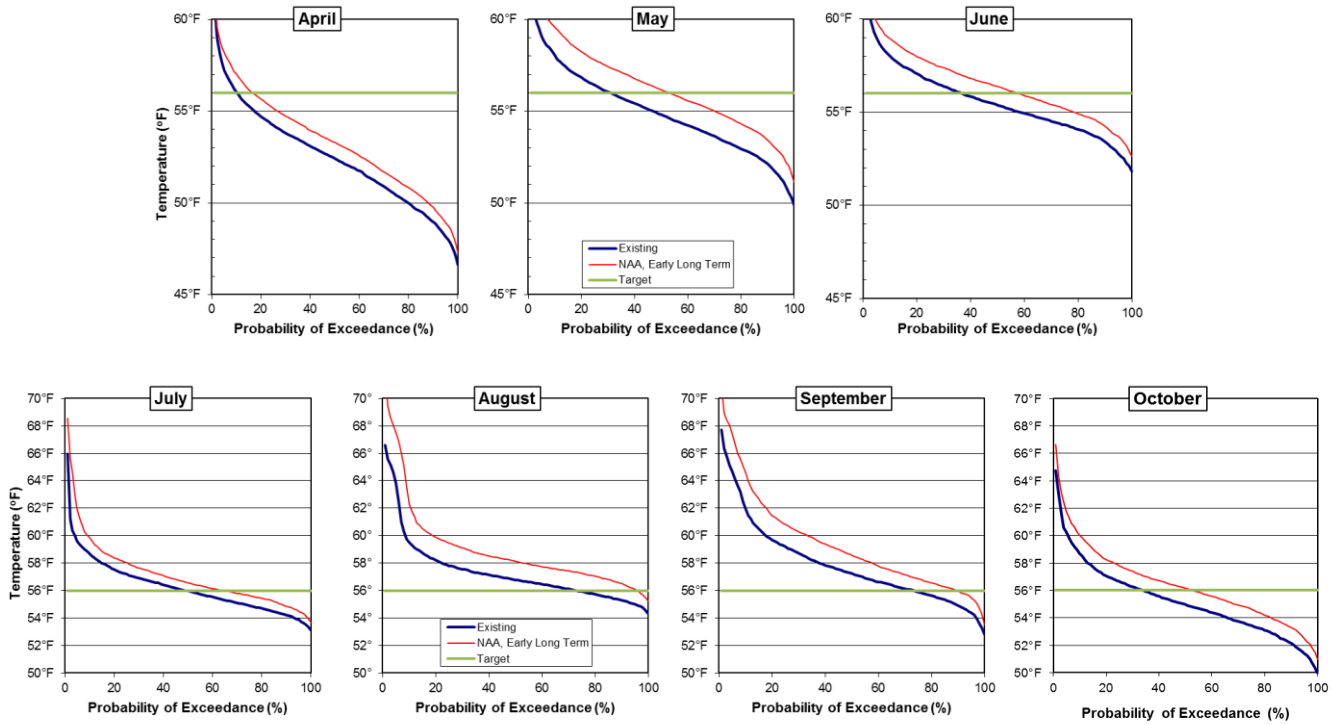
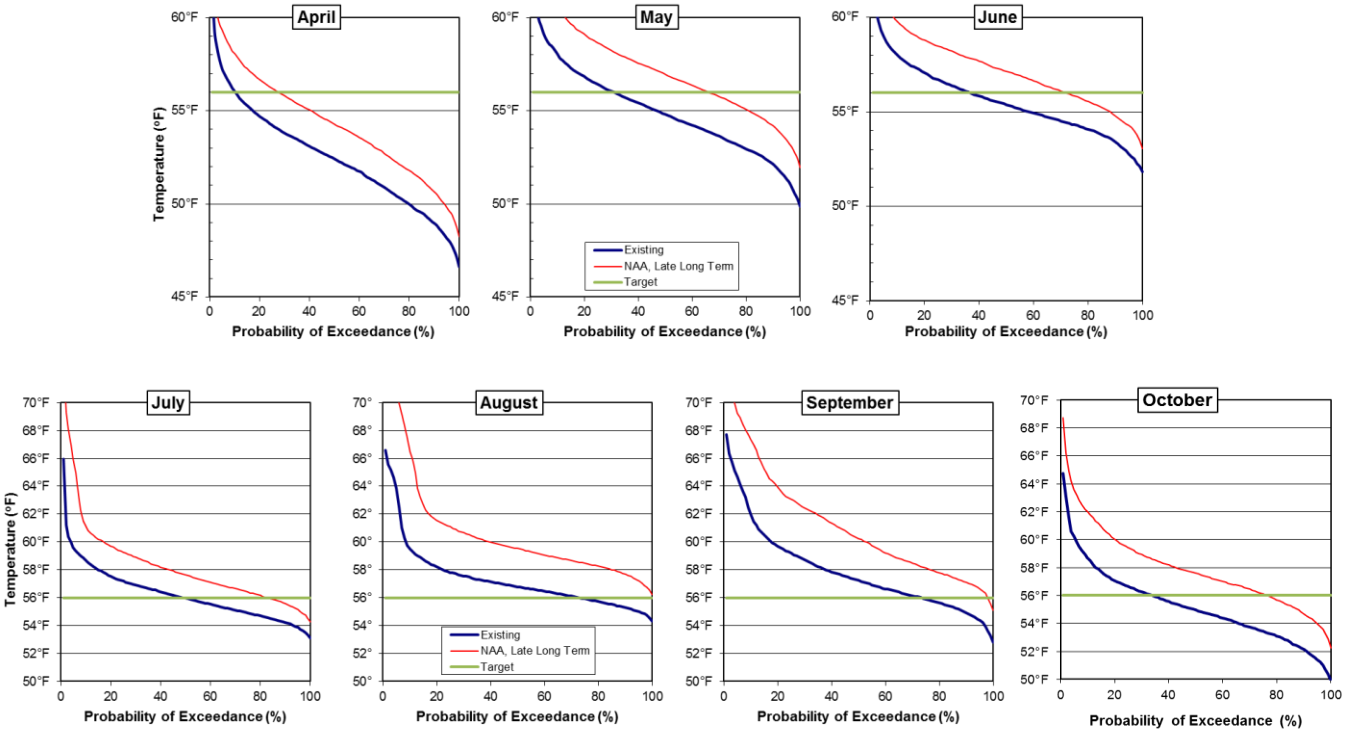


Figure 13. Temperature Exceedance Sacramento River at Bend Bridge Existing, No Action Alternative, LLT



Conclusions regarding Climate Change Assumptions and Implementation

In examining the possible effects of climate change, it is not appropriate to assume that current project operations will remain static and not respond to climate change. The BDCP's simplistic approach of assuming a linear operation of the CVP and SWP produces results that are not useful for dealing with the complex problem of climate change because it does not reflect the way in which the CVP and the SWP would actually operate whether or not the BDCP is implemented. Reviewers recommend a sensitivity analysis be conducted to develop a better understanding of the range of possible responses to climate change by the CVP and SWP, and the regulatory structures that dictate certain project operations.

Including climate change, without adaptation measures, results in insufficient water needed to meet all regulatory objectives and user demands. For example, the BDCP Model results that include climate change indicate that during droughts, water in reservoirs is reduced to the minimum capacity possible. Reservoirs have not been operated like this in the past during extreme droughts and the current drought also provides evidence that adaptation measures are called for long in advanced to avoid draining the reservoirs. In this aspect, the BDCP Model simply does not reflect a real future condition. Foreseeable adaptations that the CVP and SWP could make in response to climate change include: (1) updating operational rules regarding water releases for flood protection; (2) during severe droughts, emergency drought declarations could call for mandatory conservation; and (3) if droughts become more frequent, the CVP and SWP would likely revisit the rules by which they allocate water during shortages and operate more conservatively in wetter years. The modifications to CVP and SWP operations made during the winter and spring of 2014 in response to the drought supports the likelihood of future adaptations. The BDCP Model is, however, useful in that it reveals that difficult decisions must be made in response to climate change. But, in the absence of making those decisions, the BDCP Model results themselves are not informative, particularly during drought conditions. With future conditions projected to be so dire without the BDCP, the effects of the BDCP appear positive simply because it appears that conditions cannot get any worse (i.e., storage cannot be reduced below its minimum level). However, in reality, the future condition will

not be as depicted in the BDCP Model. The Reviewers recommend that Reclamation and DWR develop more realistic operating rules for the hydrologic conditions expected over the next half-century and incorporate those operating rules into the any CalSim II Model that includes climate change.

2.2 BDCP Operation

The next step of our analysis centered on reviewing BDCP modeling of the with project scenarios as described in the December 2013 Draft BDCP and described as Alternative 4 in the Draft EISR.

Description of the BDCP Project

At the time of review, this Alternative was coined Alt 4 and represented a dual conveyance facility. The two DWR analyses reviewed were identified as:

- Alt 4 (dual conveyance) – ELT

  The same system demands and facilities as described in the NAA-ELT with the following primary changes: three proposed North Delta Diversion (NDD) intakes of 3,000 cfs each; NDD bypass flow requirements; additional positive OMR flow requirements and elimination of the San Joaquin River I/E ratio and the export restrictions during VAMP; modification to the Freemont Weir to allow additional seasonal inundation and fish passage; modified Delta outflow requirements in the spring and/or fall (defined in the Decision Tree discussed below); movement of the Emmaton salinity standard; redefinition of the EI ratio; and removal of current permit limitations for the south Delta export facilities. Set within the ELT environment.
- Alt 4 (dual conveyance) – LLT

  The same as the previous Scenario except established in the LLT environment.

The BDCP contemplates a dual conveyance system that would move water through the Delta's interior or around the Delta through an isolated conveyance facility. The BDCP CalSim II files contained a set of studies evaluating the projected operation of a specific version of such a facility. The Alternative was imposed on two baselines: the NAA-ELT scenario and the NAA-LLT scenario.

The changes (benefits or impacts) of the operation due to Alt 4 are highly dependent upon the assumed operation of not only the BDCP facilities and the changed regulatory requirements associated with those facilities, but also by the assumed integrated operation of the CVP and SWP facilities. The modeling of the NAA Scenarios introduced a significant change in operating protocols suggested primarily for reaction to climate change. We consider the extent of the reaction not necessarily representing a likely outcome, and thus have little confidence that the NAA baselines are a "best" (or even valid) representation of a baseline from which to compare an action Alternative. However, a comparison review of the Alternative to the NAA baselines illuminates operational issues in the BDCP modeling and provides insight as to where benefits or impacts may occur as additional studies are provided.

Since the effects of climate changes are more severe in the LLT than in the ELT, this review focuses on the ELT modeling because the results are less skewed by the climate change assumptions and problems.

BDCP's Alternative 4 has four possible sets of operational criteria, termed the Decision Tree, that differ based on the "X2" standards[7] that they contemplate:

- Low Outflow Scenario (LOS), otherwise known as operational scenario H1, assumes existing spring X2 standard and the removal of the existing fall X2 standard;

[7] X2 is a salinity standard that requires outflows sufficient to attain a certain level of salinity at designated locations in the Delta at certain times of year.

- High Outflow Scenario (HOS), otherwise known as H4, contemplates the existing fall X2 standard and providing additional outflow during the spring;
- Evaluated Starting Operations (ESO), otherwise known as H3, assumes continuation of the existing X2 spring and fall standards;
- Enhanced spring outflow only (not evaluated in the December 2013 Draft BDCP), scenario H2, assumes additional spring outflow and no fall X2 standards.

While it is not entirely clear how the Decision Tree would work in practice, the general concept is that the prior to operation of the new facility, implementing authorities would select the appropriate Scenario (from amongst the four choices) based on their evaluation of targeted research and studies to be conducted during planning and construction of the facility.

For our analysis, we reviewed the HOS (or H4) scenario because the BDCP[8] indicates that the initial permit will include HOS operations that may be later modified at the conclusion of the targeted research studies. The HOS includes the existing fall X2 requirements but adds additional outflow requirements in the spring. We reviewed the model code and discussed the operations with DWR and Reclamation, who acknowledged that although the SWP was bearing the majority of the responsibility for meeting the additional spring outflow in the modeling, the responsibility would need to be shared with the CVP[9]. In subsequent discussions, DWR and Reclamation have suggested that the additional water may be purchased from other water users. However, the actual source of water for the additional outflow has not been defined. Since the BDCP modeling assumes that SWP bears the majority of the responsibility for meeting the additional outflow, yet this is not how the project will be operated in reality, our review of the BDCP modeling results for HOS is limited to the evaluation of how the SWP reservoir releases on the Feather River translate into changes in Delta outflow and exports.

Our remaining analysis examines the ESO (or H3) scenario (labeled Alt 4-ELT or Alt 4-LLT in this section) because it employs the same X2 standards as are implemented in the No Action Alternatives NAA-ELT and NAA-LLT. This allows us to focus our analysis on the effects of the BDCP operations independent of the possible change in the X2 standard.

High Outflow Scenario (HOS or H4) Results

In Alt 4-ELT H4 Feather River flows during wetter years are increased more than 3,000 cfs in April and May and then decreased in most year types during July and August, while September flow is only decreased in wetter years. Figure 14 shows average monthly change in Feather River flow by water year type. Accompanying the changes in Feather River flow are changes in Oroville Reservoir storage levels, Figure 15 contains average monthly changes in Oroville storage. Alt4-ELT H4 end of June storage in Oroville during wetter years is about 480 TAF lower than the NAA-ELT while critical year storage is about 400 TAF higher. Counter to the reduction in Oroville storage, CVP average upstream carryover storage increases about 80 TAF and critical year increases by 380 TAF. Figure 16 contains average monthly changes in Delta outflow, increases in Feather River spring time flows are generally not used to increase Delta outflow, but are allowed to support increases in Delta exports.

Figure 17 displays changes in average monthly Delta exports, there are increases when diverting higher upstream spring releases in wetter years, while there are decreases during summer months in most years. Figure 18

[8] Draft BDCP, Chapter 3, Section 3.4.1.4.4
[9] August 7, 2013 meeting with DWR, Reclamation, and CH2M HILL

contains an average annual summary of project deliveries, total CVP deliveries increase by about 70 TAF while SWP deliveries decrease by about 100 TAF. Dryer year SWP deliveries decrease by 250 to 400 TAF, while wet year deliveries increase by 200 TAF. Total CVP deliveries increase in wetter years by exporting increased releases from Oroville.

The overall effect of the HOS appears to be increases in Oroville releases that support both CVP and SWP exports in wetter years, with modest increases in Delta outflow. There is also a decrease in SWP reliability through large delivery reductions in dryer years accompanied by Oroville storage increases. In addition to increases in dry and critical year storage in Oroville, total CVP dry and critical year carryover increases by 100 TAF and 380 TAF respectively with negligible reductions in wetter years types.

CVP and SWP obligation for providing flow to satisfy Delta outflow requirements is described in the Coordinated Operations Agreement (COA). Because the CVP and SWP share responsibility for meeting required Delta outflow based on specific sharing agreement, it doesn't seem reasonable that CVP water supplies would increase while SWP water supplies decrease under this Alternative. The manner in which this alternative is modeled is inconsistent with existing agreements and operating criteria. If the increases in outflow were met based on COA, there would likely be reductions in Shasta and Folsom storage that may cause adverse environmental impacts.

Figure 14. Changes in Feather River Flow, Alt 4 H4 ELT minus NAA-ELT

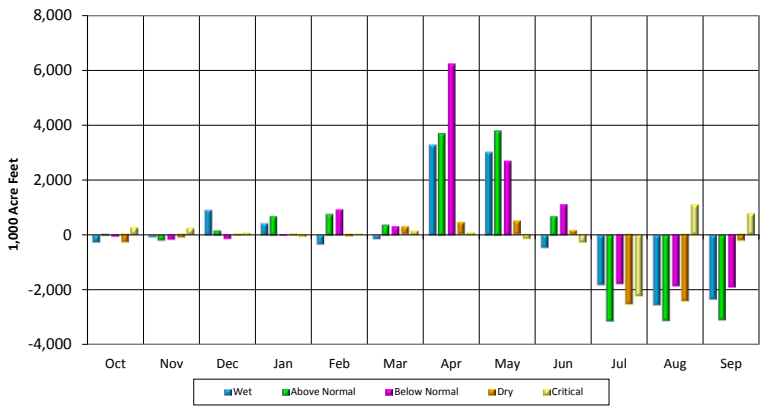


Figure 15. Changes in Oroville Storage, Alt 4 H4 ELT minus NAA-ELT

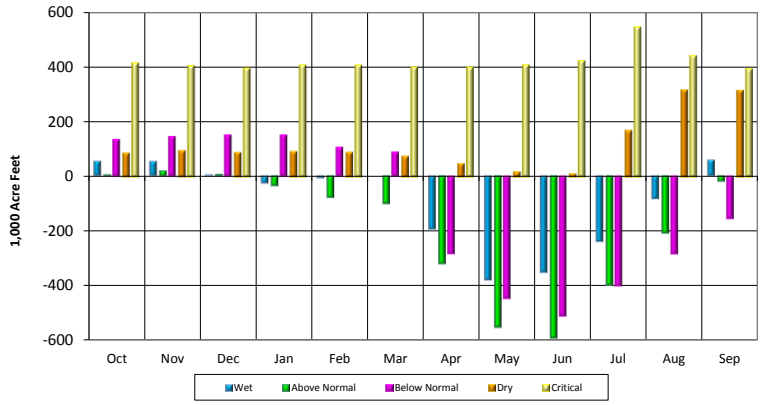


Figure 16. Changes in Delta Outflow, Alt 4 H4 ELT minus NAA-ELT

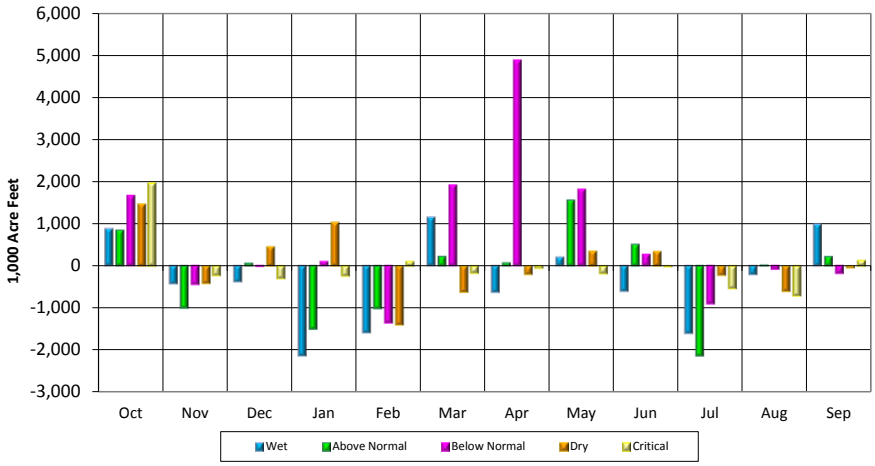


Figure 17. Changes in Delta Export, Alt 4 H4 ELT minus NAA-ELT

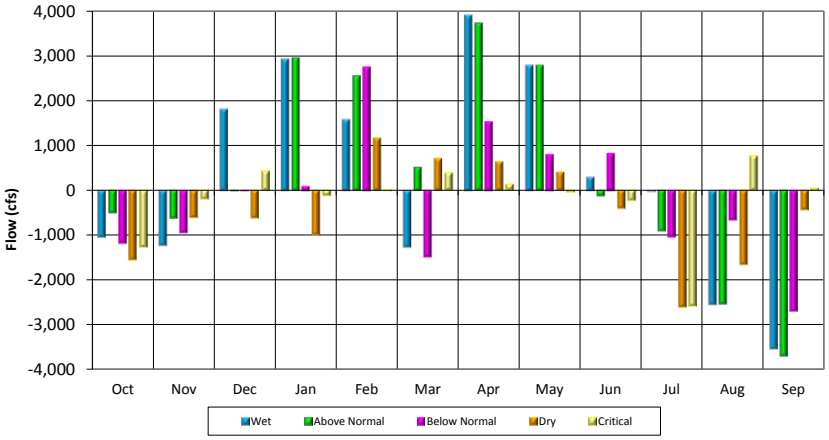
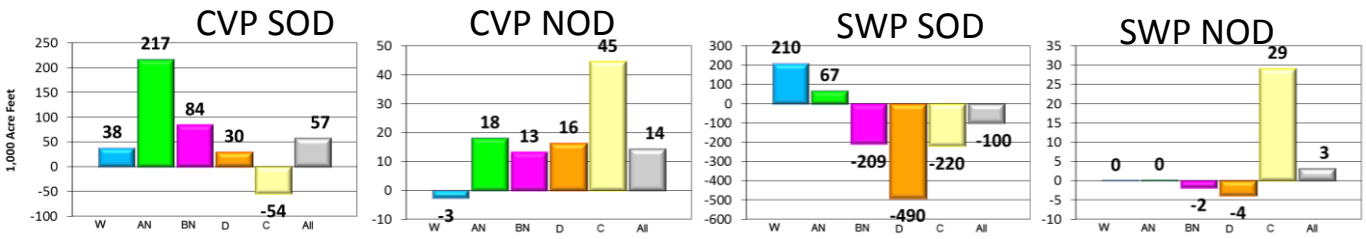


Figure 18. Changes in CVP and SWP Deliveries, Alt 4 H4 ELT minus NAA-ELT

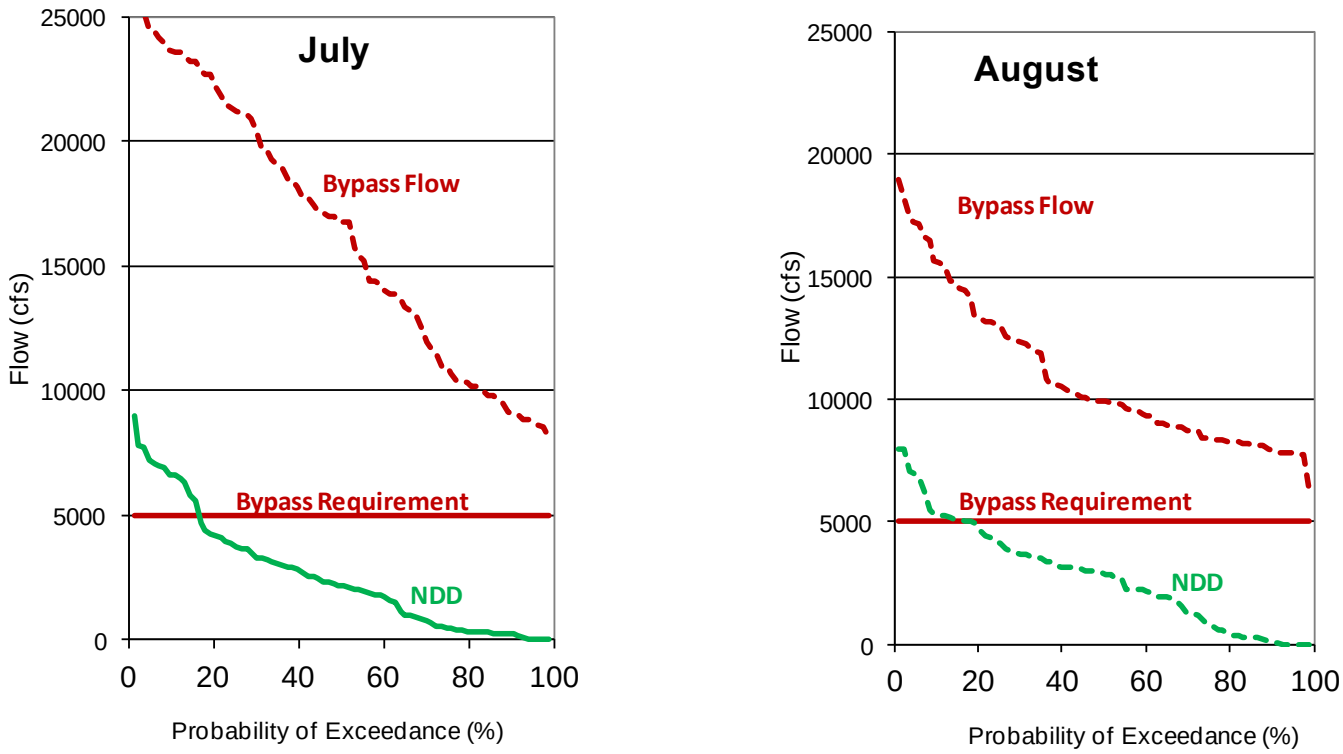


Evaluated Starting Operations (ESO or H3) Results

North Delta Diversion Intakes

Sacramento River flow below the North Delta Diversion (NDD) must be maintained above the specified bypass flow requirement, therefore the NDD rates are limited to the Sacramento River flow above the bypass requirement. Due to an error in CalSim II that specifies an unintended additional bypass requirement, modeling performed for the BDCP EIRS often bypasses more Sacramento River flow than is specified in the BDCP project description. This error has been fixed in the most recent public releases of CalSim II, but BDCP modeling has not been updated to reflect these fixes. Figure 19 contains exceedance probability plots showing the Sacramento River required bypass, Sacramento River bypass flow, NDD, and excess Sacramento River flow to the Delta as modeling for BDCP. As can be seen in Figure 19, the bypass flow is always above the bypass requirement in July and August. The BDCP version of CalSim sets a requirement for Sacramento River inflow to the Delta needed to satisfy all Delta flow, quality, and export requirements, this requirement should be removed when modeling the NDD.

Figure 19. NDD, Bypass Requirement, Bypass Flow, and Excess Sacramento R. flow for Alt 4-ELT



CVP/SWP Exports

Overall the Alt 4 will increase exports compared to the NAA-ELT, with the majority of the increased exports realized by the SWP. Figure 20 illustrates a comparison between the NAA-ELT and Alt 4-ELT of CVP and SWP exports. On average, total combined exports under Alt 4–ELT are projected to increase by 537 TAF from 4.73 MAF to 5.26 MAF compared to the NAA-ELT.

Figure 20. Change in CVP (Jones) and SWP (Banks) Exports (Alt 4-ELT minus NAA-ELT)

With the addition of the North Delta Diversion facility, the water exported dramatically shifts from South Delta diversions to North Delta diversions. Figure 21 illustrates the change in routing of South of Delta exports under Alt 4 compared to the NAA-ELT. On average, export through the South Delta facility are projected to decrease by 2.1 MAF and the North Delta diversions will export 2.6 MAF which includes the 2.1 MAF shifted from the South Delta facility plus the additional 537 TAF of increased exports.

Figure 21. Change in Conveyance Source of Exports (Alt 4-ELT minus NAA-ELT)

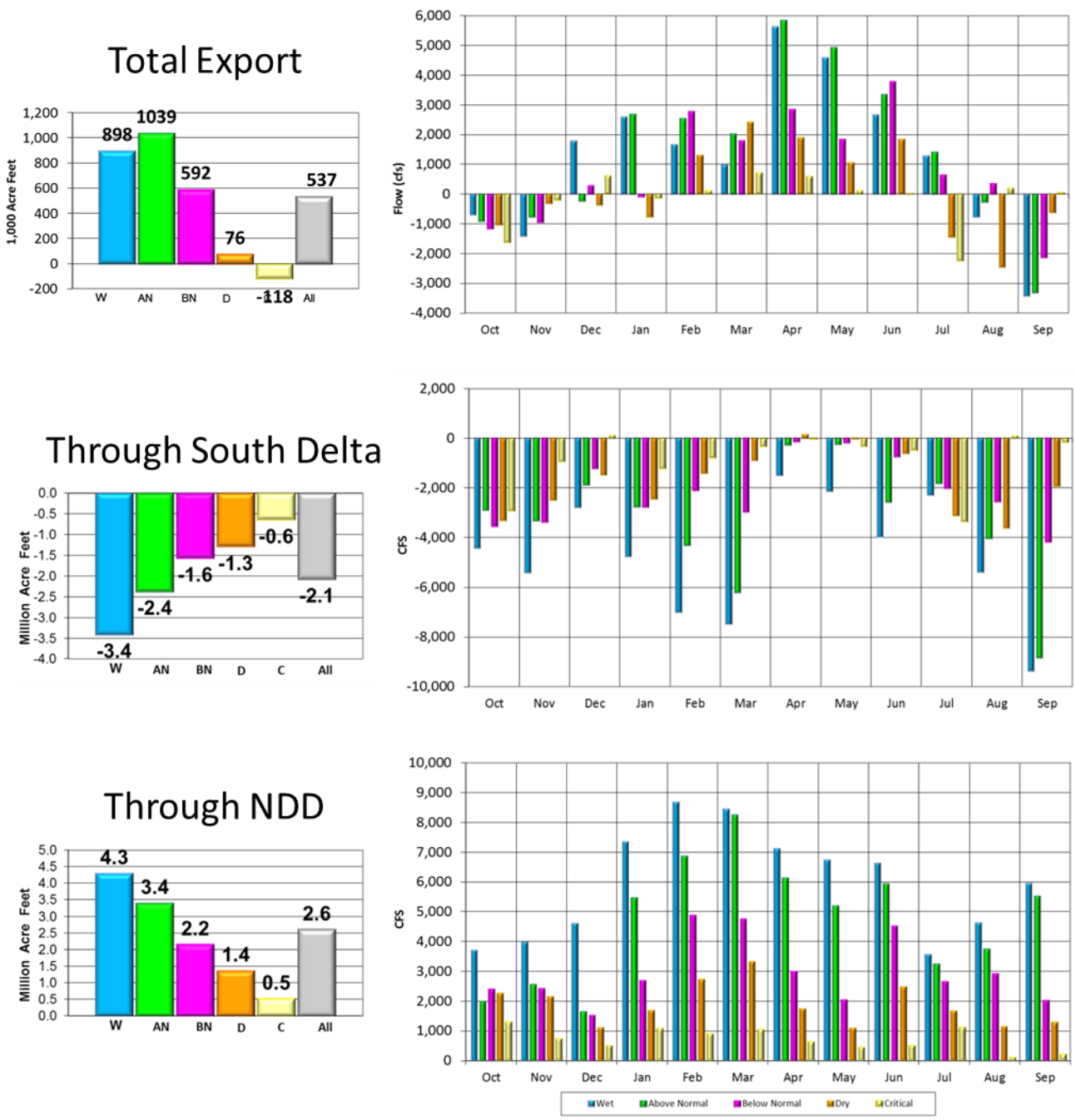
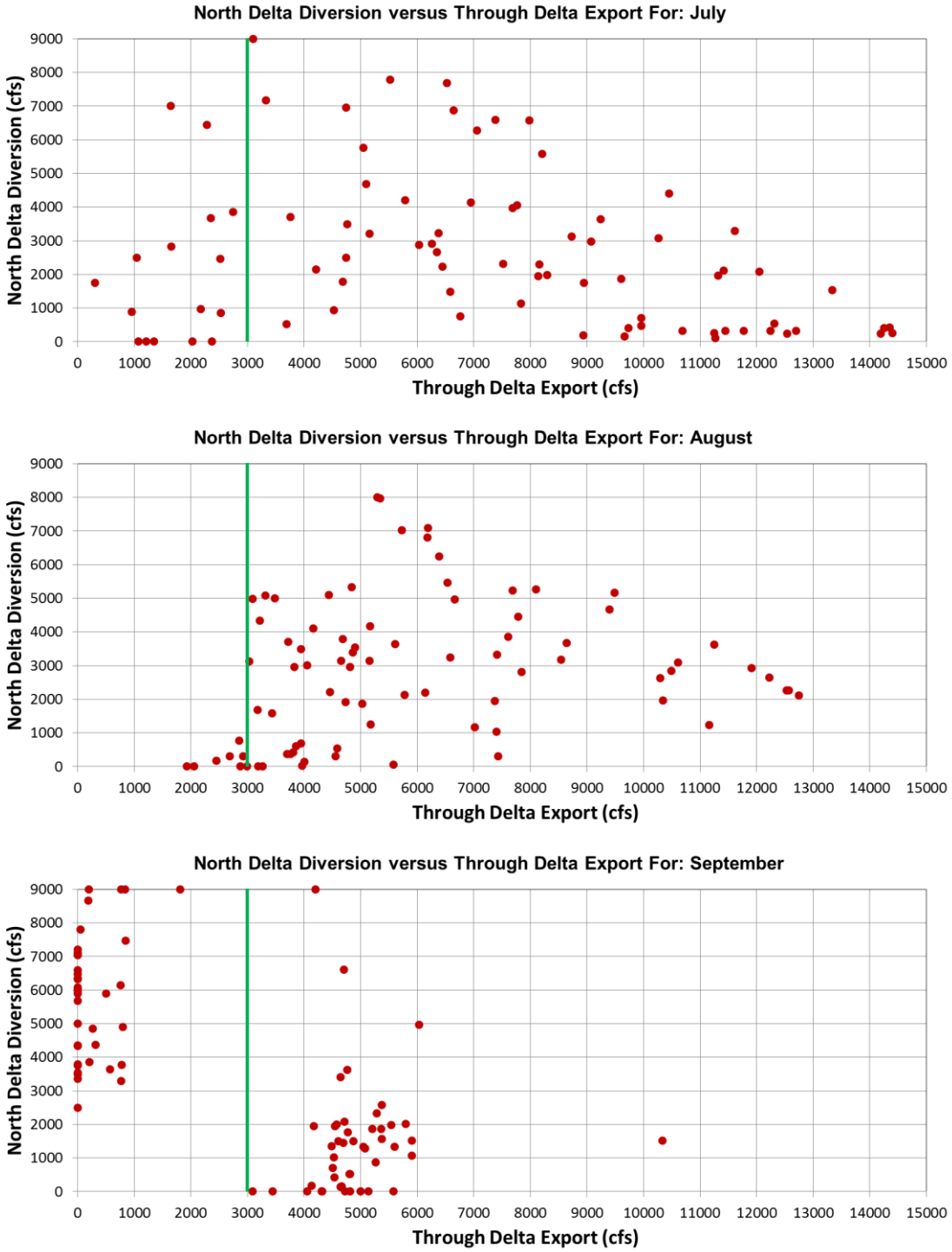


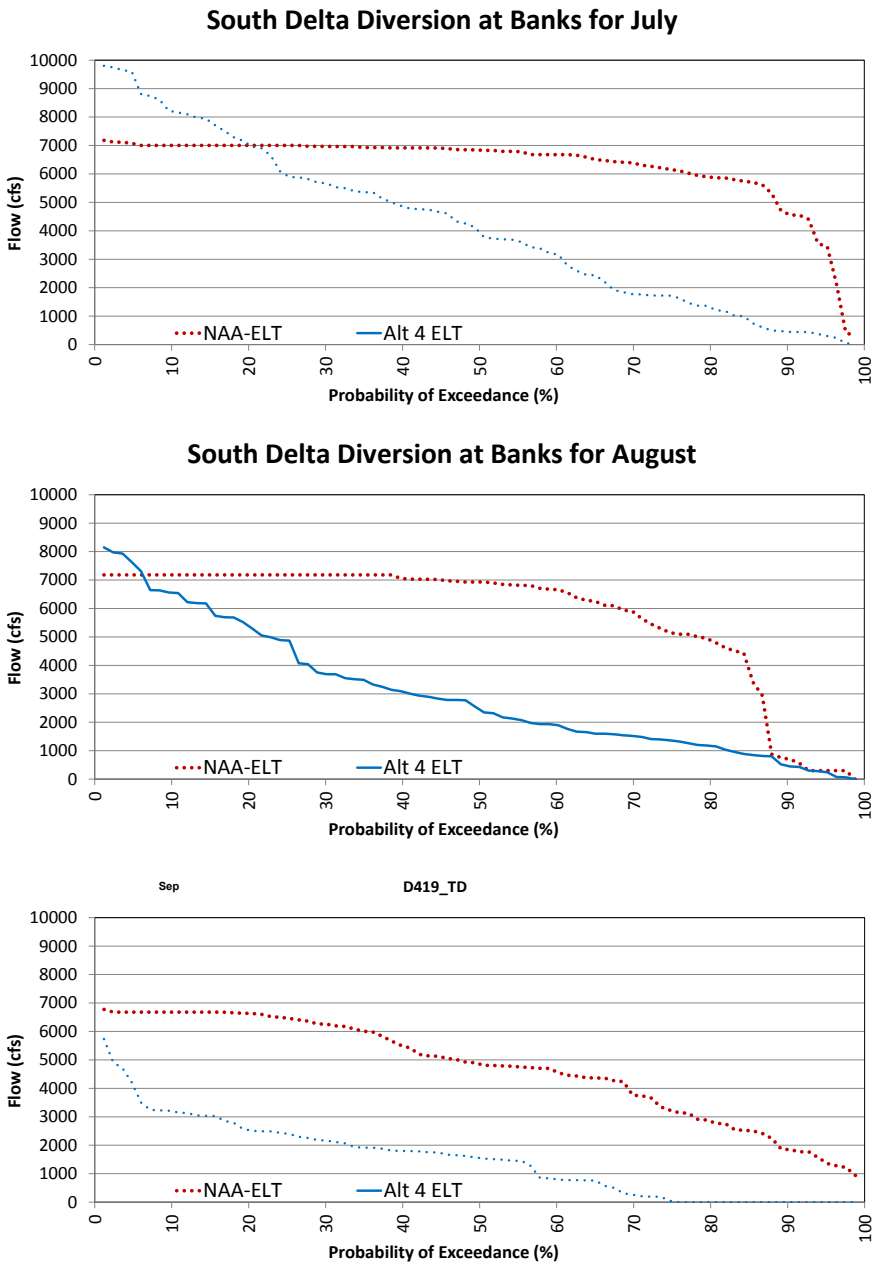
Figure 22 contains figures for July, August, and September for Alt 4-ELT that plot NDD against SDD. In the months of July to September SDD are occasionally very high, exceeding 14,000 cfs in July, with minimal NDD. This occurs due to outdated model code that imposes an instream flow requirement in Sacramento River flow below Hood in excess of the bypass criteria prescribed in the BDCP. There are numerous occurrences when bypass flows prescribed in the BDCP are exceeded and SDD are higher than expected. On the other hand, there are also many times when NDD are above minimum pumping levels and SDD are below the BDCP prescribed 3,000 cfs threshold indicated by the green line in Figure 22. For unknown reasons, the model code requiring SDD to be greater than 3,000 cfs before NDDs occur from July through September is deactivated in the BDCP modeling of this Alternative.

Figure 22. Alt 4-ELT North Delta Diversion Versus South Delta Diversion for July, August, and September



South Delta Diversion at Banks is not limited to existing permit capacity of 6,680 cfs and pumping may reach full capacity of 10,300 cfs in July, August, and September. Figure 23 contains exceedance probability charts of South Delta Diversion at Banks for July, August, and September. The chart for July shows SDD at Banks exceeding existing permit capacity 20% of years, in August this occurs in about 7% of years. There are South Delta diversions at Banks 25% of the time in September while diversions from the Sacramento River may range from 2,500 cfs to 7,500 cfs.

Figure 23. South Delta Diversion at Banks



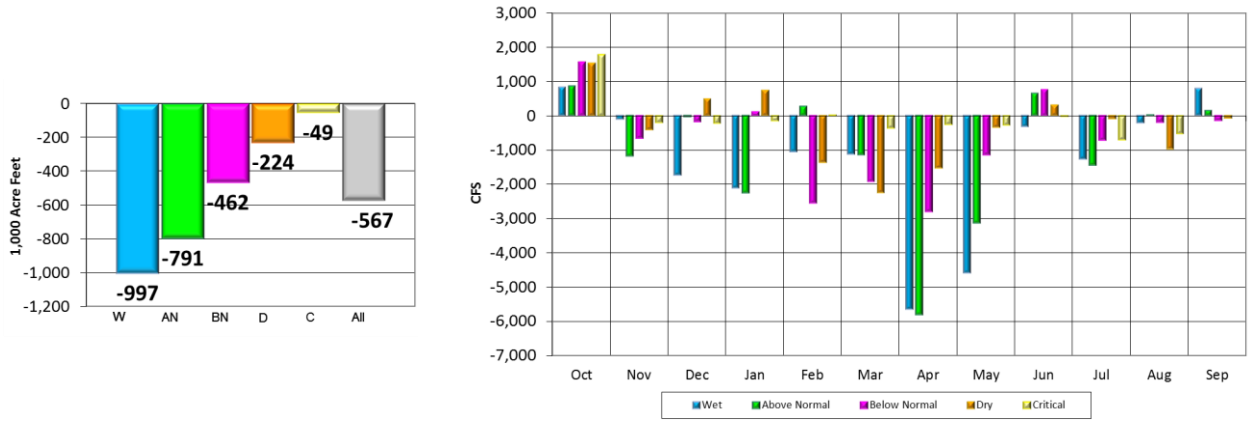
Generally exports increase during winter and spring months due to the ability to avoid fishery concerns by diverting at the North Delta rather than South Delta.

Delta Outflow

Figure 24 illustrates a comparison of Delta outflow between the NAA-ELT and Alt 4-ELT. Decreases in Delta outflow are the result of the CVP and SWP ability to increase Delta exports in Alt 4-ELT. The apparent increase in Delta outflow in October is partially due to additional export restrictions though Old and Middle River flow requirements. However, the increase in October Delta outflow is also due to an unrealistic operation of the Delta Cross Channel. The additional export restrictions cause the flow standards imposed at Rio Vista to be the controlling point in CVP and SWP operations; the water quality standards are all being met and do not require

flows above the amount needed to satisfy the Rio Vista standard. Meeting the Rio Vista flow standards without closing the Delta Cross Channel gate results in releasing more water from upstream reservoirs than would otherwise be necessary. This occurs because a certain amount of the water released to meet the Rio Vista flow standards would flow into the Central Delta at location of the Delta Cross Channel gate. This water would not make it to Rio Vista and therefore would not be counted towards meeting the Rio Vista flow standards. However, due to the BDCP model's assumed restrictions on exports at this time, this water could not be pumped from the South Delta facilities and thus ends up as "extra" Delta outflow. By closing the Delta Cross Channel gate, the operators would assure that all of the water released to meet the Rio Vista flow standards would be counted towards those standards. The BDCP model's assumptions that the Delta Cross Channel gate would not be closed are not practical or a sensible operation as the operators confirmed they would close the gate during these conditions to avoid the unnecessary loss of water supplies (as was done in October and November 2013). The assumption in the BDCP model to maintain the gate in the open position causes it to overstate the amount of Delta outflow.

Figure 24. Delta Outflow Change (Alt 4-ELT minus NAA-ELT)



CVP/SWP Reservoir Carryover Storage

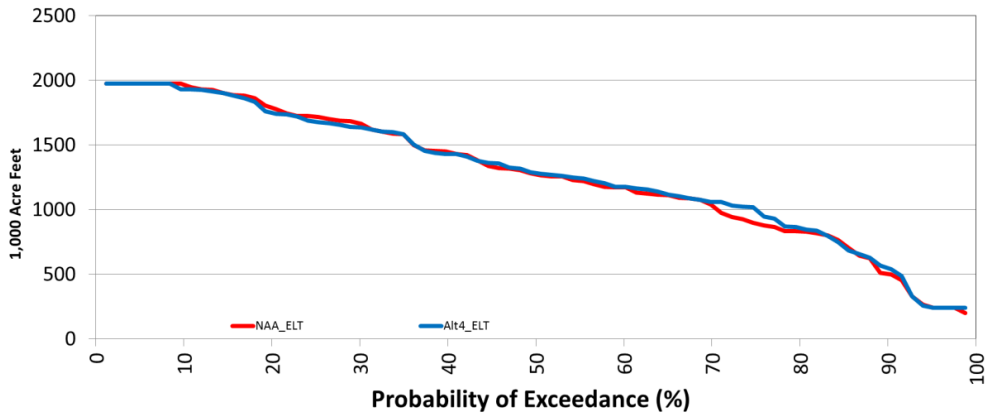
CVP/SWP reservoir operating criteria in the Alt4-ELT scenario differs from the NAA-ELT scenario. This difference is primarily driven by changes in both CVP and SWP San Luis Reservoir target storage. CalSim II balances upstream Sacramento Basin CVP and SWP reservoirs with storage in San Luis Reservoir by setting target storage levels in San Luis Reservoir. CalSim II will release water from upstream reservoirs to meet target levels in San Luis Reservoir and the target storage will be met as long as there is capacity to convey water and water is available in upstream reservoirs. In Alt 4 the San Luis Reservoir target storage is set very high in the spring and early summer months, and then reduced in August and set to San Luis Reservoir dead pool from September through December. This change in San Luis target storage relative to the NAA causes upstream reservoirs to be drawn down from June through August and then recuperate storage relative to the NAA by cutting releases in September; Alt 4 upstream storage then remains close to the NAA during fall months. These operational criteria cause changes in upstream cold water pool management and affect several resource areas. Figure 25, Figure 26, Figure 27, and Figure 28 contain exceedance charts for carryover storage and average monthly changes in storage by Sacramento Valley Water Year Type for North of Delta CVP and SWP reservoirs.

San Luis Reservoir Operations

In addition to changes in upstream storage conditions, changes in San Luis Reservoir target storage cause San Luis Reservoir storage to reach dead pool in many years with subsequent SOD delivery shortages. Although some

delivery shortages are due to California Aqueduct capacity constraints, the largest annual delivery shortages are a result of inappropriately low target storage levels. Average annual Table A shortages due to artificially low San Luis reservoir storage levels increased from 3 TAF in the NAA-ELT scenario to 35 TAF in the Alt4-ELT scenario. (Shortages due only to a lack of South of Delta conveyance capacity were not included in these averages.) Such shortages occurred in 2% of simulated years in the NAA-ELT scenario and 23% of years in the Alt4-ELT scenario. In addition to the inability to satisfy Table A allocations, low storage levels cause loss of SWP contractors' Article 56 water stored in San Luis Reservoir. Average annual Article 56 shortages were 43 TAF in the Alt4-ELT scenario because of low San Luis storage and 5 TAF in the NAA-ELT scenario. Low San Luis storage causes Article 56 shortages in 27% of simulated years in the Alt4-ELT scenario as compared to 5% of simulated years in the NAA-ELT. Another consequence of low storage levels in San Luis Reservoir is a shift in water supply benefits from Article 21 to Table A. As seen in Figure 29 and Figure 30 San Luis Reservoir storage fills more regularly in the Alt 4-ELT scenario, but is exercised to a lower point more often.

Figure 25. Trinity Reservoir Carryover Storage and Average Monthly Changes (Alt 4-ELT minus NAA-ELT) in Storage by Water Year Type



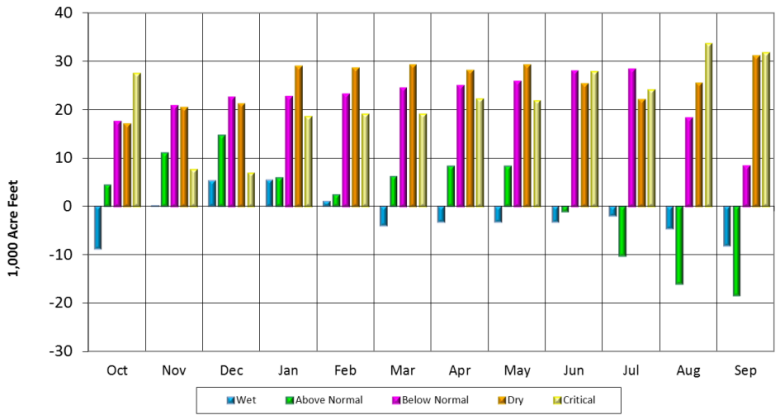
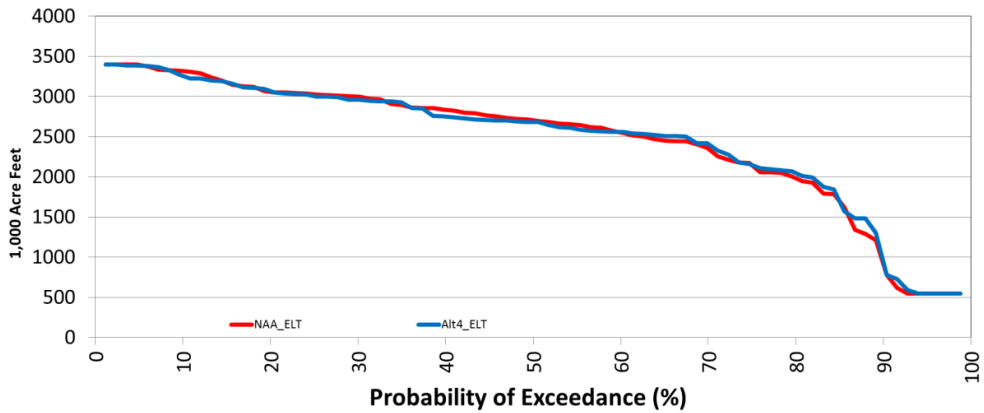


Figure 26. Shasta Reservoir Carryover Storage and Average Monthly Changes (Alt 4-ELT minus NAA-ELT) in Storage by Water Year Type



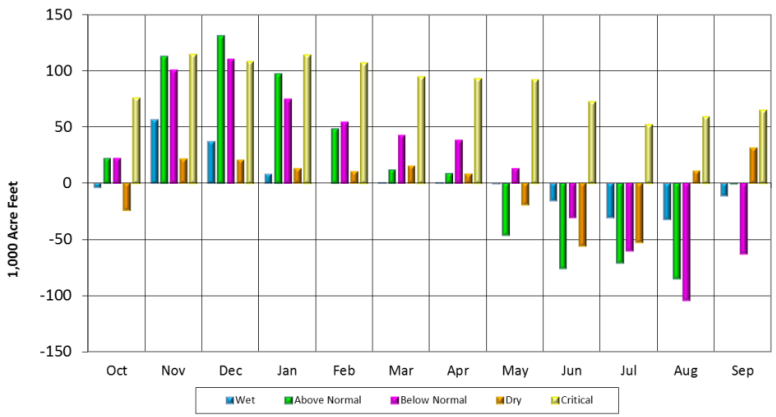
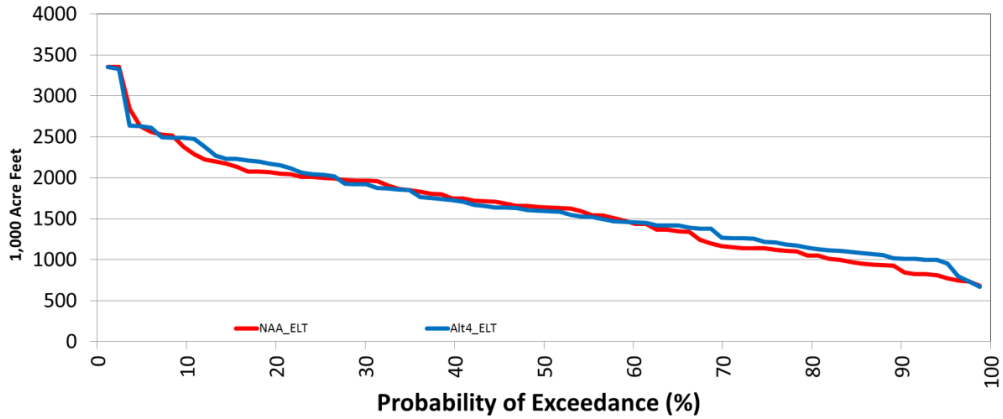


Figure 27. Oroville Reservoir Carryover Storage and Average Monthly Changes (Alt 4-ELT minus NAA-ELT) in Storage by Water Year Type



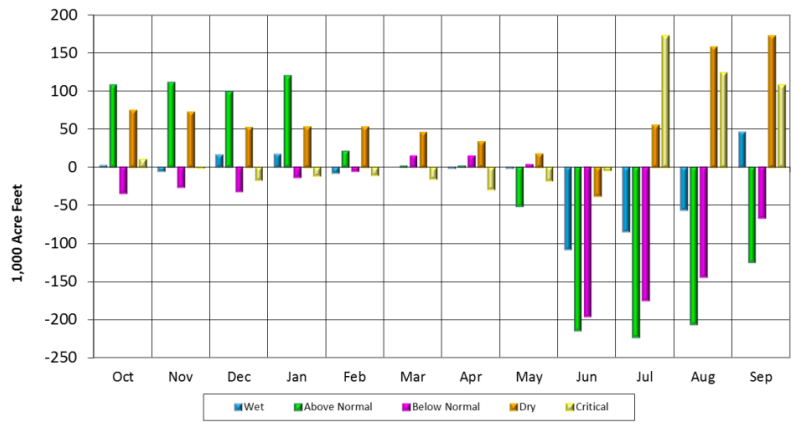
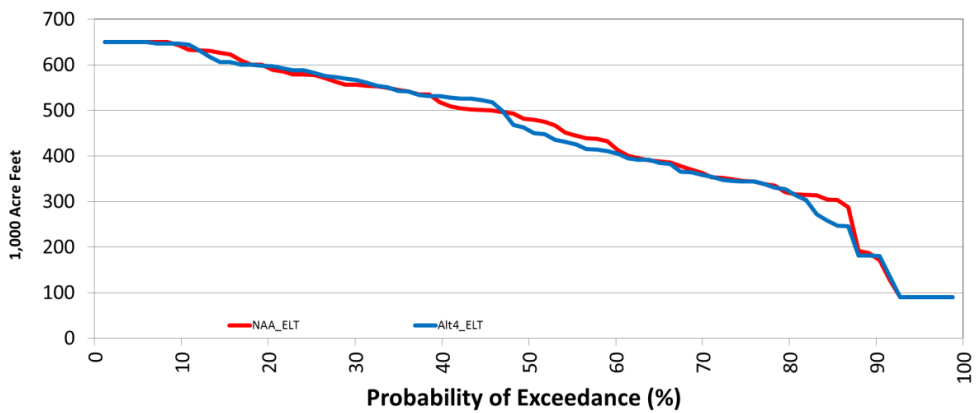


Figure 28. Folsom Reservoir Carryover Storage and Average Monthly Changes (Alt 4-ELT minus NAA-ELT) in Storage by Water Year Type



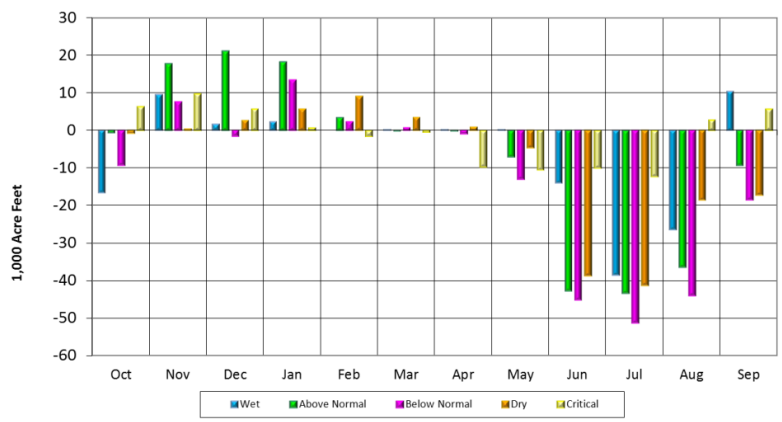


Figure 29. Federal Share of San Luis Reservoir (Alt 4-ELT and NAA-ELT)

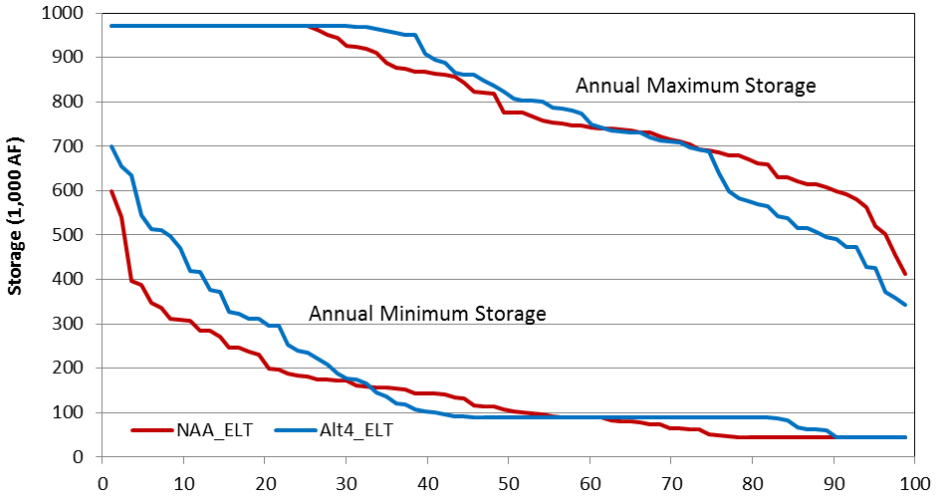
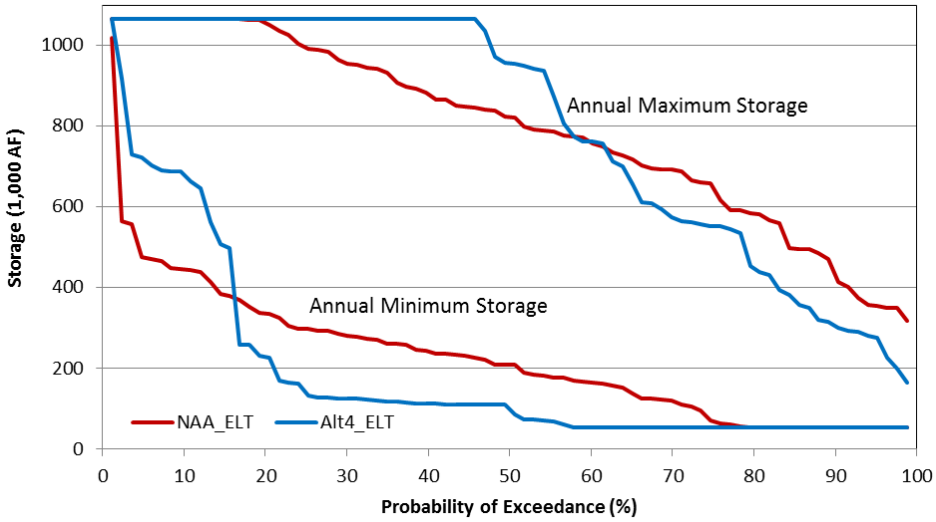


Figure 30. State Share of San Luis Reservoir (Alt 4-ELT and NAA-ELT)



<u>CVP Water Supply</u>

The changes in water supply to CVP customers, based on customer type and water year type is shown in Table 3. Alt 4-ELT shows an average increase of approximately 109,000 AF of delivery accruing to CVP customers with CVP SOD agricultural contractors receiving most of the benefit. Changes in Sacramento River Settlement contract deliveries are not an anticipated benefit of the BDCP, increases in these deliveries in Alt 4-ELT relative to the NAA-ELT are due to the shortages in the NAA-ELT from climate change that are reduced in Alt 4-ELT. Although the BDCP modeling demonstrates minor benefits to NOD CVP service contractors, this increase is not an anticipated benefit of the BDCP.

Consistent with modeling for the NAA-ELT Scenario, San Joaquin River Exchange Contractors receive full deliveries in accordance with contract provisions. Figure 31 compares CVP Service Contract delivery of Alt 4-ELT to the NAA-ELT Scenario. Increases in delivery generally occur in below and above normal years.

Table 3. CVP Delivery Summary (Alt 4-ELT and NAA-ELT)

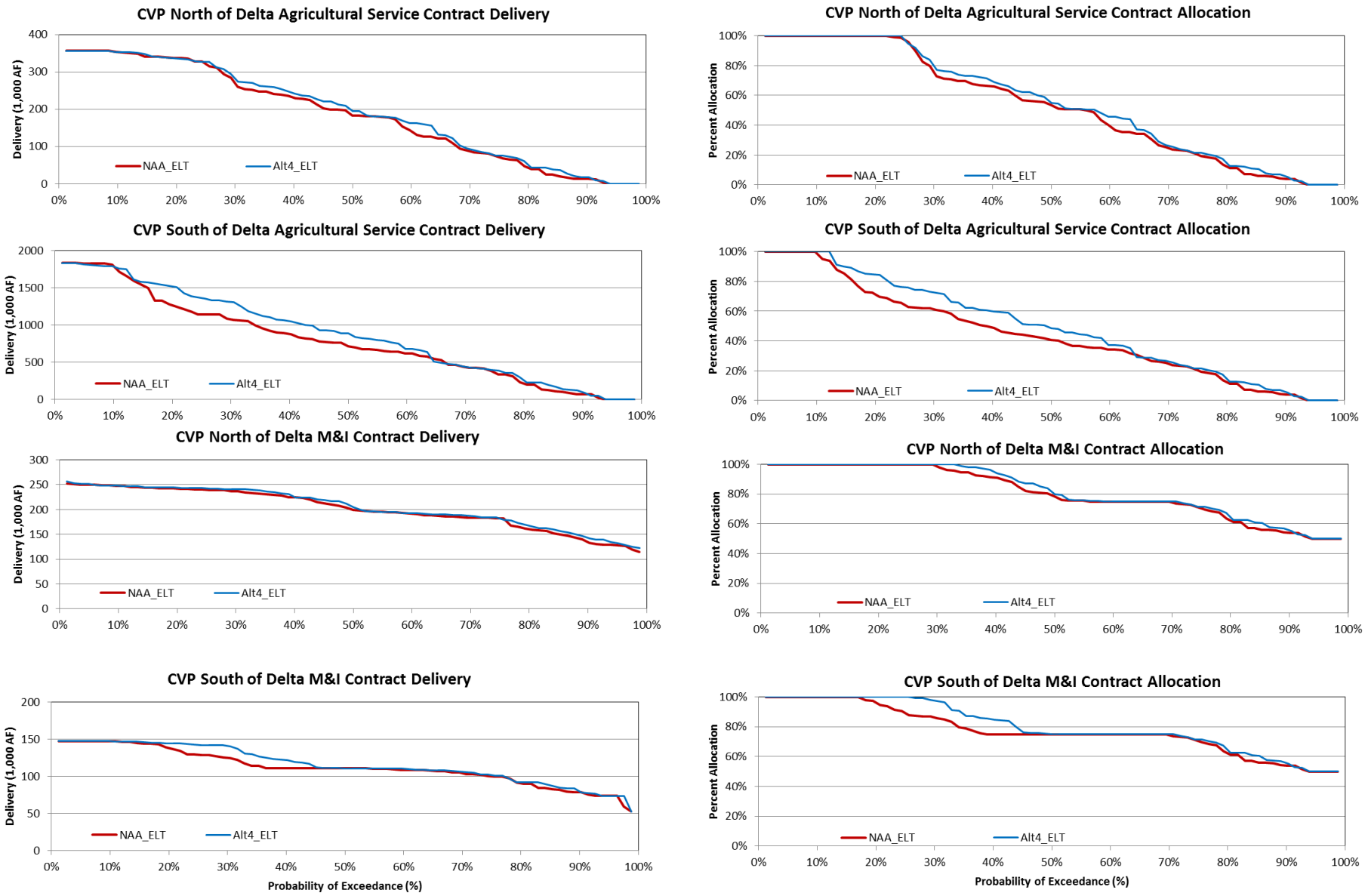
NAA-ELT (1,000 AF)

	AG NOD	AG SOD	Exchange	M&I NOD	M&I SOD	Refuge NOD	Refuge SOD	Sac. Setlmnt	CVP NOD Total	CVP SOD Total
All Years	**187**	**796**	**852**	**201**	**112**	**86**	**271**	**1846**	**2321**	**2215**
W	309	1364	875	236	134	90	281	1856	2491	2837
AN	246	908	802	214	110	83	257	1716	2258	2246
BN	146	596	875	198	108	92	281	1899	2335	2044
D	95	440	864	175	100	90	277	1890	2250	1864
C	29	152	741	140	79	64	223	1674	1908	1376

Difference: Alt4-ELT minus NAA-ELT (1,000 AF)

	AG NOD	AG SOD	Exchange	M&I NOD	M&I SOD	Refuge NOD	Refuge SOD	Sac. Setlmnt	CVP NOD Total	CVP SOD Total
All Years	8	90	0	4	4	1	0	3	15	94
W	1	68	0	1	3	2	1	-2	1	72
AN	14	199	0	3	12	1	0	-1	17	211
BN	17	153	0	5	4	0	0	0	22	158
D	10	48	0	5	2	1	-1	-1	15	49
C	3	6	0	5	2	-1	2	26	33	12

Figure 31. CVP Service Contract Deliveries (Alt 4-ELT and NAA-ELT)



SWP Water Supply

Similar in nature, but larger in magnitude are changes in SWP deliveries. Figure 32 and Table 4 illustrate the benefits of Alt 4-ELT in comparison to the NAA-ELT Scenario. These studies show an increase in average annual SWP SOD deliveries of approximately 408,000 AF, but a reduction in critical year deliveries of approximately 177,000 AF. There is an overall reduction in Article 56 deliveries. Typically in modeling and in actual SWP operations, increases in Table A correspond with increases in Article 56. The reason that Article 56 deliveries decrease overall is that insufficient quantities of water are carried over in San Luis and Article 56 contractors are subsequently shorted. SWP delivery increase is slightly less than increases in Banks export because there is increased wheeling for the Cross Valley Canal contractors with BDCP.

Table 4. SWP Delivery Summary (Alt 4-ELT and NAA-ELT)

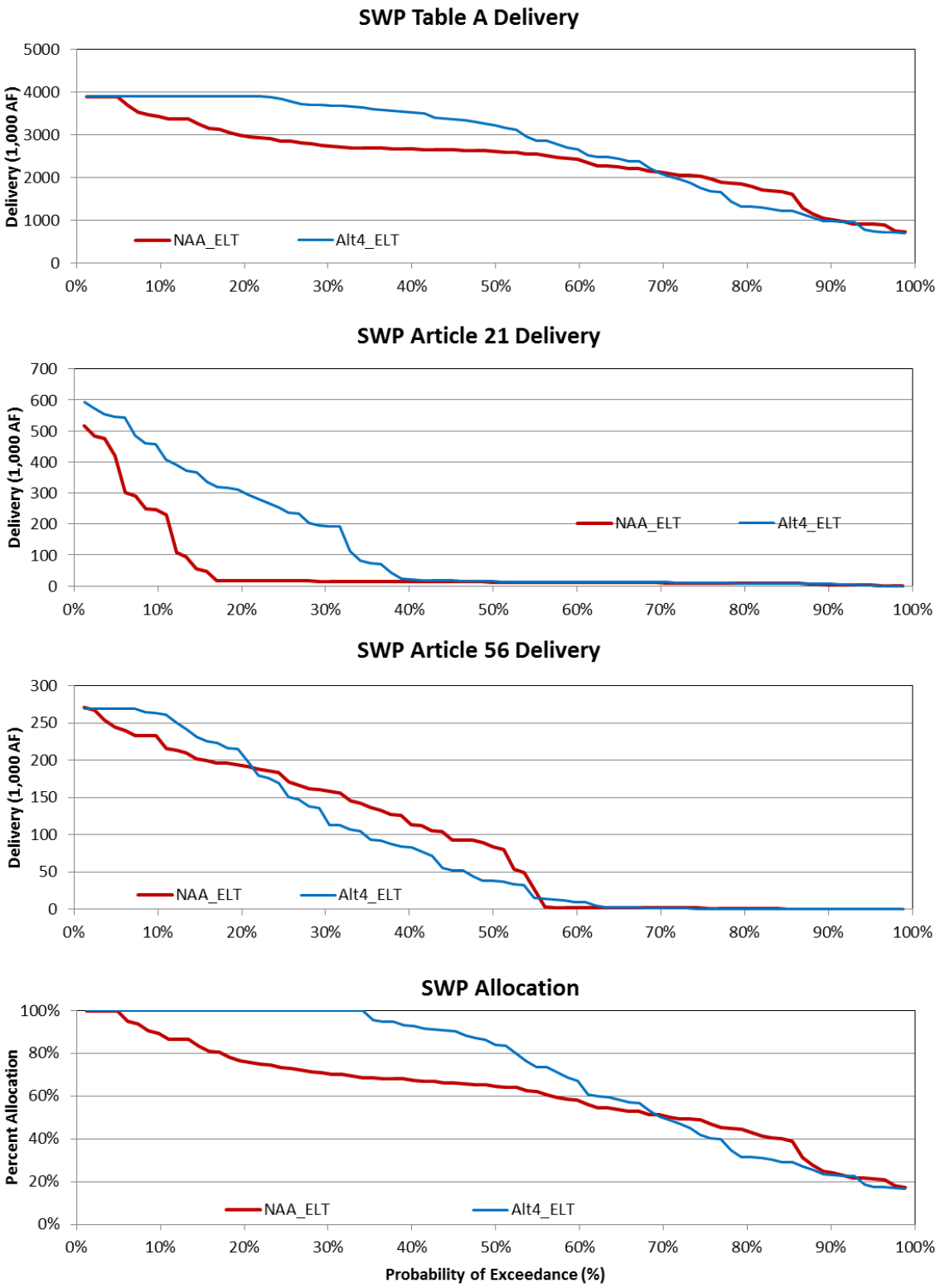
NAA-ELT (1,000 AF)

	Table A	Art. 21	Art. 56	Total
All Years	**2425**	**52**	**90**	**2567**
W	3112	79	112	3303
AN	2467	34	57	2559
BN	2515	48	109	2673
D	2033	43	88	2165
C	1172	28	47	1246

Difference: Alt4-ELT minus NAA ELT (1,000 AF)

	Table A	Art. 21	Art. 56	Total
All Years	339	75	-6	408
W	587	159	5	751
AN	728	99	-24	803
BN	525	44	2	571
D	-120	19	-10	-111
C	-146	-19	-12	-177

Figure 32. SWP Contract Deliveries (Alt 4-ELT and NAA-ELT)



Freemont Weir Modifications and Yolo Bypass Inundation

A component of the BDCP Alternative 4 is a modification to the Freemont Weir to allow water to flow into the Yolo Bypass when the Sacramento River is at lower flow than is currently needed. Currently, the Sacramento River does not flow over the Freemont Weir until flow reaches about 56,000 cfs. With the proposed modification Sacramento River flow may enter the Yolo Bypass at much lower flow levels. Figure 33 and Figure 34 contains charts that compare Freemont Weir flow into the Yolo Bypass to Sacramento River flow at the weir, Figure 33 show this relationship for the NAA-ELT and Figure 34 shows this same relationship for Alt 4-ELT.

Although CalSim II is a monthly time-step model, it contains an algorithm that estimates daily flow. Therefore, average monthly flows displayed in Figure 33 shows Sacramento River entering the Yolo Bypass at flow levels less than 56,000 cfs, when this occurs water is flowing over the Freemont Weir for a portion of the month. There is a 100 cfs minimum flow diversion from the Sacramento River diversion to the Yolo Bypass from September through June in Alt 4-ELT.

Figure 35 and Figure 36 contains average monthly flow from the Sacramento River over the Freemont Weir to the Yolo Bypass for the NAA-ELT (Figure 35), average monthly difference between Alt 4-ELT and NAA-ELT (Figure 36), and the annual average difference between Alt 4-ELT and NAA-ELT (Figure 37). In the NAA-ELT scenario flow over the Freemont Weir generally occurs in wet years, this flow is extended to all year types and all months except July and August in Alt 4-ELT. The average annual increase in flow is about 430 TAF.

Figure 33. Fremont Weir vs. Sacramento River NAA-ELT

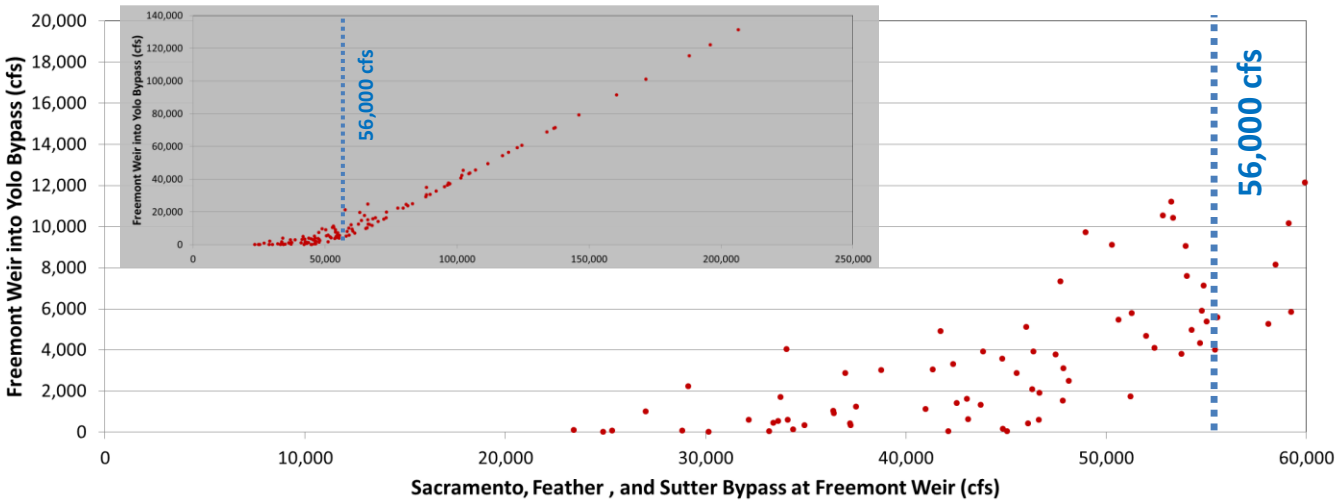


Figure 34. Fremont Weir vs. Sacramento River Alt 4-ELT

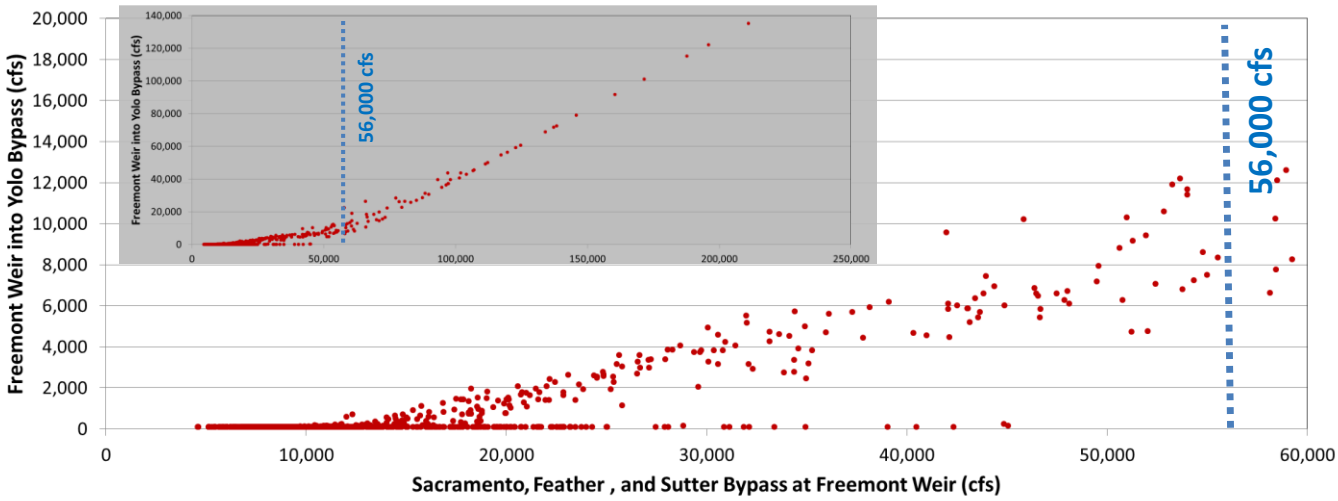


Figure 35. Average Fremont Weir Flow to Bypass by Water Year Type NAA-ELT

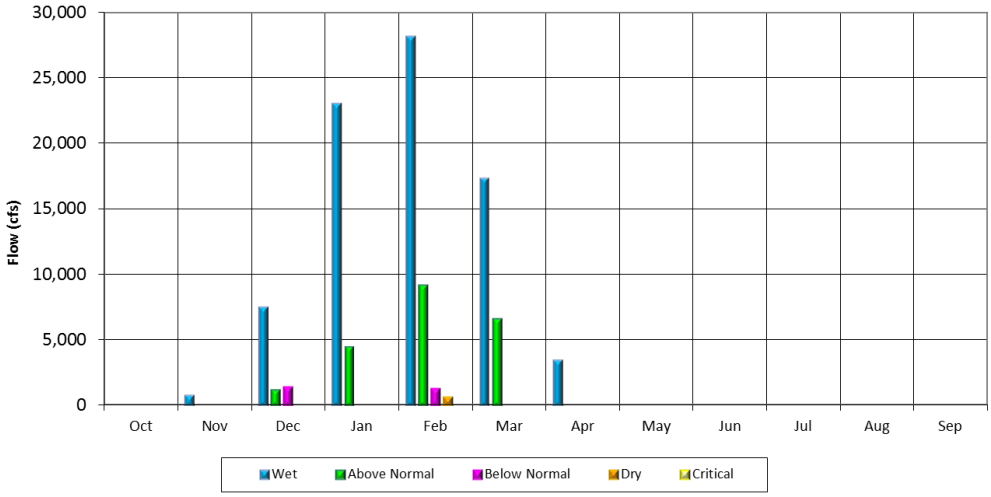


Figure 36. Average Fremont Weir Flow to Bypass by Water Year Alt 4 ELT minus NAA-ELT

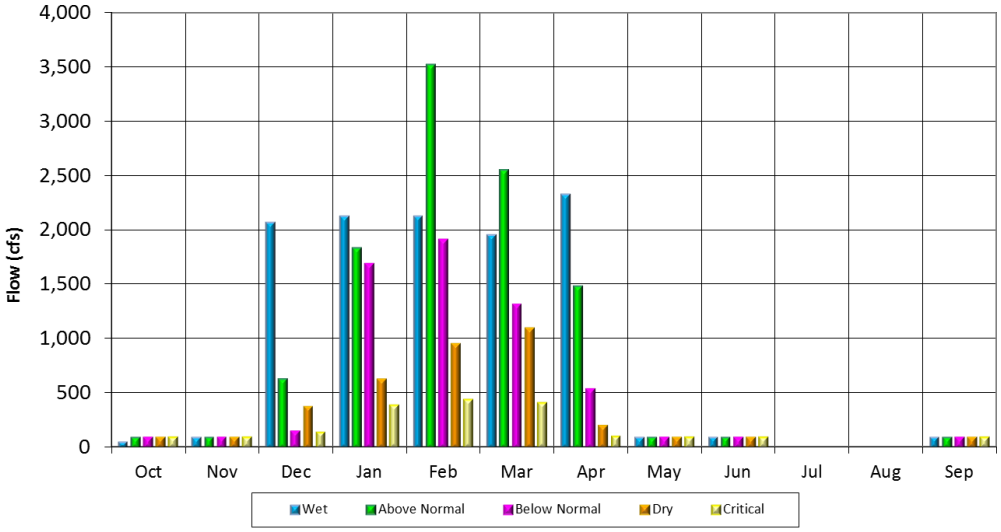
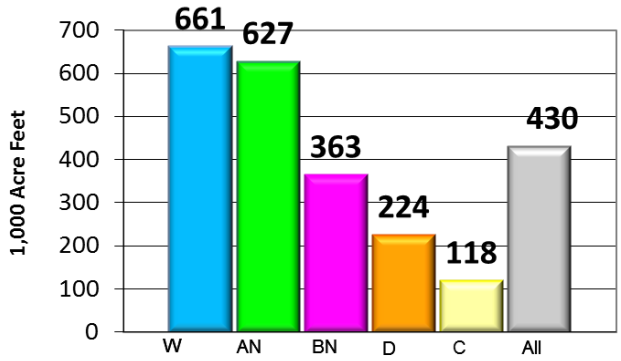


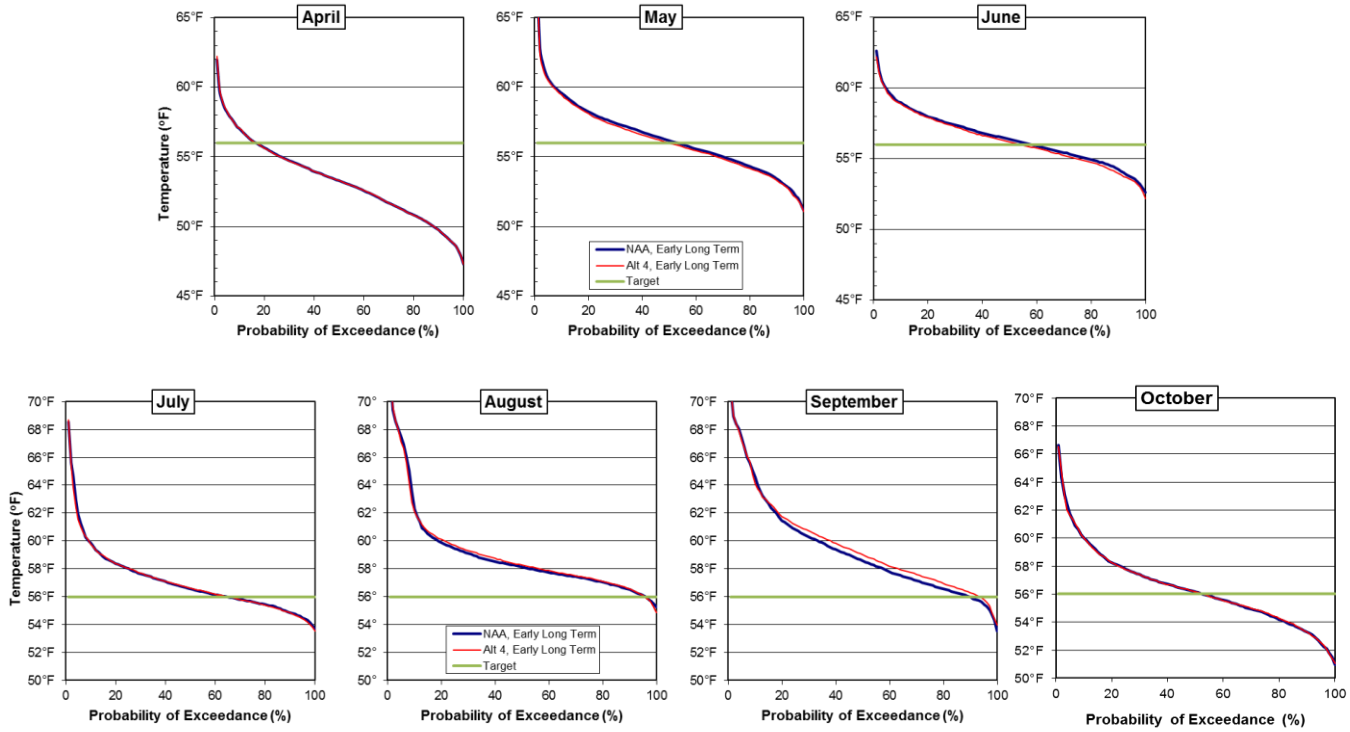
Figure 37. Annual Change in Fremont Weir Flow to Bypass Alt 4-ELT minus NAA-ELT



Sacramento River Temperature

Figure 38 contains exceedance probability plots of Sacramento River temperature at Bend Bridge for the NAA-ELT and Alt 4-ELT. For the months of April through July modeling shows few changes in upper Sacramento River water temperature. The Alt 4-ELT scenario shows temperature increases in August relative to the NAA-ELT. In about 75% of years modeling shows about 0.5°F increase in Alt 4-ELT relative to the NAA-ELT. The temperature models will meet inputted target temperatures until Shasta Lake cold water is depleted, this typically occurs in September. This is the likely reason temperature increases in modeling tend to occur in September.

Figure 38. Sacramento River Temperature at Bend Bridge NAA-ELT and Alt 4-ELT



Conclusions regarding CalSim II modeling of BDCP Alternative 4

BDCP's "High Outflow Scenario" is not sufficiently defined for analysis.
The High Outflow Scenario (HOS) requires additional water (Delta outflow) during certain periods in the spring. The BDCP Model places most of the responsibility for meeting this new additional outflow requirement on the SWP. However, the SWP may not actually be responsible for meeting this new additional outflow requirement. This is because the COA, as it is currently being implemented, would require a water allocation adjustment that would keep the SWP whole. Where one project (CVP or SWP) releases water to meet a regulatory requirement, the COA requires a water balancing to ensure the burden does not fall inappropriately among the projects. The BDCP Model is misleading because it fails to adjust project operations, as required by the COA, to "pay back" the water "debt" to the SWP due to these additional Delta outflow requirements. Unless there is a significant revision to COA, the BDCP Model overstates the impacts of increased Delta outflow on the SWP and understates the effects on the CVP.

Furthermore, after consulting with DWR and Reclamation project operators and managers, the Reviewers conclude that there is no apparent source of CVP or SWP water to satisfy both the increased Delta outflow requirements and pay back the COA "debt" to the SWP without substantially depleting upstream water storage. It appears, through recent public discussions regarding the HOS, that BDCP anticipates additional water to satisfy the increased Delta outflow requirement and to prevent the depletion of cold water pools will be acquired through water transfers from upstream water users. However, this approach is unrealistic because during most of the spring, when BDCP proposes that Delta outflow be increased, agricultural water users are not typically irrigating. This means that there is not sufficient transfer water available to meet the increased Delta outflow requirements without releasing stored water from the reservoirs. Releasing stored water to meet the increased Delta outflow requirements could potentially impact salmonids on the Sacramento and American River systems

Simulated operation of BDCP's dual conveyance, coordinating proposed North Delta diversion facilities with existing south Delta diversion facilities, is inconsistent with the project description.
The Draft BDCP and associated Draft EIR/EIS specify criteria for how much flow can be diverted by the new North Delta Diversion (NDD) facilities and specify when to preferentially use either the NDD facilities or the existing South Delta Diversion (SDD) facilities. However, the BDCP Model contains an artificial constraint that prevents the NDD facilities from taking water as described in the BDCP project description. In addition to affecting diversions from the NDD, this artificial constraint contains errors that affect the NAA operation. This error has been fixed by DWR and Reclamation in more recent versions of the model; however, the error remains in the BDCP Model. Additionally, the BDCP Model does not reflect the Summer operations of the SDD that are described in the Draft EIR/EIS as a feature of the BDCP project intended to prevent water quality degradation in the south Delta. The net effect of these two errors is that the BDCP Model significantly underestimates the amount of water diverted from the NDD facilities and overestimates the amount of water diverted from the SDD.

BDCP modeling contains numerous coding and data issues that skew the analysis and conflict with actual real-time operational objectives and constraints
logic is coded into the CalSim II model to simulate how DWR and Reclamation would operate the system under circumstances for which there are no regulatory or other definitive rules. This attempt to specify (i.e., code) the logic sequence and relative weighting so that a computer can simulate "expert judgment" of the human operators is a critical element to the CalSim II model. In the BDCP Model, some of the operational criteria for water supply allocations and existing facilities such as the Delta Cross Channel and San Luis Reservoir are inconsistent with real-world conditions.

3 INDEPENDENT MODELING

The Independent Modeling effort originally stemmed from reviews of BDCP Model during which the Reviewers discovered that the BDCP Model did not provide adequate information to determine the effects of the BDCP. There are three basic reasons why the Reviewers cannot assess how the BDCP will affect water operations: 1) NAAs do not depict reasonable operations under the described climate change assumptions, 2) operating criteria used in the BDCP Alternative 4 result in unrealistic operations, and 3) updates to CalSim II since the BDCP modeling was performed almost 4 years ago will likely alter model results to a sufficient degree that conclusions based on the BDCP modeling will likely be different than those disclosed in the Draft EIR/EIS. Given that it is not possible to determine how BDCP may affect CVP and SWP operations or water system flows and conditions with the BDCP model, Independent Modeling was performed to assess potential effects due to the BDCP.

To revise the models, the Reviewers consulted with operators at DWR and Reclamation to improve the representation of operational assumptions. Additionally, the Reviewers consulted with modelers at DWR and Reclamation to share findings, to strategize on the proper way to incorporate the guidance received from the operators, and to present revised models to DWR and Reclamation for their review. This collaborative and iterative process differed considerably from a standard consulting contract where the work product is not shared beyond the client-consultant until a final version is complete. To the contrary, consultations with agency experts were conducted early and repeatedly to ensure the revisions would reflect reasonable operations and to provide an independent review.

The first phase of this Independent Modeling effort was development of an updated without project baseline (similar to the NAA but with current, improved assumptions). The Independent Modeling does not incorporate climate change because the climate change hydrological assumptions developed by BDCP cause unrealistic operation of the system absent commensurate changes to operating criteria.

After the baseline was complete and reviewed, the second phase of this effort incorporated the facilities and operations for the BDCP described as Alternative 4 H3 in the Draft EIR/EIS, and otherwise known as the Evaluated Starting Operations (ESO) scenarios in the BDCP. During this phase, the issues that were identified during the Reviewers' initial review were corrected along with corrections made to resolve additional issues that were revealed as improvements were incorporated. Finally, results of the Independent Modeling and potential effects of the BDCP on water supply and instream flows are discussed.

3.1 Changes to CalSim II Assumptions

Revisions approved by DWR and Reclamation for the 2013 baseline

DWR and Reclamation provided CalSim II models used for the 2013 SWP Delivery Reliability Report (DRR) for use in this independent modeling effort. Changes to these models were made for this effort and provided to DWR and Reclamation, many of these changes have since been incorporated into DWR and Reclamation's model and others are under review.

The CalSim II model used for the 2013 SWP DRR is located on DWR's web site at: http://baydeltaoffice.water.ca.gov/modeling/hydrology/CalSim/Downloads/CalSimDownloads/CalSim-IIStudies/SWPReliability2013/index.cfm. Documentation for this model is described in the report titled: "*Draft Technical Addendum to the State Water Project Delivery Reliability Report 2013*", also located on DWR's web site at: http://baydeltaoffice.water.ca.gov/swpreliability/. Key modeling assumptions used for this effort are consistent with the 2013 SWP DRR and are listed in Table 4 of the Technical Addendum.

CalSim II is continuously being worked on and improved to better represent CVP and SWP operations and fix known problems. The Technical Addendum to the 2013 SWP DRR contains a description of updates and fixes that have occurred since modeling was performed for the BDCP Draft EIRS. Among these changes and fixes are key items that directly affect operation of facilities proposed in BDCP Alternative 4, these items are described on page 4 of 2013 SWP DRR Technical Addendum. Key among these fixes is the correction of the Sacramento River flow requirement for Delta inflow that causes NDD bypass to exceed requirements.

A key component of this independent modeling effort is the development of an acceptable CalSim II Future No-Action (FNA) model scenario. The purpose for developing the FNA Scenario is to produce an operational scenario that is realistic enough to understand how changes proposed in the BDCP will affect operations. The process of developing the FNA involved research and development of CalSim II model updates and several meetings with Reclamation and DWR modeling and operations staff. In addition to changes in the FNA Scenario, CalSim II was updated to better reflect operation of the NDD, CVP and SWP reservoir balancing, DCC gate operations, and CVP/SWP water supply allocations.

Additional Revisions to CalSim II Assumptions

The following changes were made to the 2013 SWP DRR version of CalSim II for this effort:

- San Joaquin River Basin
    - Turned off San Joaquin River Restoration Program (SJRRP) The SJRRP will cause a change to San Joaquin River inflow to the Delta not associated with the BDCP. To avoid adding complications to the identification of BDCP export benefits the SJRRP was not incorporated into the analysis.
    - Tuolumne: updated time-series, lookup tables, and wresl code
    - Turned off SJRA (VAMP) releases
- Updated Folsom flood diagram
- Rice decomposition demand diversions from Feather River
- Dynamic EBMUD diversion at Freeport
- SEP1933 correction to daily disaggregated minimum flow requirements at Wilkins Slough and Red Bluff
- CVP M&I demands are updated to reflect assumptions used by Reclamation
- Yuba Accord Transfer
- Los Vaqueros Reservoir capacity

<u>San Joaquin River Basin</u>

BDCP modeling depicted San Joaquin River Basin operations generally consistent with the actions, programs and protocols in place at the time of NOI/NOP issuance. Some of those conditions are now not representative of current development or operations. With the exception of the assumption for the SJRRP, the independent modeling has revised San Joaquin River Basin operations to reflect more contemporary LOD assumptions. In future level analyses the independent modeling similarly assumes no SJRRP, but only for analysis simplicity concerning BDCP export benefits. Additional analyses may be useful in understanding effects of collectively implementing the BDCP and SJRRP.

The San Joaquin River Basin (SJR) is depicted for current conditions, primarily affected by the operations of the Stanislaus, Tuolumne, Merced, and upper San Joaquin River tributaries. The upper San Joaquin River is currently modeled in a “pre-“ SJRRP condition, consistent with the 2005 CalSim version. The FNA Scenario also models the upper San Joaquin River without the SJRRP. The SJR depicts near-term operations including SWRCB D-1641 flow and water quality requirements at Vernalis met when hydrologically possible with New Melones operations. The Vernalis flow objective is set by SWRCB D-1641 February-June base flow requirements. There are no pulse flow requirements during April and May, and there is no acquired flow such as VAMP or Merced water. D1641 Vernalis water quality requirements are set at 950/650 EC to provide an operational buffer for the requirement. New

Melones is operated to provide RPA Appendix 2E flows as fishery releases and maintains the DO objective in the Stanislaus River through a flow surrogate. Stanislaus River water right holders (OID/SSJID) are provided deliveries up to land use requirements as occasionally limited due to operation agreement (formula). CVP Stanislaus River contractors are provided allocations up to 155 TAF per year in accordance with proposed 3-level plan based on the New Melones Index (NMI). For modeling purposes during the worst drought sequence periods, CVP Stanislaus River contractors and OID/SSJID diversions are additionally cut to maintain New Melones Reservoir storage no lower than 80 TAF. Merced River is operated for Federal Energy Regulatory Commission (FERC) and Davis-Grunsky requirements, and provides October flows as a condition of Merced ID's water rights. The Tuolumne River is operated to its current FERC requirements and current water use needs and has been updated to recent conditions.

Folsom Lake Flood Control Diagram

During wetter years, inflow to Folsom Lake is sufficient to keep the reservoir full while satisfying all demands downstream. When this condition occurs in actual operations, operators increase releases during summer months to maintain higher instream flows and prevent large releases in the fall to evacuate Folsom to satisfy flood control storage requirements. To prevent the model from keeping the reservoir full going into the fall months and then making large releases to comply with flood control storage requirements, the maximum allowable storage during summer months is ramped from full storage in June to flood control levels in the fall. Although this is a common modeling tool, Folsom storage level for the end of September was set too low in the SWP DRR model causing unnecessary releases and resulting in Folsom storage being lower than desired. An adjustment was made to achieve a more realistic summer drawdown for Folsom.

Feather River Rice Decomposition Demand

Demand for rice straw decomposition (decomp) water from Thermalito Afterbay was added to the model and updated to reflect historical diversion from Thermalito in the October through January period. There are approximately 110,000 acres of rice in the Feather River Service Area irrigated primarily with water diverted from Thermalito Afterbay. Although decomp water demand for the Sacramento River has been included in CalSim II since about 2006, this demand has been absent for the Feather River. Inclusion of decomp demand in the version of CalSim II used for this effort results in an increase in Feather River diversion in fall months of about 160,000 AF.

Dynamic EBMUD Diversion at Freeport

Previously the EBMUD operation was pre-determined and input to CalSim II as a time-series. The below criteria was implemented in CalSim II model code to achieve a dynamic representation of EBMUD diversion from the Sacramento River at Freeport.

The EBMUD water service contract is unique. EBMUD's total system storage must be forecast to be below 500 TAF on October 1 for CVP water to be available under the EBMUD contract. In years when this occurs, we assume EBMUD will take the minimum of 65 TAF of CVP water or their CVP allocation (133 TAF * CVP M&I allocations) in the first and second years of any multi-year period when CVP water is available under their contract. In the third year, EBMUD would be limited to 35 TAF of CVP water (assuming diversion of 65 TAF in years one and two) because their contract limits cumulative CVP water over three consecutive years to 165 TAF. The 65, 65, 35 TAF annual diversion pattern then repeats if water is available for four or more consecutive years under the EBMUD contract.

Wilkins Slough Minimum Flow Requirement

Wilkins Slough minimum flow requirements, C129_MIF, includes an adjustment for daily operations based on work with the Sacramento River Daily Operations Model (SRDOM). The flow adjustment for daily flows for September 1933 in the state variable input file appeared unreasonable in the previous model. The flow

adjustment in this month was approximately 1,860 cfs and was requiring release of approximately 100 TAF out of Shasta. Review of the entire time-series of daily adjustments showed the adjustment in this month was an order of magnitude greater than in any other September in the simulation period. The year 1933 is a critically dry year, and the third of four consecutive Shasta Critical years. Historical precipitation records from the consumptive use models for the Sacramento Valley, which serves as the basis of much of the CalSim hydrology, were reviewed to ensure there was no unusual precipitation in this month that may create variations in daily flows. It was determined that this daily adjustment is in error. The daily adjustment for this time-step was set to 10 cfs, the value for August 1933.

CVP M&I Demands

Reclamation M&I contractor demands upstream from the Delta have not been adequately represented in CalSim II until Reclamation updated the model in 2012. A more accurate representation of CVP M&I demands, developed in 2012, was incorporated into the model for this effort.

Yuba Accord Water Transfer

In CalSim, Yuba Accord Water Transfers are limited to releases from New Bullards Bar Reservoir. The release is picked up at Banks Pumping Plant or stored in Oroville and Shasta for later release. The additional release from New Bullards Bar is represented in CalSim through an inflow arc. The subsequent refill of New Bullards Bar is represented in CalSim through a diversion arc. In CalSim II, refill is assumed to always occur in the winter following the transfer. However, in the SWP DRR model, there were a few years in which no transfers took place but refill still occurred in the following winter. This was fixed in the updated baseline by capping refill to the previous summer's total transfer.

Los Vaqueros Reservoir

Expansion of Los Vaqueros Reservoir was completed in 2012. Storage capacity was increased from 103 TAF to 160 TAF. In DWR's BDCP studies, Los Vaqueros capacity was set to 103 TAF. The independent modeling increases Los Vaqueros capacity to 160 TAF.

3.2 Changes to BDCP Operations

San Luis Reservoir Rule-Curve Logic Change

In the independent modeling, San Luis rule-curve logic was refined for both SWP and CVP operations. San Luis rule-curve is used to maintain an appropriate balance between San Luis Reservoir storage and North of Delta reservoirs. The key considerations in formulating rule-curve are as follows:

- Ensure that sufficient water is available in San Luis Reservoir to meet contract allocations when exports alone are insufficient due to various operational constraints.
- Minimize San Luis Reservoir carryover storage to low point criteria (both CVP and SWP) and Article 56 carryover (only SWP). The basic premise is to maintain Reservoir San Luis storage no higher than necessary to satisfy south of Delta obligations to avoid excessive drawdown of upstream storage.

In DWR's BDCP studies, there were significant shortages in Table A and Article 56 deliveries because of an improper balance between upstream and San Luis Reservoir storage. The updated SWP rule-curve logic reduces these shortages but does not eliminate them. Also, the updated CVP rule-curve logic allows for higher CVP allocations without increasing risk of shorting SOD contractors.

Upstream Storage Release to Fill San Luis Reservoir Above Needed Supply

In the BDCP NAA and the independent modeling FNA, the model has a priority to release excess stored water that will likely be released for flood control purposes from Shasta and Folsom storage for export at Jones Pumping Plant to storage in San Luis Reservoir in the late summer and early fall months. The purpose was to get a head start on filling San Luis Reservoir for the coming water year if there is a high likelihood of Shasta or Folsom spilling. This was an assumed CVP/SWP adaptation to the export reductions in the winter and spring months due to the salmon and smelt biological opinions. However, with the NDD facility in Alt 4, winter and spring export restrictions impact CVP exports much less and there is no longer a reason to impose this risk on upstream storage. As such, the weights, or prioritizations, of storage in Shasta and Folsom were raised so that excess water would not be released specifically to increase CVP San Luis storage Reservoir above rule-curve. This was changed in Alt 4 and not the FNA to better reflect how the system may operate under these different conditions.

Delivery allocation adjustment for CVP SOD Ag service and M&I contractors

CVP SOD Ag service and M&I allocations are limited by both systemwide water supply (storage plus inflow forecasts) and Delta export constraints; whereas similar CVP NOD allocations are dependent solely on water supply. This frequently results in SOD water service contractors receiving a lower contract year allocation than NOD water service contractors, especially under the Biological Opinion export restrictions. However, with the NDD facility operations as proposed under Alt 4 H3, the CVP can largely bypass these Delta export restrictions, and the export capacity constraint on CVP SOD allocations was determine to be overly conservative. Therefore, the export capacity component of CVP SOD allocations was removed in the BDCP Alternative and both SOD and NOD CVP allocations are equal and based only on water supply.

Folsom/Shasta Balance

CVP operations were refined in the BDCP Alternative to provide maximum water supply benefits to CVP contractors while protecting Trinity, Shasta, and Folsom carryover storage in the drier years. As a whole, this was accomplished with refinements to allocation logic and San Luis rule-curve. However, in initial study runs, an imbalance between Folsom and Shasta was created; while there was a total positive impact to upstream storage in dry years, there was a negative impact to Folsom storage. This was resolved by inserting Folsom protections in the Shasta-Folsom balancing logic. With these protections, the positive carryover impacts were distributed to Trinity, Shasta, and Folsom.

North Delta Diversion Bypass Criteria

The daily disaggregation method for implementing NDD bypass criteria as implemented in DWR's BDCP model was left mostly intact for the updated BDCP studies. However, there were modifications to properly fit the bypass criteria implementation within the latest CalSim operations formulation. Modifications are as follows:

1. No NDD operations occur in cycles 6 through 9 so that Delta operations and constraints can be fully assessed without NDD interference.
2. Cycles 10 and 11 (Daily 1 and Daily 2 respectively) were added to determine NDD operations given various operational constraints including the NDD bypass criteria.
3. From July to October, bypass criteria are based on monthly average operations (no daily disaggregation). Given the controlled reservoir releases at this time and the constant bypass criteria (5,000 cfs from July to September and 7,000 cfs in October), this was determined to be a reasonable assumption. This also simplified coordination of DCC gate operations with NDD in October which will be discussed later.
4. When warranted by conditions in cycle Daily 1 (cycle 10), the bypass criteria in May and June were allowed to be modeled on a monthly average basis in cycle Daily 2 (cycle 11). This allowed a reduction in the number of cycles necessary to determine the fully allowed diversion under the bypass criteria when

the Delta was in balance and additional upstream releases were made to support diversions from the North Delta.

Delta Cross Channel Gate Reoperation in October

The BDCP Alt 4 results in significantly more October surplus Delta outflow as compared to the baseline. The cause of this Delta surplus at a time when the Delta is frequently in balance is a combination of proposed through-Delta export constraints (OMR flow criteria and no through-Delta exports during the San Joaquin River October pulse period), Rio Vista flow requirements, and DCC gate operations. In DWR's BDCP studies, it was assumed that the DCC gates would be open for the entire month of October thereby requiring much higher Sacramento River flows at Hood in order to meet the Rio Vista flow requirement than if the DCC gates were closed. Whereas in the independent BDCP modeling it was assumed that the DCC gates were closed for a number of days during the month such that the 7,000 cfs NDD bypass criteria would be sufficient to meet the weekly average Rio Vista flow requirements. The intent was to minimize surplus Delta outflow while meeting Delta salinity standards and maintaining enough bypass flow to use the NDD facility for SOD exports. This is an approximation of what is likely to occur in real-time operations under similar circumstances. Further gate closures may be possible as salinity standards allow if operators decide to preserve upstream storage at the expense of NDD diversions. This type of operation would require additional model refinements.

Wilkins Slough minimum flow requirement

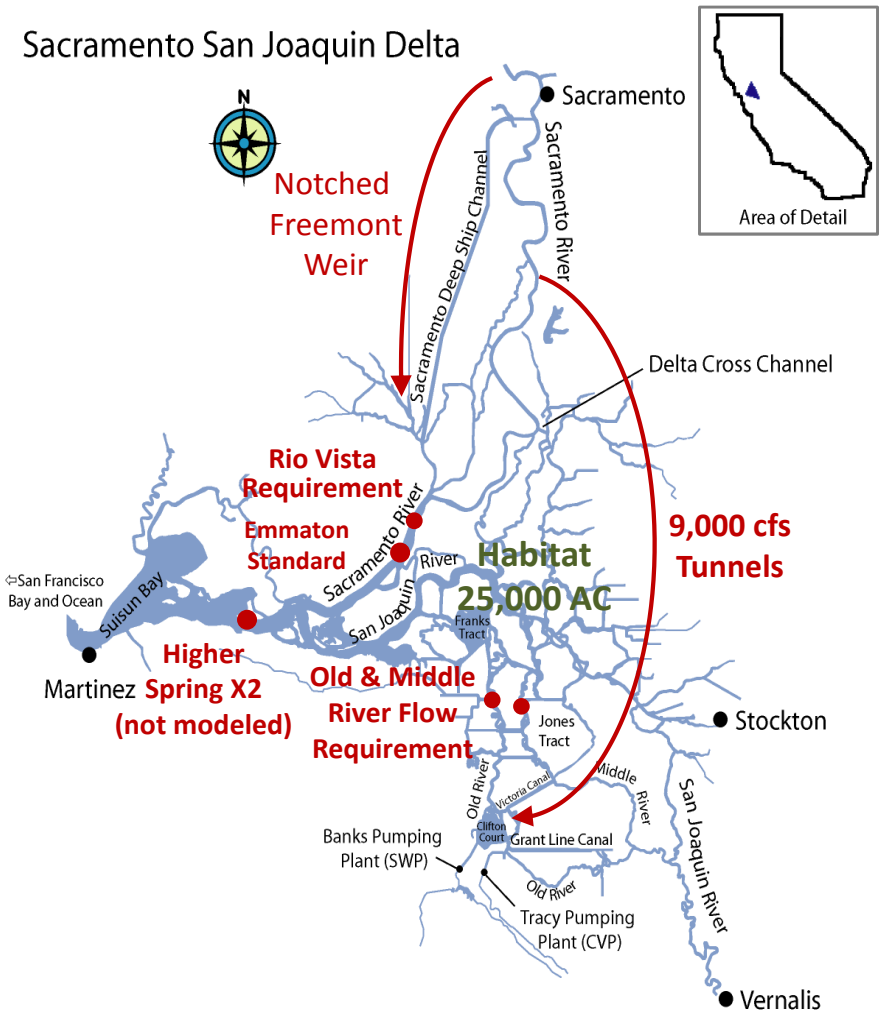
Currently in CalSim II, relaxation of the Wilkins Slough minimum flow requirement is tied to CVP NOD Ag Service Contractor allocations. This does not reflect actual operations criteria where relaxation of the flow requirement is dependent solely on storage conditions at Shasta. From the comparative analysis perspective of our CalSim planning studies, this introduces a potential problem: changes in CVP NOD Ag Service allocations can result in unrealistic changes in required flow at Wilkins Slough, and such changes in Wilkins Slough required flow can result in unrealistic impacts to Shasta storage. To bypass this problem, we assumed that the required flow at Wilkins Slough in the alternative was equal to the baseline.

3.3 Alternative 4 Modeling results

Analysis for this effort was focused on BDCP Alt 4 with existing spring and fall X2 requirements, which corresponds to "Alternative 4 H3" in the Decisions Tree. This modeling is performed without climate change, and includes refined operating criteria for the NDD, CVP and SWP reservoirs, DCC gate closures, and water supply allocations. This modeling includes all Project features that are included in Alt 4 in the BDCP modeling. The Project features are displayed in Figure 39 and summarized as:

- NDD capacity of 9,000 cfs
- Bypass flow requirements for operation of the NDD
- Additional positive OMR flow requirements
- No San Joaquin River I/E ratio
- Changed location for Emmaton water quality standard in SWRCB D-1641
- Additional Sacramento River flow requirement at Rio Vista
- 25,000 acres of additional tidal habitat
- Notched Fremont Weir

Figure 39. Alt 4 Features

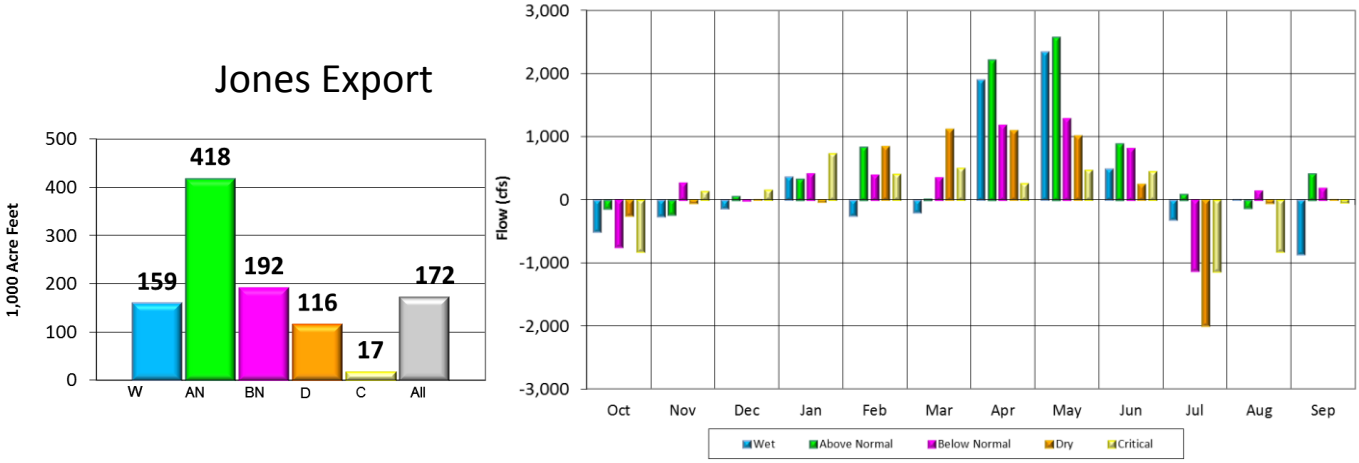


For the purpose of describing results of the independent modeling, the revised Future No Action model scenario is labeled "FNA" and the revised BDCP Alt 4 scenario is labeled "Alt 4".

CVP/SWP Delta Exports

Average annual exports at Jones pumping plant are about 170 TAF higher in the Alt 4 Scenario compared to the FNA scenario, as seen in Figure 40. Increases generally occur from January through June when Old & Middle River (OMR) criteria limit use of Jones PP in the FNA Scenario. Decreases occur in July in drier year types because the increased ability to convey water in spring months reduces the need to convey water stored in upstream reservoirs in July. Reductions in Jones export in October are partially a function of increases in OMR flow requirements.

Figure 40. Change in Delta Exports at Jones Alt 4 minus FNA



Similar to export at Jones, Banks exports are generally higher from January through June because use of NDD allows pumping that is not possible in the FNA Scenario, as seen in Figure 41. Banks exports are increased during summer months of wetter year types. This is due to earlier wheeling for CVP Cross Valley Canal contractors (without NDD Banks capacity isn't typically available until Fall in wet years) and wheeling of CVP water through Joint Point of Diversion (JPOD). CVP export at Banks is displayed in **Figure 42**. In wetter years, upstream CVP reservoirs hold more water than can be exported at Jones pumping plant, this water is typically spilled in the FNA scenario. CVP water stored in upstream reservoirs can be released in July, August, and September to support south of Delta beneficial use of water through use of JPOD in Alt 4.

Figure 41. Change in Delta Exports at Banks Alt 4 minus FNA

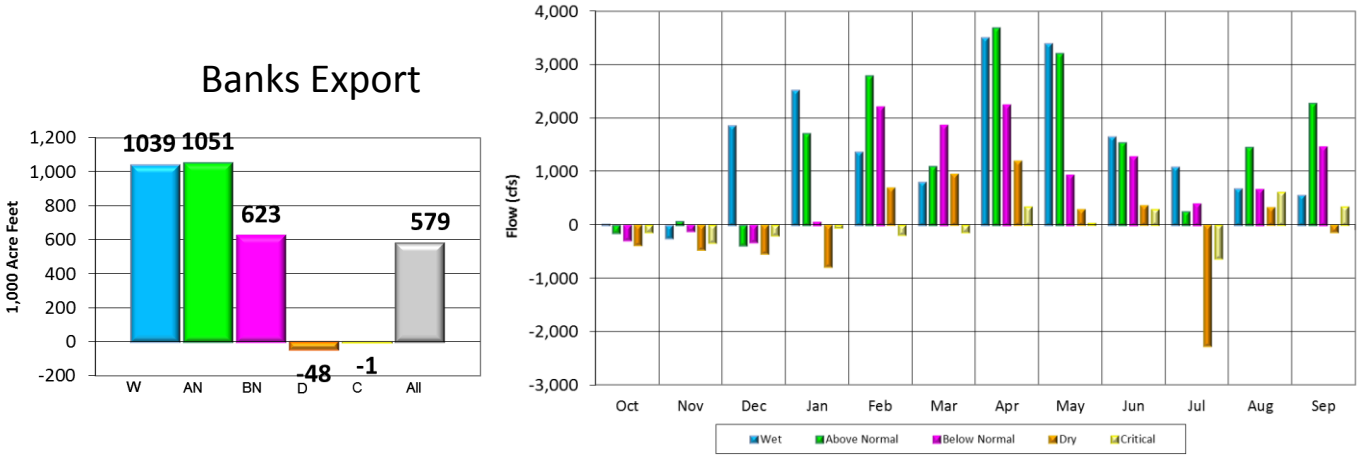
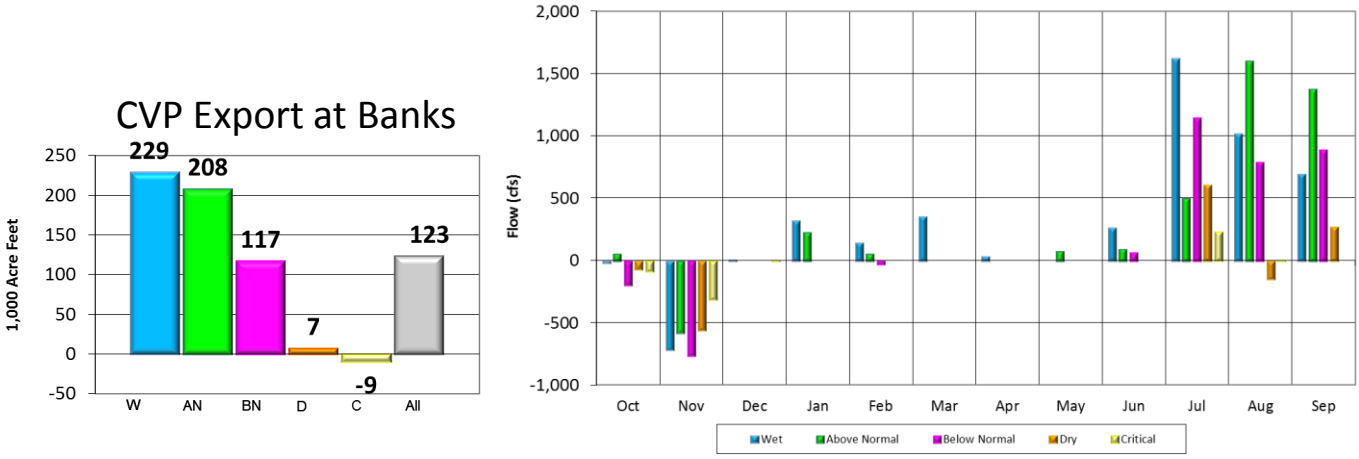


Figure 42. Change in CVP Delta Exports at Banks Alt 4 minus FNA

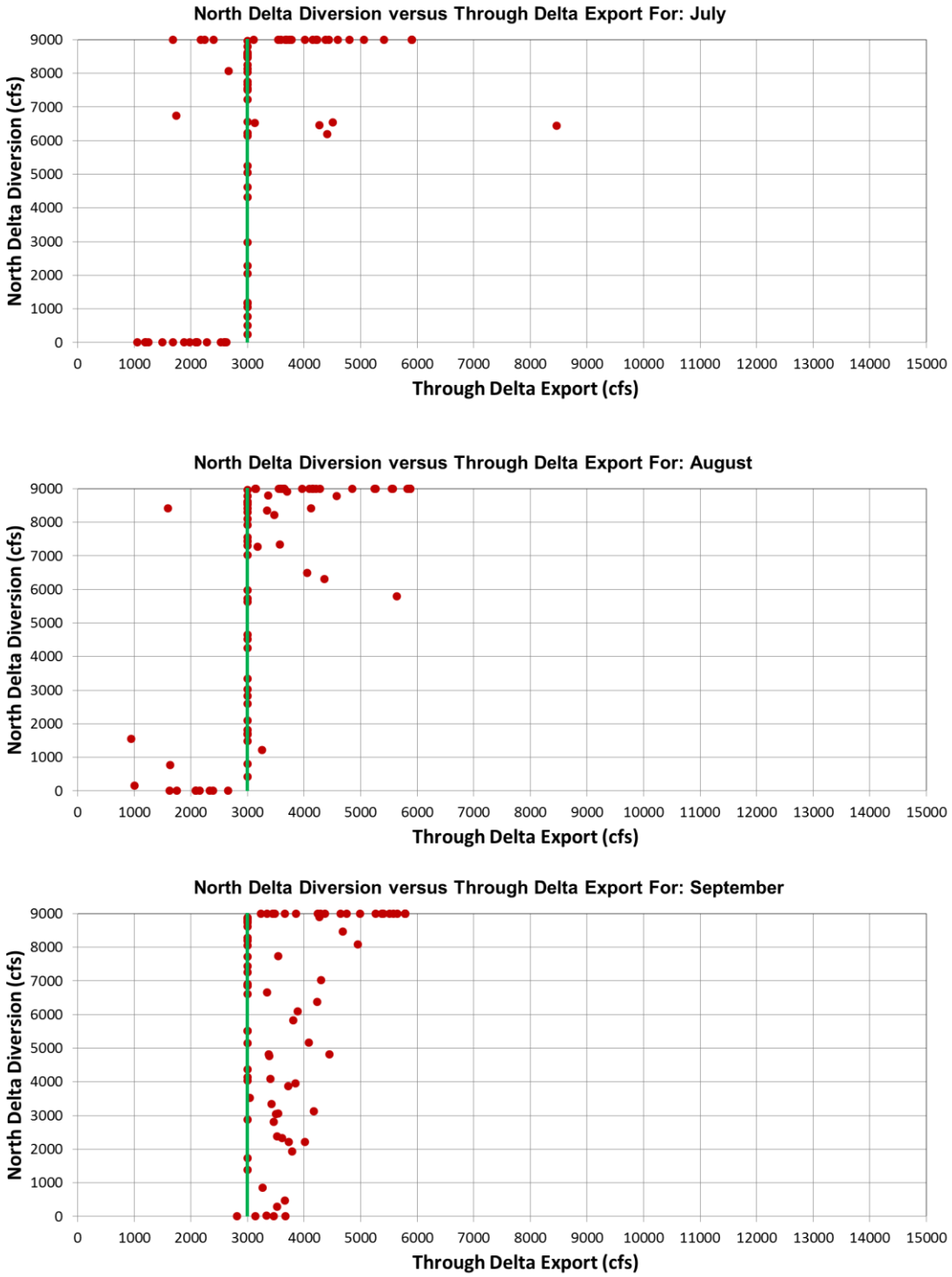


Changes in total, South Delta, and North Delta exports are displayed in Figure 43. Average annual increase in total Delta exports is about 750 TAF, the increases primarily occur in wetter year types with lesser increases in dryer years. South Delta export decreases about 2.53 MAF in Alt 4 relative to the FNA. Export through the NDD is 3.28 MAF in Alt 4, about 58% of total exports are diverted from the North Delta.

Figure 43. Change in Conveyance Source of Exports (Alt 4 minus FNA)

Figure 44 contains modeling results from Alt 4 for July, August, and September that plot NDD against SDD (Through Delta Export). There are many occasions when SDD are 3,000 cfs, which is due to criteria specifying that SDD during this time period need to be at least 3,000 cfs prior to diverting at the NDD facility. Although there are about six occurrences in July and three in August where the model did not satisfy this criterion, this issue has not yet been addressed for this modeling effort.

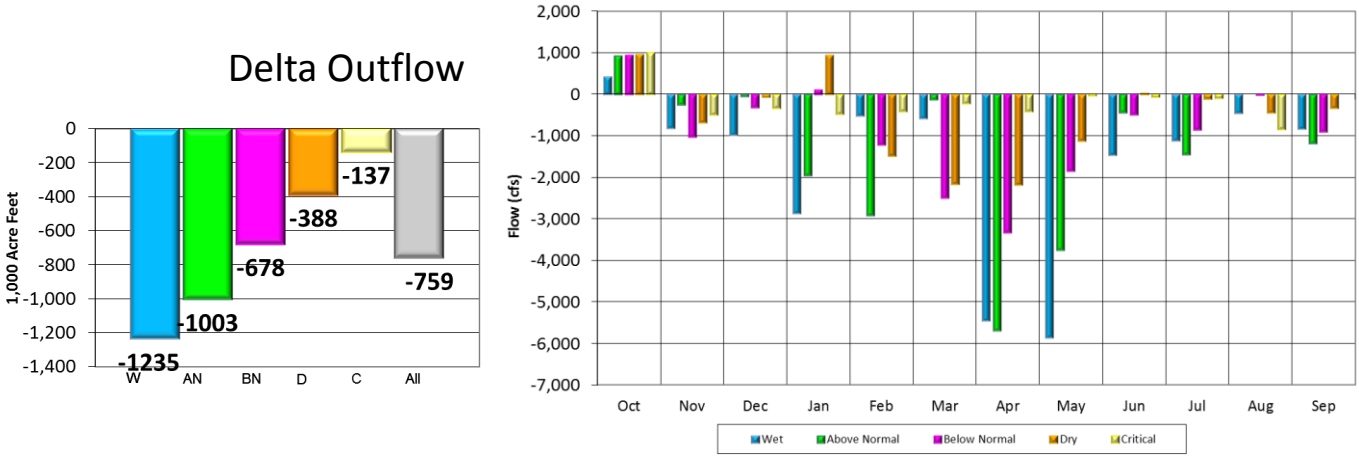
Figure 44. Alt 4 North Delta Diversion Versus South Delta Diversion for July, August, and September



Delta Outflow

Figure 45 contains annual and monthly average changes in Delta outflow by water year type, average annual Delta outflow decreases about 760 TAF in the Alt 4 Scenario relative to the FNA Scenario. The decrease is primarily due to increases in Delta exports, which are about 750 TAF on average. Larger decreases generally occur in January through May when exports are constrained in the FNA Scenario and in the Alt 4 Scenario the NDD can be used to export water. Delta outflow increases in October due to the combination of additional OMR flow requirements that restrict exports and Sacramento River flow requirements at Rio Vista. The additional surplus Delta outflow in Alt 4 was minimized through coordination of the Delta Cross Channel Gate operations with the Rio Vista flow requirements and North Delta Diversion bypass requirements.

Figure 45. Changes in Delta Outflow (Alt 4 minus FNA)



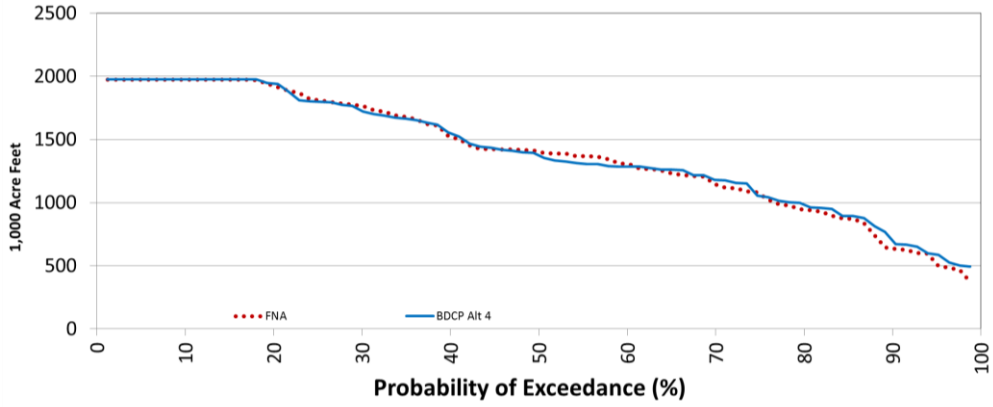
Carryover Storage

Figure 46, Figure 47, Figure 48, and Figure 49 contain exceedance charts for carryover storage and average monthly changes in storage by Sacramento Valley Water Year Type for CVP and SWP upstream reservoirs. CVP/SWP reservoirs tend to be higher in the Alt 4 Scenario relative to the FNA on an average basis. Generally, CVP/SWP reservoirs are higher in storage in dryer year types and can be lower in wetter year types.

Ability to convey stored water from upstream CVP/SWP reservoirs to south of Delta water users is increased in Alt 4 relative to the FNA. Therefore, when upstream reservoirs are at higher storage levels more water is released to satisfy south of Delta water demands. This is the primary reason Shasta, Oroville, and Folsom tend to be lower during summer months of wetter years.

Currently, and in the FNA Scenario, the CVP and SWP ability to export natural flow, or unstored water, is constrained due to SWRCB D-1641 and requirements in the salmon and smelt biological opinions. With the greater ability to export unstored water during winter and spring months in the Alt 4 Scenario, compared to FNA, there is generally a reduced reliance on stored water to satisfy south of Delta demands. The increased ability to export unstored water allows the CVP and SWP to maintain higher storage levels in upstream reservoirs during dryer year types while still maintaining south of Delta deliveries. Carryover storage in the Alt 4 Scenario tends to be higher than the FNA Scenario at lower storage levels, and Alt 4 storage is lower in wetter years when storage levels are higher. In the wettest of years there is enough water in the system that both scenarios have similar carryover storage conditions.

Figure 46. Trinity Reservoir Carryover Storage and Average Monthly Changes in Storage by Water Year Type



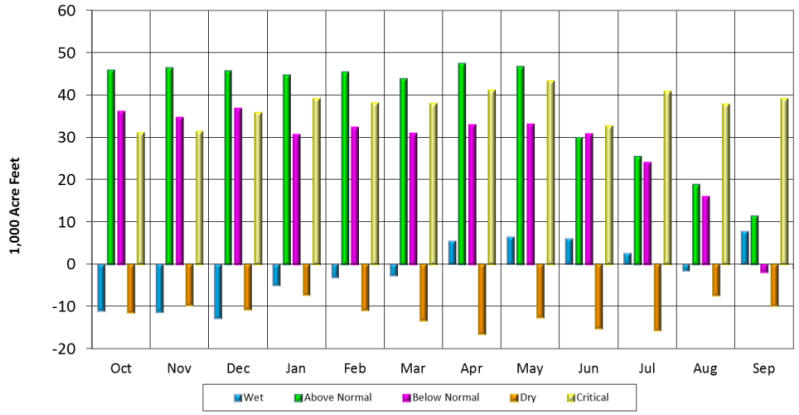
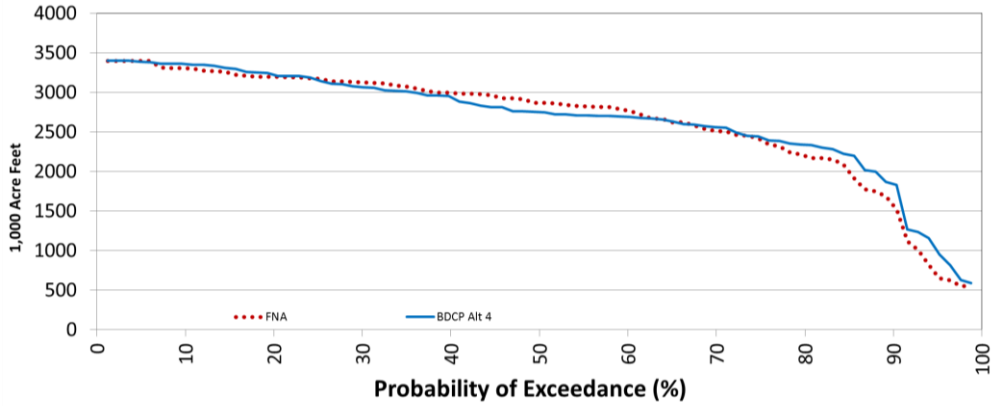


Figure 47. Shasta Reservoir Carryover Storage and Average Monthly Changes in Storage by Water Year Type



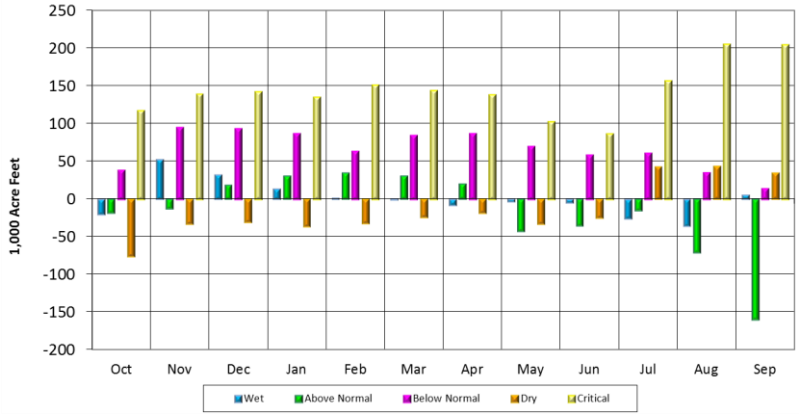
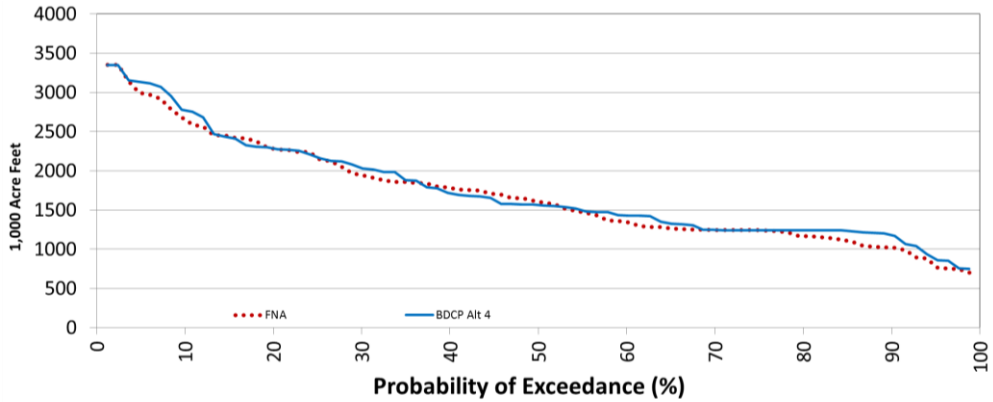


Figure 48. Oroville Reservoir Carryover Storage and Average Monthly Changes in Storage by Water Year Type



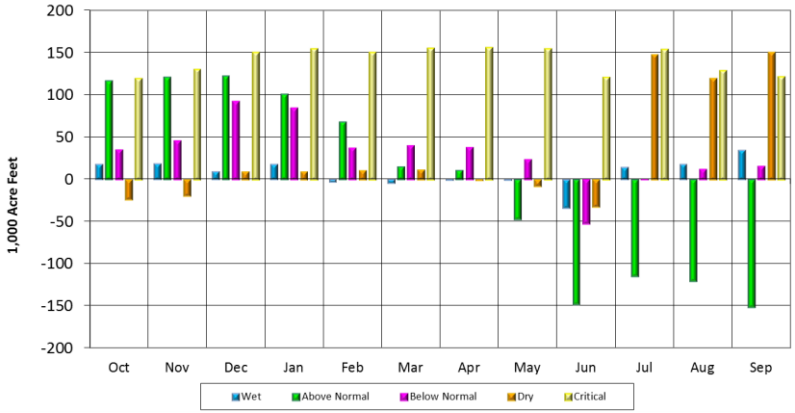
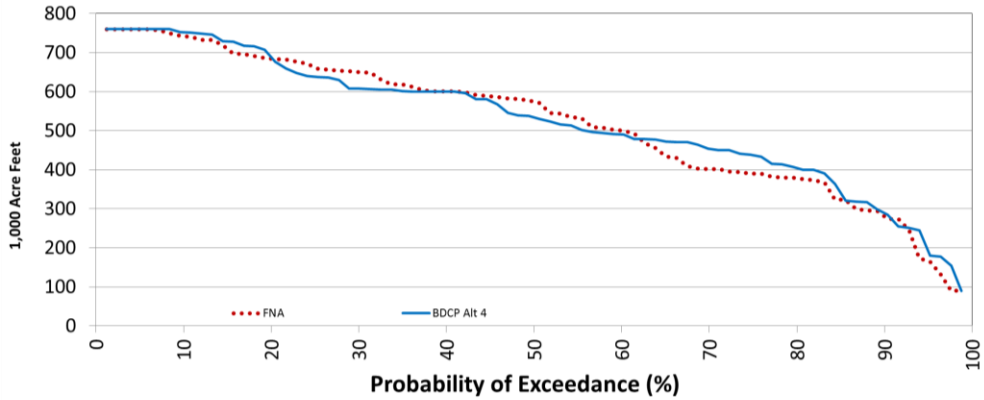
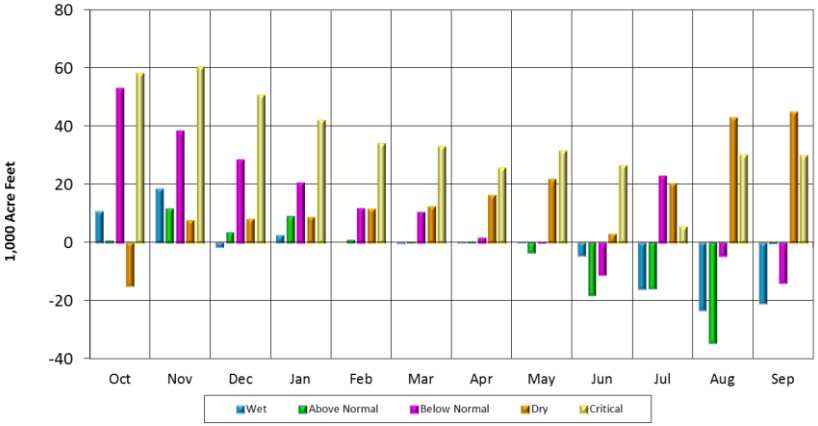


Figure 49. Folsom Reservoir Carryover Storage and Average Monthly Changes in Storage by Water Year Type





San Luis Reservoir Operations

As seen in Figure 50 and Figure 51 below, both CVP and SWP portions of San Luis Reservoir storage fills more regularly in the Alt 4 Scenario. As described earlier in this document, low point in both CVP and SWP San Luis Reservoir is managed to satisfy water supply obligations the model makes during the spring of each year. This is a complex balance involving available upstream storage, available conveyance capacity, delivery allocations, and south of Delta demand patterns. Considering this myriad of variables, there are times when low point in San Luis Reservoir is higher in the Alt 4 Scenario than the FNA Scenario and times when the opposite is true.

Figure 50. SWP San Luis

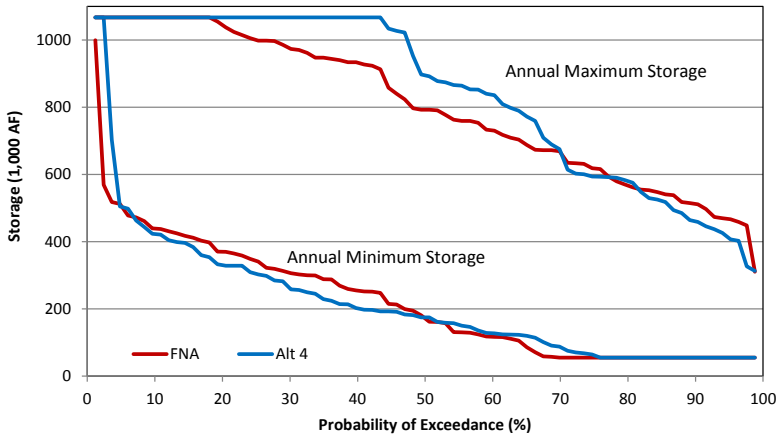
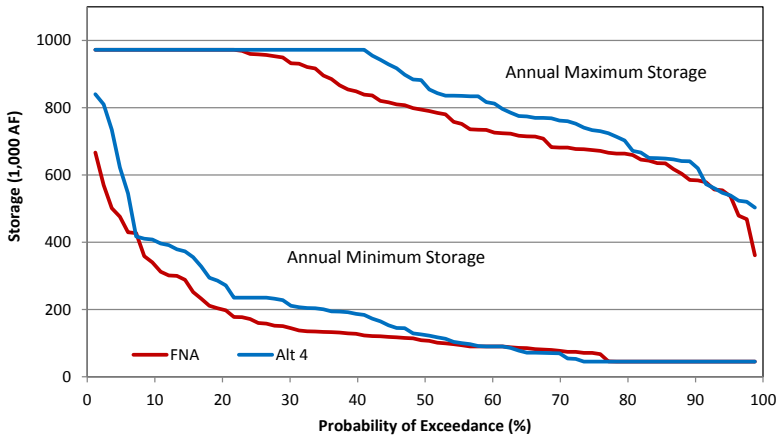


Figure 51. CVP San Luis



CVP Water Supply

As can be seen in Table 5, the independent modeling analysis shows an average increase of approximately 262 TAF of delivery accruing to CVP customers in the Alt 4 Scenario relative to the FNA Scenario, mostly occurring to CVP SOD agricultural customers. Delivery increases are greater in wetter year types with lower increases in dryer years. Figure 52 contains exceedance probability plots for CVP water service contractor deliveries and allocations. Changes in Sacramento River Settlement and San Joaquin River Exchange Contractor deliveries do not occur in the modeling analysis and are not an anticipated benefit of the BDCP. Although modeling demonstrates minor changes to NOD CVP service contractors, this increase is not an anticipated benefit of the BDCP.

Table 5. CVP Delivery Summary

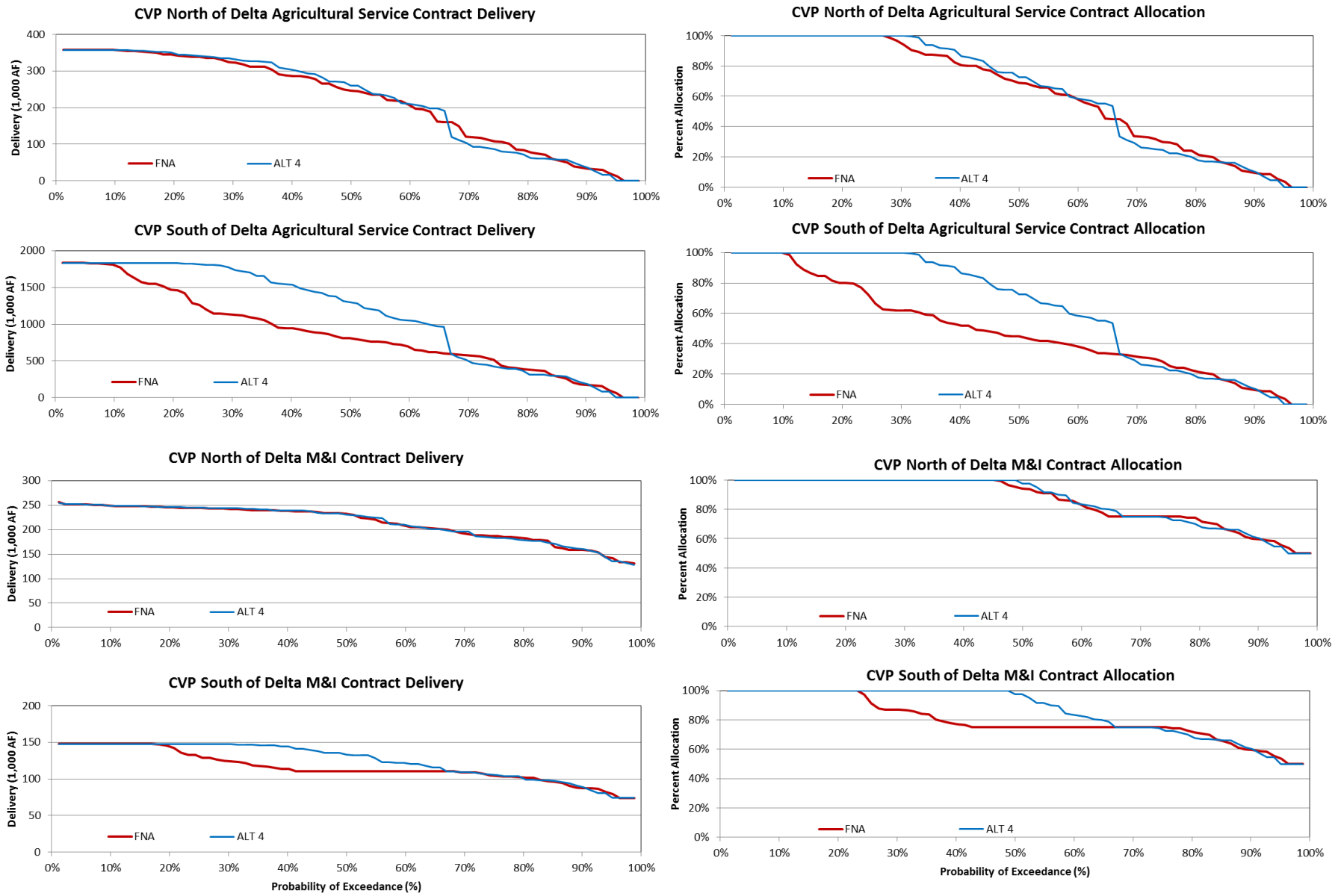
Average Annual CVP deliveries by Water Year Type FNA (1,000 AF)

	AG NOD	AG SOD	Exchange	M&I NOD	M&I SOD	Refuge NOD	Refuge SOD	Sac. Setlmnt	CVP NOD Total	CVP SOD Total
All Years	**220**	**882**	**852**	**214**	**116**	**87**	**273**	**1860**	**2380**	**2306**
W	327	1408	875	241	135	90	280	1856	2515	2881
AN	284	999	802	221	113	83	258	1716	2304	2341
BN	206	725	875	217	111	90	281	1900	2413	2176
D	138	569	864	195	106	88	277	1896	2317	2000
C	43	202	741	157	87	71	234	1754	2025	1447

Difference: Alt 4 minus FNA (1,000 AF)

	AG NOD	AG SOD	Exchange	M&I NOD	M&I SOD	Refuge NOD	Refuge SOD	Sac. Setlmnt	CVP NOD Total	CVP SOD Total
All Years	2	251	0	0	9	0	0	0	2	260
W	0	305	0	0	10	0	1	0	0	316
AN	10	492	0	1	14	1	0	-2	10	504
BN	12	354	0	5	16	0	-2	1	19	366
D	-10	67	0	-4	4	1	0	-1	-15	72
C	2	27	0	2	2	1	0	-1	4	29

Figure 52. CVP Water Supply Delivery and Allocation



SWP Water Supply

The independent analysis shows an increase in average annual SWP SOD deliveries of approximately 450 TAF, but a reduction in critical year deliveries of approximately 116 TAF. Annual average Article 21 deliveries increase by about 100 TAF and Article 56 increases by about 18 TAF. Figure 53 contains exceedance probability plots for SWP SOD deliveries for the FNA and Alt 4 Scenarios, each of these plots show increases in higher delivery years. Although Table A deliveries increase in 65% of years, there are decreases in 35% of the dryer years (see Table 6).

Table 6. SWP Delivery Summary

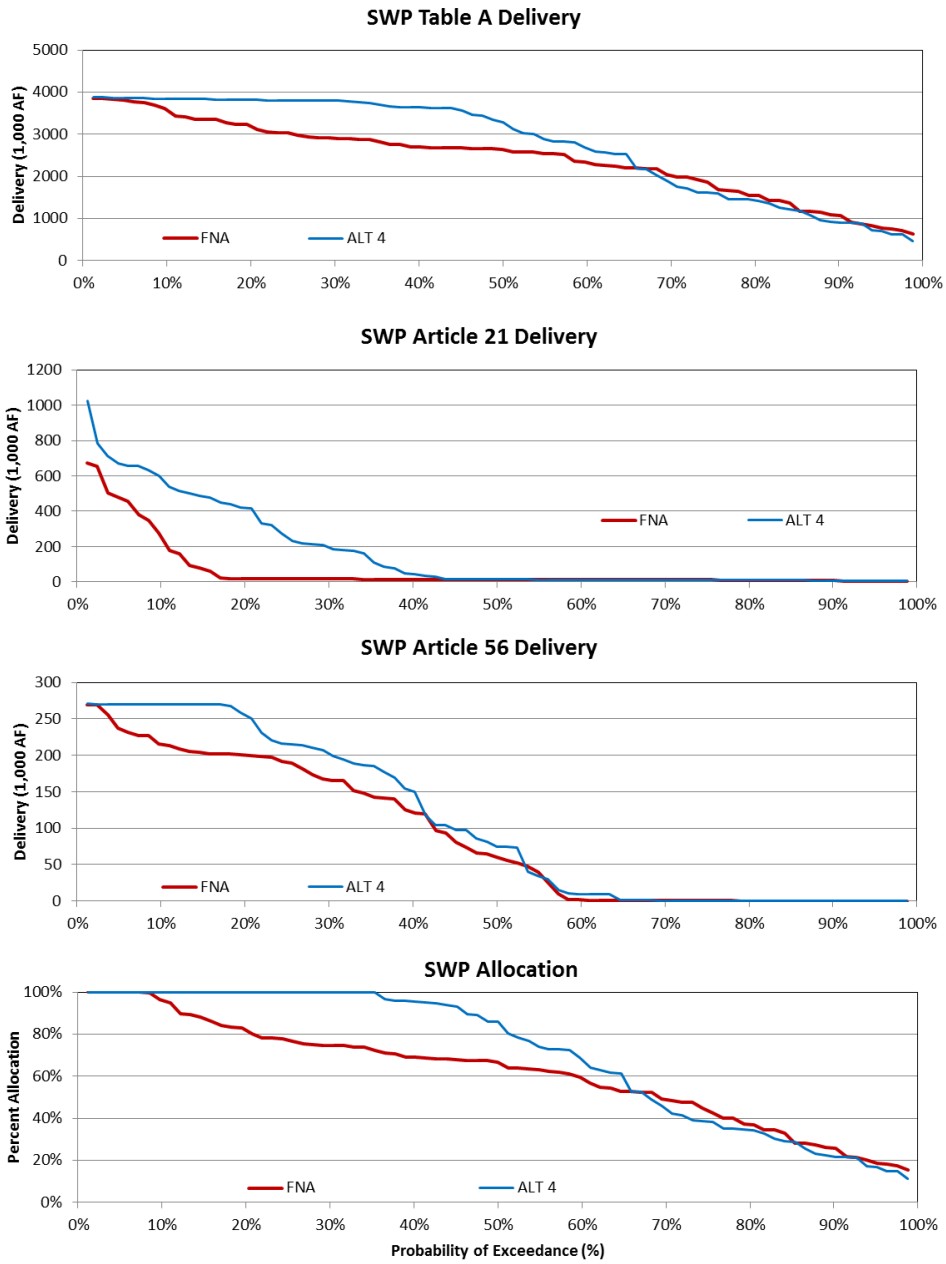
FNA

	Table A	Art. 21	Art. 56	Total
All Years	**2426**	**64**	**90**	**2580**
W	3221	98	121	3440
AN	2628	86	81	2794
BN	2527	82	95	2703
D	1809	14	70	1893
C	1105	17	48	1170

Difference Alt4 minus FNA

	Table A	Art. 21	Art. 56	Total
All Years	328	102	18	448
W	525	220	14	759
AN	636	98	-1	733
BN	565	50	31	647
D	-63	41	27	6
C	-124	-8	16	-116

Figure 53. SWP Delivery for Alt 4 and FNA



4 COMPARING INDEPENDENT MODELING AND BDCP MODELING

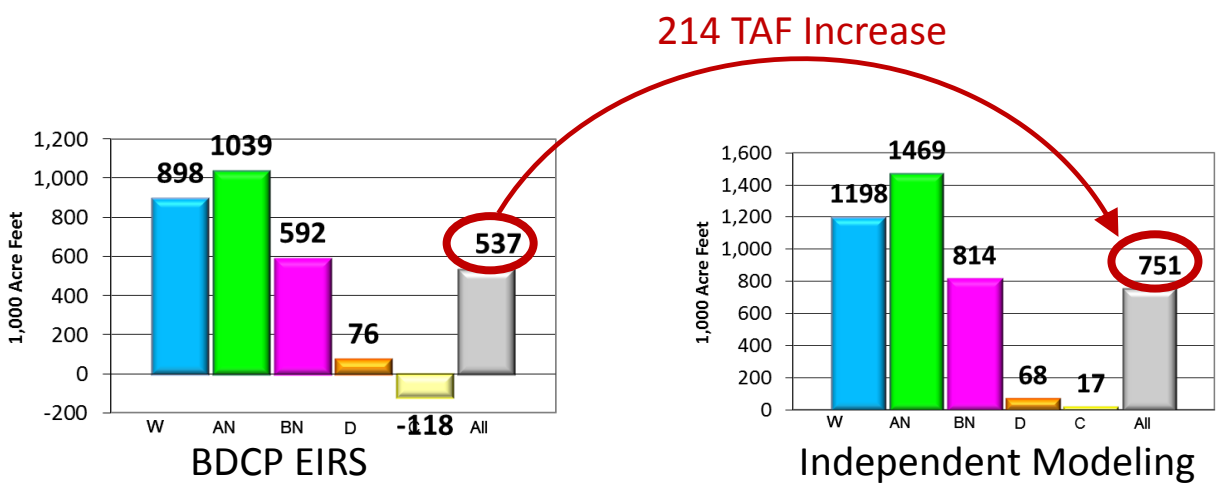
The independent modeling effort originally stemmed from reviews of DWR's BDCP modeling where we found that BDCP modeling does not provide adequate information to determine how BDCP may affect the system. Based on the premise that the independent modeling portrays a more accurate characterization of how the CVP/SWP system may operate under Alt 4, this comparison is meant to demonstrate the differences between results of a more accurate analysis and BDCP modeling. Differences in results between these modeling efforts are believed to provide insight regarding how effects that BDCP will have on the actual CVP/SWP system differ from modeling used to support the Draft EIRS.

Although thorough comparisons of modeling were performed, only key differences are illustrated for the purpose of this comparison.

Delta Exports

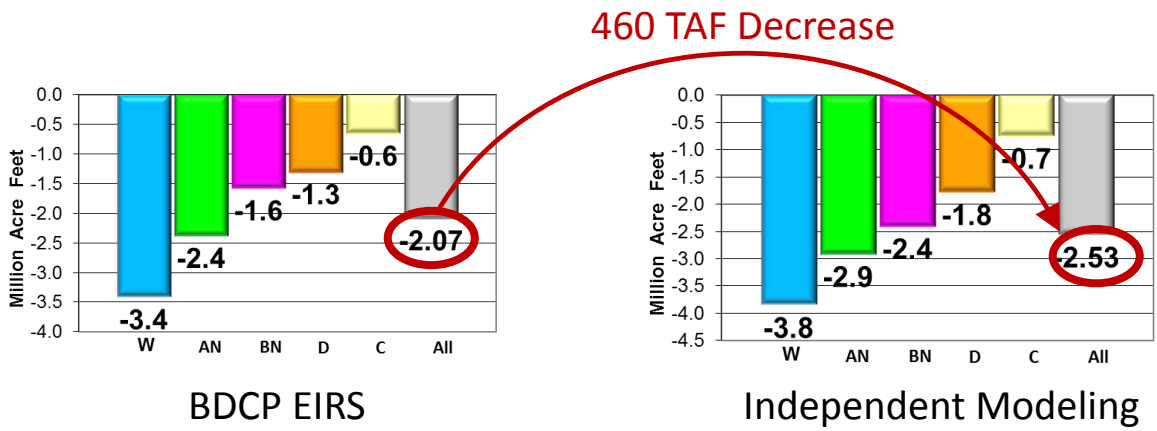
Figure 54 displays changes in the Delta exports for the BDCP modeling (Alt 4-ELT minus NAA-ELT) and for the independent modeling (Alt 4 minus FNA). Independent modeling analysis shows about 200 TAF greater increases in exports than the BDCP modeling. A large component of this difference is due to fixes of known modeling issues, as described in the 2013 SWP DRR. This difference is also attributable to more realistic reservoir operations, more efficient DCC gate operations, changes in water supply allocation logic, and more efficient operation of the NDD.

Figure 54. Result Difference: Delta Exports



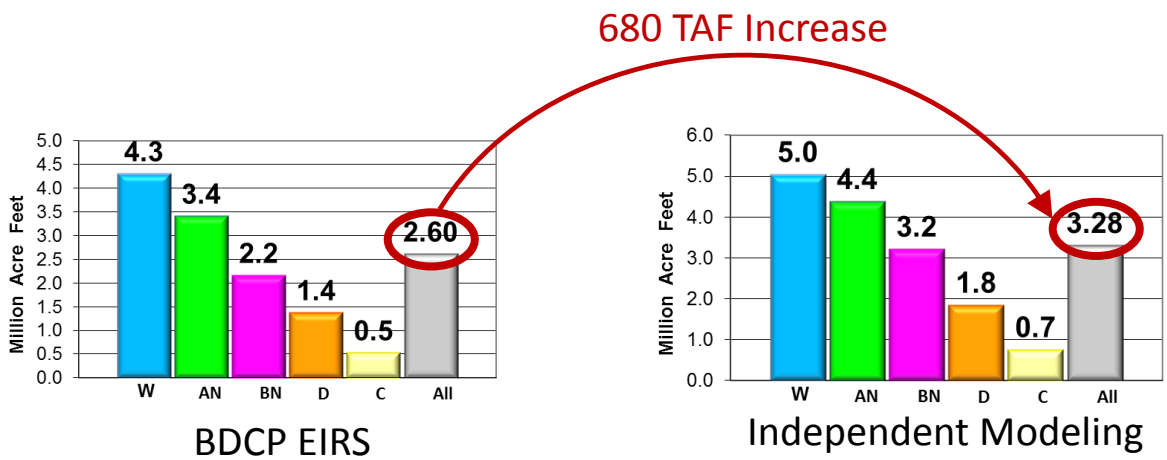
Average annual SDD are decreased by about 460 TAF in the independent analysis compared to the BDCP modeling. A large component of this difference is due to fixes of known modeling issues, as described in the 2013 SWP DRR. These fixes prevent "artificial" bypass criteria from limiting use of the NDD beyond what is intended in the BDCP project description. This difference is also attributable to more efficient DCC gate operations and more efficient operation of the NDD. Figure 55 demonstrates the difference between the BDCP and independent analysis, where SDD decrease by 2.07 MAF in the BDCP analysis and by 2.53 MAF in the independent analysis.

Figure 55. Result Difference: South Delta Diversion



Use of the NDD is 680 TAF greater in the independent analysis relative to the BDCP analysis. A large component of this difference is due to fixes of known modeling issues, as described in the 2013 SWP DRR. These fixes prevent "artificial" bypass criteria from limiting use of the NDD beyond what is described in the BDCP project description. Figure 56 compares average annual NDD in the BDCP to the independent analysis.

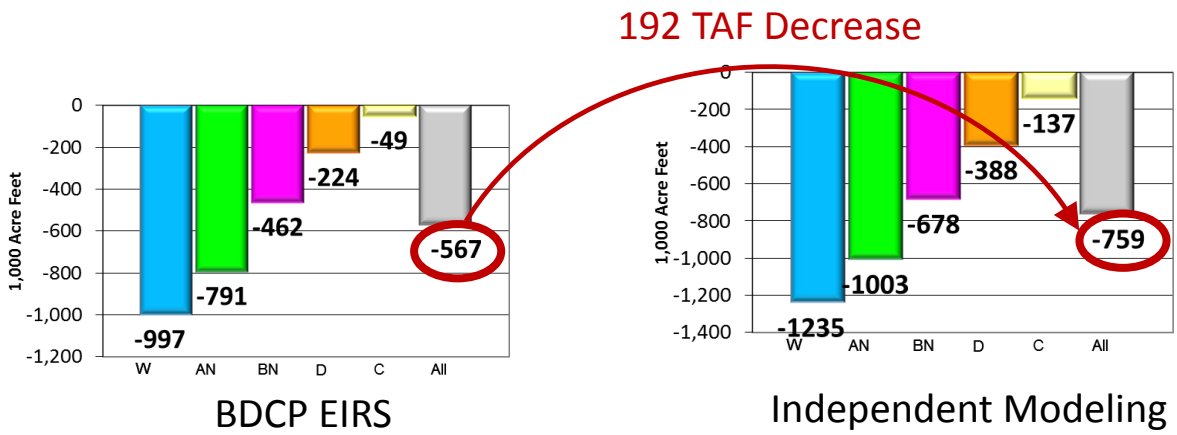
Figure 56. Result Difference: North Delta Diversion



Delta Outflow

Total Delta exports in the independent analysis are about 200 TAF greater than the BDCP modeling analysis with a corresponding decrease in Delta outflow in the independent analysis of about 200 TAF. Figure 57 compares average annual changes in Delta outflow between the independent analysis and BDCP modeling, BDCP modeling shows a decrease of about 567 TAF and the independent analysis shows a decrease of about 759 TAF.

Figure 57. Result Difference: Net Delta Outflow



Reservoir Storage

Reservoir operating rules for Alt4 in the BDCP EIRS modeling are changed relative to the NAA. In the BDCP EIRS modeling of Alt 4 rules are set to releases more water from upstream reservoirs to San Luis Reservoir from late winter through July, reduce releases in August, and then minimize releases to drive San Luis Reservoir to dead pool from September through December. This operation is inconsistent with actual operations and causes reductions in upstream storage from May through August. Figure 58 and Figure 59 contain exceedance probability plots of carryover storage and average monthly changes in storage by water year type for Shasta and Folsom for the BDCP and independent modeling. Although carryover storage for Alt 4 and the NAA is similar in the BDCP EIRS modeling, there is drawdown from June through August that may cause impacts to cold water pool management. In the independent modeling upstream reservoirs are drawn down more in years when storage is available while dryer year storage is maintained at higher levels, this is illustrated in the carryover plots for Shasta and Folsom in Figure 58 and Figure 59.

Figure 58. Result Difference: Shasta Storage

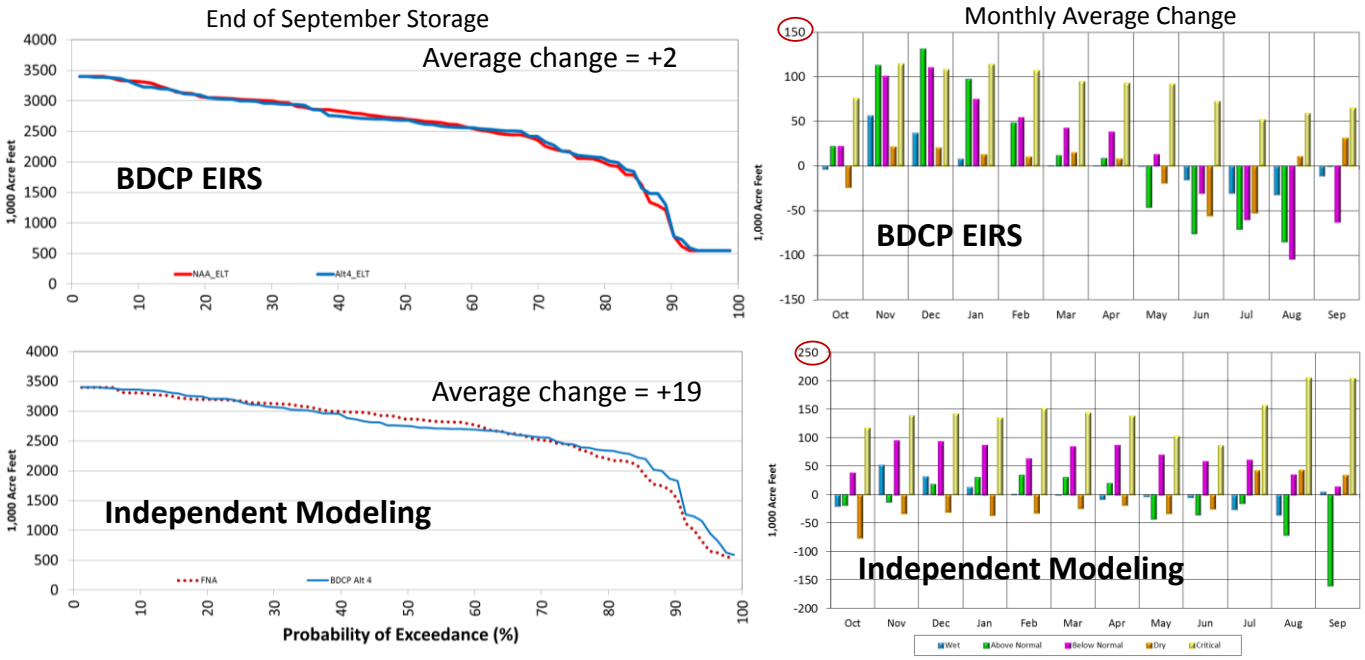
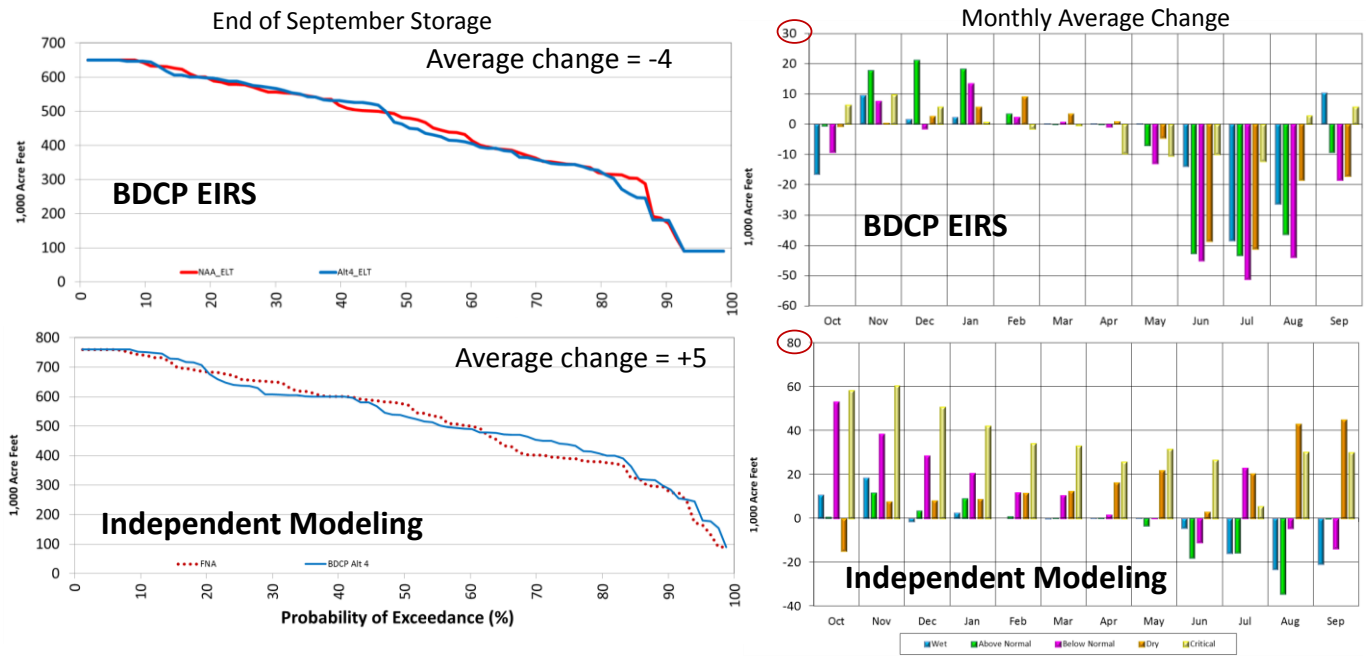


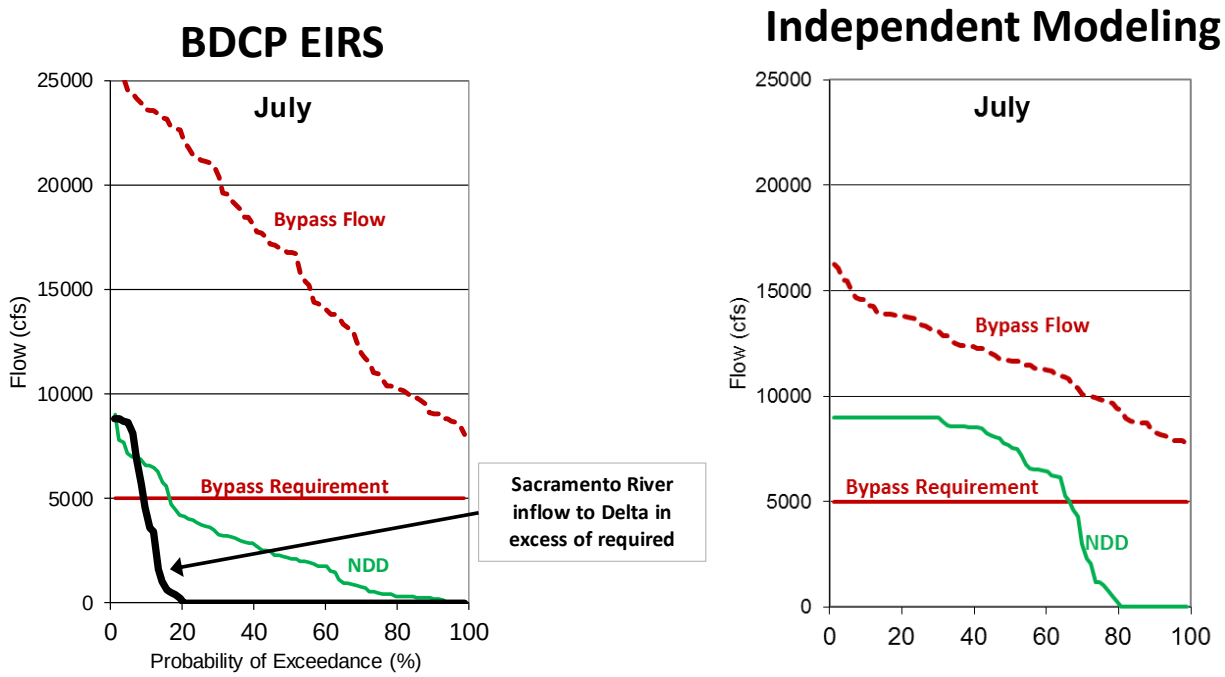
Figure 59. Result Difference: Folsom Storage



North Delta Diversions

Independent modeling shows greater NDD during July and other months because the BDCP EIRS modeling includes artificially high Sacramento River bypass flow requirements. Figure 60 contains exceedance probability plots of Sacramento River required bypass, Sacramento River bypass flow, NDD, and excess Sacramento River flow to the Delta. As can be seen in Figure 60, bypass flow is always above the bypass requirement. The BDCP version of CalSim sets a requirement for Sacramento River inflow to the Delta that the independent modeling does not need in order to satisfy Delta requirements, therefore the NDD is higher in the independent modeling.

Figure 60. NDD, and Sacramento River Flow



Delta flows below the NDD facility

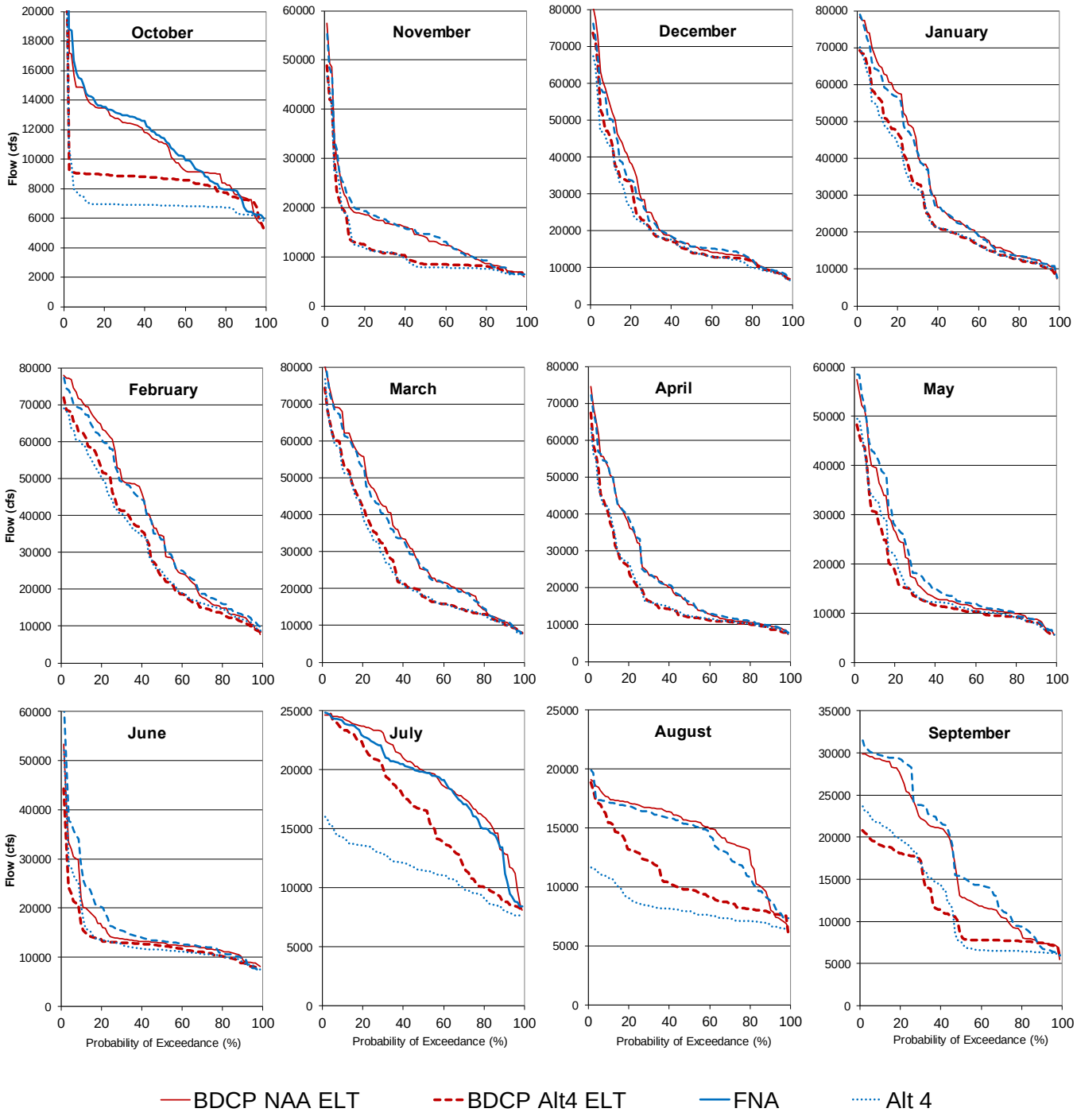
Figure 61 contains monthly exceedance probability plots for Sacramento River below the NDD for the following scenarios: 1) BDCP NAA-ELT, 2) BDCP Alt 4-ELT, 3) independent modeling FNA, and 4) independent modeling Alt 4. The most significant differences in flow changes occur in October, July, August, and September. Changes in Sacramento River flow entering the Delta are a key indicator of changes in interior Delta flows, water levels, and water quality.

For the month of October the independent modeling shows flow below the NDD to be about 2,000 cfs lower than the BDCP modeling. The difference in this month is largely due to reoperation (closure) of the cross channel gate to lessen the amount of Sacramento River flow at Hood necessary to maintain Rio Vista flow requirements downstream of the cross channel gates.

The most substantial difference between the BDCP and independent modeling occurs in July and August. The differences in these two months are primarily attributable to model fixes that have occurred since the BDCP modeling was performed. In the independent modeling, July flows are reduced on average about 7,500 cfs while BDCP shows a reduction of about 3,300 cfs. In the independent modeling August flows are reduced on average about 5,900 cfs while BDCP shows a reduction of about 3,900 cfs.

In the independent modeling September flows are reduced by about 6,100 cfs while BDCP modeling shows a reduction of about 5,300 cfs. The independent modeling shows Sacramento River flow entering the Delta to be about 7,000 cfs 50% of the time, BDCP modeling show Sacramento River flow is about 8,000 cfs 50% of the time.

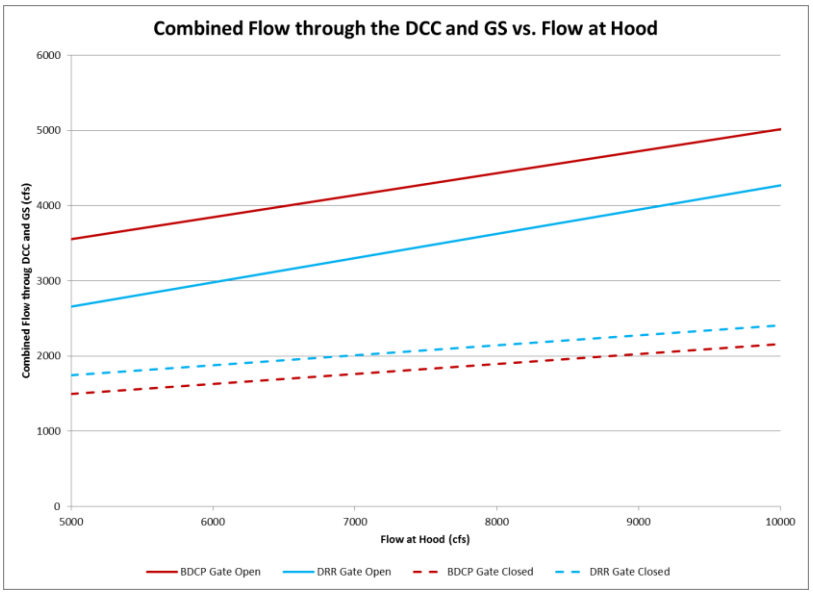
Figure 61. Sacramento River below Hood



Sacramento River water entering the Central Delta

In CalSim, flow through the DCC gate and Georgianna Slough from the Sacramento River into the Central Delta is assumed to be linearly dependent on flow at Hood. There are two linear relationships; one is used when the DCC gates are closed, and the other is used when the DCC gates are open. The 2013 SWP Delivery Reliability Report CalSim II modeling, and therefore our independent modeling, used different linear flow relationships than BDCP. The BDCP and 2013 DRR (and independent) flow relationships for both the open and closed gate conditions are compared in Figure 62. When Sacramento River flow at Hood is in the range from 5,000 cfs to 10,000 cfs the balance between Hood flow, required flow at Rio Vista, and DCC gate operation can affect upstream reservoir operations, SOD exports, and Delta outflow. As shown in Figure 62, given the same flow at Hood and DCC gates closed, the independent analysis will show slightly higher flow into the Central Delta (12% to 17% difference for the Hood flows in the 5,000 cfs to 10,000 cfs range). With DCC gates open the same flow at Hood, the independent analysis will show lower flow into the Central Delta (-15% to -25% difference for the Hood 5,000 cfs to 10,000 cfs range). Figure 63 and Figure 64 show the differences through the DCC and combined flow through the DCC and Georgiana Slough.

Figure 62. Flow through Delta Cross Channel and Georgiana Slough versus Sacramento River Flow at Hood



In addition to the differences in flow equations for portion of Sacramento River entering the interior Delta through the DCC and Georgiana Slough, the DCC gate operations were modified for the month of October. In the independent modeling, the DCC gate is operated to balance the amount of Sacramento River flow needed to meet flow standards at Rio Vista on the Sacramento River and flow needed to meet western Delta water quality. This changed operation often results in DCC gate closures for about 15 days during the month of October. The reduction in flow through the DCC during October can be seen in Figure 64.

Figure 63. Cross Channel Flow

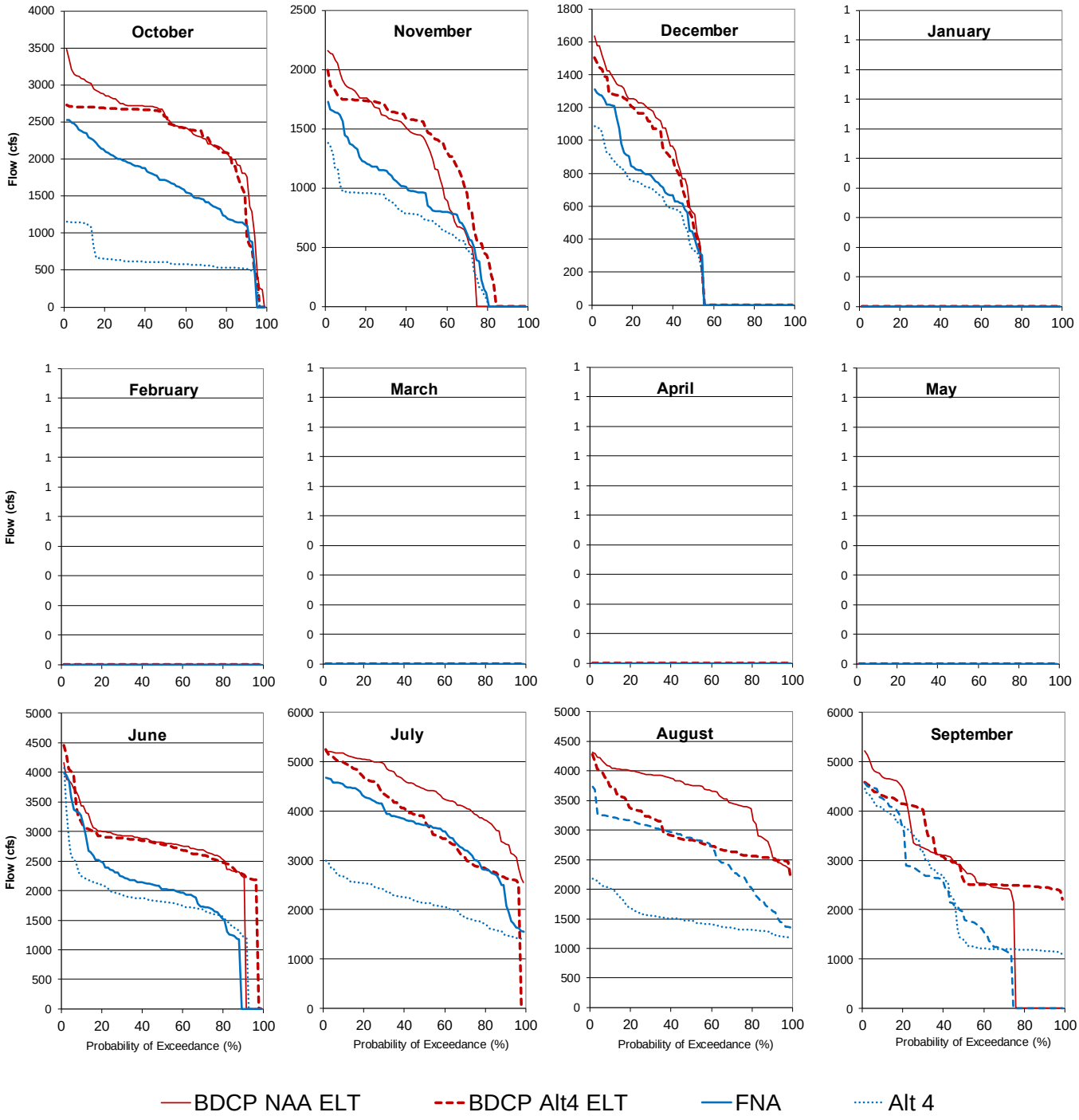
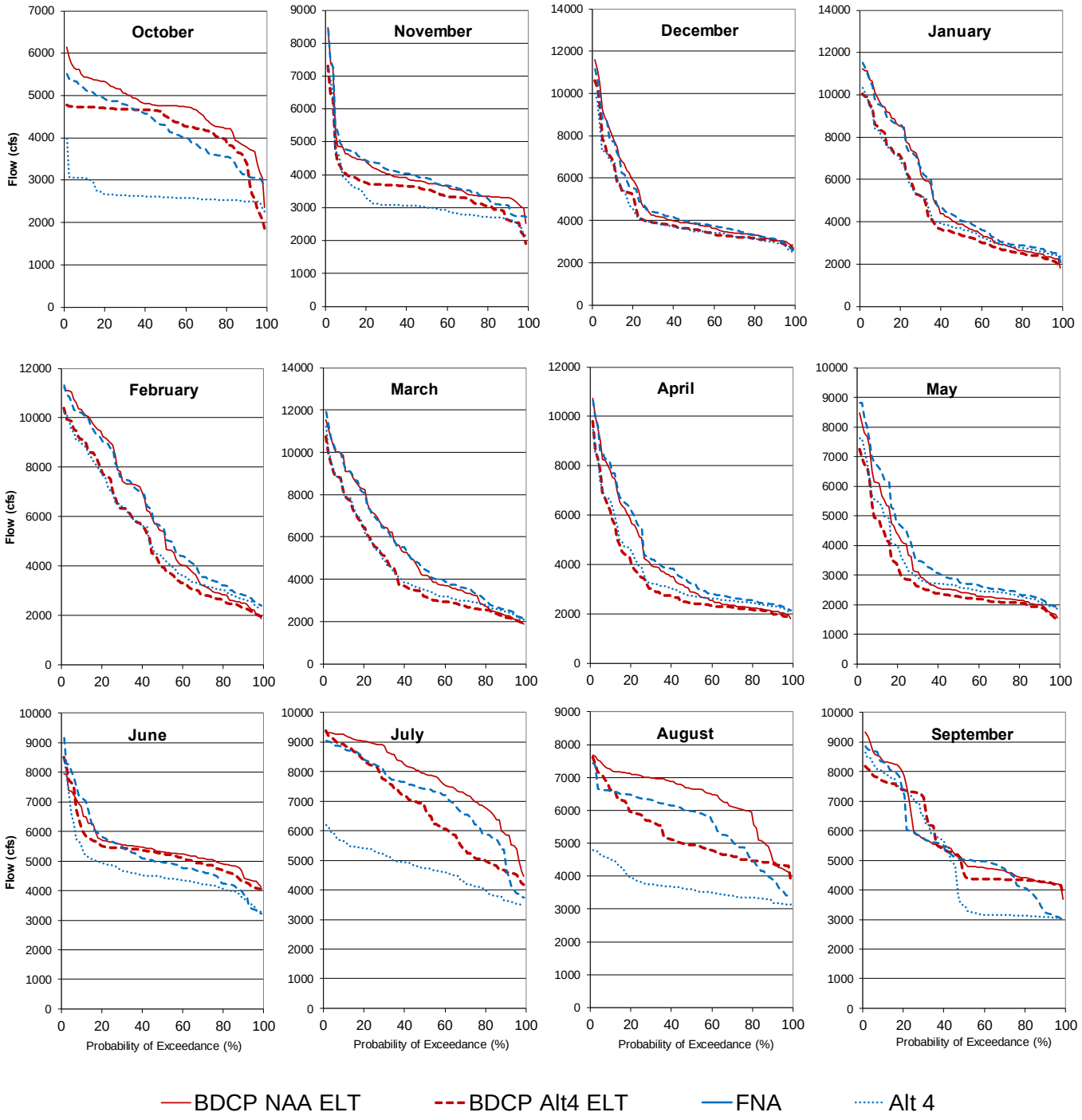


Figure 64. Flow through Delta Cross Channel and Georgiana Slough



Conclusions regarding BDCP effects

Based on the Independent Modeling, the amount of water exported (diverted from the Delta) may be approximately 200 thousand acre-feet (TAF) per year higher than the amount disclosed in the Draft EIR/S. This total represents

- approximately 40 TAF/yr more water diverted and delivered to the SWP south of Delta contractors, and
- approximately 160 TAF/yr more water diverted and delivered to the CVP south of Delta contractors.

The BDCP Model estimates that, under the NAA ELT (without the BDCP), total average annual exports for CVP and SWP combined are estimated to be 4.73 million acre feet (MAF) and in the Independent Modeling FNA combined exports are 5.61 MAF. The BDCP Model indicates an increase in exports of approximately 540 TAF and the Independent Modeling shows an increase of approximately 750 TAF in Alt 4.

The Independent Modeling suggests that Delta outflow would decrease by approximately 200 TAF/yr compared to the amount indicated in the Draft EIR/S.

- This lesser amount of Delta outflow has the potential to cause greater water quality and supply impacts for in-Delta beneficial uses and additional adverse effects on species. To determine the potential effects of the reduced amount of outflow, additional modeling is needed using tools such as DSM2.

The BDCP Model does not accurately reflect the location of the diversions that the SWP and CVP will make from the Delta.

- When the errors in the model are corrected, it reveals that the North Delta intakes could divert approximately 680 TAF/yr more than what was disclosed in the BDCP Draft EIR/S, and
- the amount of water diverted at the existing South Delta facilities would be approximately 460 TAF/yr less than what is projected in the BDCP Draft EIR/S.

Hydrologic modeling of BDCP alternatives using CalSim II has not been refined enough to understand how BDCP may affect CVP and SWP operations and changes in Delta flow dynamics. Better defined operating criteria for project alternatives is needed along with adequate modeling rules to analyze how BDCP may affect water operations. Without a clear understanding of how BDCP may change operations, affects analysis based on this modeling may not produce reliable results and should be revised as improved modeling is developed.

BDCP1674

EXHIBIT D:

Memo: Technical Comments on Bay-Delta Conservation Plan Modeling

Walter Bourez, Patrick Ho, and Gary Kienlen

July 29, 2014

MBK ENGINEERS

Water Resources ● Flood Control ● Water Rights

T E C H N I C A L M E M O R A N D U M

DATE: July 29, 2014

TO: North Delta Water Agency

FROM: Walter Bourez, Patrick Ho, and Gary Kienlen

SUBJECT: Technical Comments on Bay-Delta Conservation Plan Modeling

This technical memorandum is a summary of MBK Engineers' findings and opinions on the hydrodynamic modeling performed in support of the environmental document for the Bay-Delta Conservation Plan (BDCP) for North Delta Water Agency (NDWA). The results of that modeling are summarized in Appendix 5A to the Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the BDCPs.

This review of the BDCP modeling focuses on water quality, stage, flow, and velocity at numerous locations within the NDWA. Although, this memorandum focuses on the following locations, data for other locations reviewed are contained in the Appendix:

- Sacramento River at Emmaton
- Sacramento River at Three Mile Slough
- Sacramento River at Rio Vista
- Steamboat Slough at Sutter Slough
- North Fork Mokelumne River
- Cache Slough at Ryer Island
- Barker Slough at North Bay Aqueduct (NBA)
- Shag Slough

No Action Alternative

Assumptions used in CalSim II water operations modeling and DSM2 Delta hydrodynamic modeling for the BDCP No Action Alternatives (NAA) are defined in the December 2013 BDCP[1] and associated EIR/EIS. Those assumptions include changes to hydrology cause by climate change.

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[1] The detailed assumptions are stated in BDCP EIR/EIS Appendix 5A.

Climate Change

Analysis presented in the BDCP plan and EIR/EIS attempts to incorporate the effects of climate change at two future climate periods: Early Long Term (ELT) at approximately year 2025; and Late Long Term (LLT) at approximately year 2060. Although BDCP modeling includes both the ELT and LLT, the EIR/EIS relies on the LLT and only includes the ELT in Appendix 5. As described in the BDCP plan and EIR/EIS[2], other analytical tools were used to determine anticipated changes to precipitation and air temperature that is expected to occur under ELT and LLT conditions. Projected precipitation and temperature were then used to determine how much water is expected to flow into the upstream reservoirs. These time-series were then input to the CalSim II model to perform water operations modeling and determine Delta inflow, outflow, and exports.

A second aspect of climate change, the anticipated amount of sea level rise, is incorporated into the CalSim II model by modifying a subroutine that determines salinity within the Delta based on flows within Delta channels. Sea level rise is evaluated in greater detail through use of DSM2 using output from CalSim II. Effects of sea level rise will manifest as a need for additional outflow when Delta water quality is controlling operations to prevent seawater intrusion. In this technical memorandum, we do not critique the climate change assumptions themselves[3], we instead focus on effects of BDCP by comparing with project modeling to without project modeling.

There are three without Project ("baseline" or "no action") modeling scenarios used for the BDCP modeling analysis: No Action Alternative (NAA)[4], No Action Alternative at the Early Long Term (NAA-ELT), and No Action Alternative at the Late Long Term (NAA–LLT). Assumptions for NAA, NAA-ELT, and NAA-LLT are provided in the EIR/EIS's modeling appendix[5]. The only difference between these scenarios is the climate-related changes made for the ELT and LLT conditions (Table 1).

Table 1. Scenarios Used to Evaluate Climate Change

	Climate Change Assumptions	
Scenario	**Hydrology**	**Sea Level Rise**
No Action Alternative (NAA)	None	None
No Action Alternative at Early Long Term (NAA-ELT)	Modified reservoir inflows and runoff for expected conditions at 2025	15 cm
No Action Alternative at Early Long Term (NAA-LLT)	Modified reservoir inflows and runoff for expected conditions at 2060	45 cm

[2] BDCP EIR/EIS Appendix 5A, Section A and BDCP HCP/NCCP plan Appendix 5.A.2.
[3] This should not be read to imply that climate change assumptions are reasonable or considered correct or incorrect; the limited review reflects the scope of this memorandum.
[4] NAA is also called the Existing Biological Conditions number 2 (EBC-2) in the Plan.
[5] BDCP EIR/EIS Appendix 5A, Section B, Table B-8.

Description of the BDCP Project

The BDCP contemplates a dual conveyance system that would move water through the Delta's interior or around the Delta through an isolated conveyance facility. The BDCP CalSim II files contain a set of studies evaluating the projected operation of a specific version of such a facility. Each Alternative was imposed on two baselines: the NAA-ELT scenario and the NAA-LLT scenario. The BDCP Preferred Alternative, Alternative 4, has four possible sets of operational criteria, termed the Decision Tree. Key components of Alternative 4 ELT and Alternative 4 LLT are as follows:

The same system demands and facilities as described in the NAA with the following primary changes:

- three proposed North Delta Diversion (NDD) intakes of 3,000 cfs each;
- NDD bypass flow requirements;
- additional positive Old and Middle River (OMR) flow requirements and elimination of the San Joaquin River I/E ratio and the export restrictions during Vernalis Adaptive Management Program;
- modification to the Fremont Weir to allow additional seasonal inundation and fish passage;
- modified Delta outflow requirements in the spring and/or fall (defined in the Decision Tree discussed below);
- relocation of the Emmaton salinity standard; redefinition of the E/I ratio;
- acquisition of 25,000 acres and 65,000 acres of in-Delta lands for ELT and LLT environments respectively for habitat restoration; and
- removal of current permit limitations for the south Delta export facilities.

The changes (benefits or impacts) of the operation due to Alternative 4 are highly dependent upon the assumed operation of not only the NDD and the changed regulatory requirements associated with those facilities, but also by the assumed integrated operation of existing CVP and SWP facilities. The modeling of the NAA scenarios introduces significant changes in operating protocols suggested primarily to react to climate change. The extent of the reaction does not necessarily represent a likely outcome, and thus, the reviewers have little confidence that the NAA baselines are a valid representation of a baseline from which to compare an action Alternative. However, a comparison review of the Alternative 4 to the NAA illuminates operational issues in the BDCP modeling and provides insight as to where benefits or impacts may occur.

BDCP Alternative 4 has four possible sets of operational criteria, termed the Decision Tree, that differ based on the "X2" standards that they contemplate:

- Low Outflow Scenario (LOS), otherwise known as operational scenario H1, assumes existing spring X2 standard and the removal of the existing fall X2 standard;
- High Outflow Scenario (HOS), otherwise known as H4, contemplates the existing fall X2 standard and providing additional outflow during the spring;
- Evaluated Starting Operations (ESO), otherwise known as H3, assumes continuation of the existing X2 spring and fall standards;
- Enhanced spring outflow only (not evaluated in the BDCP), scenario H2, assumes additional spring outflow and no fall X2 standards.

While it is not entirely clear how the Decision Tree would work in practice, the general concept is that, prior to operation of the NDD, implementing authorities would select the appropriate Decision Tree scenario (from amongst the four choices) based on their evaluation of targeted research and studies to be conducted during planning and construction of the facility.

Our review examined the ESO (or H3) scenario (labeled Alt 4-ELT or Alt 4-LLT) because it employs the same X2 standards which are implemented in NAA-ELT and NAA-LLT. This allowed the Reviewers to focus the analysis on the effects of the BDCP operations independent of the possible change in the X2 standard.

Method of Review

The first part of the review focused on effects of Delta hydrodynamics determined by DSM2 Models used in support of the EIR/EIS. During a separate review of the CalSim II modeling used in support of the EIR/EIS (Model), MBK Engineers and Dan Steiner found that the Model provided very limited useful information to understand the effects of BDCP. The Model contains erroneous assumptions, errors, and outdated tools, which result in impractical or unrealistic Central Valley Project (CVP) and State Water Project (SWP) operations. The unrealistic operations, in turn, do not accurately depict the effects of the BDCP. The Model used in support of the EIR/EIS analyzes NDD and habitat restoration as inseparable project components; therefore, it is not possible to distinguish whether the effects of the project are due to climate change, NDD operations or the proposed habitat restoration. Moreover, it is possible, if not probable, that NDD could be constructed and operating for an extended period of time without the proposed habitat in place. Habitat restoration requires time to establish its intended functionality and effects to Delta hydrodynamics and salinity from operating the NDD itself cannot be evaluated under the Model. To separate and understand the effects, the independent DSM2 modeling included two additional scenarios, an NAA with habitat scenario and an Alternative 4 NDD (Alt 4 NDD) without habitat scenario.

An independent CalSim II water operation modeling analysis was thus performed by MBK Engineers and a subsequent DSM2 Delta hydrodynamics modeling analysis was performed and provided by Contra Costa Water District. Assumptions used in the Independent CalSim II water operations modeling are described in a report prepared by MBK Engineers and Dan Steiner titled “Report on Review of Bay Delta Conservation Program Modeling” (MBK, 2014).

The DSM2 Independent Modeling provides two Alternative 4 scenarios: 1) Alt 4 NDD without climate change, sea level rise, and habitat restoration; and, 2) Alt 4 NDD without Climate Change and sea level rise, but includes 25,000 acres of habitat. For basis of comparison, a NAA without climate change, sea level rise, and habitat was provided.

Outputs were extracted from the DSM2 modeling and flows, stage, velocities, and salinity under the alternative were compared against the baseline, i.e. Alt 4 ELT is compared to NAA-ELT and Alt 4 LLT is compared to NAA-LLT. DSM2 simulates from October 1974 to September 1991 and produces output at 15-minute intervals. Daily maximums, minimums, and averages are then calculated from the 15-minute data. To provide meaning to the data, daily exceedance charts were produced. Percent exceedance describes the portion of the dataset, expressed in percentages, that exceeds a specific level. For example, a 90% flow exceedance of 200,000 cfs means that 90% of the daily flow during the simulated period, i.e. October 1974 to September 1991, is greater than 200,000 cfs. Exceedances provide an

overall view of the entire dataset in an ordered manner. When alternatives are plotted together, differences between the alternatives are easily distinguishable and potential project effects can be identified.

Hydrodynamics and salinity were reviewed at various locations within NDWA. For the purposes of this review locations reviewed include the NDWA contract compliance points on the Sacramento River at Three Mile Slough, Rio Vista and Walnut Grove, Steamboat Slough at Sutter Slough, and the North Fork Mokelumne River at Walnut Grove. It is the reviewers' understanding that the majority of the habitat areas will be located within the lower Yolo Bypass area; therefore, the Cache Slough complex, which includes lower Cache Slough, Shag Slough, and Barker Slough and another area of interest to the NDWA and its landowners. In the inner Delta, changes in cross channel gate operations at Walnut Grove will control the hydrodynamics of the Mokelumne River; and therefore, effects of flow, stage, and velocities along the North Fork Mokelumne River were reviewed.

Summary of findings

BDCP Modeling

Figure 1 through Figure 16 illustrates hydrodynamics, and water quality under the NAA-ELT and the Existing Conditions from the EIR/EIS. Positive maximum values quantify daily outgoing, or ebb tides, while negative minimum values quantify daily incoming (reverse), or flood tides. Under the NAA-ELT, daily positive flows and daily reverse flows increase, while daily maximum, average, and minimum stage are increased throughout the system when compared to existing conditions. As shown in Figure 1, for the Sacramento River at Emmaton, daily outgoing flows increase by an average of 4,335 cfs, while daily average reverse flow increase by 3,614 cfs. As illustrated in Figure 2, daily maximum, average, and minimum stage on the Sacramento River at Emmaton increases by approximately 0.5 feet when compared to existing conditions. Similar effects are observed in velocities at Emmaton. Figure 3 illustrates increases in daily average outgoing and incoming velocity. Positive changes in daily maximum represent an increase in velocity on the outgoing tide, while negative changes in daily minimum velocity represent an increase in velocity on the incoming tide. Increased velocities have the potential to induce scouring along channels and undermine levee stability. Figure 6 illustrates the 14-day running average salinity, expressed as electrical conductivity in millimhos per centimeter, for the Sacramento River at Threemile Slough over the simulation period. The NDWA contract provision at Three Mile Slough is plotted to emphasize periods of contract compliance or non-compliance. Water quality is in compliance when the 14-day running average is less than the allowed salinity concentration. Likewise, water quality is non-compliant when the 14-day running average exceeds allowed salinity concentration. To summarize Figure 6, non-compliant days were counted for the simulation period and expressed as a percentage of non-compliant days in the simulation period, or 6,209 days. Figure 7 illustrates the percentage of 6,209 days that were non-compliant, and also quantifies the concentration in excess of contract compliance under the NAA-ELT and existing conditions. Overall, water quality in the Sacramento River at Three Mile Slough is worse under NAA-ELT when compared to existing conditions. Under the existing conditions, 472 days were non-compliant under NDWA contract provisions, while 736 days were non-compliant under the NAA-ELT. Similar effects to flows, stage, velocities, and water quality are observed in the Sacramento River at Three Mile Slough, the Sacramento River at Rio Vista, Steamboat Slough at Sutter Slough, Barker Slough at the NBA pumping plant, and Shag Slough, illustrated from Figure 6 through Figure 16.

Figures 17 through 32 illustrate percent exceedances of hydrodynamics and water quality under the NAA-ELT and Alt 4-ELT. In the Sacramento River at Emmaton and Rio Vista, under Alt 4-ELT, daily positive flows and daily reverse flows increase, while daily average flow decreases when compared to NAA-ELT. Moreover, daily maximum stage decreases, while daily minimum stage increases when compared to NAA-ELT. At Emmaton, daily average flow decreases by approximately 1,370 cfs, daily average positive flows increase by approximately 10,680 cfs, while daily average reverse flow increases by approximately 8,450 cfs as illustrated in Figure 17. Daily maximum stage decreases on an average of 0.32 feet, while daily minimum stage increases on average by approximately 0.37 feet as illustrated in Figure 18. Decreases in daily maximum stage and increases in daily minimum stage could be explained by the transport of flood and ebb tides into proposed habitat areas, which provides a dampening effect to hydrodynamics in the Delta system.

Although habitat areas are not clearly defined, the effects are observed at lower parts of the Delta system, such as the observations at Emmaton. Figure 23 and Figure 27 illustrates an improvement in water quality in the Sacramento River at Rio Vista and at Three Mile Slough under Alt 4-ELT when compared to NAA-ELT. In Steamboat Slough at Sutter Slough, daily maximum, average, and minimum flows decrease under ALT 4-ELT as illustrated in Figure 28. As would be expected with decreased flows, decreases in stage also were also observed in Steamboat Slough, where daily average stage decreased by approximately 0.25 feet and the maximum stage is reduced on average by approximately 0.53 feet under Alt 4-ELT when compared to NAA-ELT. At the NBA pumping plant on Barker Slough daily maximum stage is decreased on average by approximately 0.6 feet, while daily minimum stage is increased on average by approximately 0.77 feet as illustrated in Figure 31. At Shag Slough, daily maximum stage is reduced on average by 0.55 feet, while daily minimum stage is increased on average by approximately 0.57 feet as illustrated in Figure 32.

In summary, water quality is worsened under NAA-ELT when compared with existing conditions. At Three Mile Slough, the number of days not compliant with NDWA water quality contract provisions has increased by 264 days under NAA-ELT, compared to existing conditions. However, water quality improves under Alt 4 ELT when compared to NAA-ELT. An assumption under the ELT climate change environment is a 15 cm sea level rise. Sea level rise increases stage throughout the Delta system, which may result in increased seepage and flood risk to Delta Islands. However, under the project alternative (Alt 4), daily maximum stages are reduced, while daily minimum stage increases when compared to NAA-ELT.

Independent Modeling

Figures 33 through 52 illustrate hydrodynamics and water quality under the NAA without habitat and NAA with habitat. Under NAA with habitat, daily positive flows and daily reverse flows increase in the Sacramento River at Emmaton and at Rio Vista, while daily average flow decreases when compared to NAA without habitat. Moreover, daily maximum stage decreases, while daily minimum stage increases when compared to NAA with habitat. At Emmaton, daily average flow increases by approximately 170 cfs, daily average positive flows increase by approximately 9,590 cfs, while daily average reverse flow increase by approximately 5,125 cfs, as illustrated in Figure 33. Daily maximum stage decreases on an average of 0.31 feet, while daily minimum stage increases on average by approximately 0.36 feet, as illustrated in Figure 34. Figures 37 and 39 illustrate improvement in water quality in the Sacramento River at Emmaton and at Three Mile Slough under the NAA with habitat, when compared to NAA without habitat. For Steamboat Slough at Sutter Slough, daily maximum, average, and minimum flows

decrease under NAA without habitat as illustrated in Figure 44. Corresponding changes in stage are also observed; the daily average stage is reduced by approximately 0.1 feet, daily maximum stage is reduced on average by approximately 0.42 feet, while daily minimum stage is increased on average by 0.2 feet under NAA with habitat compared to NAA without habitat.

In the interior Delta, daily positive flow in the North Fork Mokelumne River increase on average by 1,140 cfs, while daily reverse flow increase on by 2,755 cfs, as illustrated in Figure 47. Daily maximum stage decreases on average by approximately 0.72 feet while daily minimum stage increases on average by approximately 0.8 feet, as illustrated on Figure 48. In Cache Slough at Ryer Island, daily maximum stage decrease on average by approximately 0.5 feet, while daily minimum stage increases by an average of approximately 0.5 feet. In Barker Slough at the NBA pumping plant, daily maximum stage is reduced approximately 0.6 feet on average, while daily minimum stage is increased on average by approximately 0.76 feet, as illustrated in Figure 51. At Shag Slough, daily maximum stage is reduced on average by 0.52 feet, while daily minimum stage is increased an average of 0.56 feet, as illustrated in Figure 52.

Figures 53 through 72 compare the hydrodynamics and water quality under Alternative 4 with habitat and NAA without habitat. The effects are similar in pattern when compared to the models in support of the EIR/EIS. In the Sacramento River at Emmaton and at Rio Vista, under Alt 4 with habitat, daily positive flows and daily reverse flows increase, while the daily average flows decrease when compared to NAA without habitat. Moreover, daily maximum stage decreases, while daily minimum stage increases when compared to NAA without habitat. At Emmaton, daily average flow decreases by approximately 1,800 cfs, daily average positive flows increase by 8,600 cfs, while daily average reverse flow increase by 7,460 cfs, as illustrated in Figure 53. Daily maximum stage decreases by an average of 0.32 feet, while daily minimum stage increases by approximately 0.36 feet, as illustrated in Figure 54. Figure 57 and Figure 59 illustrate worsening water quality in the Sacramento River at Rio Vista and at Three Mile Slough under Alt 4 with habitat when compared to NAA without habitat. In Steamboat Slough at Sutter Slough, daily maximum, average, and minimum flows decrease under ALT 4 with habitat, as illustrated in Figure 64. Daily average stage is reduced by 0.29 feet, while daily maximum stage is reduced on average by 0.56 feet under Alt 4 with habitat when compared to NAA without habitat. In the interior Delta, daily positive flow in the North Fork Mokelumne River increase on average by 1,140 cfs, while daily reverse flow increases by 2,750 cfs, as illustrated in Figure 67. Daily maximum stage decreases on average by approximately 0.72 feet while daily minimum stage increases on average by 0.8 feet, as illustrated by Figure 68. In Cache Slough at Ryer Island, daily maximum stage decrease on average approximately by 0.53 feet, while daily minimum stage increase on average approximately by 0.5 feet. At the NBA pumping plant on Barker Slough, daily maximum stage is reduced on average approximately by 0.62 feet, while daily minimum stage is increased on average approximately by 0.75 feet, as illustrated in Figure 71. At Shag Slough, daily maximum stage is reduced on average approximately by 0.54 feet, while daily minimum stage is increased on average approximately by 0.55 feet, as illustrated in Figure 72.

Figures 73 through 92 compare hydrodynamics and water quality under Alternative 4 without habitat and NAA without habitat. On the Sacramento River at Emmaton and Rio Vista, under Alt 4 without habitat, daily positive flows, daily reverse flows, and daily average flows decrease when compared to NAA without habitat. Changes in daily maximum, minimum, and average stage is immeasurable when compared to NAA without habitat. At Emmaton, daily average flow decreases approximately by 2,260 cfs, daily average positive flows decrease approximately by 1,060 cfs, while daily average reverse

flow increase approximately by 2,650 cfs, as illustrated in Figure 73. Figure 77 and Figure 79 illustrate worsening in water quality in the Sacramento River at Emmaton and at Three Mile Slough under Alt 4 without habitat when compared to NAA without habitat. In Steamboat Slough at Sutter Slough, daily maximum, average, and minimum flows decrease under ALT 4 with habitat, as illustrated in Figure 84. Daily average stage is reduced approximately by 0.21 feet and daily maximum stage is reduced on average approximately by 0.13 feet. Daily average stage is reduced by 0.21 feet under Alt 4 without habitat when compared to NAA without habitat. In the interior Delta, daily positive flow in the North Fork Mokelumne River decrease on average by 230 cfs, while daily reverse flow increase on by 300 cfs, as illustrated in Figure 87. Changes in stage are immeasurable under Alt 4 without habitat as illustrated in Figure 88. Daily maximum, minimum and average stage in Cache Slough at Ryer Island, at the NBA pumping plant on Barker Slough, and at Shag Slough decrease by 0.02 feet, as illustrated in Figures 90 through 92.

The EIR/EIS did not analyze the NDD without habitat restoration. Therefore, the impacts of the project cannot be adequately assessed if the NDD were to begin operating before habitat areas are acquired and established. Contrary to the Model in support of the EIREI/S, the independent analysis, without habitat, Alt 4 results worsening of water quality at Emmaton and Three Mile Slough when compared to NAA without habitat. Also, daily maximum, minimum, and average flow decrease at Emmaton and Rio Vista.

Conclusions and Recommendations

Based on the BDCP modeling, water quality under Alt 4 NAA-ELT worsens when compared with existing conditions. At Three Mile Slough, the number of days where water quality is not compliant with NDWA contract increases by 264 days under NAA-ELT, compared to existing conditions. Because the BDCP modeling includes assumptions regarding climate change and sea level rise, effects of Alt 4 water operations are not easily discernable. Additionally, the Modeling used in support of the EIR/EIS analyzes NDD and habitat restoration as inseparable project components; therefore, it is not possible to distinguish whether the effects indicated by the BDCP modeling are due to NDD operations or the proposed habitat restoration. Furthermore, it is possible, if not probable, that NDD could be constructed and operating for an extended period of time without the proposed habitat in place. Habitat restoration requires time to establish its intended functionality and effects to Delta hydrodynamics and salinity from operating the NDD itself cannot be evaluated under the BDCP Model.

In addition to water quality, the project's effects on river stage, flows, and velocities are of great interest to NDWA. Reductions in river stage to levels below historical elevations will result in impacts to both those who rely on gravity, and those who rely on pumped diversions. Siphons in the Delta were designed to operate within the historical tidal range. Reductions in river stage below historical low water elevations will impact the ability of some siphons to function at lower tides. For those who rely on pumped diversions, lower river stage will increased energy usage and pumping costs. Furthermore, increased river stage may result in increased seepage, requiring additional maintenance for drainage.

For the reasons stated above, it is recommended that the BDCP analyze effects of operating the NDD without the habitat restoration and without the effects of climate change to assess both short and long term impacts of the proposed project. Further, the analysis should utilize the updated CalSim II operations and DSM2 hydrodynamics models.

NO ACTION ALTERNATIVE ELT VS. EXISTING CONDITIONS (BDCP EIR/EIS MODELING)

No Action Alternative ELT vs. Existing Conditions (BDCP EIR/EIS Modeling)

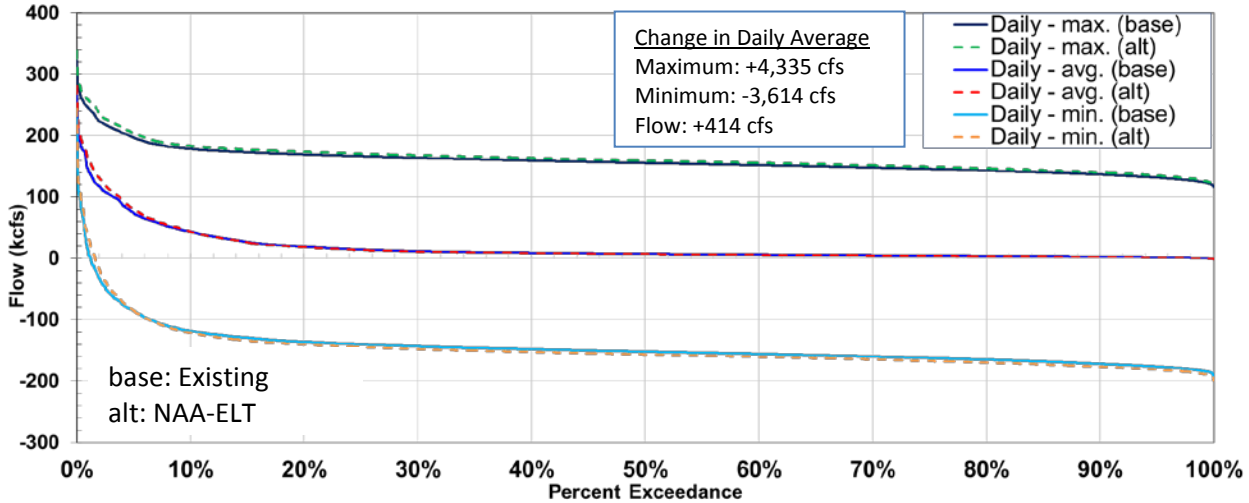

Figure 1. Daily Flow on the Sacramento River at Emmaton

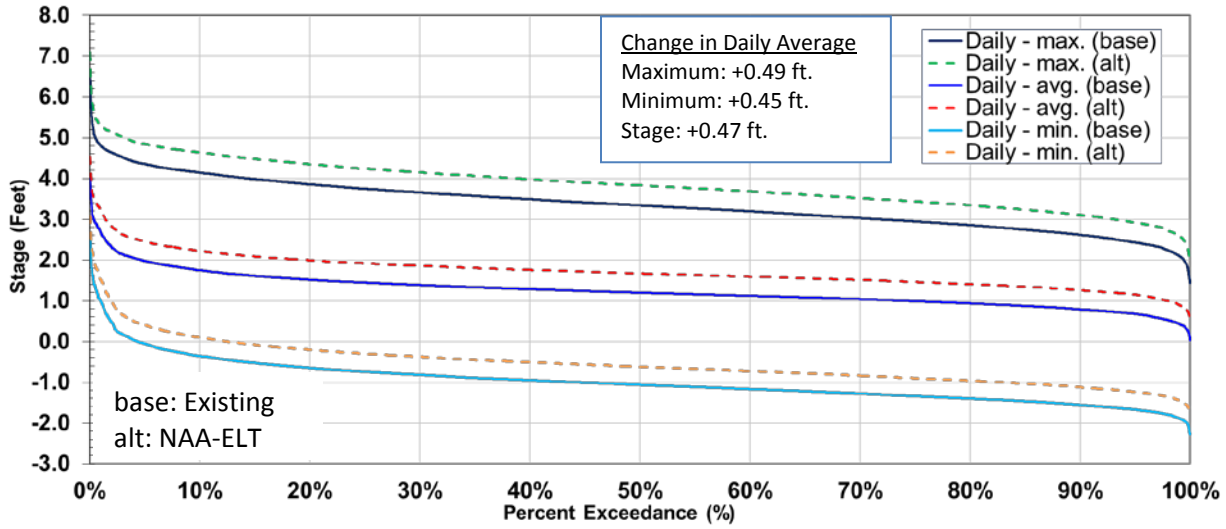

Figure 2. Daily Stage on the Sacramento River at Emmaton

No Action Alternative ELT vs. Existing Conditions (BDCP EIR/EIS Modeling) Continued

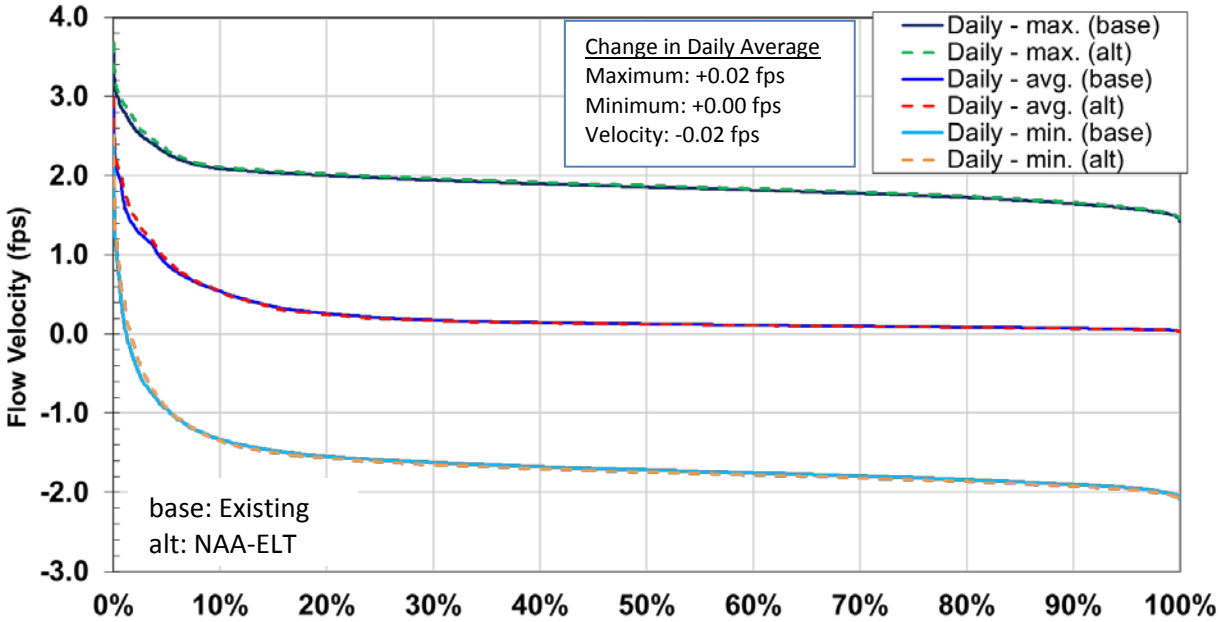

Figure 3. Daily Velocities on the Sacramento River at Emmaton

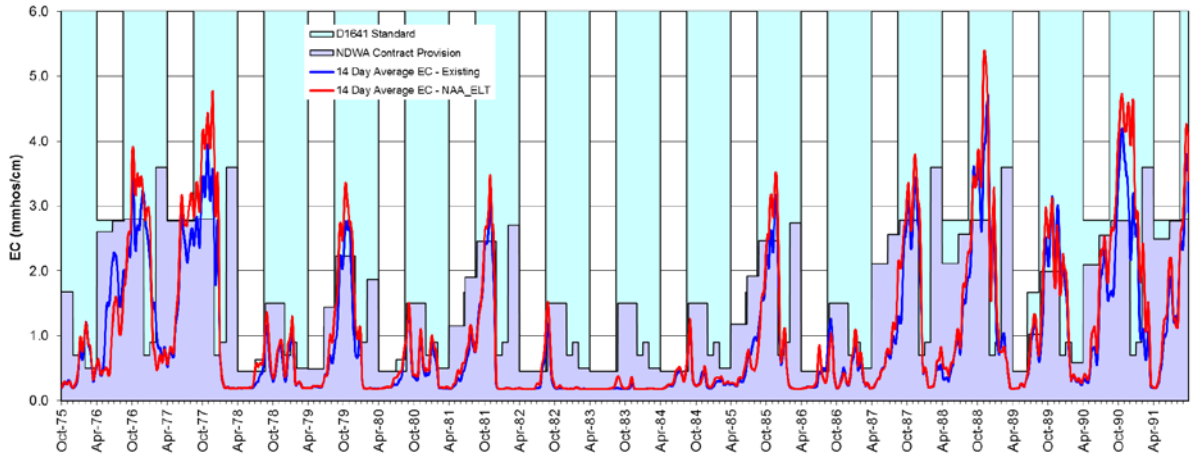

Figure 4. EC in the Sacramento River at Emmaton

No Action Alternative ELT vs. Existing Conditions (BDCP EIR/EIS Modeling) Continued

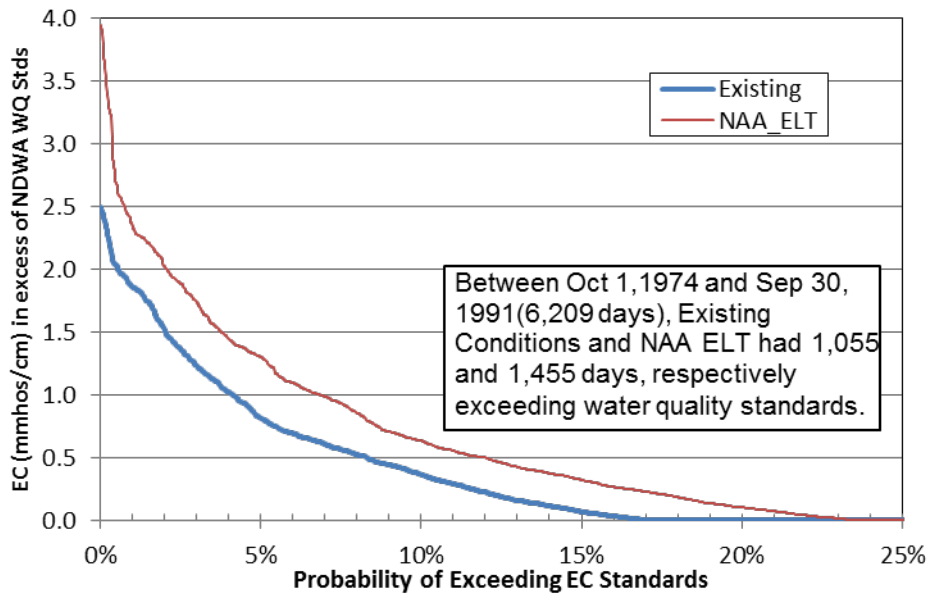

Figure 5. Probability of Exceeding EC Standards in the Sacramento River at Emmaton

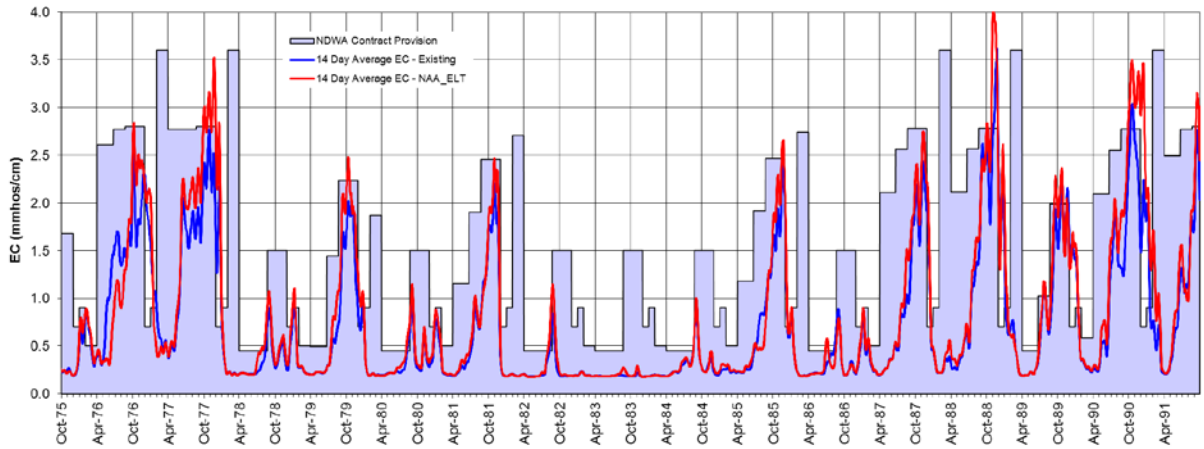

Figure 6. EC in the Sacramento River at Three Mile Slough

No Action Alternative ELT vs. Existing Conditions (BDCP EIR/EIS Modeling) Continued

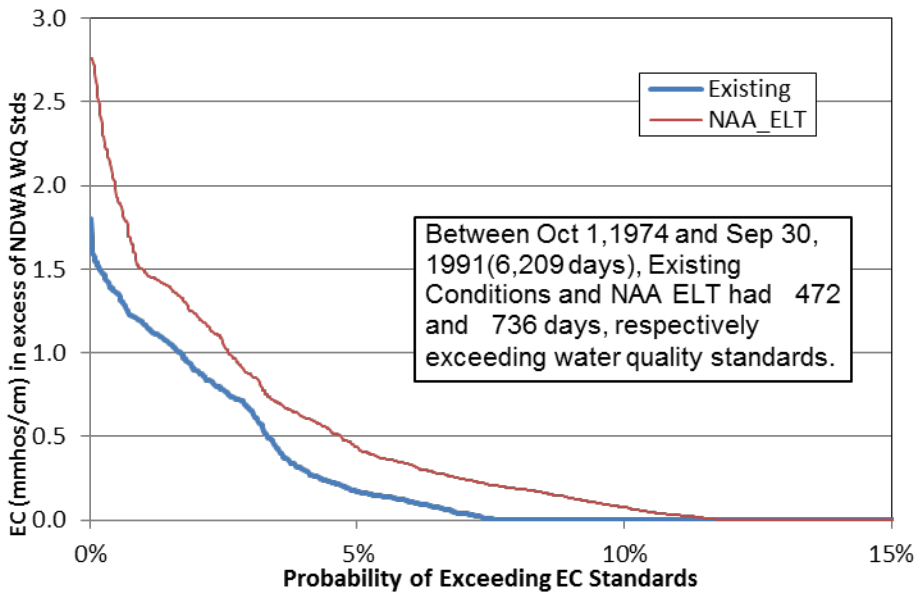

Figure 7. Probability of Exceeding EC Standards in the Sacramento River at Three Mile Slough

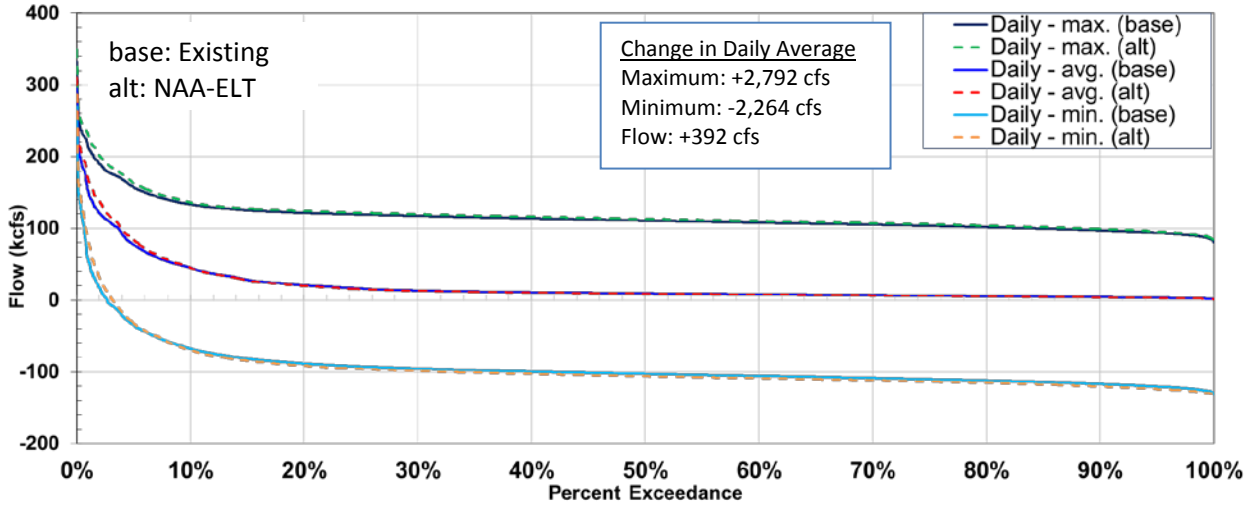

Figure 8. Daily Flow on the Sacramento River at Rio Vista

No Action Alternative ELT vs. Existing Conditions (BDCP EIR/EIS Modeling) Continued

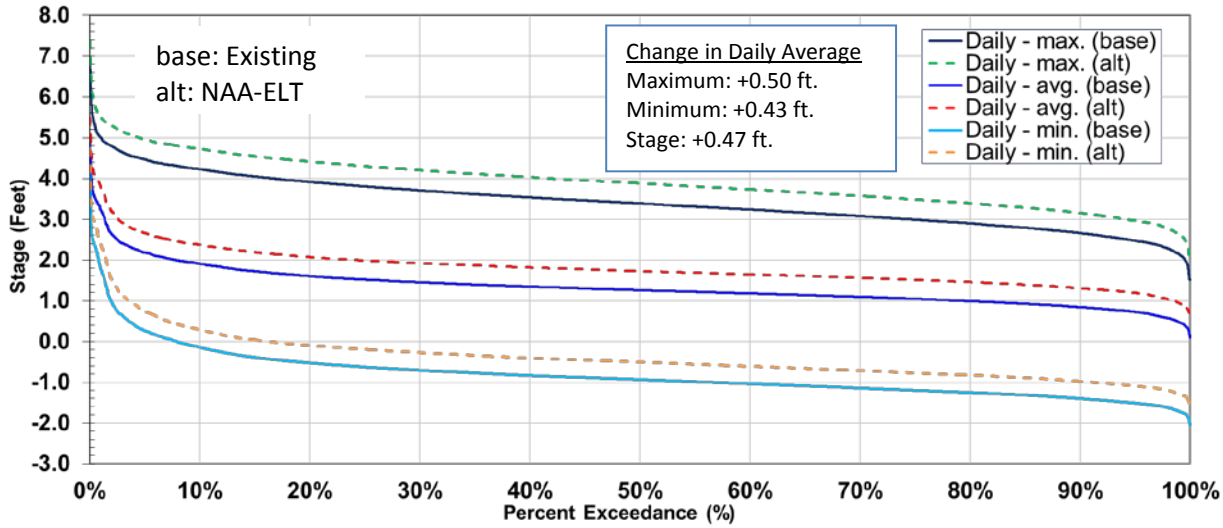

Figure 9. Daily Stage on the Sacramento River at Rio Vista

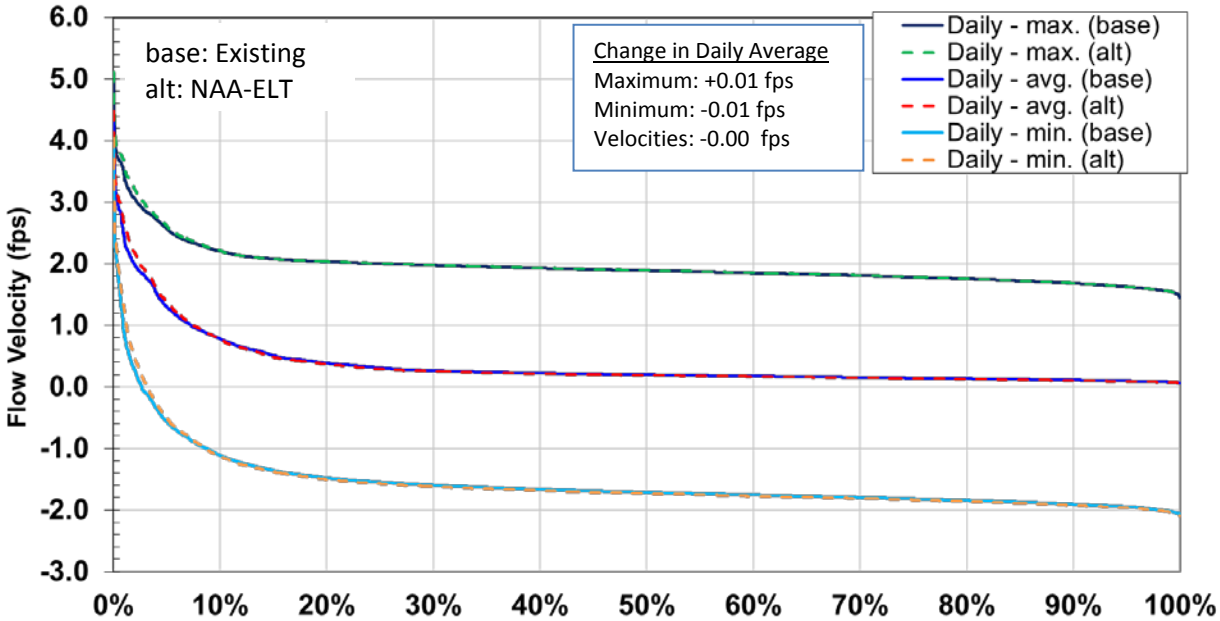

Figure 10. Daily Velocities on the Sacramento River at Rio Vista

No Action Alternative ELT vs. Existing Conditions (BDCP EIR/EIS Modeling) Continued

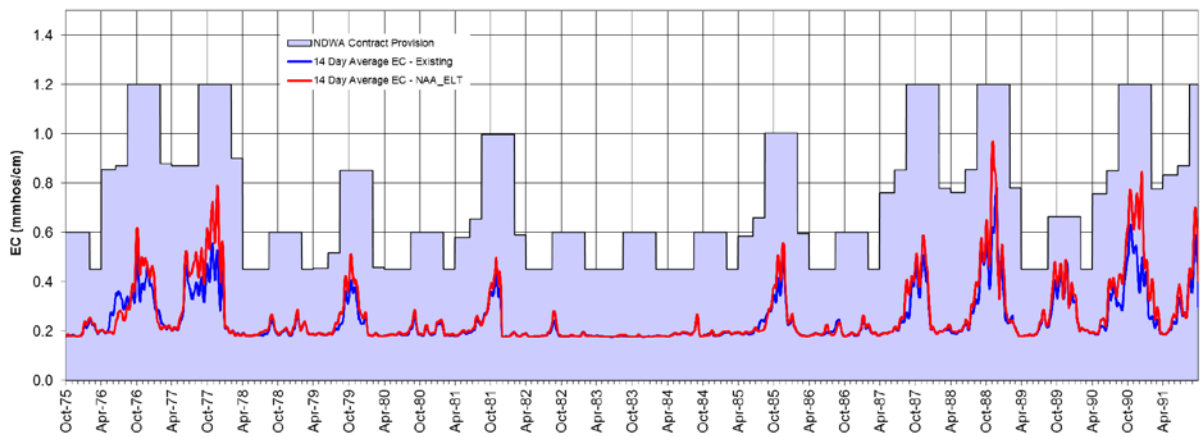

Figure 11. EC in the Sacramento River at Rio Vista

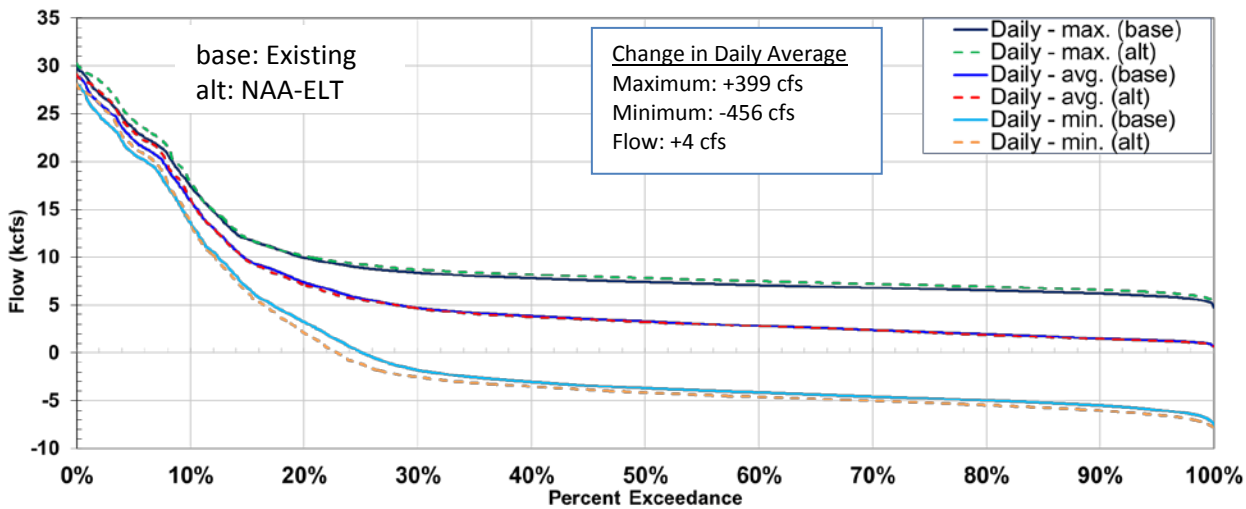

Figure 12. Daily Flow on Steamboat Slough at Sutter Slough

No Action Alternative ELT vs. Existing Conditions (BDCP EIR/EIS Modeling) Continued

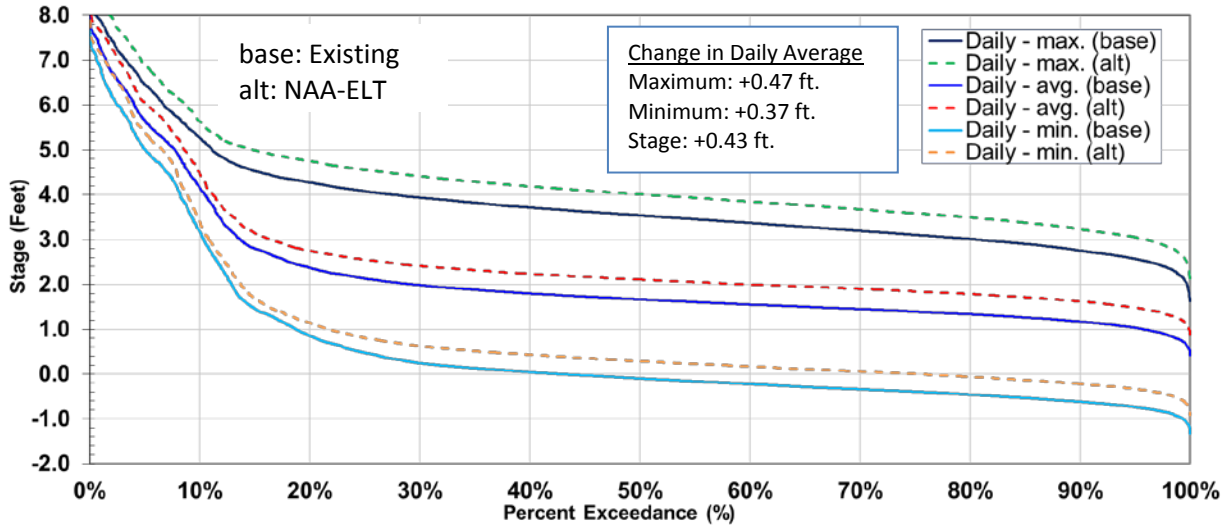

Figure 13. Daily Stage on Steamboat Slough at Sutter Slough

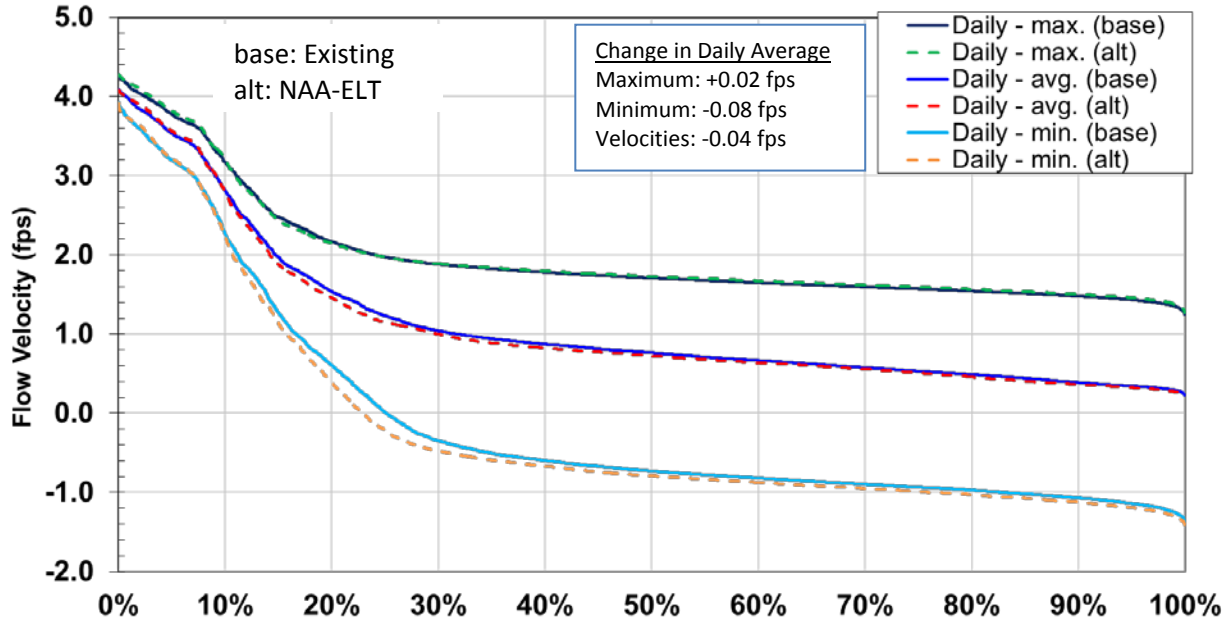

Figure 14. Daily Velocities on Steamboat Slough at Sutter Slough

No Action Alternative ELT vs. Existing Conditions (BDCP EIR/EIS Modeling) Continued

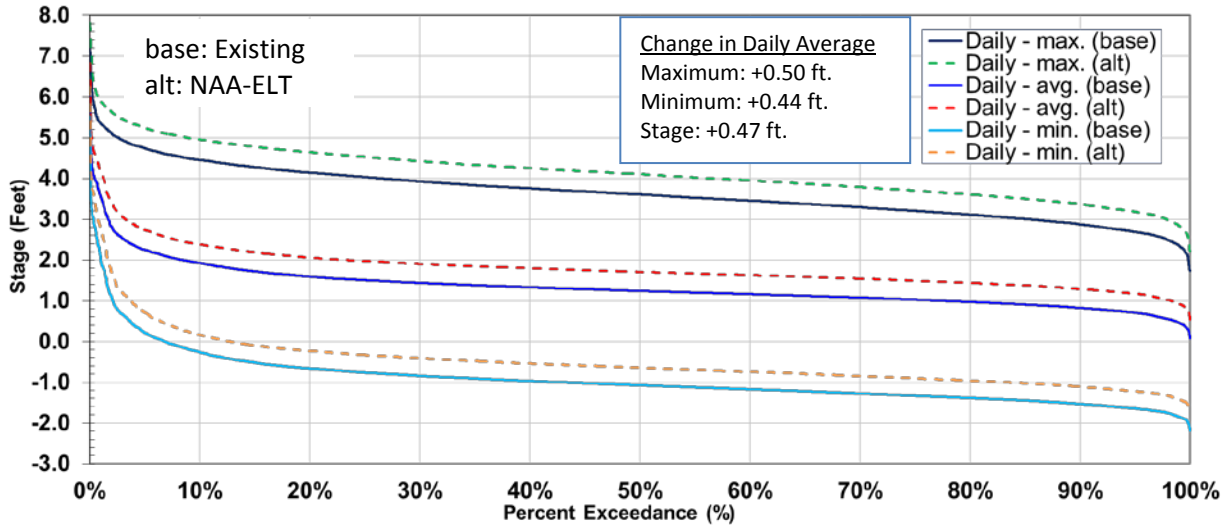

Figure 15. Daily Stage in Barker Slough at NBA Intakes

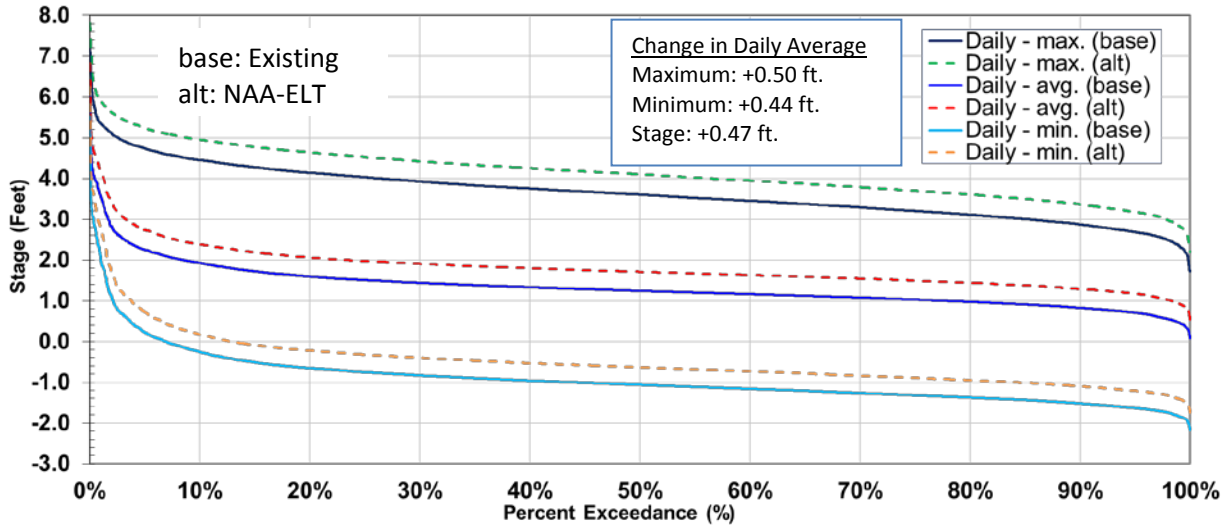

Figure 16. Daily Stage in Shag Slough

NO ACTION ALTERNATIVE ELT VS. ALTERNATIVE 4 ELT (BDCP EIR/EIS MODELING)

No Action Alternative ELT vs. Alternative 4 ELT (BDCP EIR/EIS Modeling)

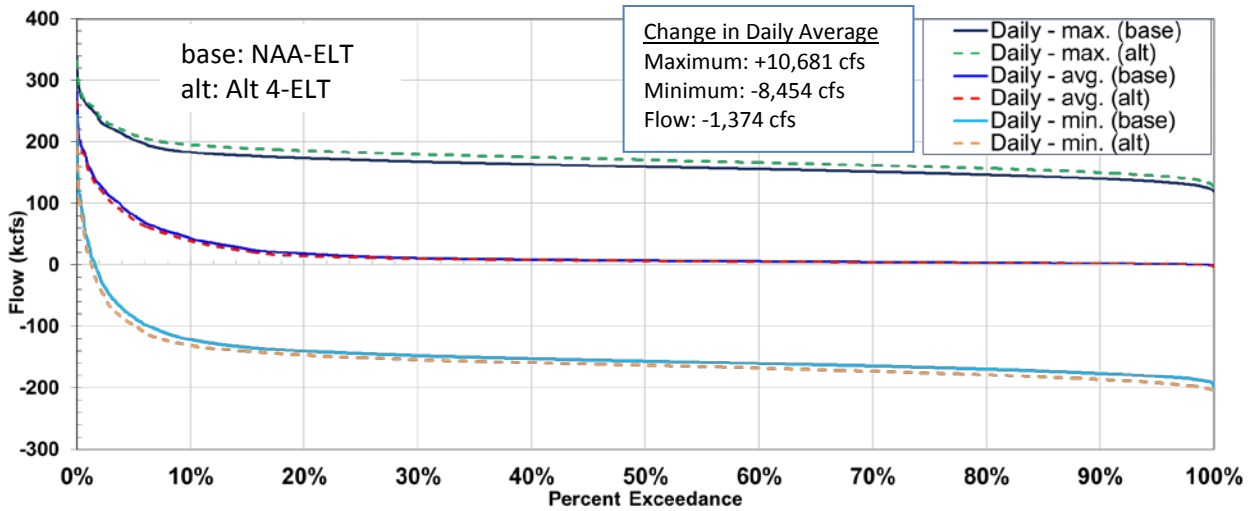

Figure 17. Daily Flow in the Sacramento River at Emmaton

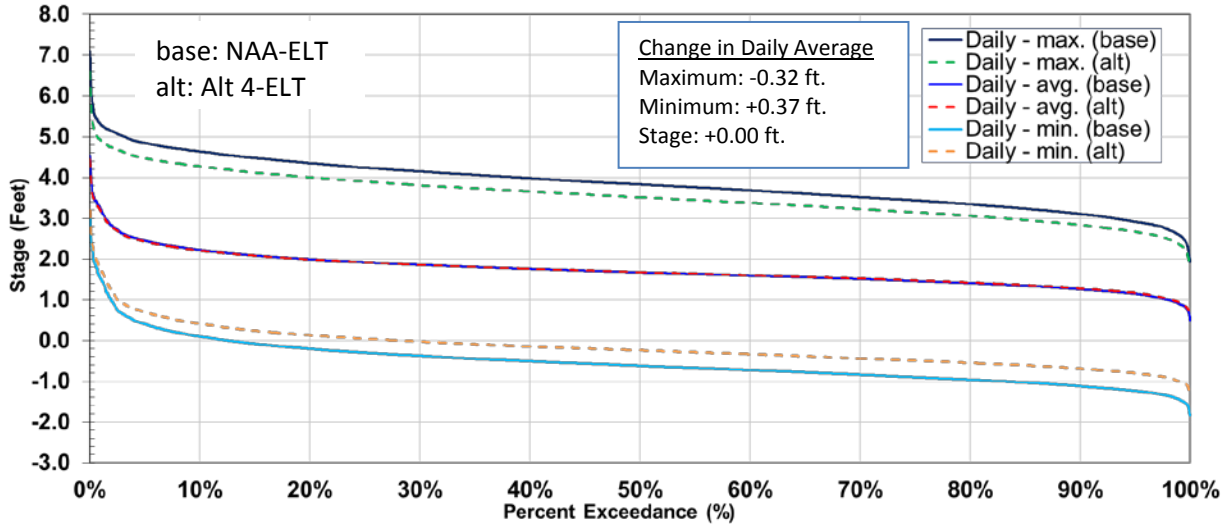

Figure 18. Daily Stage in the Sacramento River at Emmaton

No Action Alternative ELT vs. Alternative 4 ELT (BDCP EIR/EIS Modeling) Continued

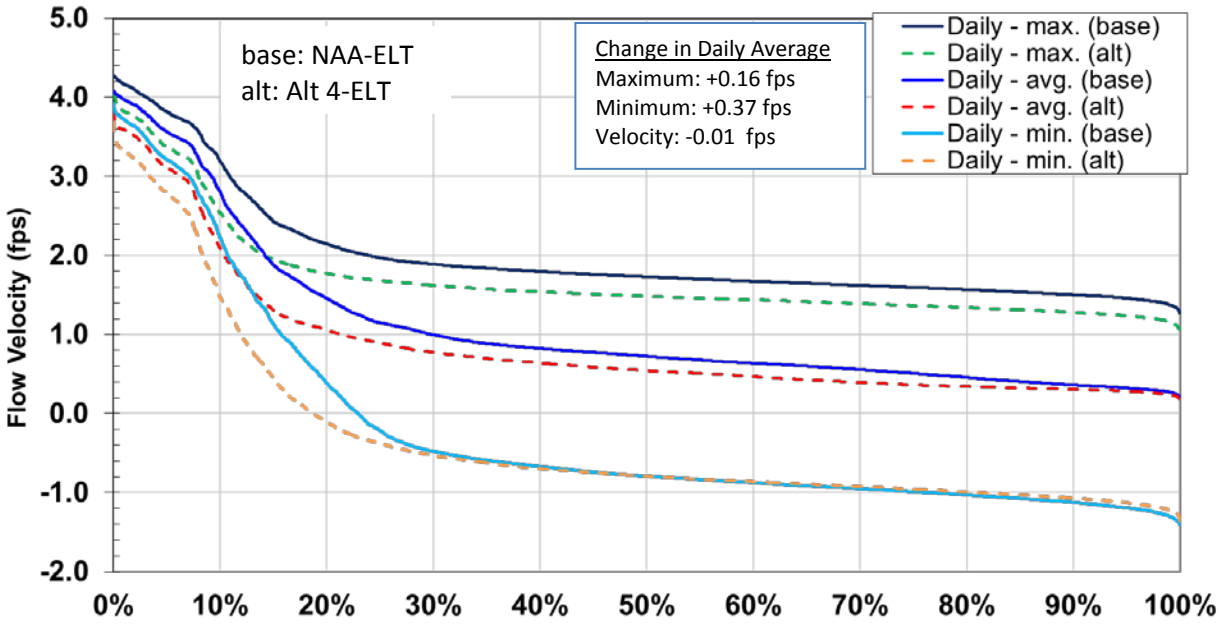

Figure 19. Daily Velocities in the Sacramento River at Emmaton

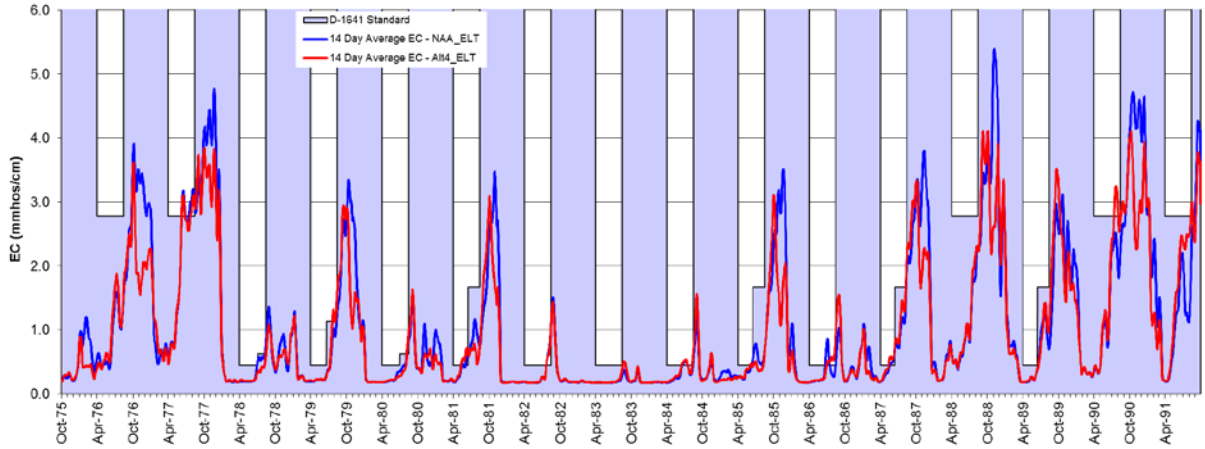

Figure 20. EC in the Sacramento River at Emmaton

No Action Alternative ELT vs. Alternative 4 ELT (BDCP EIR/EIS Modeling) Continued

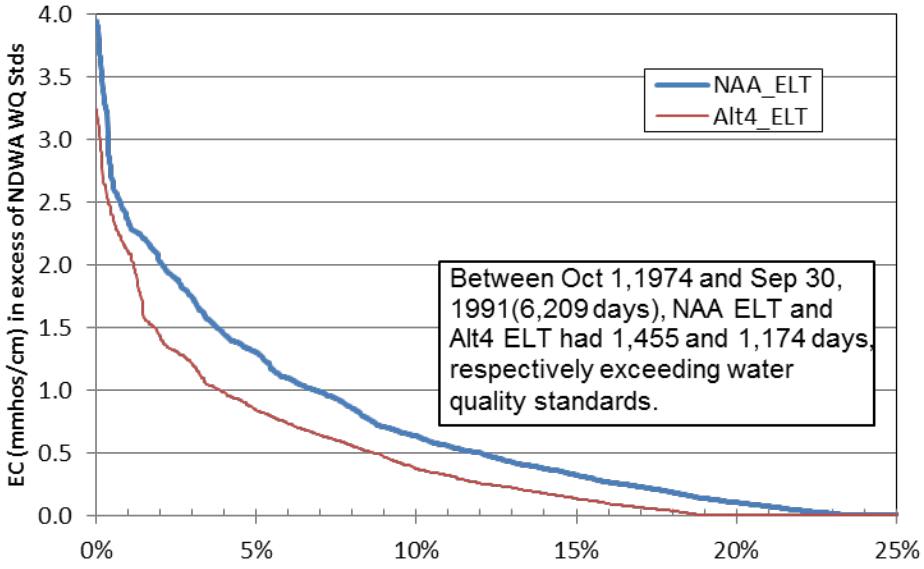

Figure 21. Probability of Exceeding EC Standards in the Sacramento River at Emmaton

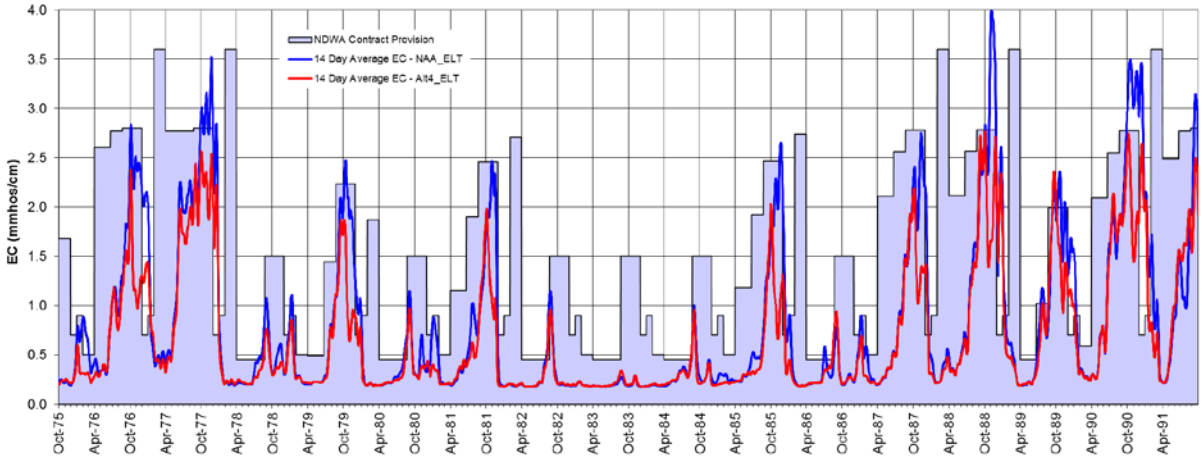

Figure 22. EC in the Sacramento River at Threemile Slough

No Action Alternative ELT vs. Alternative 4 ELT (BDCP EIR/EIS Modeling) Continued

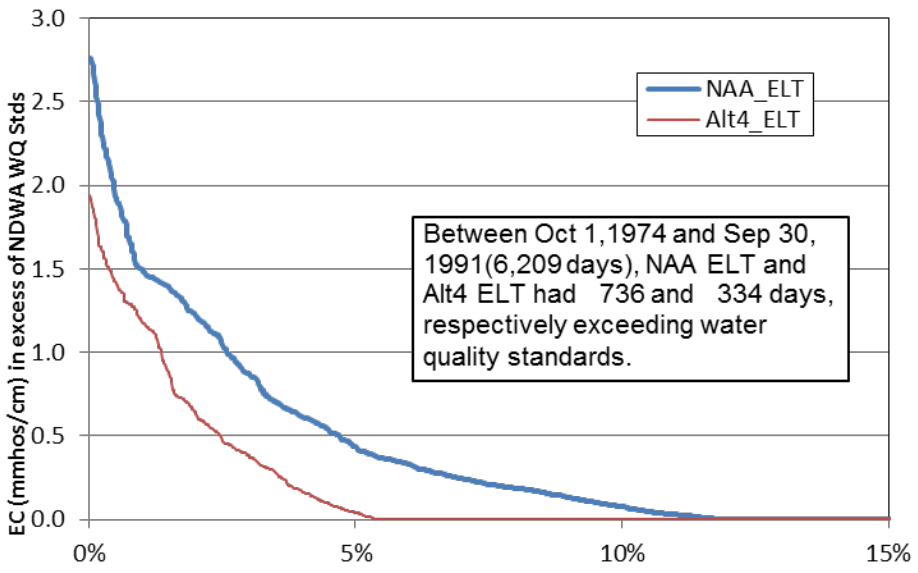

Figure 23. Probability of Exceeding EC Standards in the Sacramento River at Three Mile Slough

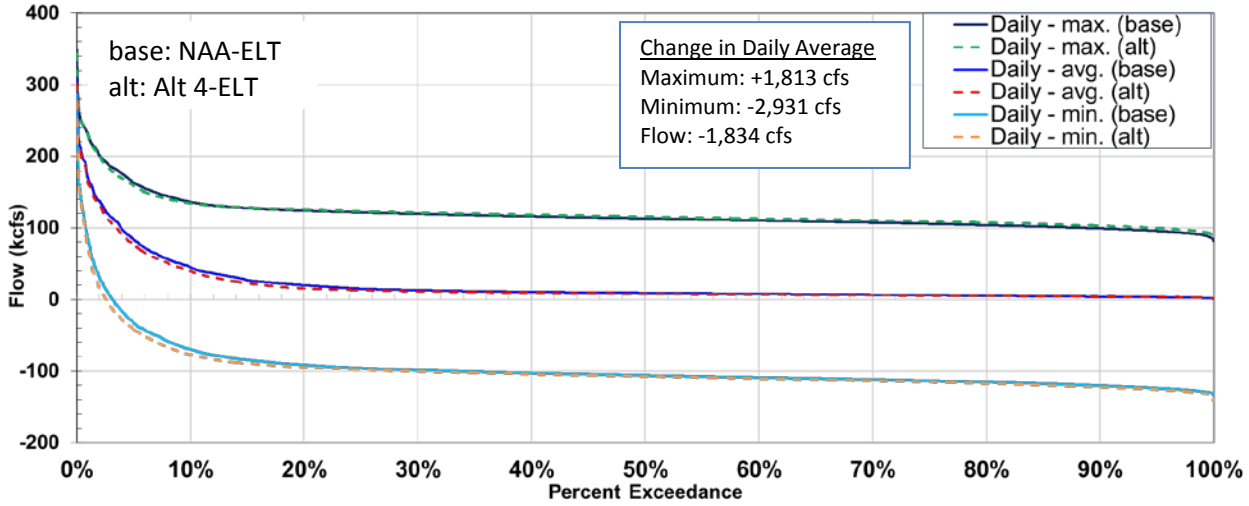

Figure 24. Daily Flow in the Sacramento River at Rio Vista

No Action Alternative ELT vs. Alternative 4 ELT (BDCP EIR/EIS Modeling) Continued

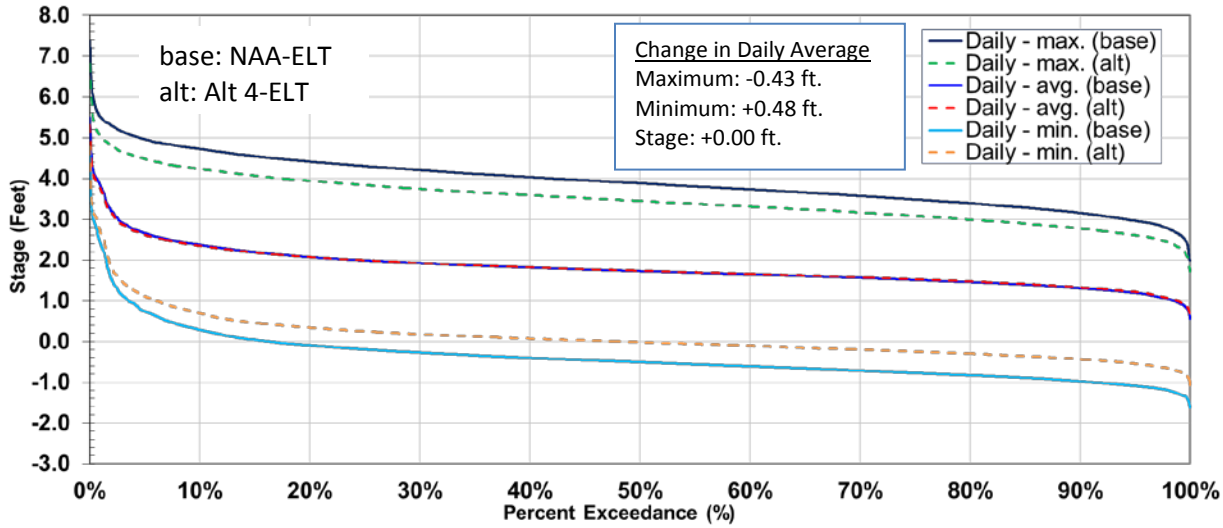

Figure 25. Daily Stage in the Sacramento River at Rio Vista

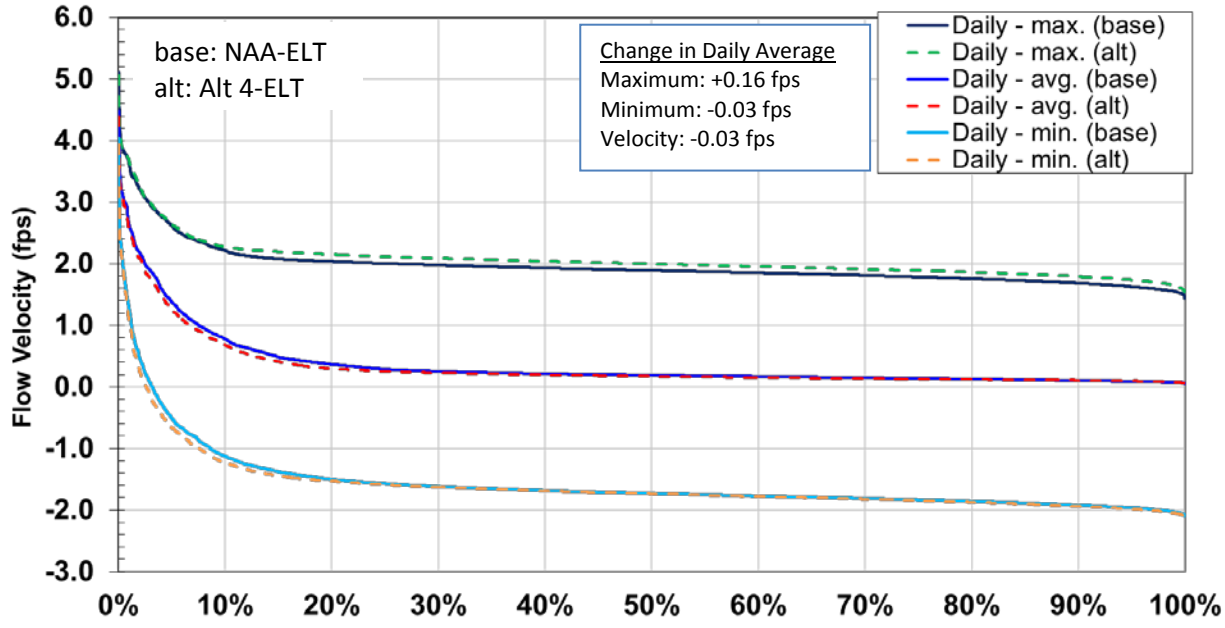

Figure 26. Daily Velocities in the Sacramento River at Rio Vista

No Action Alternative ELT vs. Alternative 4 ELT (BDCP EIR/EIS Modeling) Continued

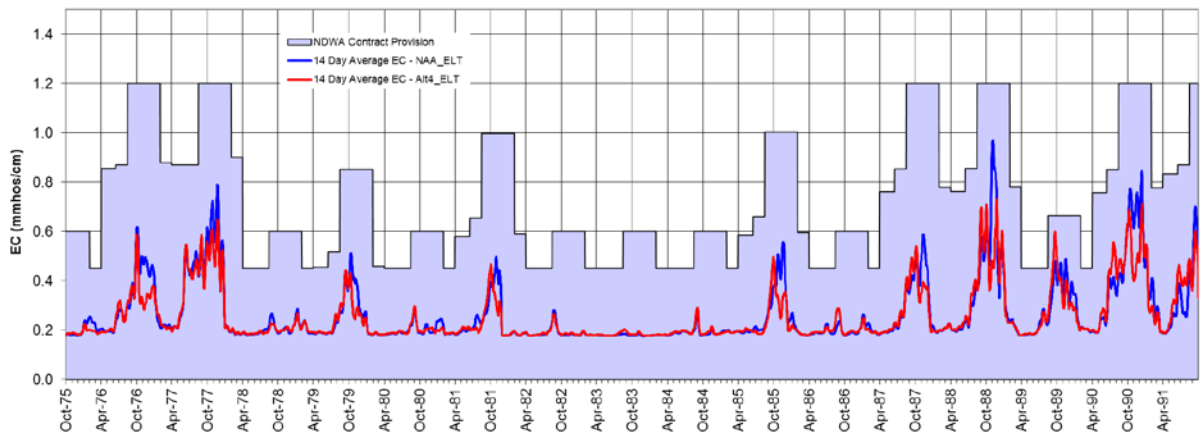

Figure 27. EC in the Sacramento River at Rio Vista

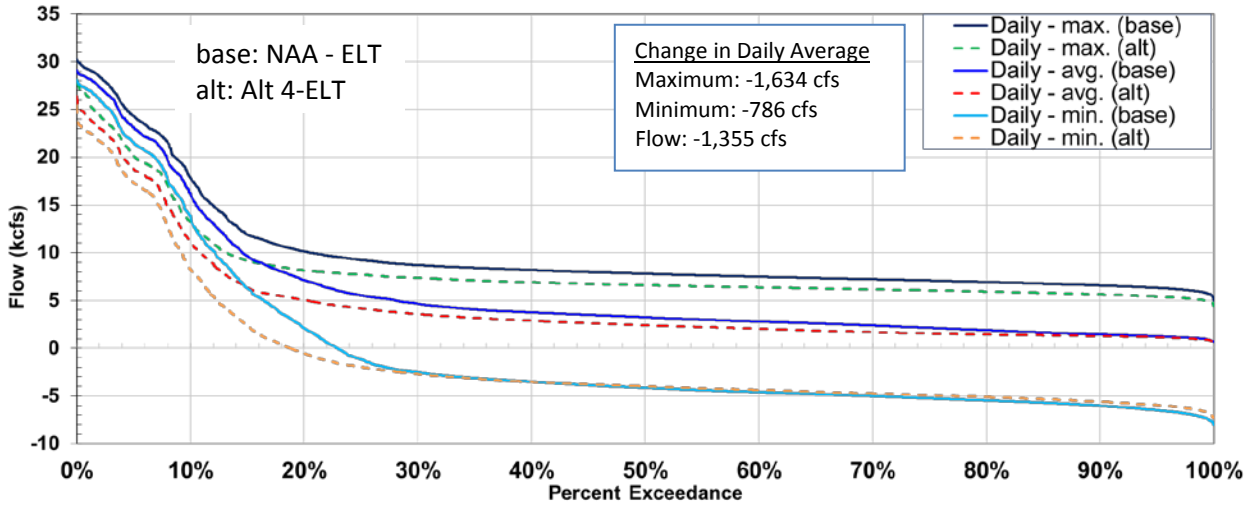

Figure 28. Daily Flow in Steamboat Slough at Sutter Slough

No Action Alternative ELT vs. Alternative 4 ELT (BDCP EIR/EIS Modeling) Continued

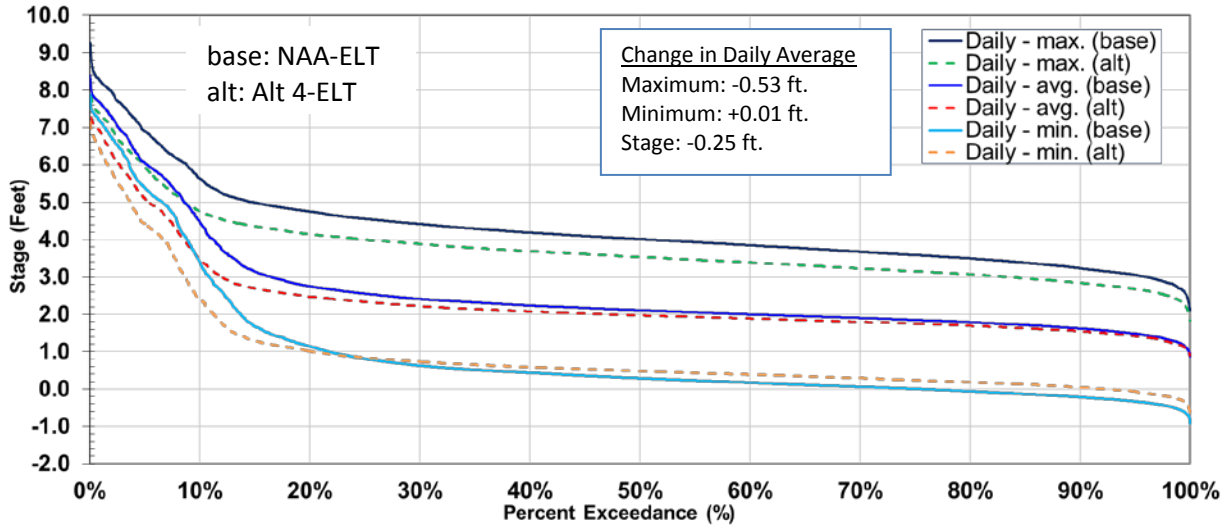

Figure 29. Daily Stage in Steamboat Slough at Sutter Slough

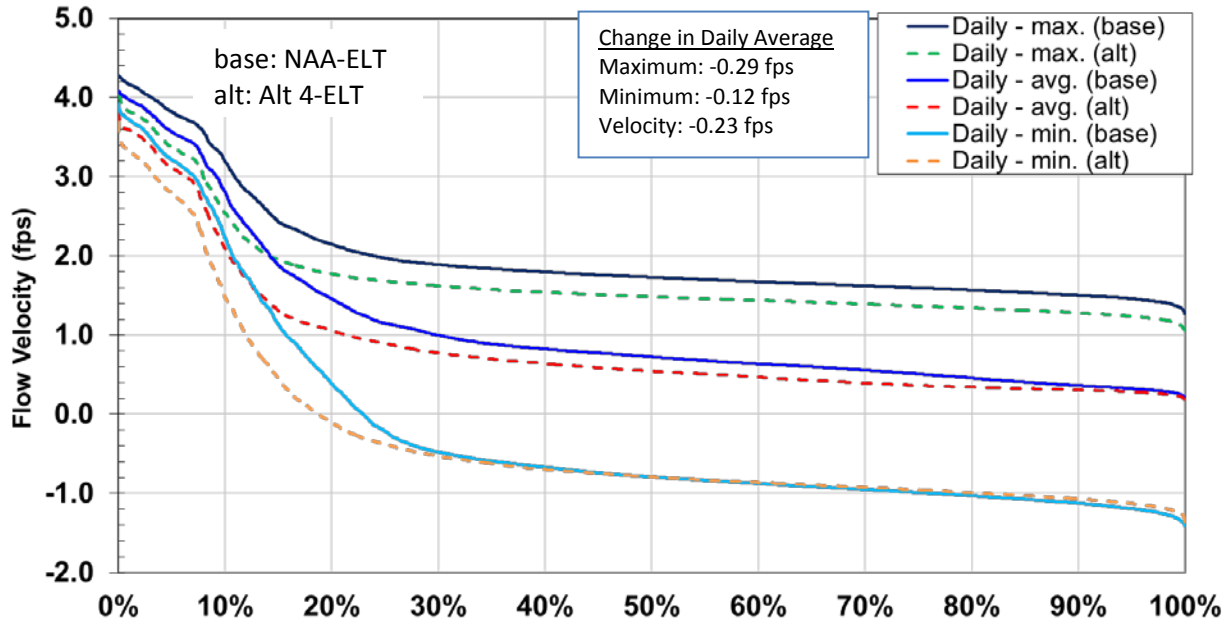

Figure 30. Daily Velocities in Steamboat Slough at Sutter Slough

No Action Alternative ELT vs. Alternative 4 ELT (BDCP EIR/EIS Modeling) Continued

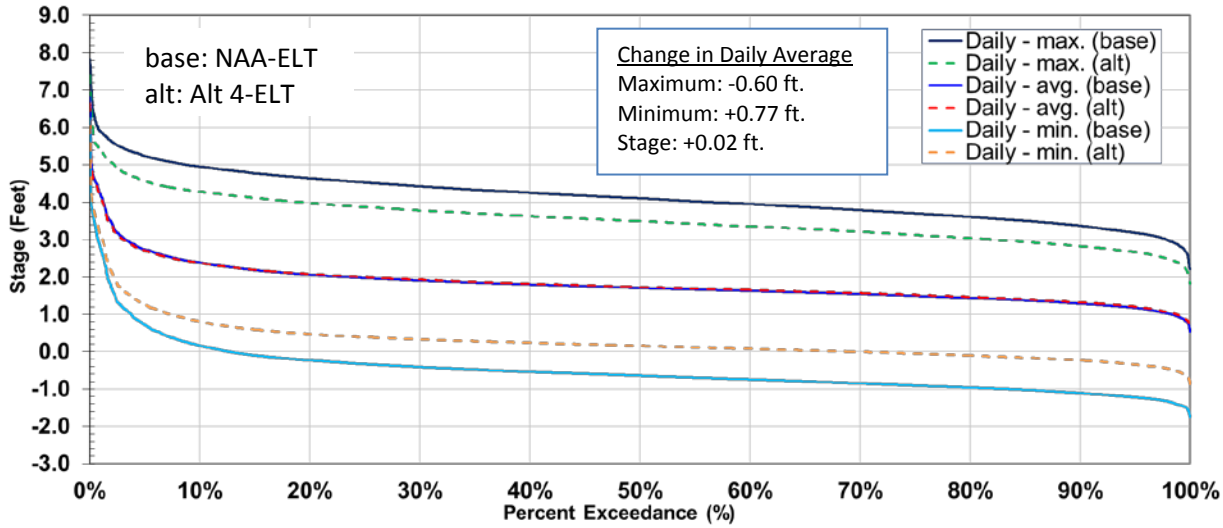

Figure 31. Daily Stage in Barker Slough at NBA Intakes

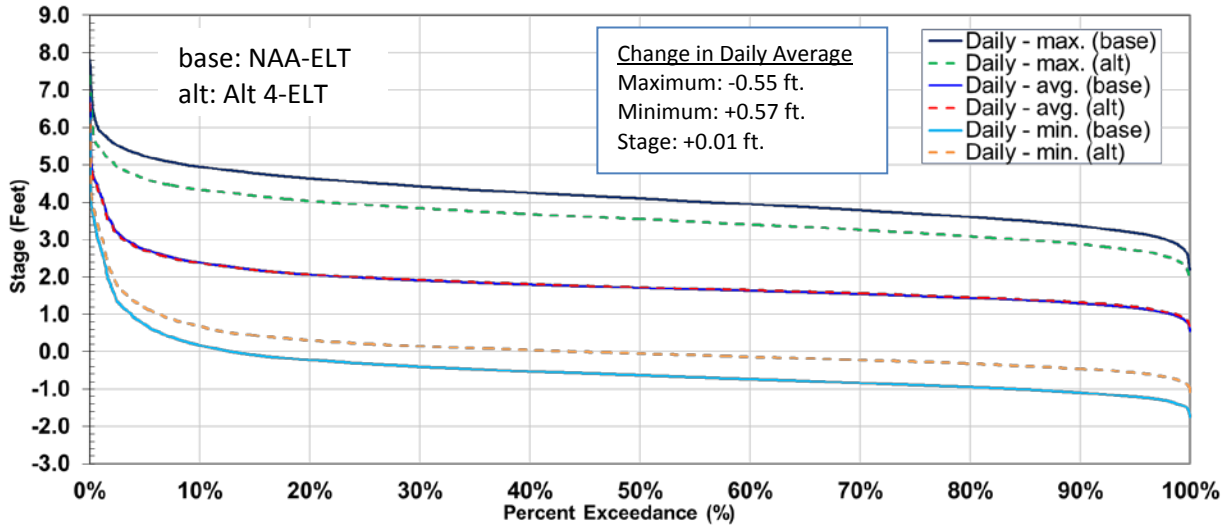

Figure 32. Daily Stage in Shag Slough

NO ACTION ALTERNATIVE WITH HABITAT VS. NO ACTION ALTERNATIVE WITHOUT HABITAT (INDEPENDENT MODELING)

No Action Alternative with Habitat vs. No Action Alternative without Habitat (Independent Modeling)

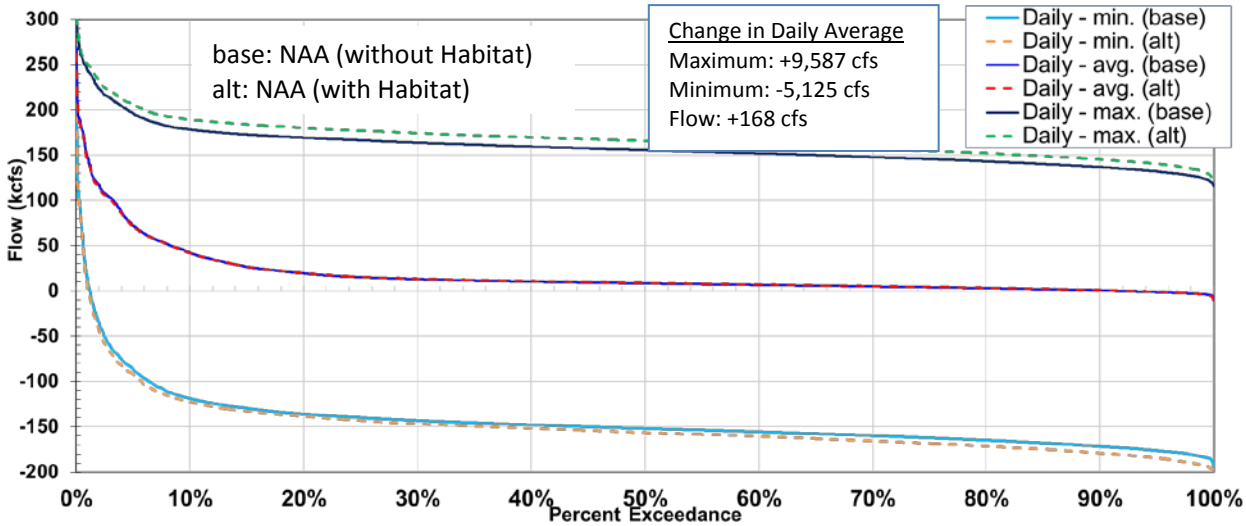

Figure 33. Daily Flow in Sacramento River at Emmaton

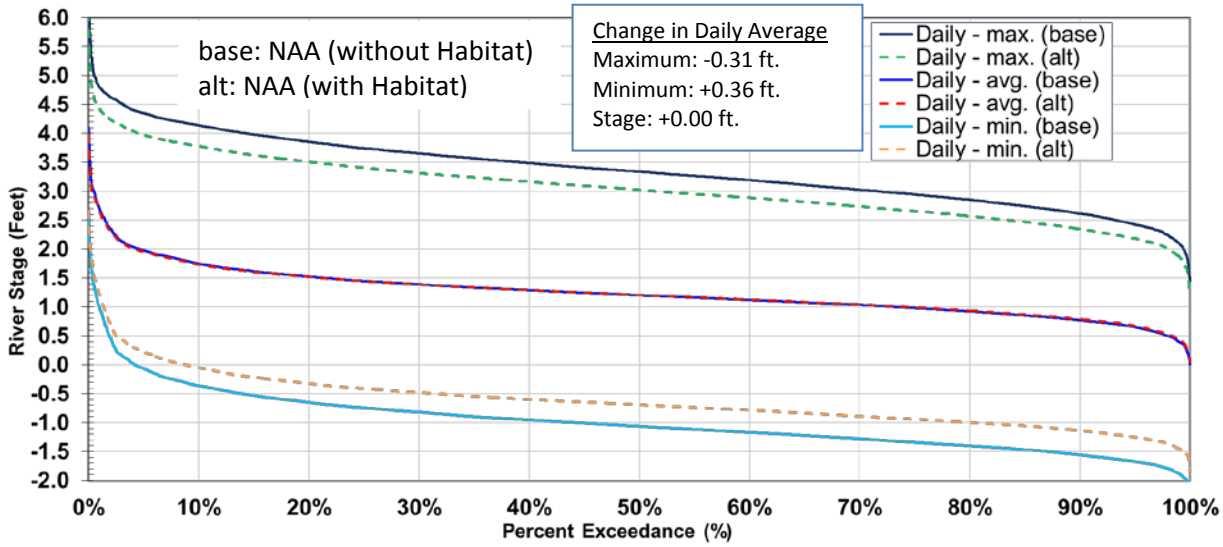

Figure 34. Daily Stage in Sacramento River at Emmaton

No Action Alternative with Habitat vs. No Action Alternative without Habitat (Independent Modeling) Continued

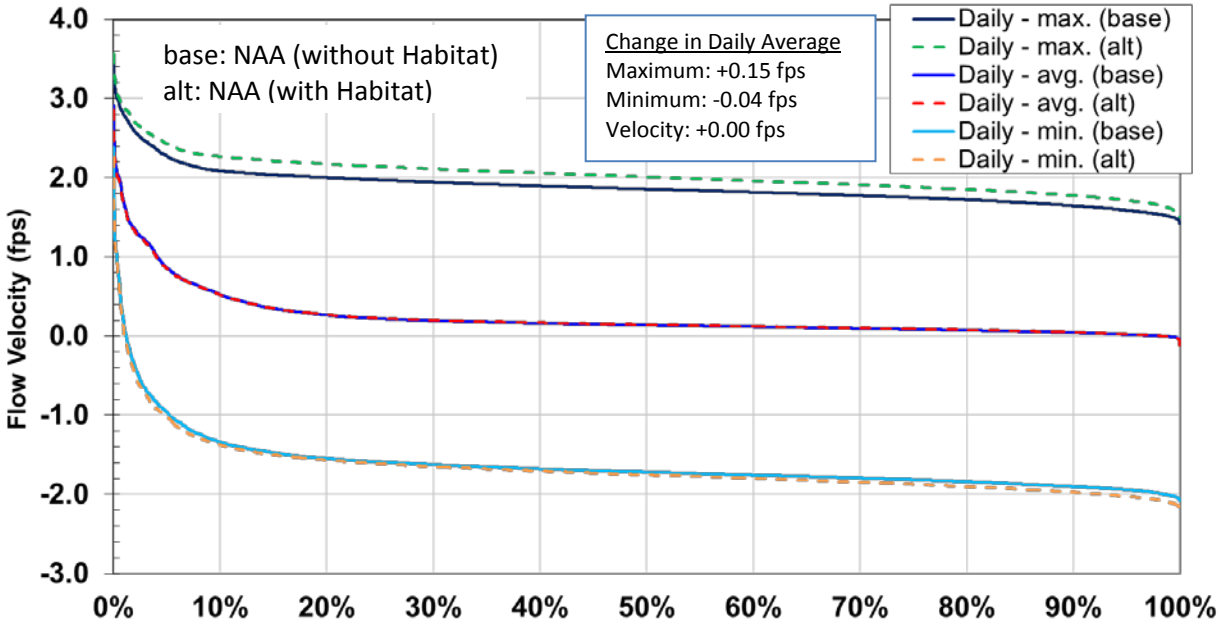

Figure 35. Daily Velocities in Sacramento River at Emmaton

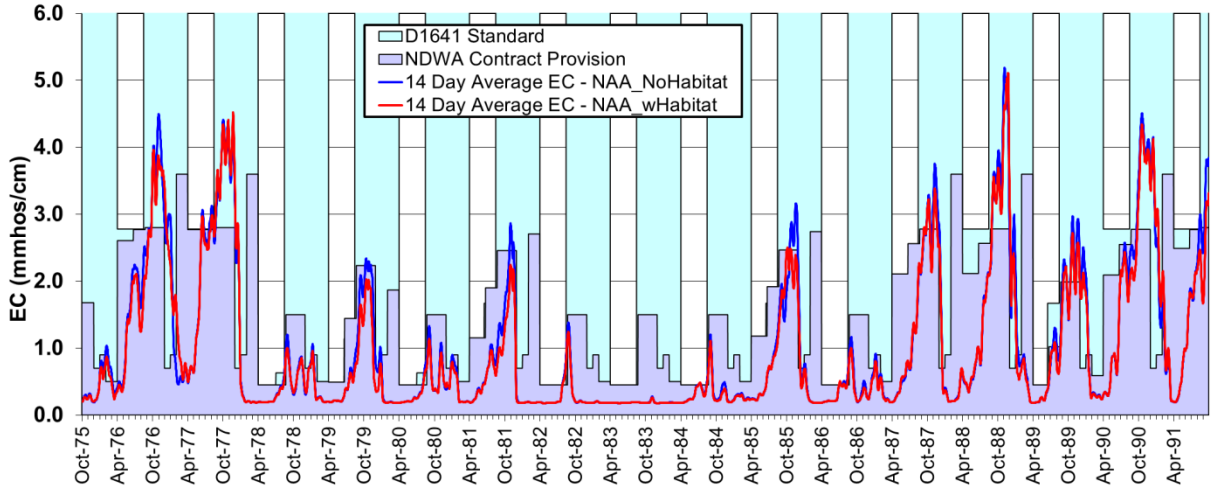

Figure 36. EC in the Sacramento River at Emmaton

No Action Alternative with Habitat vs. No Action Alternative without Habitat (Independent Modeling) Continued

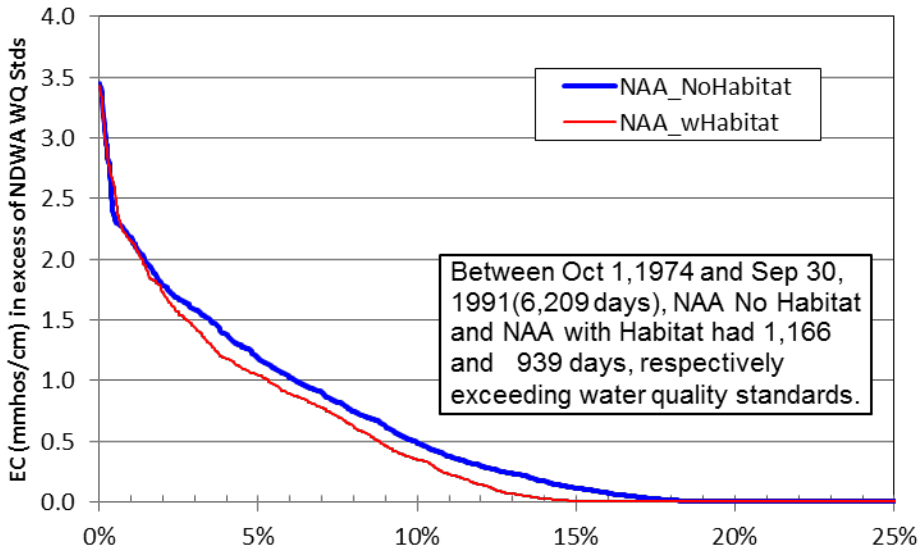

Figure 37. Probability of Exceeding EC Standards in the Sacramento River at Emmaton

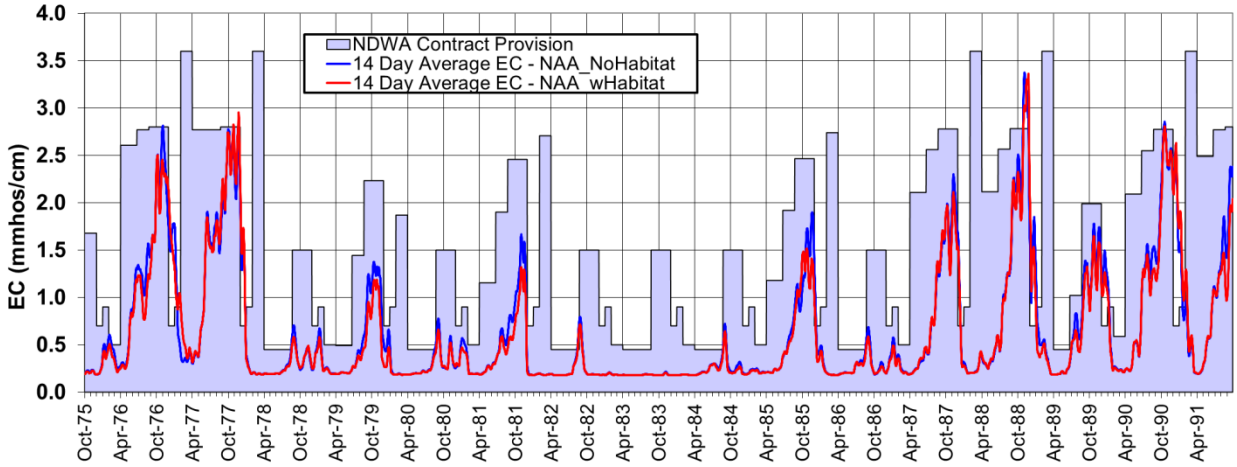

Figure 38. EC in the Sacramento River at Three Mile Slough

No Action Alternative with Habitat vs. No Action Alternative without Habitat (Independent Modeling) Continued

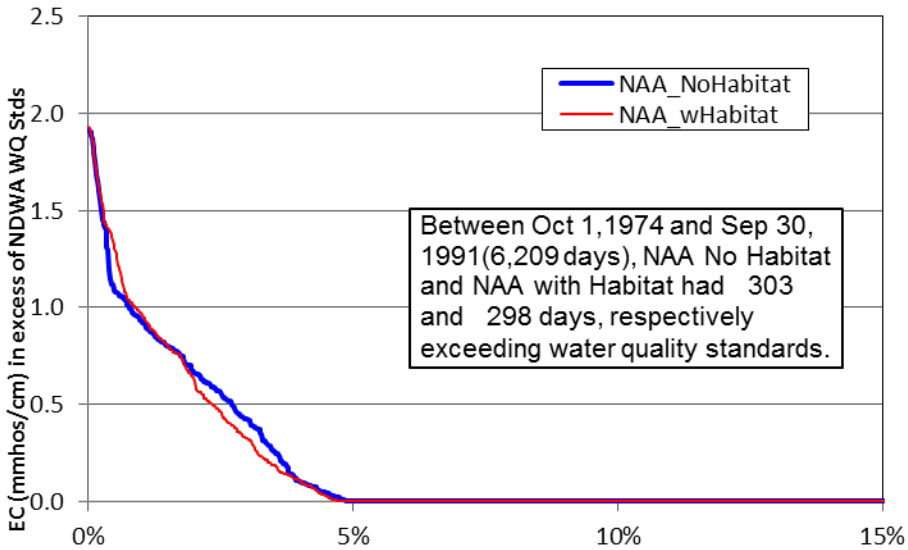

Figure 39. Probability of Exceeding EC Standards in the Sacramento River at Three Mile Slough

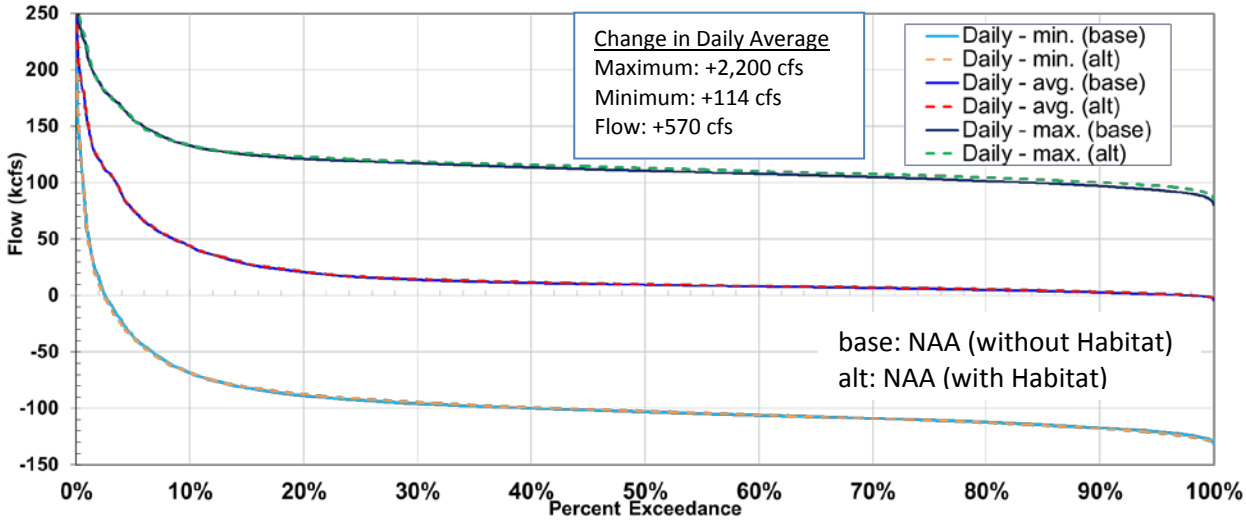

Figure 40. Daily Flow in Sacramento River at Rio Vista

No Action Alternative with Habitat vs. No Action Alternative without Habitat (Independent Modeling) Continued

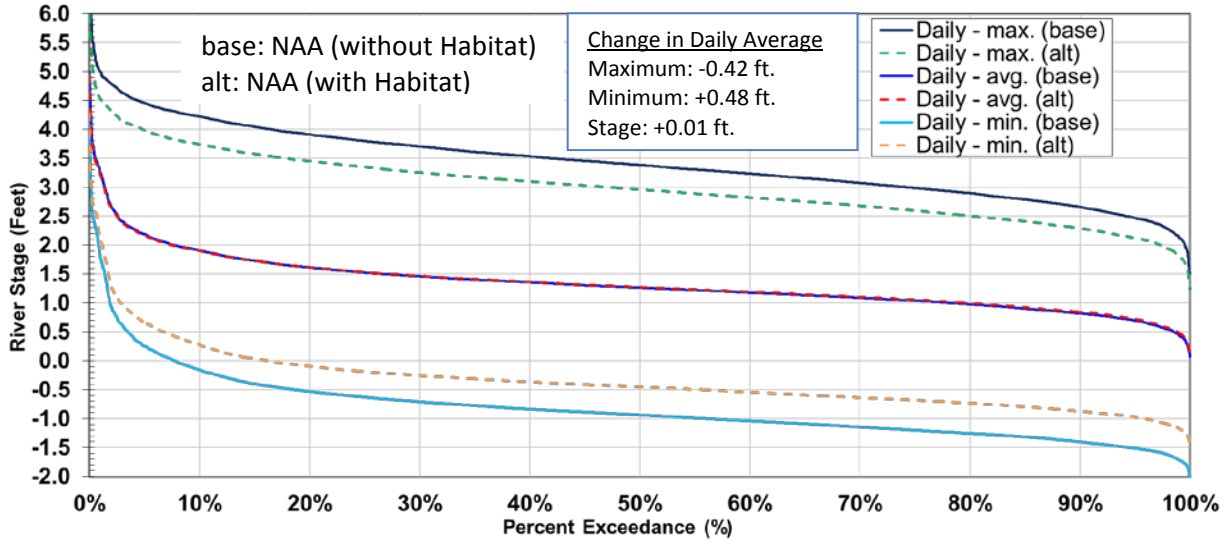

Figure 41. Daily Stage in Sacramento River at Rio Vista

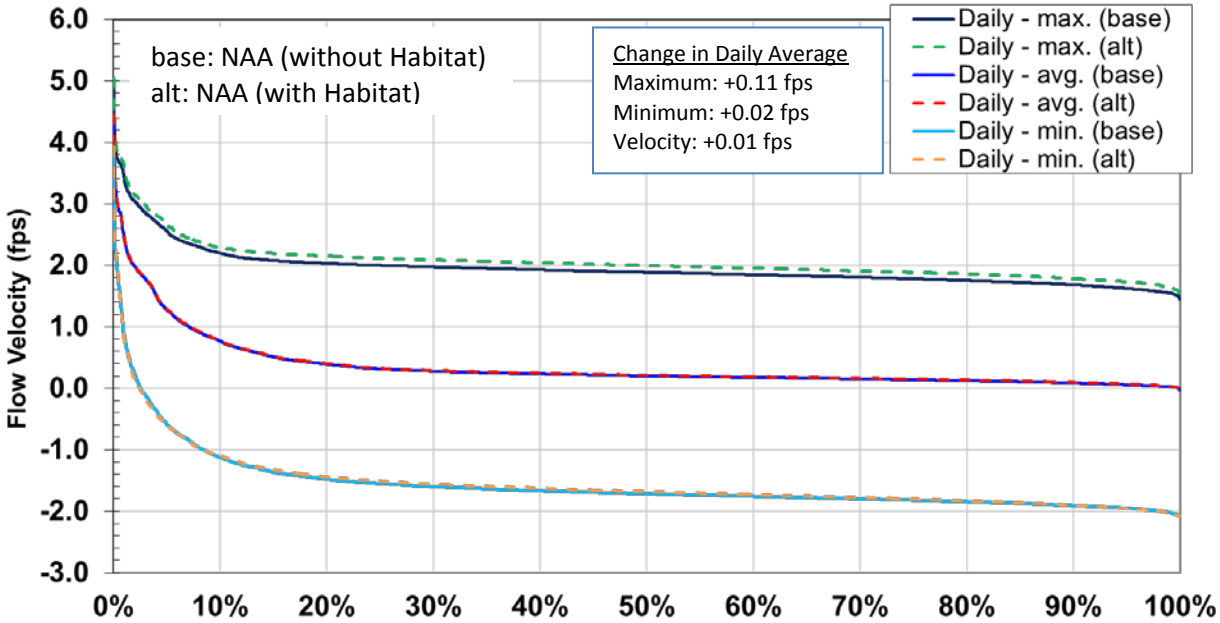

Figure 42. Daily Velocities in Sacramento River at Rio Vista

No Action Alternative with Habitat vs. No Action Alternative without Habitat (Independent Modeling) Continued

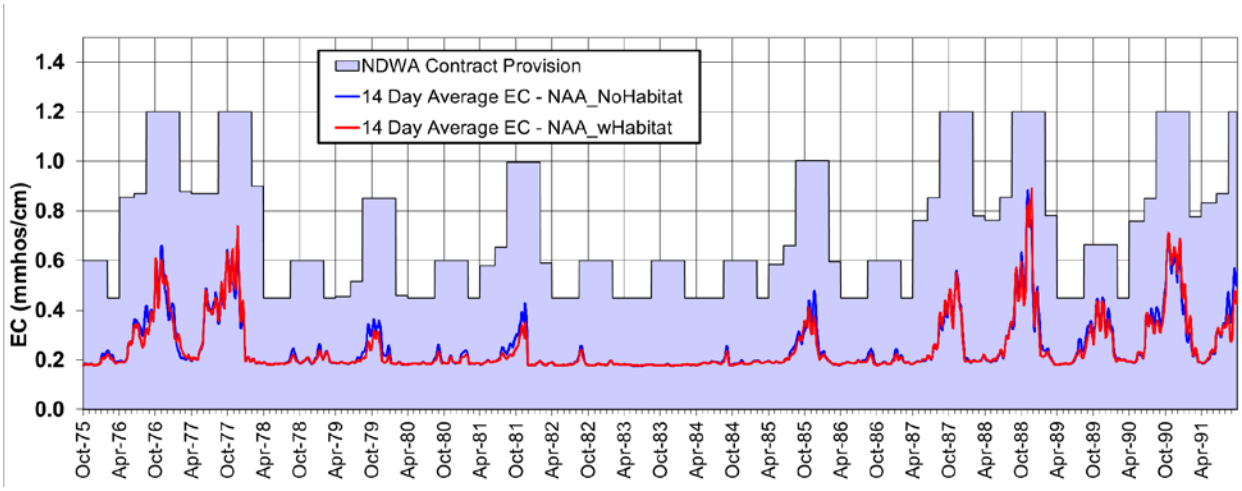

Figure 43. EC in the Sacramento River at Rio Vista

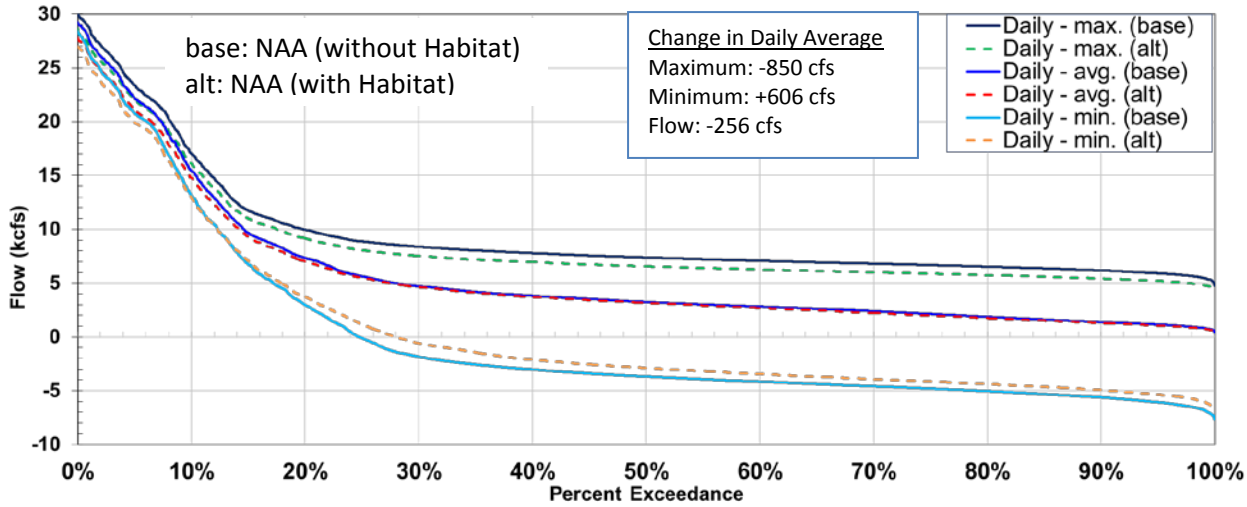

Figure 44. Daily Flow in Steamboat Slough at Sutter Slough

No Action Alternative with Habitat vs. No Action Alternative without Habitat (Independent Modeling) Continued

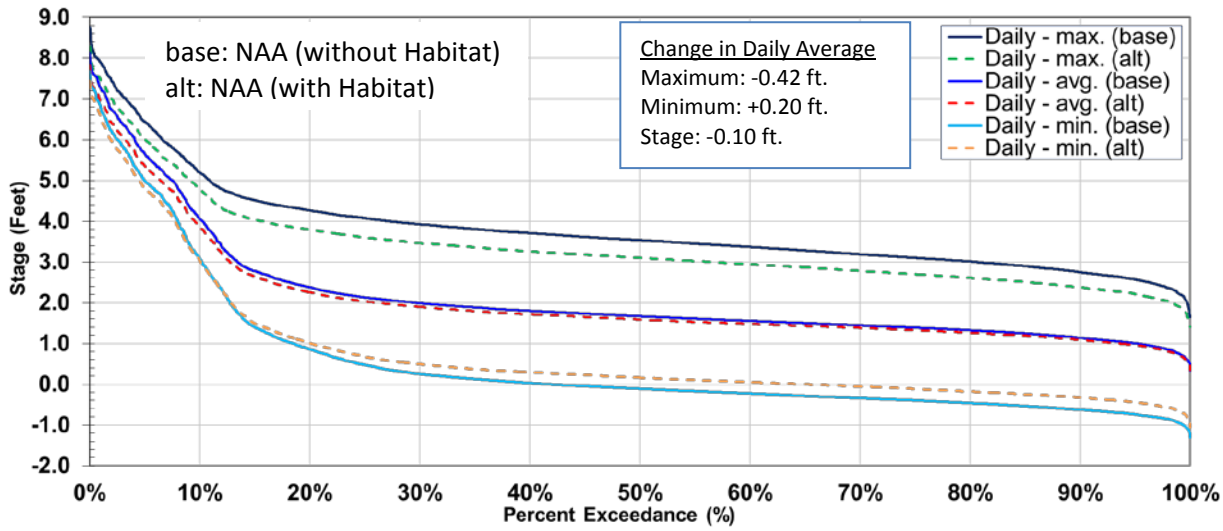

Figure 45. Daily Stage in Steamboat Slough at Sutter Slough

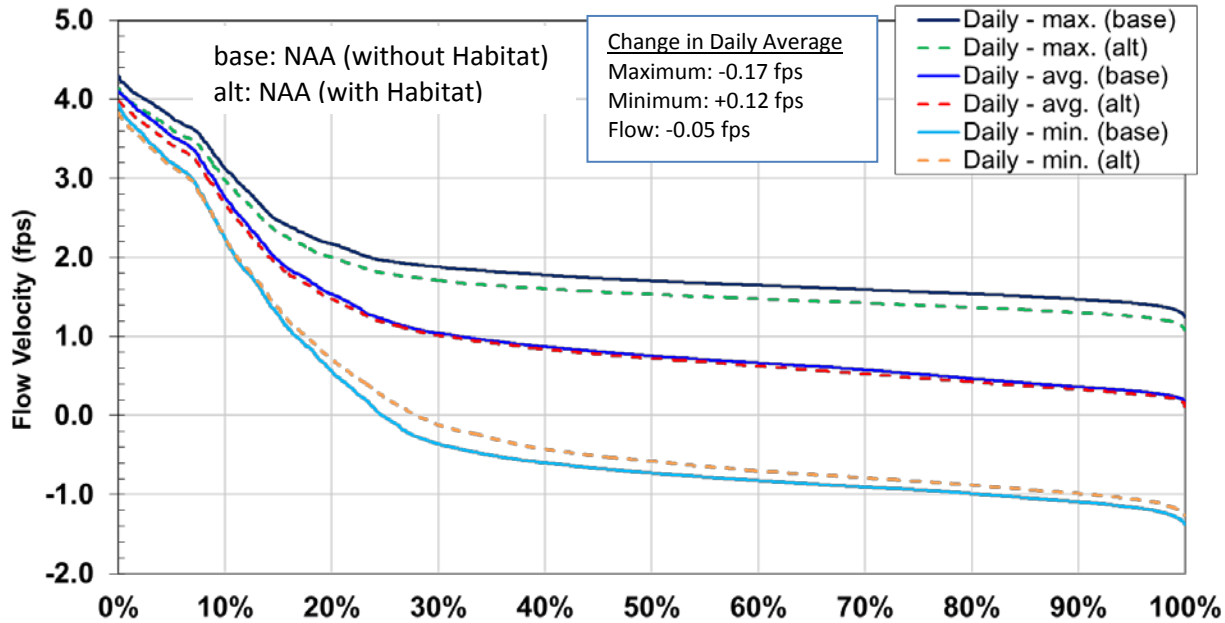

Figure 46. Daily Velocities in Steamboat Slough at Sutter Slough

No Action Alternative with Habitat vs. No Action Alternative without Habitat (Independent Modeling) Continued

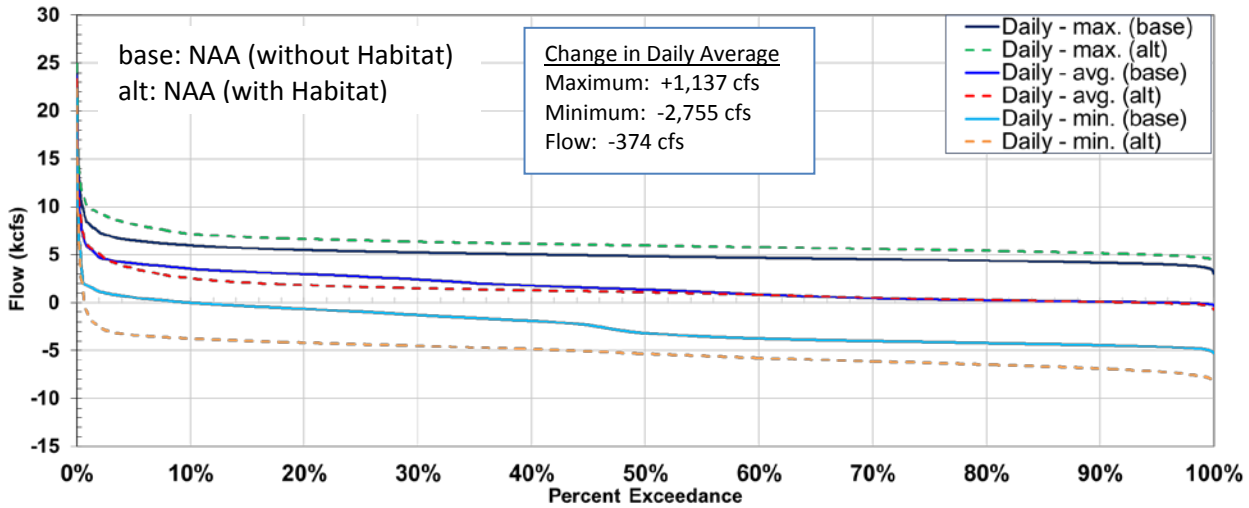

Figure 47. Daily Flow in North Fork Mokelumne River

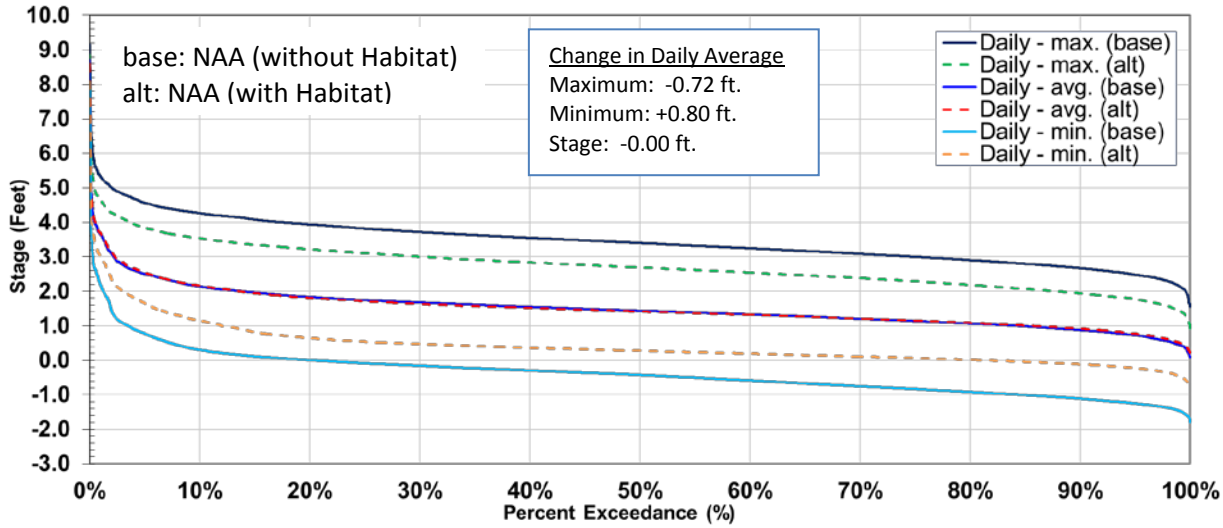

Figure 48. Daily Stage in North Fork Mokelumne River

No Action Alternative with Habitat vs. No Action Alternative without Habitat (Independent Modeling) Continued

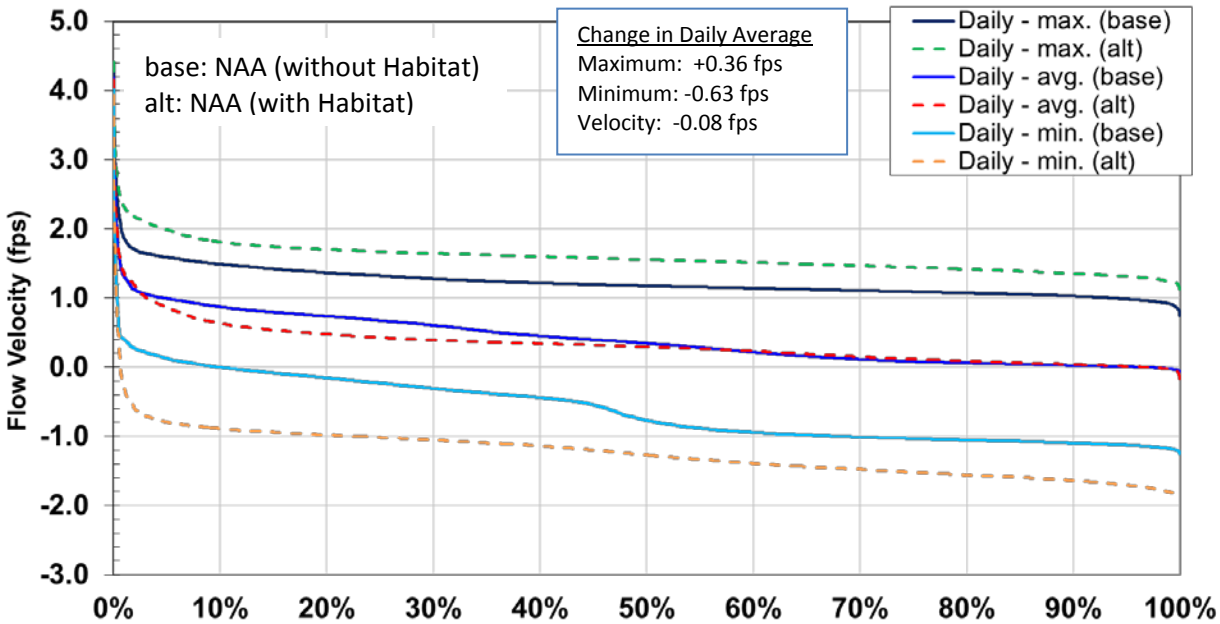

Figure 49. Daily Velocities in North Fork Mokelumne River

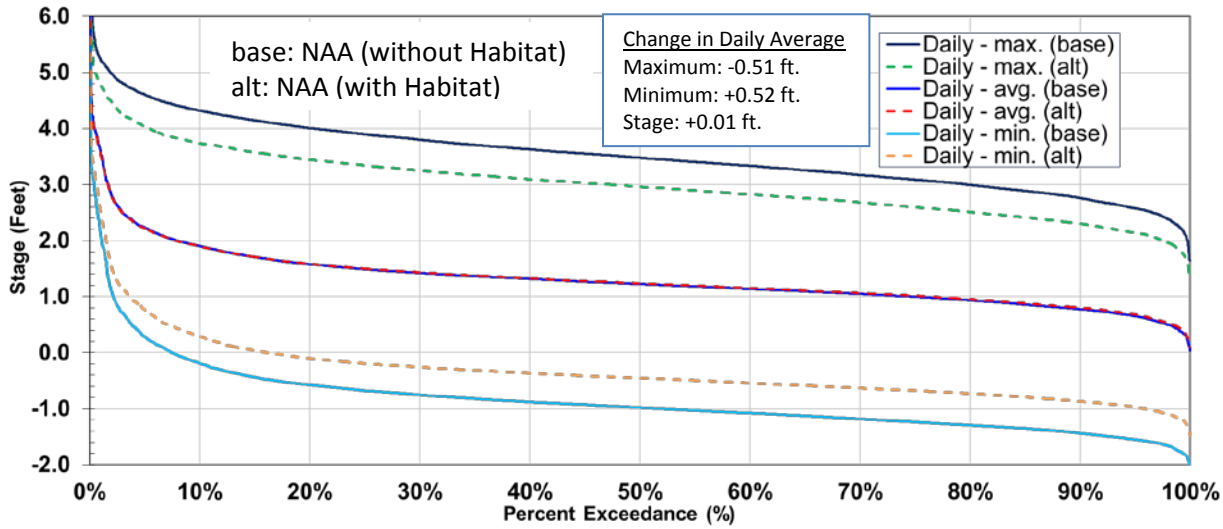

Figure 50. Daily Stage in Cache Slough at Ryer Island

No Action Alternative with Habitat vs. No Action Alternative without Habitat (Independent Modeling) Continued

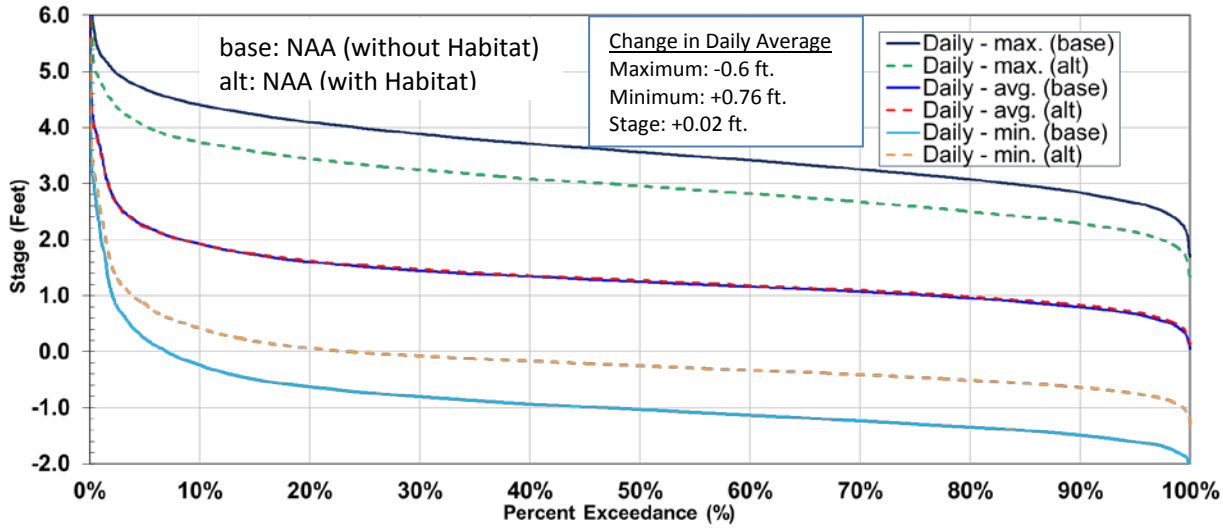

Figure 51. Daily Stage in Barker Slough at NBA Intakes

ALTERNATIVE 4 WITH HABITAT VS. NO ACTION ALTERNATIVE WITHOUT HABITAT (INDEPENDENT MODELING)

Alternative 4 with Habitat vs. No Action Alternative Without Habitat (Independent Modeling)

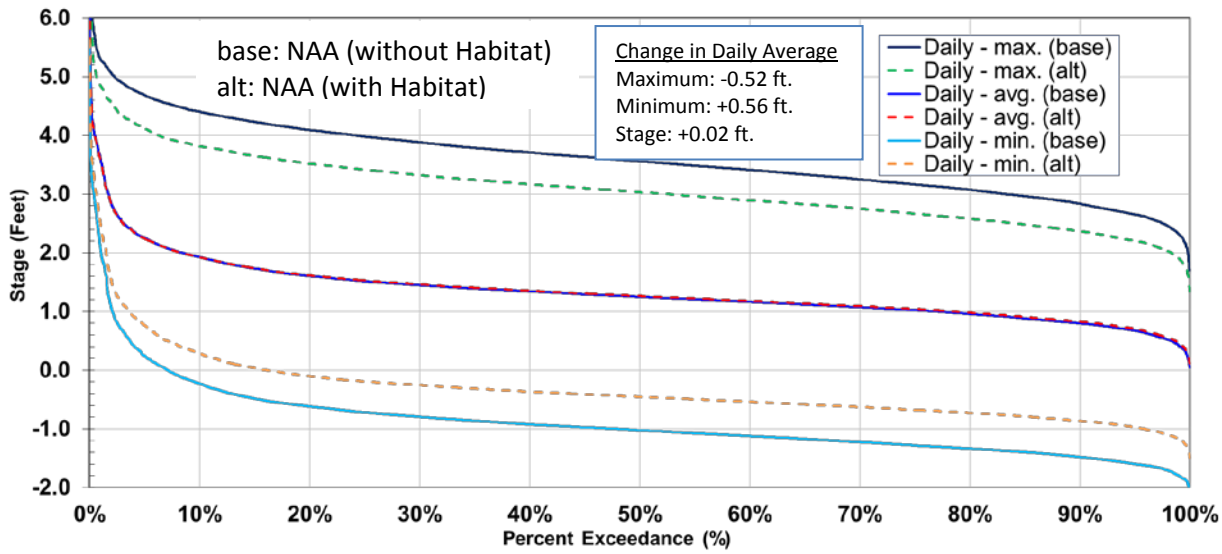

Figure 52. Daily Stage in Shag Slough Intakes

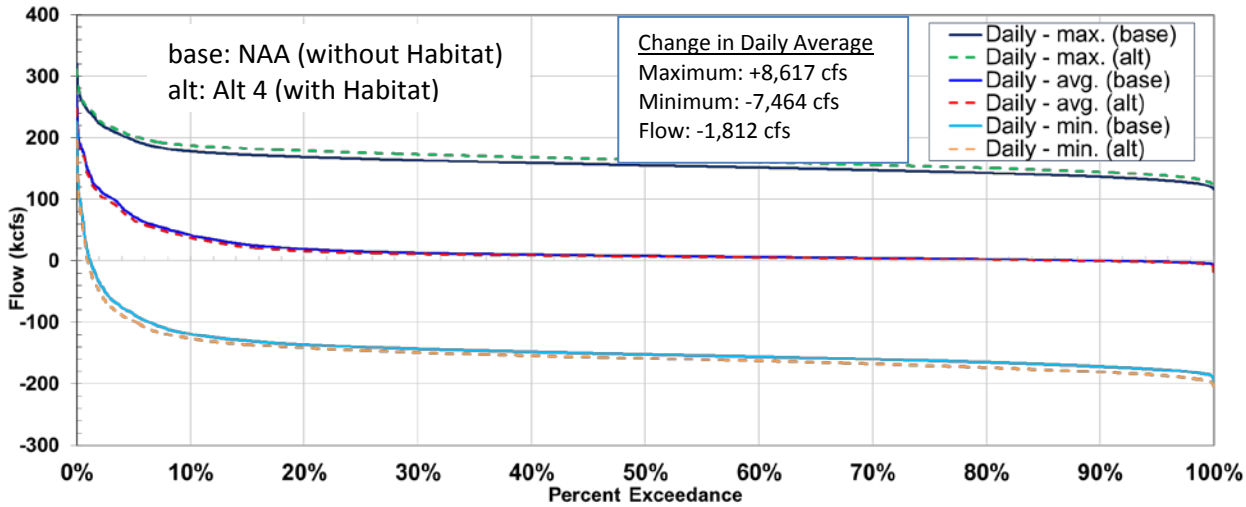

Figure 53. Daily Flow in Sacramento River at Emmaton

Alternative 4 with Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

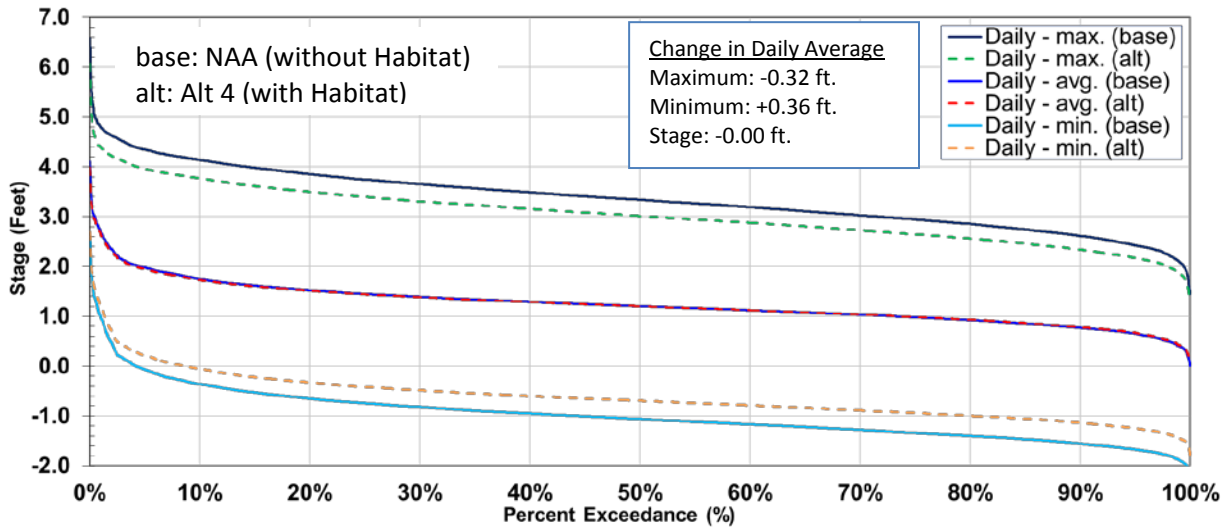

Figure 54. Daily Stage in Sacramento River at Emmaton

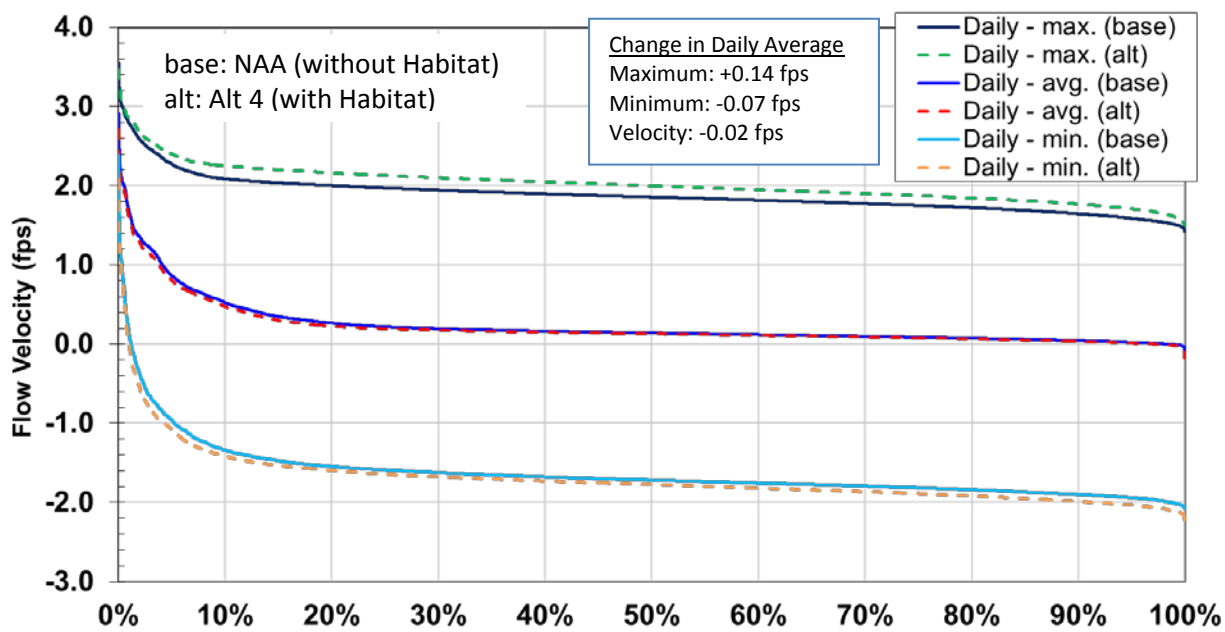

Figure 55. Daily Velocities in Sacramento River at Emmaton

Alternative 4 with Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

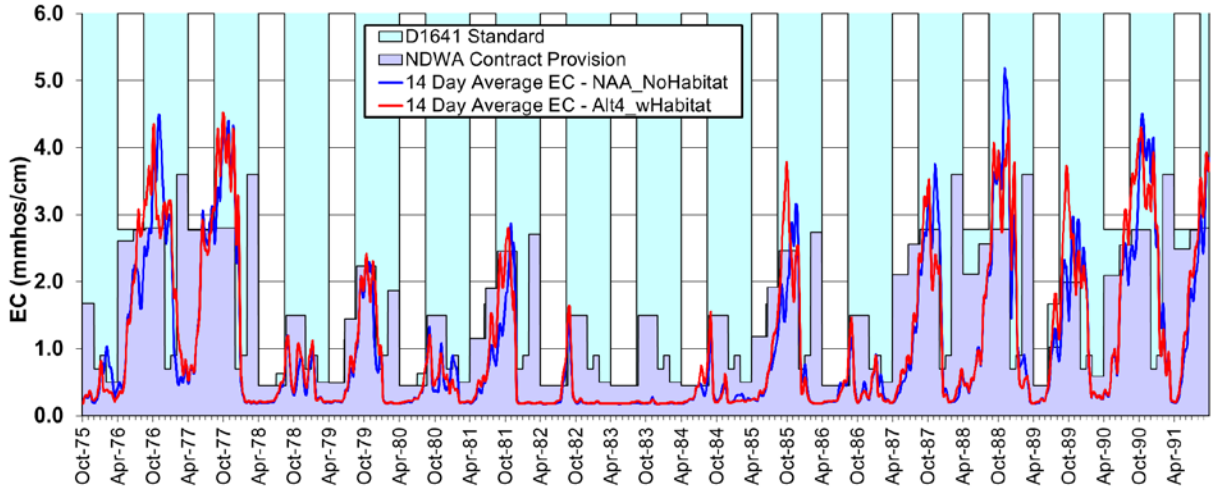

Figure 56. EC in the Sacramento River at Emmaton

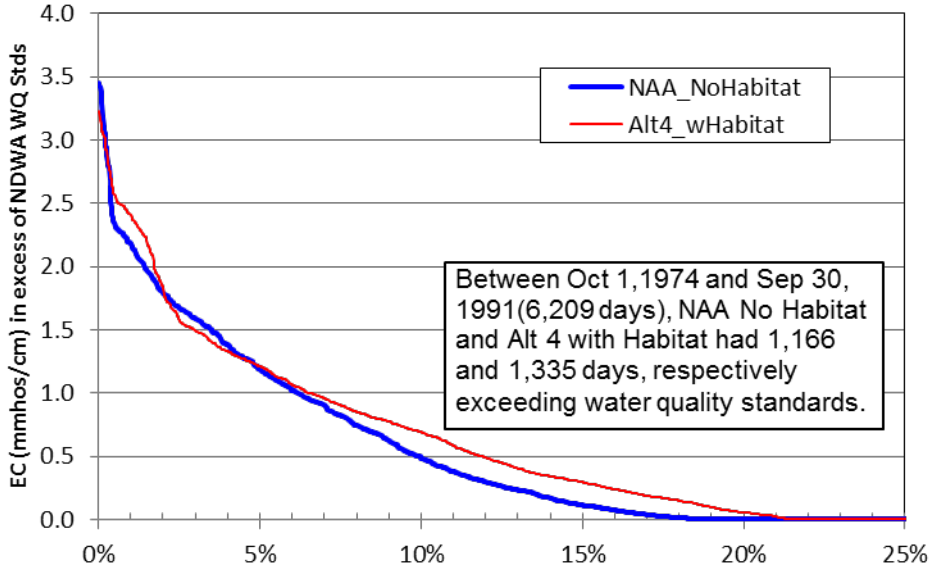

Figure 57. Probability of Exceeding EC Standards in the Sacramento River at Emmaton

Alternative 4 with Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

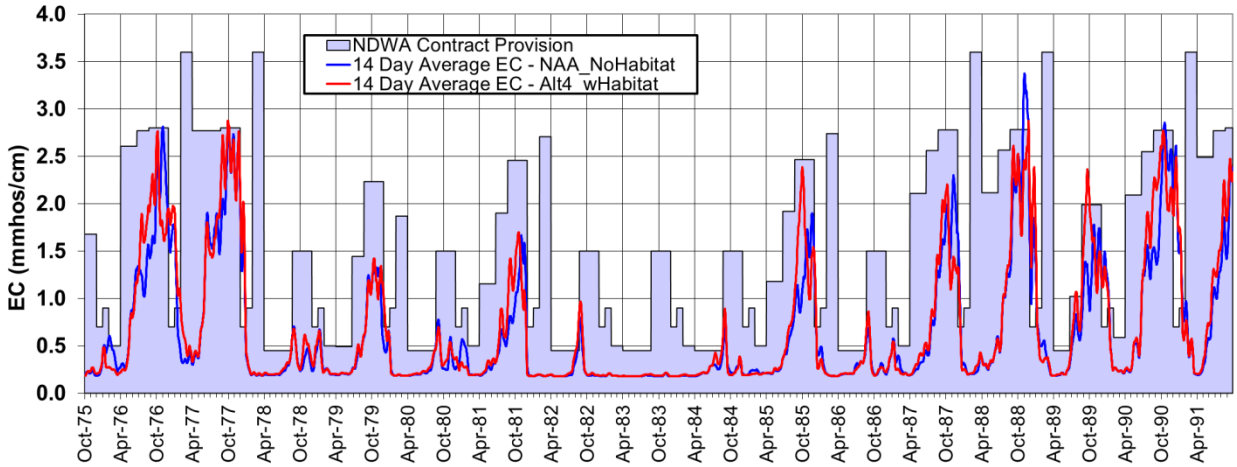

Figure 58. EC in the Sacramento River at Three Mile Slough

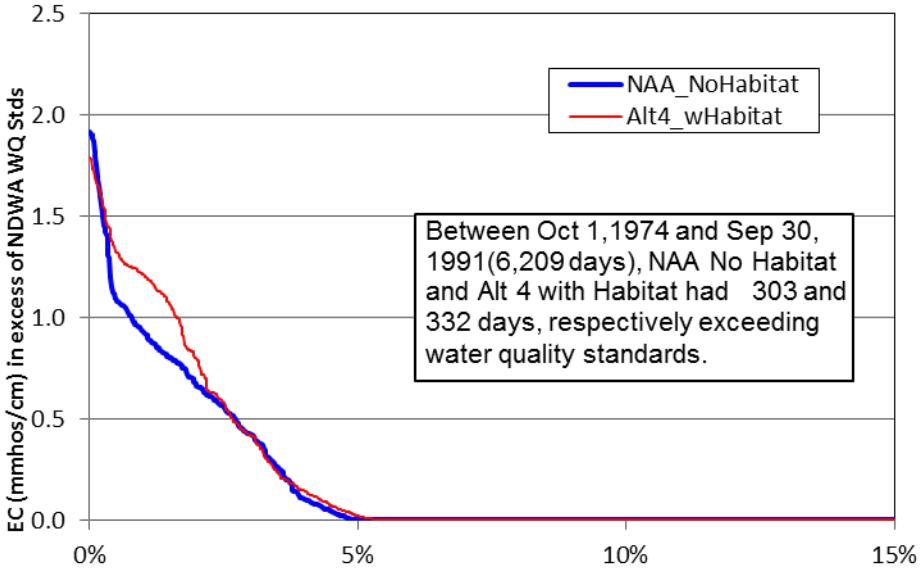

Figure 59. Probability of Exceeding EC Standards in the Sacramento River at Three Mile Slough

Alternative 4 with Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

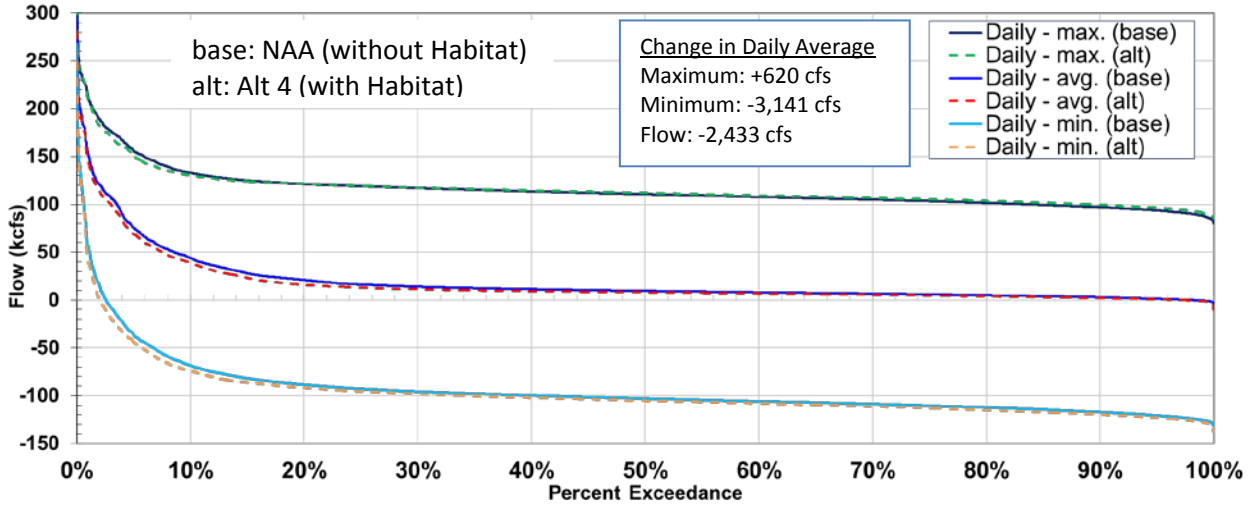

Figure 60. Daily Flow in Sacramento River at Rio Vista

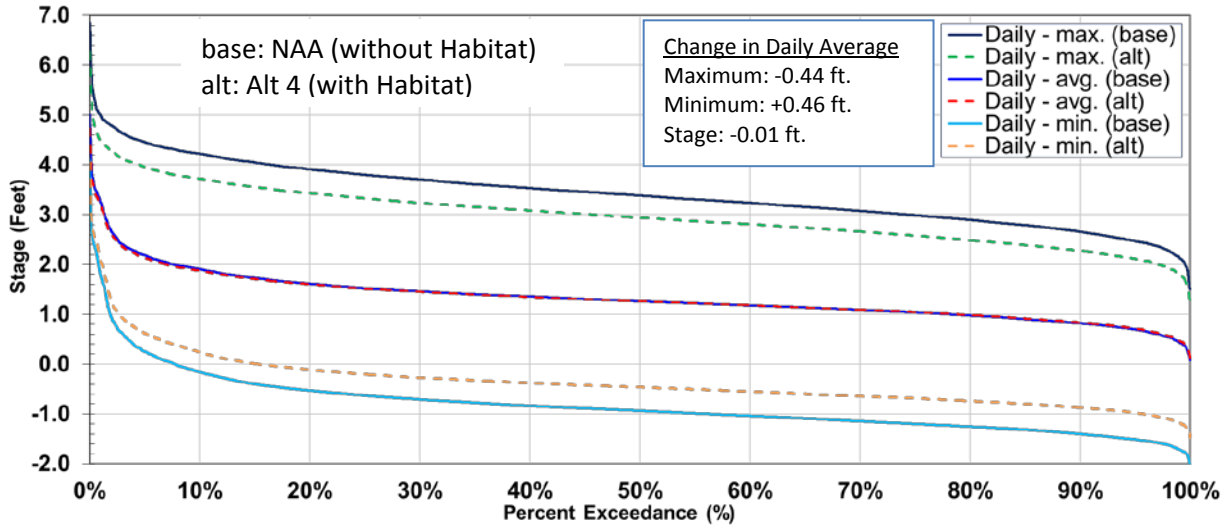

Figure 61. Daily Stage in Sacramento River at Rio Vista

Alternative 4 with Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

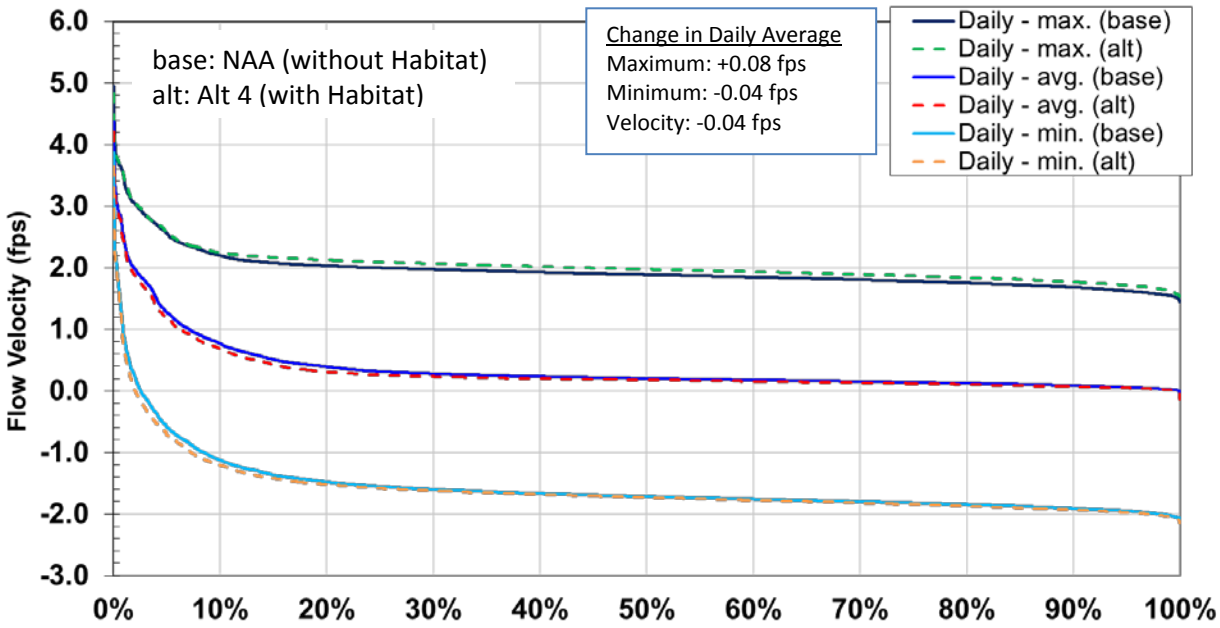

Figure 62. Daily Velocities in Sacramento River at Rio Vista

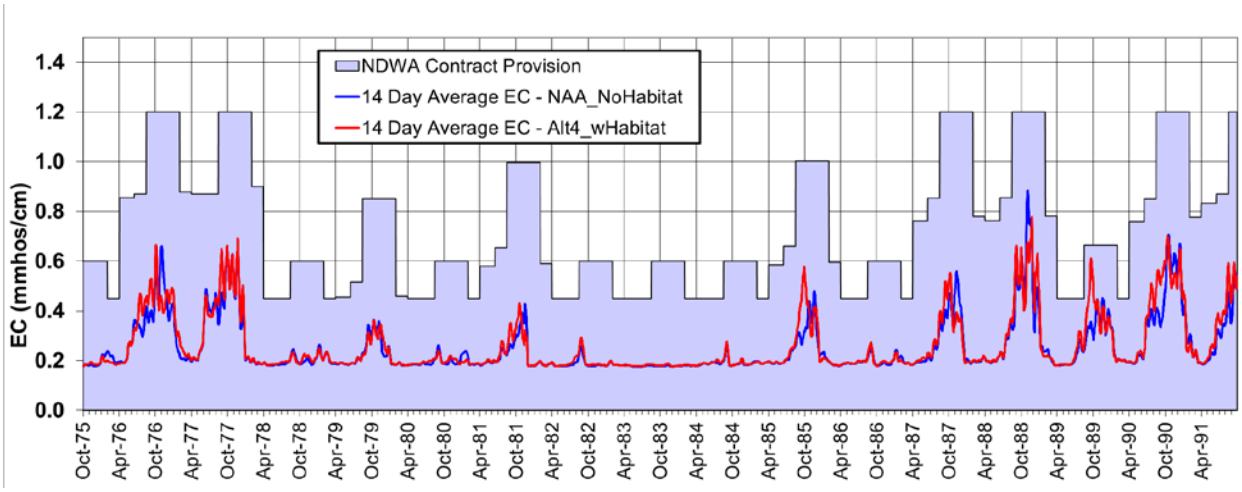

Figure 63. EC in the Sacramento River at Rio Vista

Alternative 4 with Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

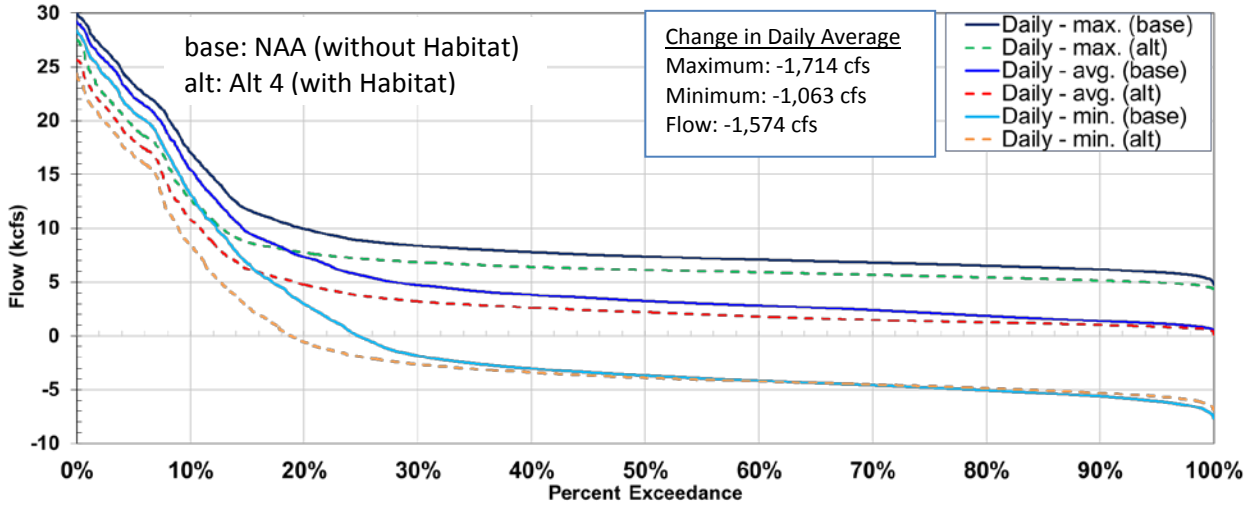

Figure 64. Daily Flow in Steamboat Slough at Sutter Slough

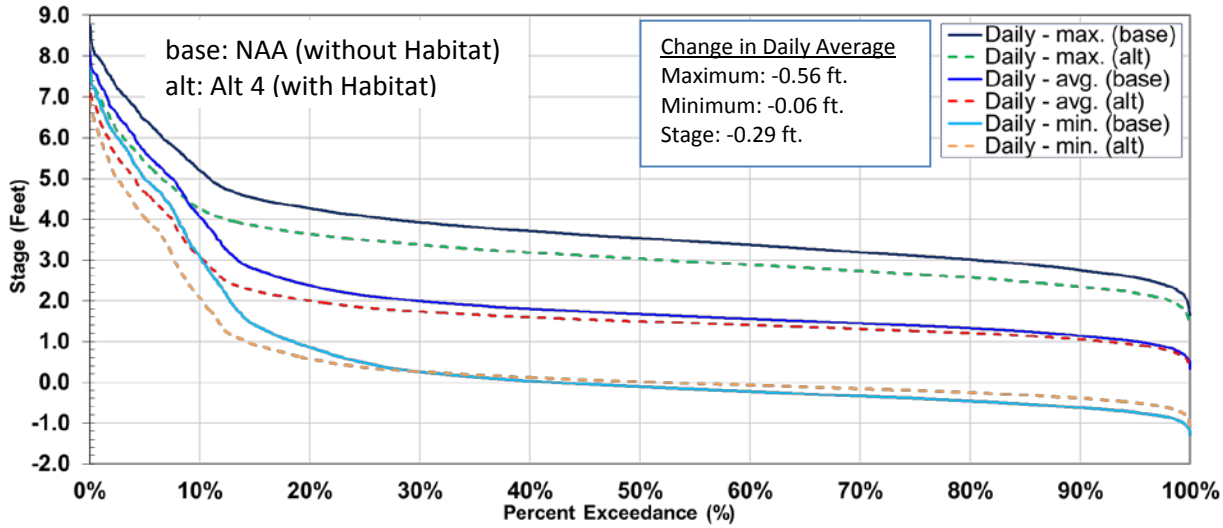

Figure 65. Daily Stage in Steamboat Slough at Sutter Slough

Alternative 4 with Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

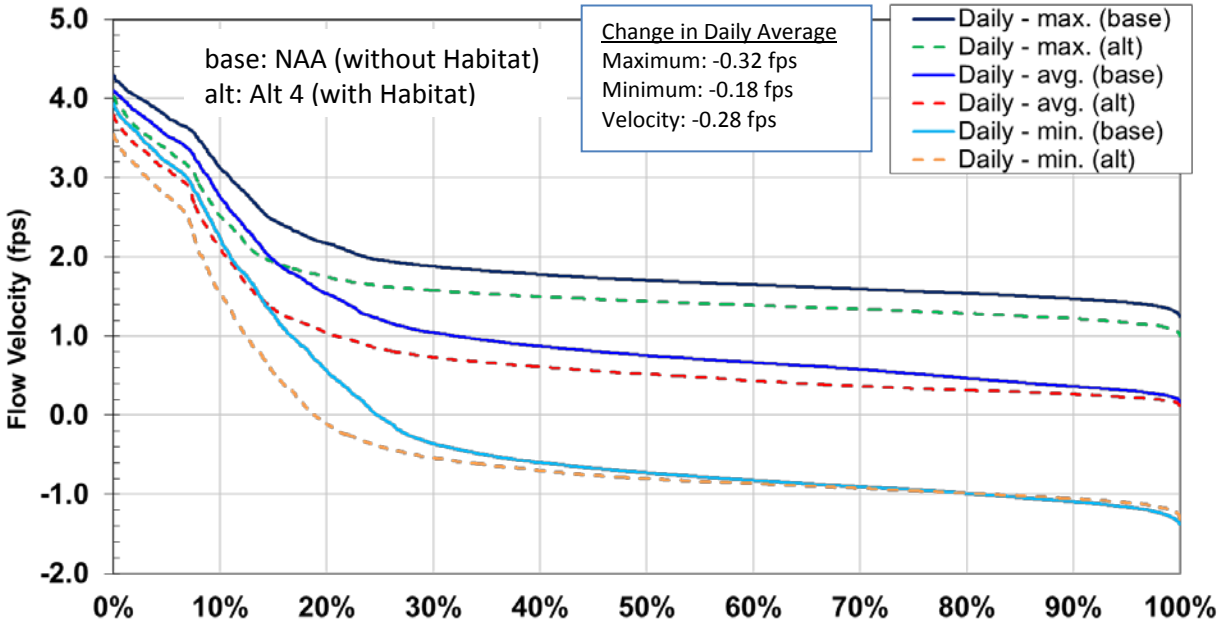

Figure 66. Daily Velocities in Steamboat Slough at Sutter Slough

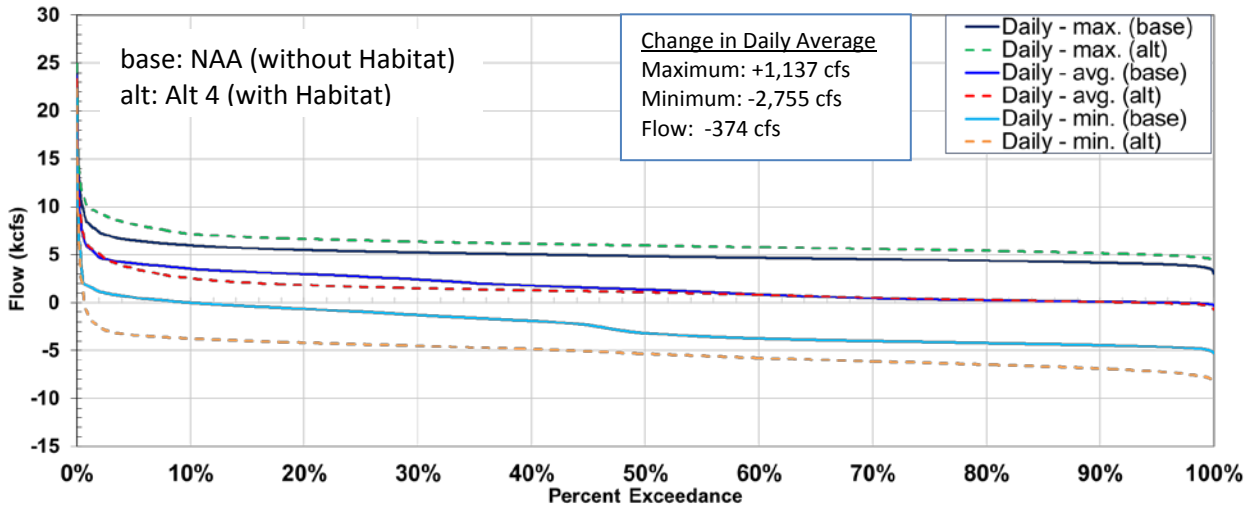

Figure 67. Daily Flow in North Fork Mokelumne River

Alternative 4 with Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

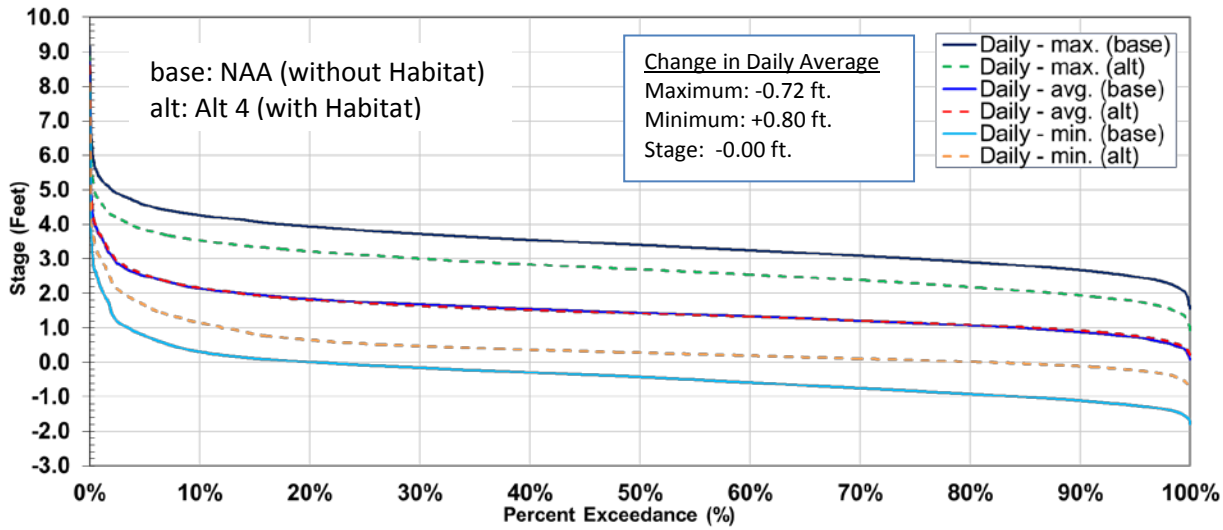

Figure 68. Daily Stage in North Fork Mokelumne River

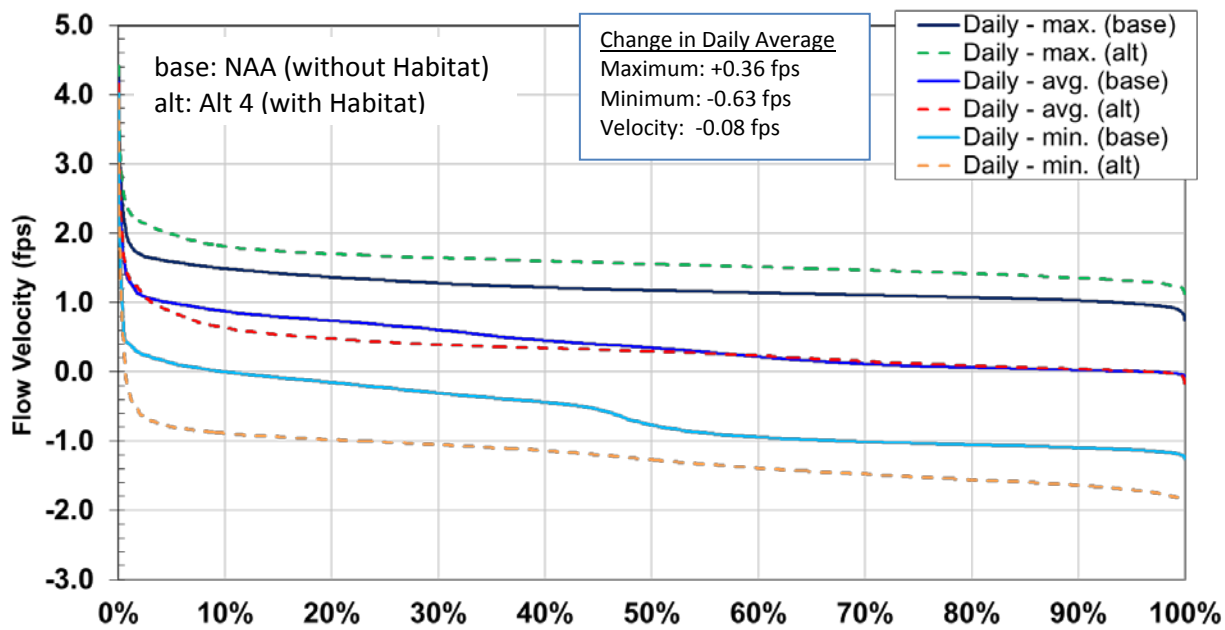

Figure 69. Daily Velocities in North Fork Mokelumne River

Alternative 4 with Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

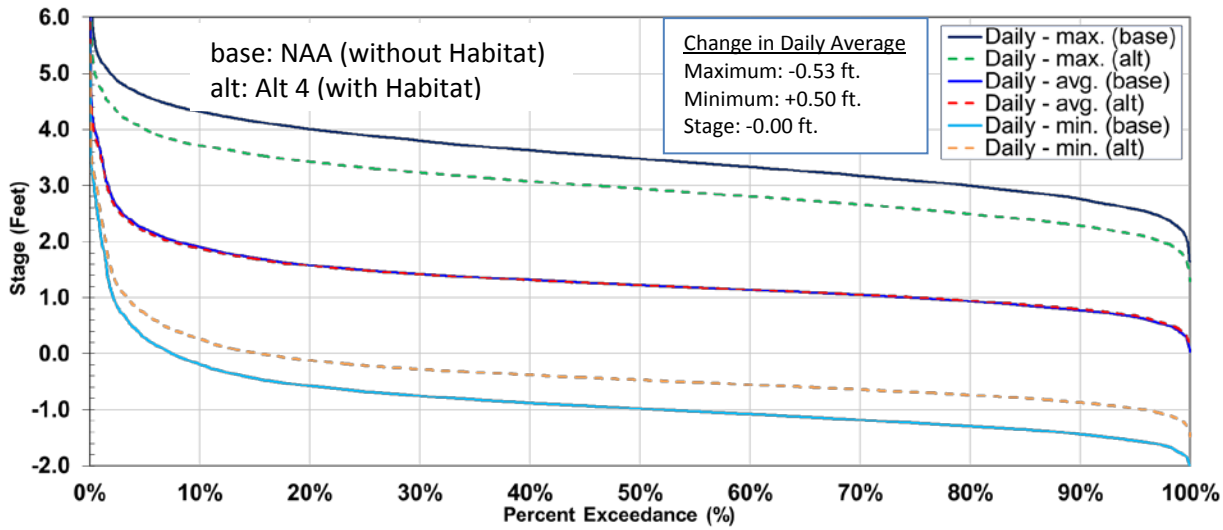

Figure 70. Daily Stage in Cache Slough at Ryer Island

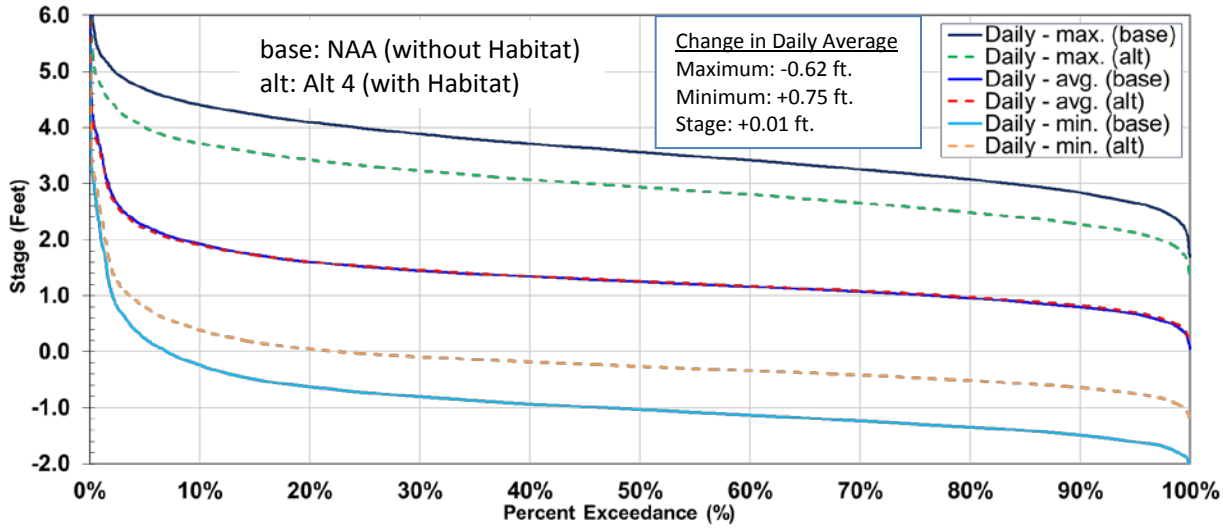

Figure 71. Daily Stage in Barker Slough at NBA Intakes

Alternative 4 with Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

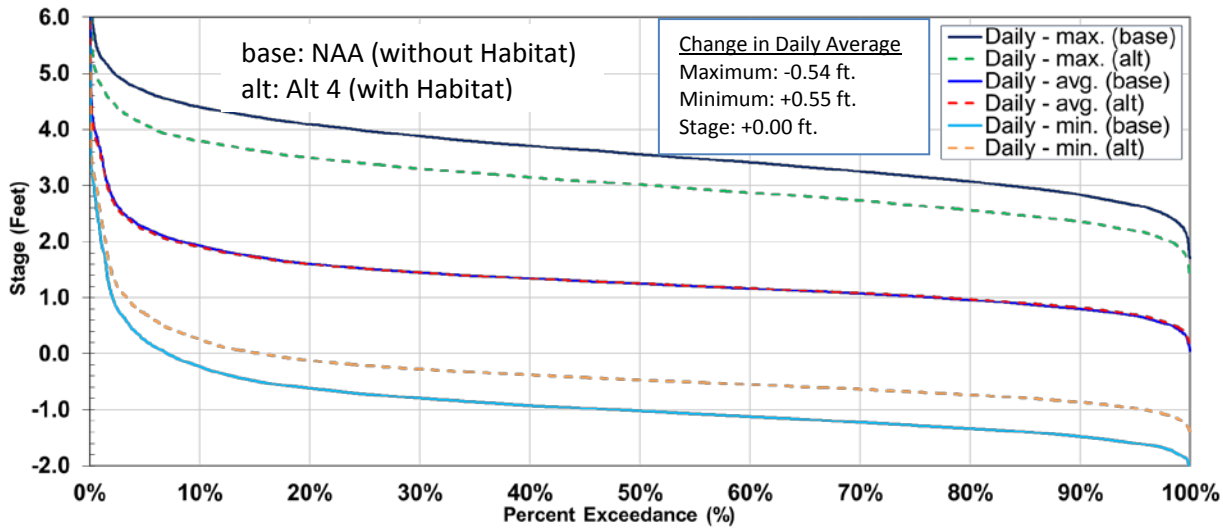

Figure 72. Daily Stage in Shag Slough Intakes

ALTERNATIVE 4 WITHOUT HABITAT VS. NO ACTION ALTERNATIVE WITHOUT HABITAT (INDEPENDENT MODELING)

Alternative 4 Without Habitat vs. No Action Alternative Without Habitat (Independent Modeling)

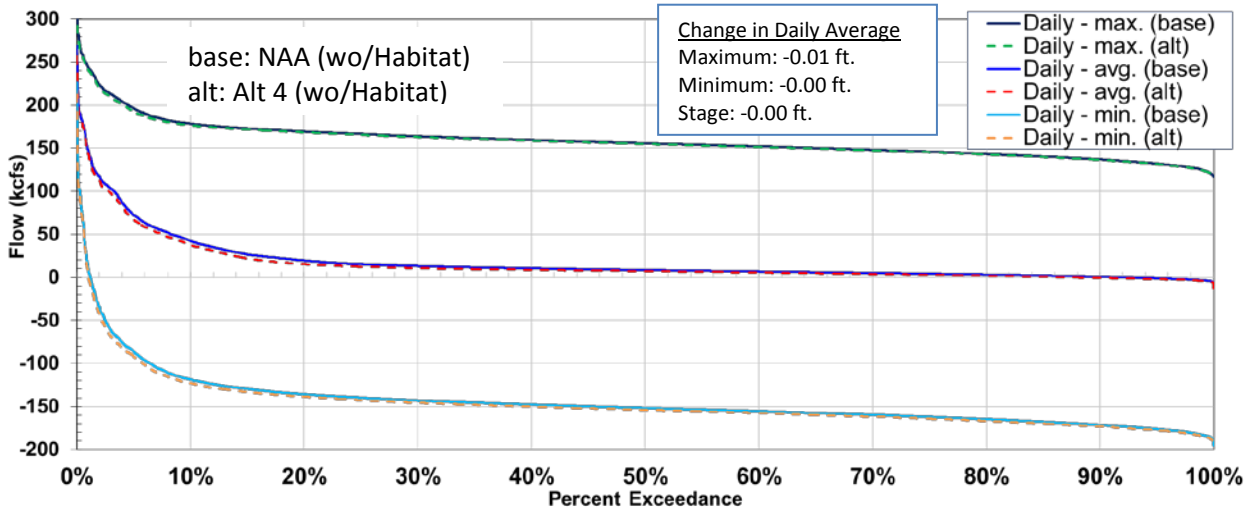

Figure 73. Daily Flow in Sacramento River at Emmaton

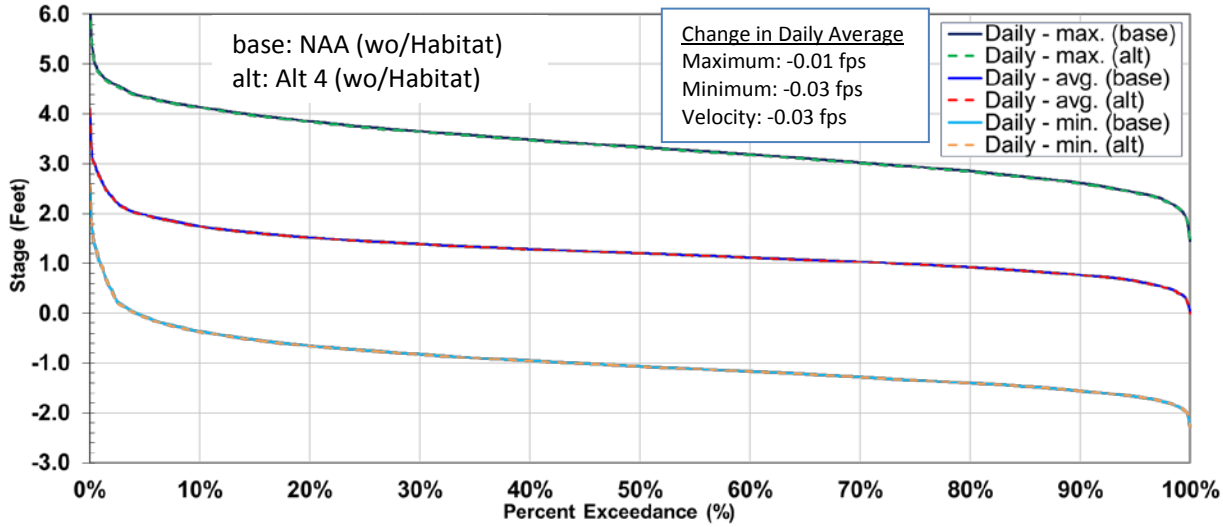

Figure 74. Daily Stage in Sacramento River at Emmaton

Alternative 4 Without Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

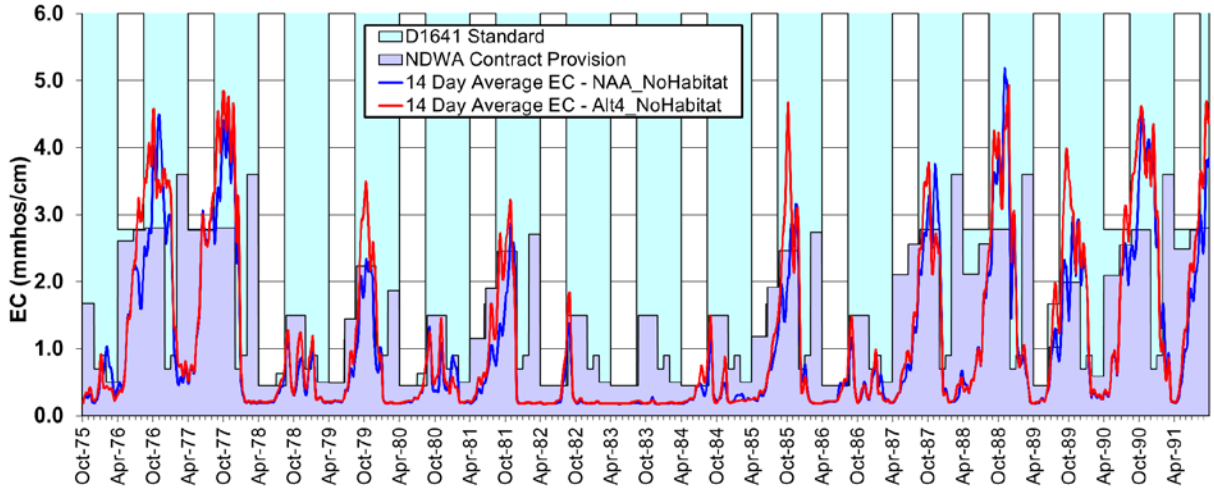

Figure 75. Daily Velocities in Sacramento River at Emmaton

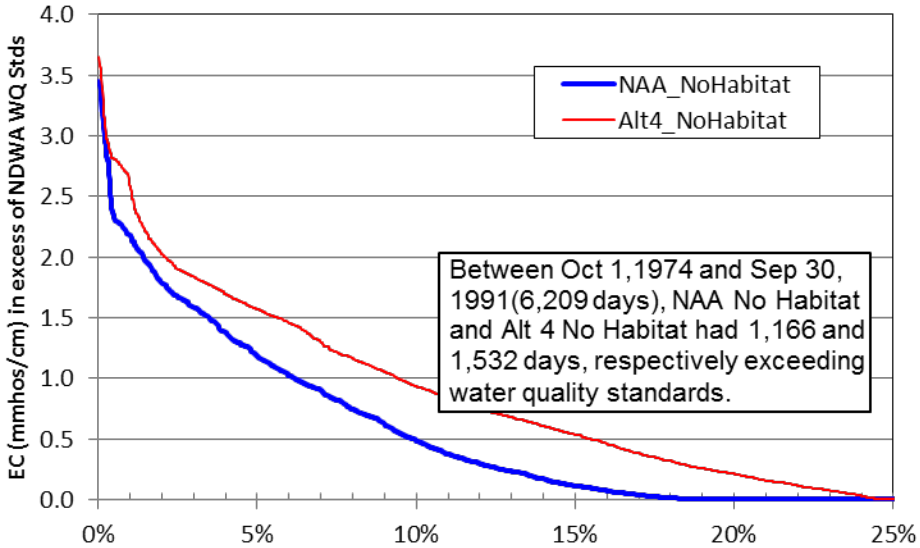

Figure 76. EC in the Sacramento River at Emmaton

Alternative 4 Without Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

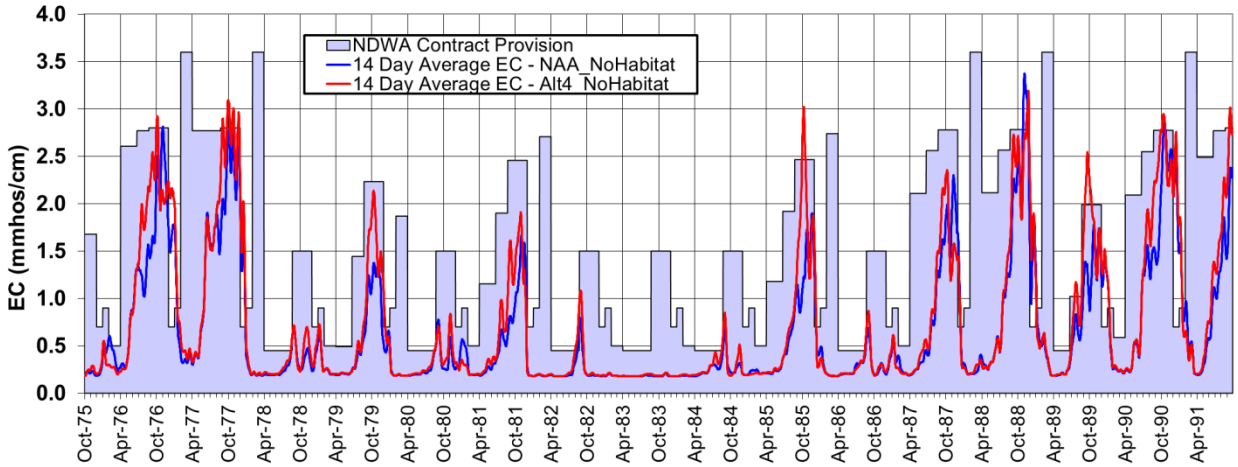

Figure 77. Probability of Exceeding EC Standards in the Sacramento River at Emmaton

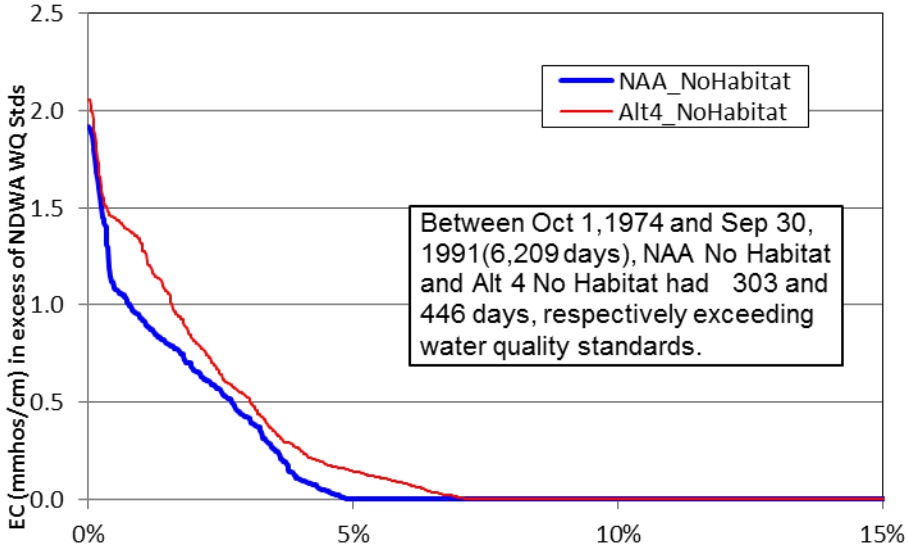

Figure 78. EC in the Sacramento River at Three Mile Slough

Alternative 4 Without Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

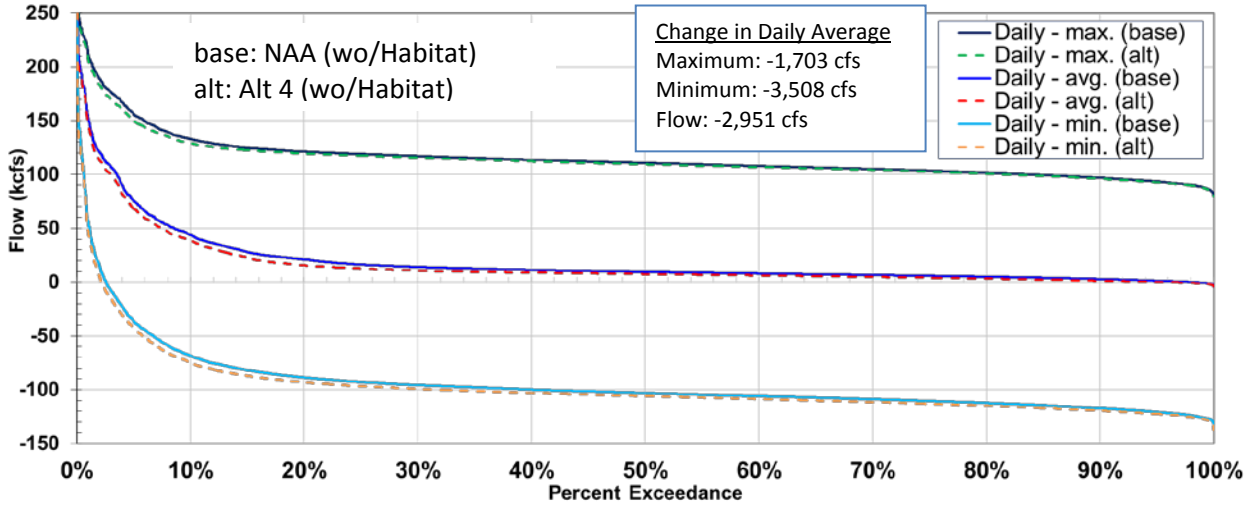

Figure 79. Probability of Exceeding EC Standards in the Sacramento River at Three Mile Slough

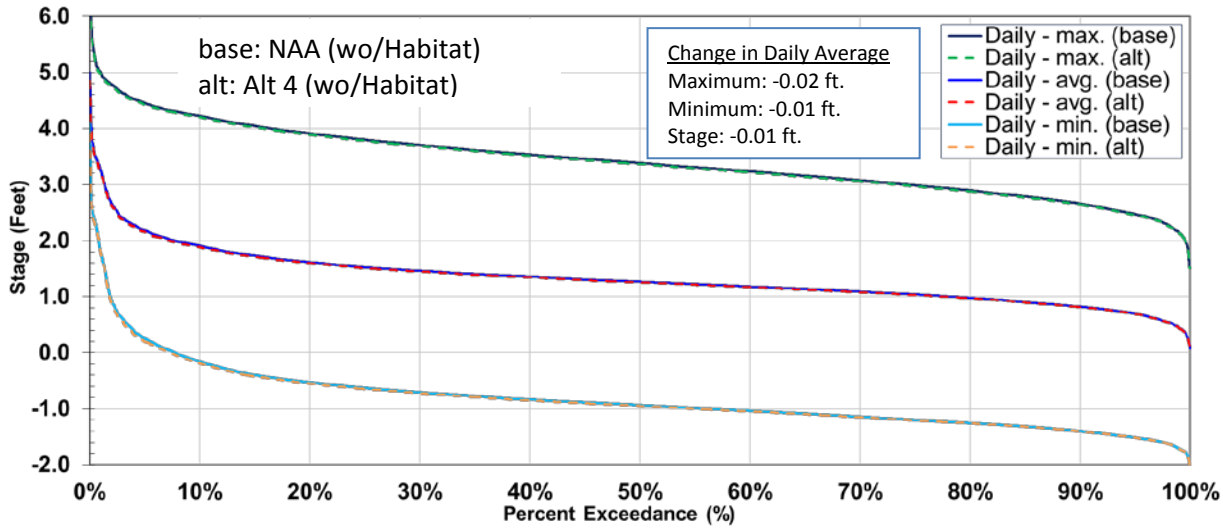

Figure 80. Daily Flow in Sacramento River at Rio Vista

Alternative 4 Without Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

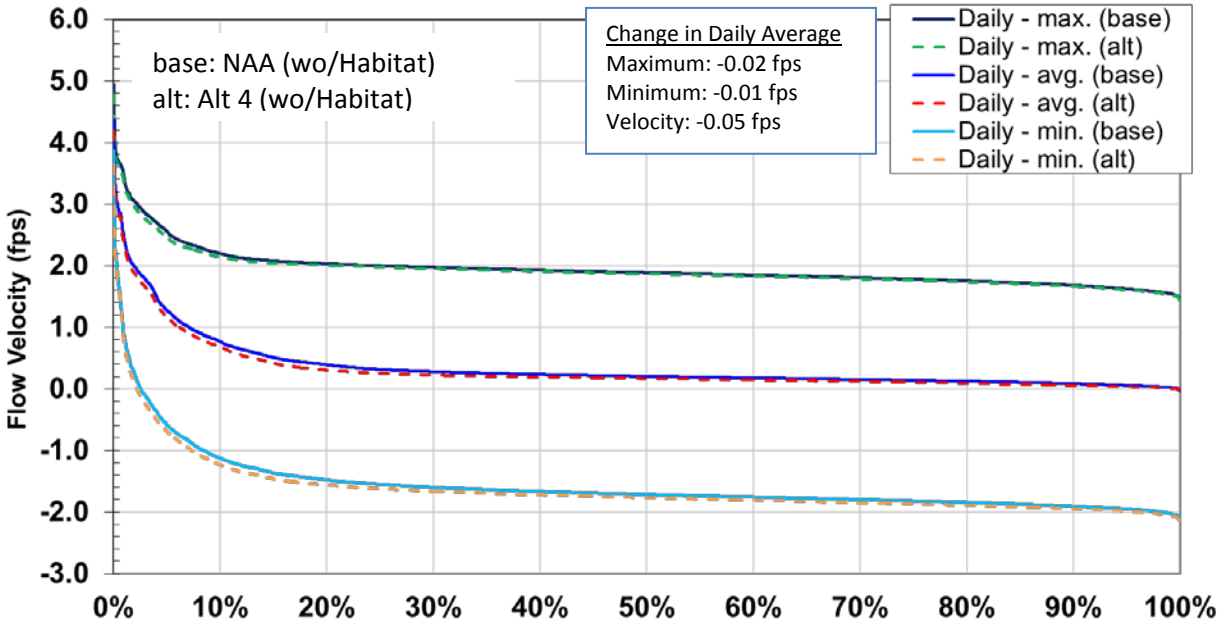

Figure 81. Daily Stage in Sacramento River at Rio Vista

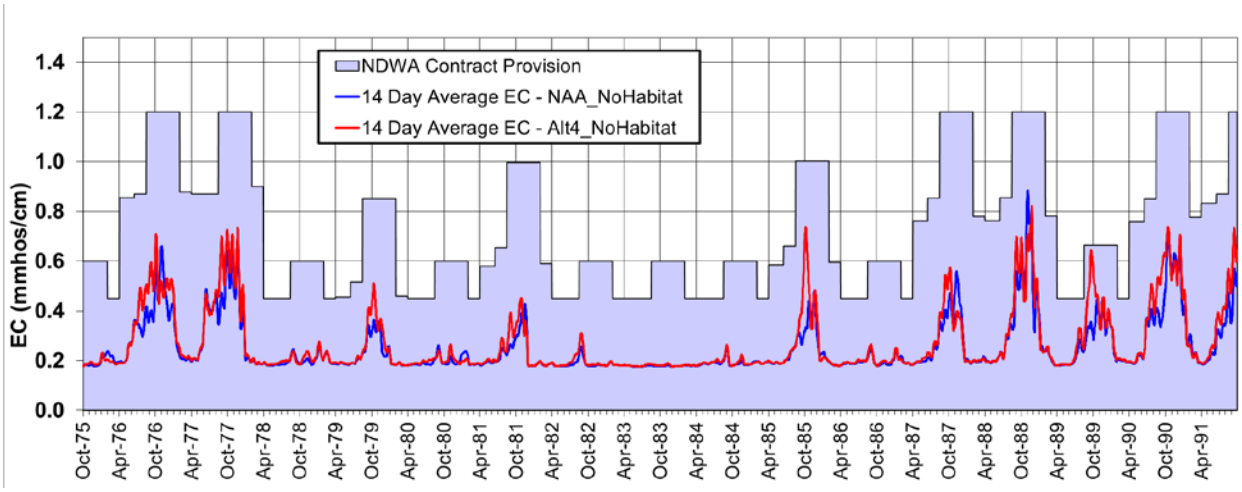

Figure 82. Daily Velocities in Sacramento River at Rio Vista

Alternative 4 Without Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

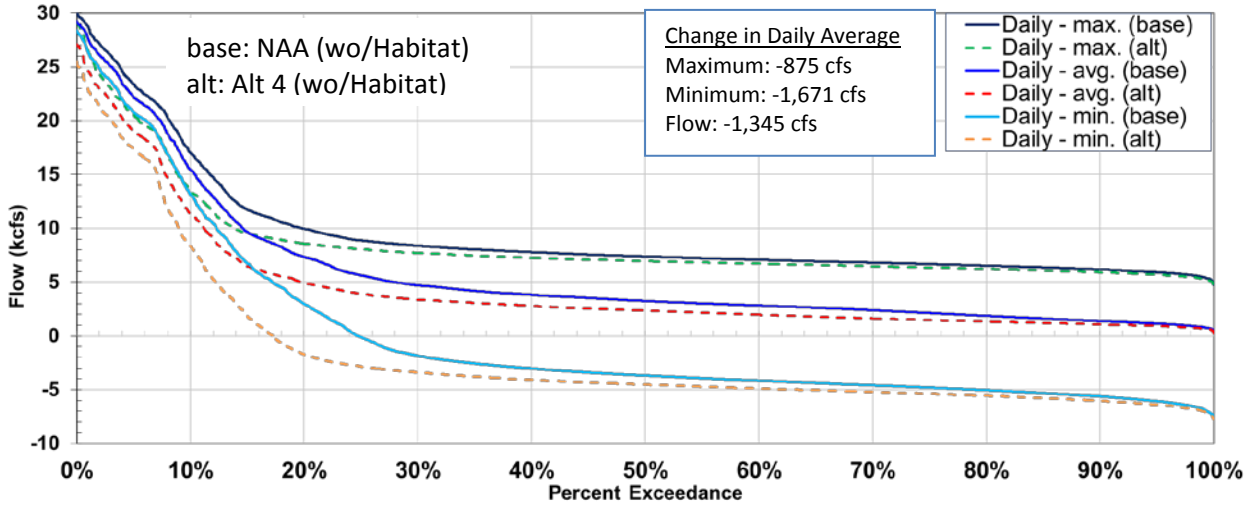

Figure 83. EC in the Sacramento River at Rio Vista

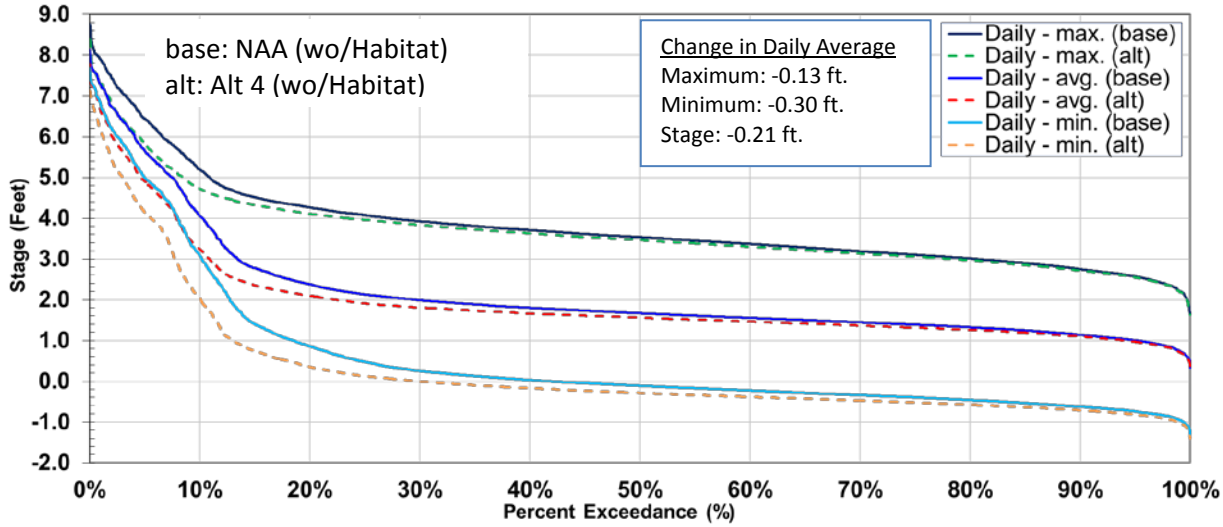

Figure 84. Daily Flow in Steamboat Slough at Sutter Slough

Alternative 4 Without Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

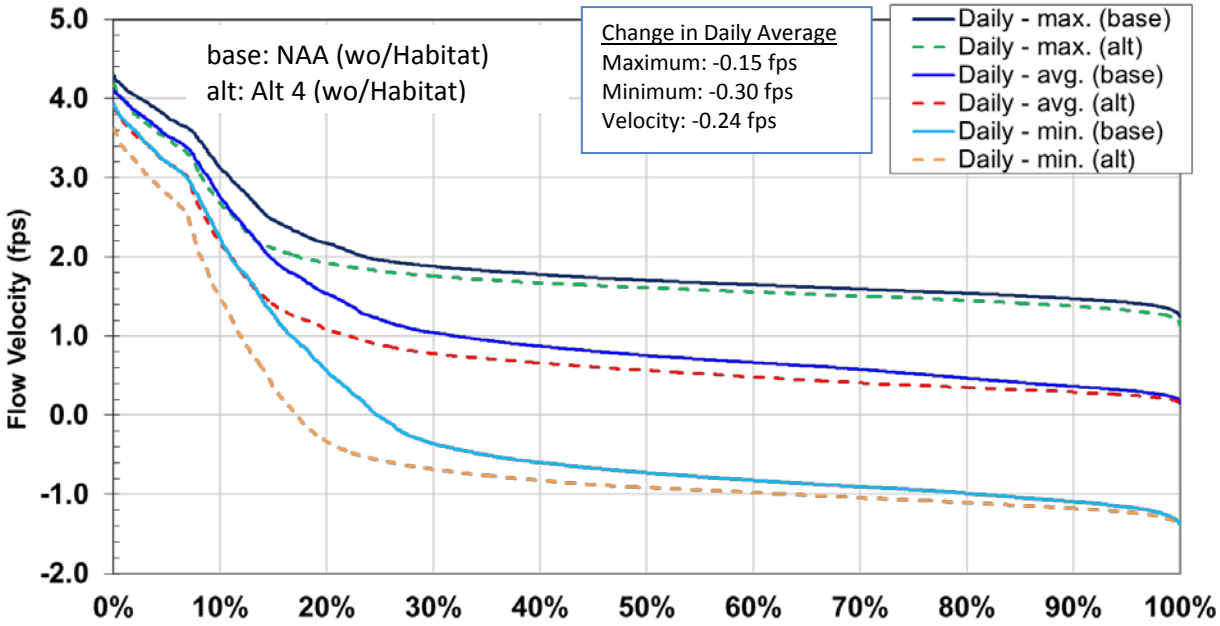

Figure 85. Daily Stage in Steamboat Slough at Sutter Slough

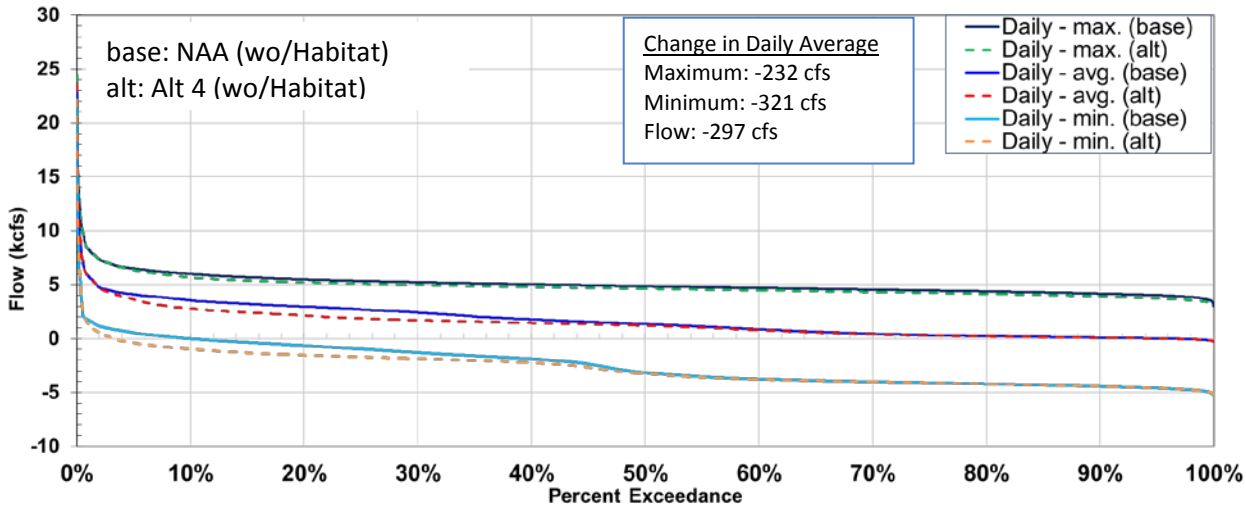

Figure 86. Daily Velocities in Steamboat Slough at Sutter Slough

Alternative 4 Without Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

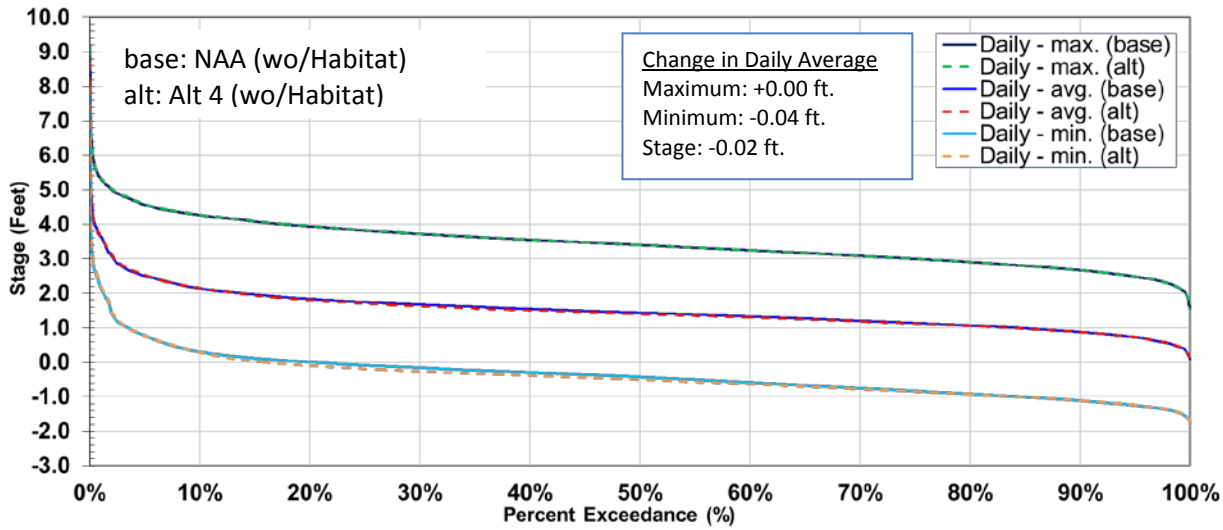

Figure 87. Daily Flow in North Fork Mokelumne River

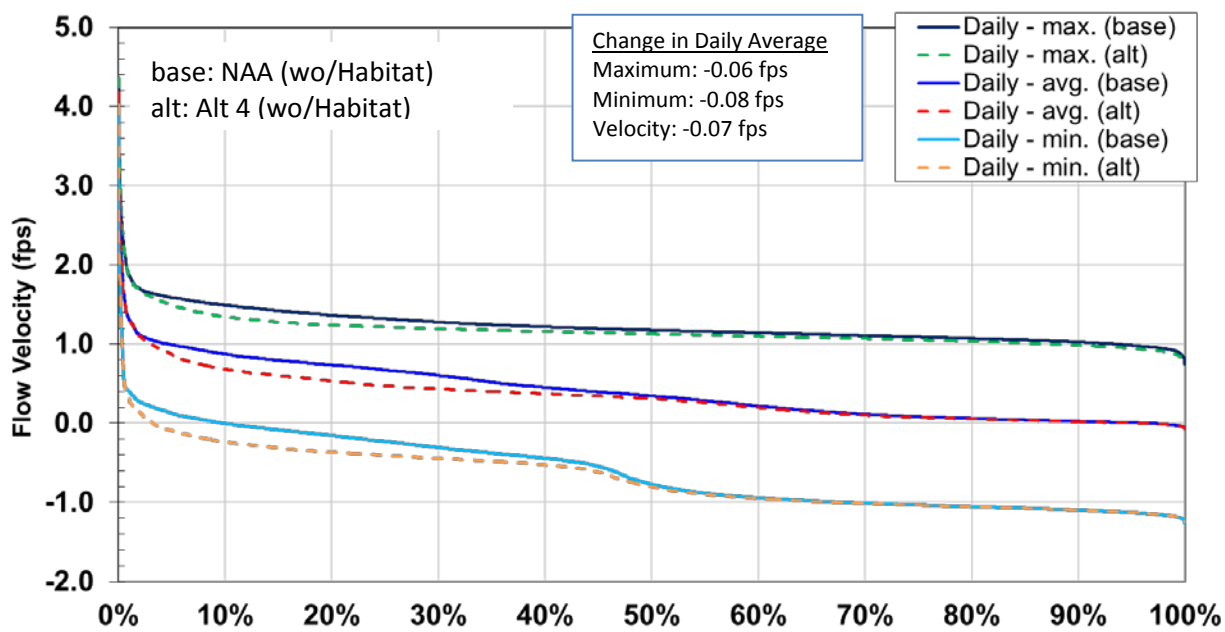

Figure 88. Daily Stage in North Fork Mokelumne River

Alternative 4 Without Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

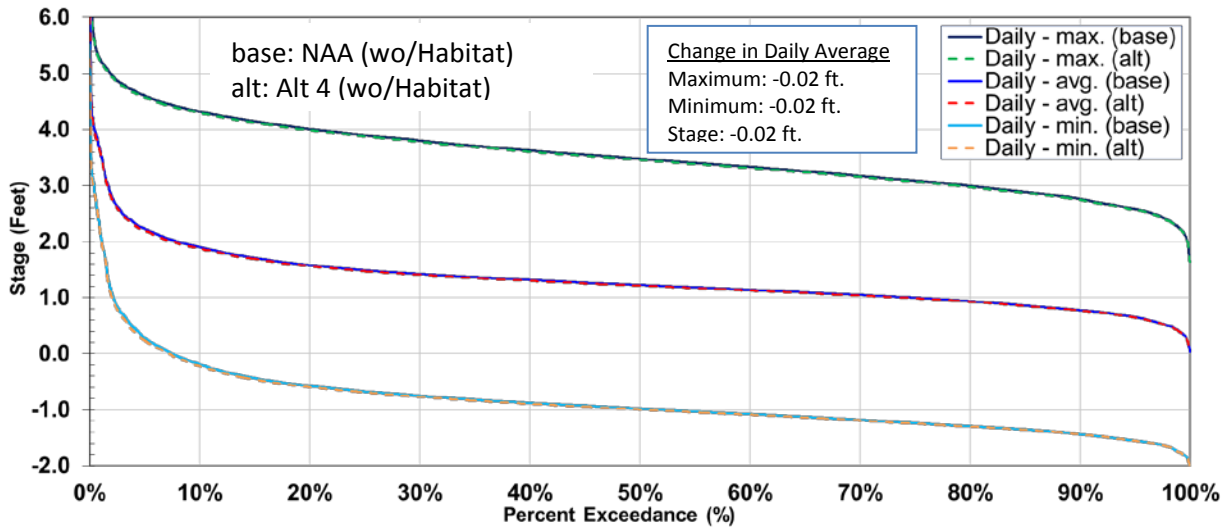

Figure 89. Daily Velocities in North Fork Mokelumne River

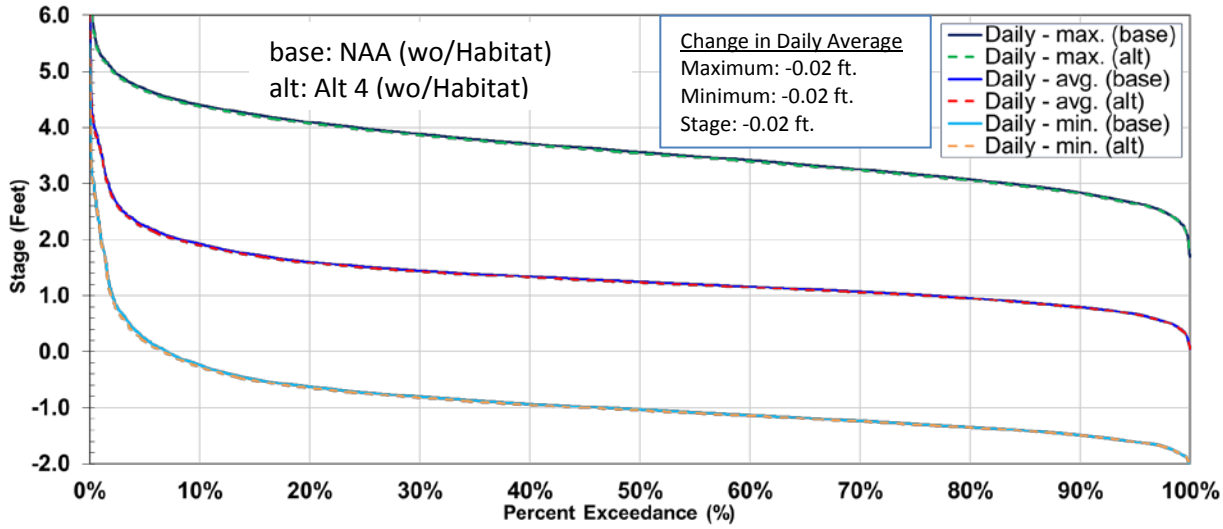

Figure 90. Daily Stage in Cache Slough at Ryer Island

Alternative 4 Without Habitat vs. No Action Alternative Without Habitat (Independent Modeling) Continued

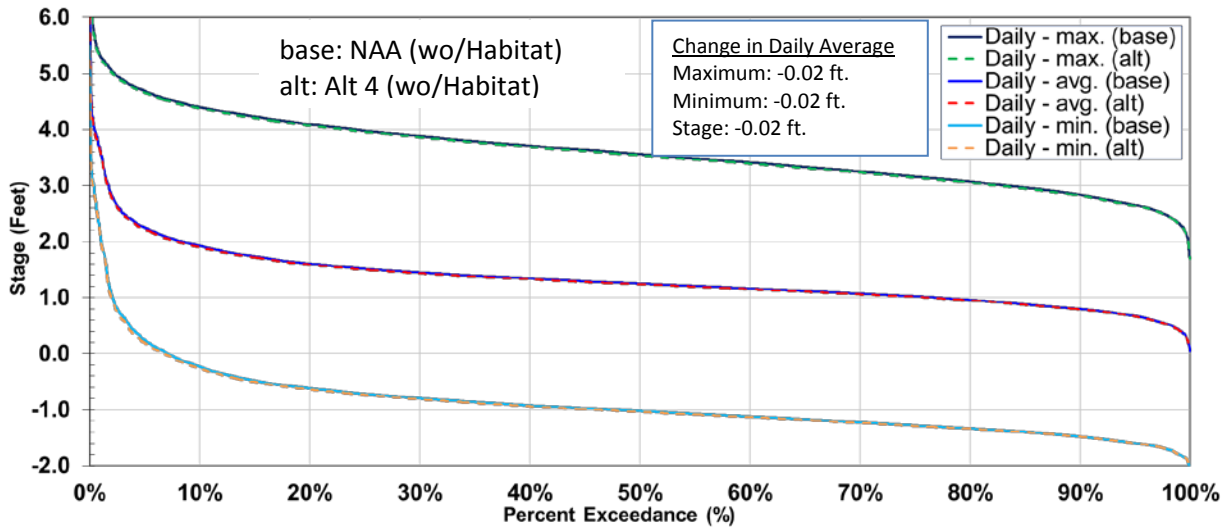

Figure 91. Daily Stage in Barker Slough at NBA Intakes

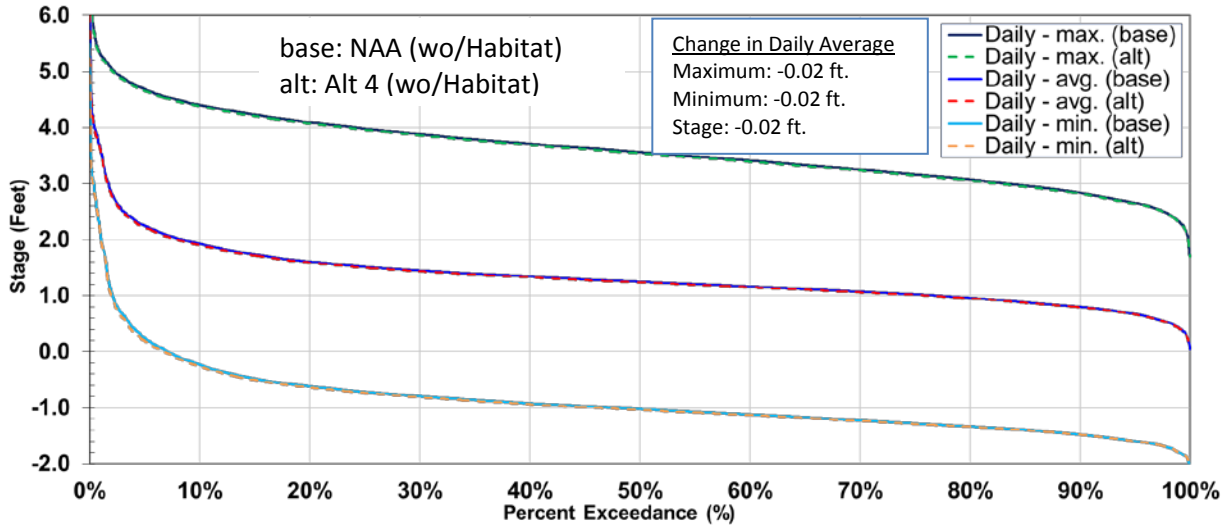

Figure 92. Daily Stage in Shag Slough Intakes

BDCP1674

EXHIBIT E:

The Delta Storage Concept

George Basye

November 21, 2009

THE DELTA STORAGE CONCEPT

The Sacramento - San Joaquin Delta (Delta),in its natural state, was a reservoir, not a stream. The inflow to the Delta could drop to near nothing, and the Delta water users would still have water of usable quality for a great many months. The quality remains acceptable in most of the Delta for a very long time, even during low inflow events, due to the configuration of the Delta. The water availability, of course, never diminishes in the Delta, due to the support provided by the tide.

The term "delta" is usually applied to the existence of a fan-shaped extension at the discharge where the flow of a river discharges into the sea. That is where the river deposits its silt, a result of the flow slowing down as it meets tide water. The river then builds up material and is constantly attempting to find an outlet, resulting in the creation of numerous islands and channels called a "delta". The word "delta" comes from the usual fan shape which resembles the Greek letter "d" or "delta". That letter has a triangular shape.

The Delta of the Sacramento and San Joaquin Rivers is different however. It does not fan out in a triangle as it reaches tide water, but has created a more circular shape. The expansion into that shape has resulted from the confined outlet at the Carquines Straight (Straight). This confined outlet has also resulted in the quality of Delta water being retained long after the inflow from the several rivers has fallen to nearly nothing. That sustained quality is attributable to the inflow of salty water being slowed by the Straight acting as a confined inlet for the salty water.

The Delta must be recognized as a natural storage reservoir. Prior to the modification of flows by the various upstream dams (as to which no criticism is intended) the high flows of the several tributaries during the winter and spring seasons of upstream rainfall and snow melt, pushed water out through the Straight making the tidal area within the Delta fresh, sometimes far out into the Bay. As the inflow diminished, the salt water from the Bay was gradually able to intrude through the Sraight into the Delta and the water quality in the lower portions would gradually diminish as a result. This intrusion was, however, a slow and gradual process as a result of the confined inlet created by the Straight.

Evidence exists of this extended period of good water quality as a result of this Delta reservoir or "storage" effect. Water quality has been recorded at the intake to the East Contra Costa Irrigation District (ECCID) on Indian Slough, in the Western Delta since 1914. That record shows that water of usable quality was available during the period between 1914, when measurements began, and the completion of the Shasta dam in the

1940's. It was continuously available at that location throughout the entire irrigation season except in October of 1931 which was a severely dry year. That, however, occured only after the need for irrigation water was virtually finished for the season.

Nature was, therefore, effectively storing water of a usable quality in the Delta during the winter and making it available throughout nearly all of the irrigation season, at least prior to the completion of the dams upstream. Indeed, farther into the Delta than the ECCID intake, the quality of water would never have dropped below an acceptable standard throughout the entire irrigation season.

Due to the effect of the tides, there was never, of course, a problem of water being phisically available. The water, though sometimes at a lower elevation in the Delta, was always physically available, unlike lands adjacent to a flowing stream which would at times find the source nearly absent.

During the negotiations leading to the 1981 North Delta Water Agency's (NDWA) contract with the State of California for assurances of water quality and quantity, and during the hearings for the permits issued to the US Bureau of Reclamation (USBR) for the operation of the Shasta Dam, there were those who questioned the continuous availability of usable water in the Delta. Some assumed that if the flows of the tributaries into the Delta fell to only nominal amounts then the Delta was essentially out of business and needed a supplemental supply. This would be on the assumption that the Delta acted as a continuance of the flowing streams. But it did not. It was effectively a reservoir, storing fresh water in the winter for use in the summer and so did not directly rely upon a continuous inflow of any particular amount.

There are said still to be some who believe that the Delta is receiving a tremendous benefit from the operation of the upstream storage dams in sustaining the availability of usable water and that without the releases from those dams, the Delta supply of usable water would be in doubt for much of the year. That is a serious misunderstanding of the way the Delta functioned prior to the dams. Without the dams, the Delta was storing water during high flows for use during the balance of the season. Those high flows pushed out the intruding salt in the Delta and turned virtually all of the Delta fresh. It was, in effect a reservoir which slowly "leaked" through gradual intrusion of saline water. The slowness was due to the limited inflow of salty water permitted by the Straight. It was not perfect and the quality gradually diminished from the extreme westerly portion toward the upper edge of the tidal effect, but it was indeed a valuable and important natural storage operation for the better part of the irrigation season.

So, what has been the impact of the upstream storage on the Delta? The high flushing flows which historically pushed salty water from the Delta channels each winter and turned them fresh, have been substantially reduced by storage of these flows in the upstream dams. The pull of the federal and State export pumps has added to the speed of the salinity intrusion into the Delta. The Project operations have a benefit from the standpoint of flood control and effective Statewide water usage. It must also be recognized, however, that the Project opertions have an adverse impact on the natural "storage effect" in the Delta. The Project operations have ha the effect of turning the natural Delta "reservoir" into more of a flowing stream, diminishing the natural storage effect.

When considering the question of what benefit the Delta water users have received from the operation of the storage reservoirs upstream on the tributaries by the State and federal governments, it must therefore be recognized that the operation of these storage reservoirs upstream, and the operation of the export pumps, have reduced the natural seasonal storage of fresh water in the Delta which existed prior to their construction. The extent of the benefit which the Delta may receive from artificial upstream storage must therefore be offset to the extent of the detriment from reduction of the storage effect which nature provided to the Delta lands prior to that upstream storage and the pull of the export pumping of the Projects.

There are those who may yet believe that the Delta water users owe their continued success to the operation of the reservoirs and that when the inflows reached a low point, the Delta irrigators were essentially out of business. Such an assumption ignores the way in which the Delta operated before the dams and the addition of the export pumps which, in effect have turned the Delta "reservoir" into more of a running stream.

This analysis deals only with the Delta water quality issue. It is not intended to analyze impacts on fish or flooding. All of these issues are connected, but in analyzing the benefits of upstream storage on Delta water quality, any benefits must be offset by the loss of the benefit which nature provided as a result of the narrow channel which limited both the outlet of fresh water and the inlet of salinity.

The 1981 Contract Between State of California Department of Resources and the North Delta Water Agency, for the Assurance of a Dependable Water Supply of Suitable Quality includes a determination of the appropriate compensation for the average benefits to the North Delta from the State Water Project operations. In so doing, it has properly weighed the issue of Project benefits along with the availability of the historic natural Delta storage in light of the Delta storage concept described above.

These comments owe their source to Gerald H. Jones, a distinguished water and flood control engineer who began his career with the East Contra Costa Irrigation District in about 1914 and retired as an Assistant State Engineer in the 1950's. He was a walking history of Delta operations. He continued to work with Delta interests until his death in the 1960's and was the first to understand and explain the "Delta Storage Concept" described above. The Delta owes a great deal of gratitude to "Jerry" Jones.

George Basye 11/21/09

REFERENCE LIBRARY

INDEX

Part A: 2008-2011

Date	Document
May 30, 2008	Comments on Bay Delta Conservation Plan Notice of Preparation of an Environmental Impacts Report and Environmental Impact Statement (EIR/EIS) for the Bay Delta Conservation Plan
June 11, 2008	Request for Membership on Bay Delta Conservation Plan Steering Committee
July 15, 2009	Bay Delta Conservation Plan Review Document Comment Form: Conservation Strategy Overview and Introduction 3.1. and 3.2
November 16, 2008	Bay Delta Conservation Plan Review Document Comment Form: 1st Draft Adaptive Management, Chap. 3 Conservation Strategy
December 10, 2009	BDCP Modeling for Modelers Follow-up
November 4, 2010	Bay Delta Conservation Plan Review Document Comment Form: Working Draft Chap. 1 introduction August 26, 2010 version
June 17, 2011	Bay Delta Conservation Plan Review Document Comment Form: Chapter 7. Implementation structure, June 3, 2011, version discussed at the June 9, 2011 BDCP Governance Work Group
November 4, 2011	NDWA and Local Agencies of the North Delta: Re: Significant Unaddressed Issues to Date

Part B: 2008-2013

Date	Document
June 11, 2008	Request for Membership on Bay Delta Conservation Plan Steering Committee
June 12, 2009	Bay Delta Conservation Plan Review Document Comment Form: Other Stressors Conservation Measures June 3, 2009
May 13, 2009	NDWA Scoping Comments on EIR/EIS
July 30, 2009	Letter to Steering Committee re: Proposed Water Operations Criteria for In Delta Water Quality
September 16, 2009	Comments – Draft proposed BDCP Near-term Conservation measures for Hydrodynamic Modeling and Analysis
November 15, 2011	NDWA comments on the First Amendment of the MOA Regarding Collaboration on the Planning, Preliminary Design and Environmental Compliance for the Delta Habitat Conservation and Conveyance Program in Connection with the Development of the BDCP
November 17, 2011	NDWA Comments re: the public meeting process
September 21, 2012	NDWA request for comprehensive socioeconomic benefit-cost analysis of the BDCP

October 17, 2012	NDWA letter to Secretary Salazar requesting geotechnical exploration before release of BDCP EIR/EIS
February 6, 2013	NDWA comments to Dr. Jerry Meral re: Task Order ICF-11 and Amendment 1 Cost Benefit Study Scope of Work for the BDCP
February 6, 2013	Stone Lakes NWR Comments on Task Order ICF-11 and Amendment 1 Cost Benefits and Costs of the BDCP
February 6, 2013	Local Agencies of the North Delta Comments on Task Order ICF-11 and Amendment 1 Cost Benefits and Costs of the BDCP
May 7, 2013	NDWA and Reclamation Districts 3, 150, 551, and 999: Request for More Effective Engagement with Cooperating Agencies of the BDCP Administrative Draft EIR/EIS
June 25, 2013	Diverse group of water agencies (NDWA, Contra Costa Water District, East Bay MUD, Friant Water Authority, San Joaquin Tributaries Authority, Northern California Water Association, San Joaquin River Water Authority, and Tehama Colusa Canal Authority) re: BDCP baselines.

Part C: April 16, 2012 Administrative Draft Comments

Date	Document
April 16, 2012	NDWA comments re: Administrative Draft
April 16, 2012	NDWA comments re: Preliminary Administrative Draft (Chapters 1, 1-A, 2, 4, and 31)

Part D & E: July 31, 2013 2nd Administrative Draft Comments

Date	Document
July 31, 2013	NDWA comments re: 2nd Administrative Draft – Chapter 5 (Water Supply); Chapter 6 (Surface Water) and General Comments (Part One)
July 31, 2013	NDWA comments re: 2nd Administrative Draft – Chapter 7 (Groundwater)

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May 30, 2008

VIA EMAIL (DELORES@WATER.CA.GOV)

Ms. Dolores Brown, Chief, Office of Environmental Compliance
Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236

SUBJECT: Comments on Bay Delta Conservation Plan Notice of Preparation of an Environmental Impact Report and Environmental Impact Statement (EIR/EIS) for the Bay Delta Conservation Plan

Dear Ms. Brown:

On behalf of the North Delta Water Agency ("North Delta"), we appreciate this opportunity to comment on the above-referenced Notice of Preparation of an Environmental Impact Report and Environmental Impact Statement for the Bay Delta Conservation Plan ("NOP") posted by the Department of Water Resources on March 17, 2008 with comments accepted until May 30, 2008.

Background

Pursuant to a special act of the California Legislature (North Delta Water Agency Act, Chapter 283, Statutes of 1973), North Delta was formed in 1973 to help address the impacts of the Central Valley and State Water Projects (Projects) upon agricultural interests within the northern part of the Sacramento–San Joaquin Delta. Beginning approximately 160 years ago, farmers in this area began reclaiming lands from flooding, appropriating water to beneficial use and establishing vibrant agricultural communities. The Bureau of Reclamation (Bureau) began constructing the Central Valley Project (CVP) began in the late 1930s, damming the major tributaries on the Sacramento River and holding back substantial quantities of the Delta water supply. As it did with landowners along the length of the Sacramento River, the United States conducted extensive studies and negotiations to ensure a sufficient supply for water right holders in the northern Delta. Discussions with Delta landowners were protracted, however, due to the complex issues of both water quantity and quality, and the issues only intensified with the commencement of the State Water Project under the Department of Water Resources (DWR).

Against this backdrop, North Delta was formed to represent northern Delta interests in negotiating a contract with both the Bureau and DWR in order to mitigate the water rights impacts of the Projects.[1] From 1974 to 1979, North Delta, the Bureau and DWR determined the outflow necessary to meet water quality standards for irrigated agriculture and generally reviewed the paramount water rights of landowners within North Delta's boundaries. The agencies also evaluated the Delta channels' historical function as natural seasonal storage. Before the Projects began withholding much of the Sacramento River system's high winter flows, the Delta channels stored sufficient fresh water to sustain water quality in the northern Delta throughout and often beyond the irrigation season. Since the Projects commenced, however, the Delta functions more like a flowing stream and, as a result, relatively minor decreases in outflow can have a serious impact on northern Delta water quality.

In 1981, DWR and NDWA executed a permanent settlement agreement that would prevent much of the Projects' detrimental effect on North Delta right holders.[2] The 1981 Contract for the Assurance of a Dependable Water Supply of Suitable Quality (1981 Contract) represents a guarantee by the State of California that, on an ongoing basis, it will ensure that suitable water will be available in the northern Delta for agriculture and other beneficial uses. The 1981 Contract requires DWR to operate the State Water Project to meet water quality criteria within the Delta channels while providing enough water to satisfy all reasonable and beneficial uses of water within North Delta's boundaries. In return, North Delta makes an annual payment to DWR. Although the two signatories are public agencies, the 1981 Contract also extends to individual landowners who, under the terms of the Contract, have executed Subcontracts guaranteeing that their lands will receive all the benefits and protections of the 1981 Contract. Many of these Subcontracts have been signed and recorded, enabling the subcontractors to enforce the terms of the 1981 Contract.

Serving as both a Habitat Conservation Plan and a Natural Community Conservation Plan, the Bay Delta Conservation Plan (BDCP) is a multi-participant strategy for mitigating the effects of the Projects (and other projects) on Delta species and the Delta ecosystem, just as the 1981 Contract mitigates for the Projects' effects on the landowners within the boundaries of North Delta. North Delta recognizes the importance of extending species protections and restoring the environmental health of the Delta while assuring a reliable water supply, and intends to play an active role in formulating appropriate comprehensive solutions to the environmental impacts caused by the Projects. At the same time, in moving ahead with the BDCP it will be critical to formulate an approach that respects and accommodates the State's commitment to ensure a permanent water supply of suitable quality to landowners within North Delta. It will also be

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[1] Section 4.1 of the Agency Act states: The general purposes of the agency shall be to negotiate, enter into, executed, amend, administer, perform and enforce one or more agreements with the United States and with the State of California . . . To protect the water supply of the lands within the agency against intrusion of ocean salinity; and . . . To assure the lands within the agency of a dependable supply of water of suitable quality sufficient to meet present and future needs."

[2] By that time, the Bureau had decided against contracting with individual parties to meet water quality standards.

critical to recognize, as the Delta Vision Task Force has, that the Delta itself is a unique place, not just a source of water supply or a species habitat. The people who live, work and play in the Delta, and who have been stewards of the Delta for generations, understand and appreciate these unique characteristics, and deserve to have their legacy continue for many future generations.

Composition of the Steering Committee

As an initial matter, the BDCP Steering Committee is composed almost exclusively of State regulatory agencies, environmental groups, and entities with contracts for water from the Projects. The habitat creation projects and mitigation measures identified during the BDCP process thus far occur exclusively within the Delta and immediately adjacent areas, yet no local districts, municipalities, or counties are on the Steering Committee and, to our knowledge, none has received an invitation to join the Steering Committee. To ensure that the BDCP process and the resulting EIR/EIS reflects the interests of the people of the Delta, the Steering Committee should be expanded as quickly as possible to include significant interests within the Delta.

Alternatives Should Evaluate the Environmental Effect of Targeted Reductions in Exports in Conjunction with Other Approaches

The NOP and previous BDCP documents strongly suggest that none of the alternatives analyzed in the EIR/EIS will include any level of reduction in Delta exports, and as a result, the EIR/EIS will not specifically evaluate the potential environmental benefits of making targeted reductions in exports. This omission is a serious error under the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) and jeopardizes the validity of the EIR/EIS. The Delta ecosystem thrived even after the commencement of the CVP; serious environmental impacts began to occur only after exports substantially increased when the SWP came online. Environmental evaluations have repeatedly shown that Delta smelt and other species are more abundant during periods of greater outflow, which is reduced when exports are high. Mark and recapture data show that the survival rates of juvenile late fall-run Chinook salmon in the central Delta also decrease as exports increase. Export-related increases in salinity potentially affect not only species, but may also reduce the quality of water for agriculture within the Delta, which DWR is contractually obligated to protect under the 1981 Contract.

Therefore, it is appropriate that the EIR/EIS provide at least one alternative that includes a reduction in water exports water as part of a multi-factored approach to mitigating the effects of the Projects. Preferably, the EIR/EIS should analyze the environmental effects of a range of reductions upon all identified alternatives to properly inform decision-makers and the public of the approach that would have the greatest promise of reducing the environmental impacts of the Projects. It is not appropriate to simply bypass this analysis under the guise of a conclusory statement that any reduction in exports is infeasible when demand management, desalination projects, conjunctive use, xeroscaping, and zero net water developments have not been fully developed in the service areas where the water is being exported.

Water Conveyance Design

Two of the four alternatives explored in prior BDCP documents rely on construction of an isolated conveyance facility as a means of exporting water from the Delta. The EIR/EIS should address the environmental effects of lining such a facility to reduce conveyance losses to the greatest extent possible. High conveyance losses would require greater quantities of water to be removed from the Delta, with commensurate impacts on aquatic species.

The EIR/EIS must also evaluate the size/capacity of any isolated conveyance facility. The capacity should be based on the minimum amount of water necessary to serve the reasonable, beneficial needs of the south-of-Delta water contractors, particularly in light of the need for water to serve the landowners within the Delta itself and to satisfy the developing needs of the northern counties where the water originates. In addition, the EIR/EIS must evaluate the terrestrial effects of constructing the facility itself. A smaller, deeper facility will have a smaller terrestrial environmental footprint than a larger, shallower facility, which should be reflected in the analysis.

Impacts of Fostering Listed Species in Expanded Areas of the Delta

Every alternative that has been identified throughout the BDCP planning process proposes extensive construction and enhancement of habitat areas to benefit aquatic and terrestrial species within and adjacent to the Delta. Examples include introducing shallow flooding into northern and western Delta lands to serve as spawning habitat and to promote growth of organisms that serve as a food source for the threatened Delta and longfin smelt and other native fish. Much like the southern Delta export pumps, a network of private and public siphons, pumping plants, and other intake facilities are used to deliver the water supply for users within the Delta. Mitigation measures that foster threatened and endangered fish species in the vicinity of these water intakes will lead to entrainment, particularly for intakes that are not currently outfitted with positive fish screen barriers.

To mitigate for the environmental effects of habitat enhancement, the EIR/EIS must address the need to install fish screens and to undertake other measures to protect aquatic and terrestrial species that are being introduced into new locations within the Delta or whose existing populations are being enhanced. Without appropriate mitigation measures in place, existing landowners engaged in longstanding land uses may inadvertently be said to "take" these listed species under the Federal and State Endangered Species Acts, even though the species would not exist in those locations were it not for the BCDP. These measures to protect introduced and enhanced listed species must be enforceable and should include requirements that those entities proposing projects under the BDCP fund the construction, operation, maintenance, repair and replacement of these measures, in perpetuity. Local landowners within the Delta should not have to pay to implement mitigation measures that are necessitated by proposed projects that will primarily benefit water service contractors south of the Delta.

The Uncertain Effects of Habitat Creation

The BDCP documents frequently refer to habitat "restoration" in the context of creating tidal marshes. The creation of tidal marshes on the Delta islands cannot be properly characterized as "restoration." It is our understanding that historically the Delta islands, just like the lands bordering the Sacramento River, had natural banks created by periodic flooding. When a river overtops its banks during a flood, the receding floodwaters deposit coarser grained suspended sediment along the banks, eventually building up a raised area resembling a natural levee. Although these natural levees would not be sufficient to prevent floods, they would have prevented overflow by the influence of the tides, and prevented the natural formation of tidal marshes along the Delta islands.

Thus, introducing man-made marshes along the banks of the Delta islands will not restore a natural habitat, but will create a new type of habitat as a means of trying to approximate aquatic conditions preferred by target species within the Delta. It is unclear what the effects might be of creating this new type of habitat. However, the EIR/EIS should identify all potential environmental impacts on hydrology, biological species, and soils resulting from this new form of habitat creation, and identify mitigation measures to reduce any impacts to below the level of significance.

Acquisition of Property Within the Delta for Installation of Habitat Improvements

The beneficial use of water in the Delta is crucial to the continued success of Delta agriculture, which is the backbone of the region's economy and history, and is fundamental to its continued vitality as a community as well as its municipal water supply. The BDCP process has identified vast areas in the Delta, and in adjacent areas, for habitat creation projects to offset the impacts of water exports and other projects. Some of these projects are expected to occur on property currently devoted to agriculture. To date, BDCP documents have not adequately disclosed or discussed the impacts of land conversion on the human community. These impacts include reducing the size and changing the nature of the local community, depressing the local economy, eliminating family legacies in land and family farming, and forcing large-scale relocation. Historic communities may be unalterably changed or even eliminated. The EIR/EIS must address such impacts when evaluating each identified alternative, and perform CEQA's critical function of informing the general public of the impacts of proposed projects.

To reduce these impacts to the greatest extent possible, project proponents should not seek to acquire new areas for habitat creation through eminent domain. Instead, any new habitat should be located on lands that are already in public hands or are subject to existing conservation or flood control easements, or else are purchased as a result of willing transactions by local landowners. It is in the public's best interest to avoid protracted and expensive eminent domain proceedings over the compensation to be paid to landowners in exchange for their property, which would include the land itself as well as the associated water rights. Any habitat creation or wetland projects depending on application of water from the Delta channels will also require a

water right, which the project proponent will have to acquire. The 1981 Contract does not provide for the diversion or use of water for environmental purposes.

Effects of Agricultural Conversion

The EIR/EIS must also include an assessment of the conversion of productive agricultural land, which is being cumulatively lost throughout the State at an alarming rate. In preparing the EIR/EIS, the agencies will need to establish appropriate thresholds of significance for the potential loss of these productive lands, and establish mitigation measures that may include funding the creation of additional agriculture lands, possibly in the Delta uplands that are currently not subject to agriculture.

The EIR/EIS should also review the numerous secondary environmental effects that will be caused by the conversion of agricultural land. As one example, to the extent that the proposed projects will convert agricultural land, they will also reduce the amount of food grown and consumed locally within and adjacent to the Delta. As a substitute supply, more food will need to be transported into neighboring communities including small municipalities as well as the cities of Sacramento and Stockton. More fossil fuels will be consumed in transporting food, which will in turn increase air emissions in areas that are already in nonattainment. The EIR/EIS should find that the proposed projects will cause a significant environmental effect if they result in a cumulatively considerable net increase of any criteria pollutant for which the affected region is considered to be in nonattainment under applicable federal or state ambient air quality standards.

Additional concerns include the erosion of the local county tax base. When productive lands are purchased by public entities and converted to habitat or open space, they do not contribute to the County tax rolls. Less money will be available to the Delta counties and special districts, including reclamation districts with responsibility for operation and maintenance of local levees. To the extent that these losses of public revenue may lead to a significant environmental effect, possibly through cutting back of funds for levee maintenance, vector control or park and recreation programs, they should be replaced by the project proponents in the form of mitigation. Furthermore, when lands are acquired by public entities for open space or habitat, they tend not to be as actively managed as agricultural lands, and can become more vulnerable to invasion by exotic species and noxious weeds. Because invasive species are often a major threat to listed species, the EIR/EIS should evaluate this possibility for potential significant environmental effects and propose mitigation accordingly.

Habitat and Species Improvement Projects Outside the Delta

The BDCP documents refer to species mitigation measures that will occur in areas outside the Delta, including the Suisun Marsh. But the location of additional measures should focus on a much broader area than just the Bay Delta. Impacts to salmon and steelhead occur throughout the greater Sacramento and San Joaquin River systems. Mitigation measures should include

eliminating physical barriers to upstream and downstream fish passage on these river systems, building fish ladders, and ensuring that migration flows are available during all critical life phases, possibly by execution of funding arrangements with districts that maintain local reservoirs. Additional projects could focus on alternative transportation for smolts, and increased funding for smolt trap and hydroacoustic studies to better evaluate stressors on smolt mortality within the Delta.

Focus on Strengthening Delta Levees

The BDCP should place a stronger focus on measures to protect and improve Delta levees, including a greater role in flood management planning. The levees help protect the water quality within the Delta, which is of grave concern to aquatic and terrestrial species, local landowners and water exporters alike. Any improved system of through-Delta conveyance will depend on the reliability of local levees. Stockpiling rock at strategic locations throughout the Delta will better enable local maintaining agencies to respond to emergency levee breaks.

Human Health and Pesticide Application

The EIR/EIS should address potential impacts to human health. The habitat creation projects that have been proposed during the BDCP process include the creation of artificial marsh areas. Marshes frequently make productive breeding areas for mosquitoes and, as a result, may increase the potential for diseases including the West Nile virus to spread to communities within and adjacent to the Delta. This impact will be felt most strongly by children and the elderly. Local mosquito and vector control districts will also likely need to resort to chemical pesticides to address increases in the mosquito population, and residual pesticides may have an effect on people who are exposed through incidental contact and on listed aquatic and terrestrial species.

Growth Inducement

The EIR/EIS is required to discuss the ways in which the proposed projects could foster economic or population growth, either directly or indirectly, in the affected environment. A growth-inducing impact may occur where the proposed project would remove an obstacle to population growth or would encourage facilities or other activities that could significantly affect the environment, either individually or cumulatively.

Exported water from the Projects will be used by CVP and SWP contractors to supply water for new development in vast areas south of the Delta. Numerous water purveyors with water service contracts rely on projected Delta exports for their SB 610 Water Supply Assessments and SB 221 Written Verifications of Water Supply, which are required prior to approval of a 500-unit residential development or a project that would increase the number of the public water system's existing service connections by 10%. The Supplemental EIR must disclose and evaluate the impacts, direct, indirect and cumulative, of growth induced by Project exports.

Public Participation

The BDCP should make a more concerted effort to reach out to local agencies and landowners, and solicit their feedback during the planning process. Many local landowners within the Delta are not accustomed to tracking public notices for large-scale environmental planning processes. During the local public scoping meetings held since publication of the NOP, many people learned about the existence of the BDCP planning process for the first time, and many more are still unaware of the process. Public meetings should be held within the Delta during each significant phase of the planning process, and in particular to get feedback regarding all lands and locations that may be identified as habitat creation or mitigation lands, and for any modifications to flood control plans and local levees. To ensure public understanding of each proposed action and appropriate feedback, the notices and meetings should include maps with clearly recognizable boundaries, and these meetings should be held *prior* to any final decisions on the location of such measures. The BDCP is a unique process with a tremendous scope, and warrants a more creative and expansive approach to soliciting public input.

Conclusion

We appreciate the opportunity to comment on the NOP. Thank you in advance for your attention to these comments.

Respectfully submitted,

DOWNEY BRAND LLP

Kevin M. O'Brien

cc: Board of Directors
North Delta Water Agency

Melinda Terry

NORTH DELTA WATER AGENCY

910 K Street, Suite 310, Sacramento, CA 95814
(916) 446-0197 Fax (916) 446-2404 melinda@northdw.com

Melinda Terry, Manager

June 11, 2008

Karen Scarborough, Chair, Bay Delta Conservation Plan Steering Committee
California Resources Agency
1416 Ninth Street, Suite 1311
Sacramento, CA 95814

Dear Ms. Scarborough:

As the General Manager of the North Delta Water Agency (NDWA), I am writing to request that NDWA be made a member of the Bay Delta Conservation Plan (BDCP) Steering Committee. I am prepared to serve as NDWA's member representative, and Kevin O'Brien will serve as NDWA's alternate.

Comprising over 277,000 acres of land within the jurisdictional Delta, NDWA plays a substantial role in the quantity, quality, and beneficial use of water flowing in the Delta channels. The California Legislature formed NDWA by a special act in 1973 (North Delta Water Agency Act, Chapter 283, California Statutes of 1973) for the principal purpose of negotiating and executing a contract with the Federal and State governments to address the impacts that the Central Valley and State Water Projects have on water users within the Delta. NDWA ultimately executed such a contract with the Department of Water Resources in 1981, and since then has administered, performed and enforced the 1981 contract to protect the water supply of NDWA lands against intrusion of ocean salinity, and to assure the NDWA lands have a dependable supply of water of suitable quality sufficient to meet present and future needs.

In developing a plan to address the impacts of Delta-related water projects on listed species, the BDCP process raises numerous issues of significant concern to NDWA and the landowners within its boundaries. NDWA's principal interests concern the BDCP's potential effects on Delta water quality and on the supply of water for beneficial uses within the northern Delta. NDWA wishes to participate in the BDCP to, among other things, help ensure that the alternatives and mitigation measures being considered by the Steering Committee are tailored to ensure protection of the northern Delta water supply, will pose as small an impact on NDWA landowners as possible, and will be broad enough to provide take coverage for projects designed to further those landowners' interests.

At the same time, NDWA is committed to advancing the broad objectives of the BDCP. NDWA supports the assurance of a reliable water supply for California, the implementation of meaningful protections for species and aquatic ecosystems within the Delta, and development of

Bay Delta Conservation Plan
Review Document Comment Form

Document: Conservation Strategy Overview and Introduction 3.1 and 3.2

Name: Melinda Terry **Affiliation:** North Delta Water Agency

Date: July 15, 2009

Please use this form to document your comments to the above document. Please number your comments in the first column and indicate the page, section, and line number (if provided) that reference the comment's location in the review document in the next three columns. **Return completed comment forms to Rick Wilder (wilderrm@saic.com) and Pete Rawlings (rawlingsms@saic.com).**

To be of the greatest value to the document development process, please make your comments as specific as possible (e.g., rather than stating that more current information is available regarding a topic, provide the additional information [or indicate where it may be acquired]; rather than indicating that you disagree with a statement, indicate why you disagree with the statement and recommend alternative text for the statement). Do not enter information in the **Disposition** column. This column will be used by SAIC to record how each comment was addressed during the document revision process.

No.	Page #	Section #	Line #	Comment	Disposition
	1	3.1	14-22	This paragraph is about the "highly altered environment" of the Delta. This language makes it sound like the channelization of and reclamation of swamp and overflow lands for farming and building of levees to protect from flooding are the cause of the decline of species as they are the only "physical disturbances within the Delta" that are mentioned. There is no mention of impacts from state and federal pumping or other "public" uses of the waterways that have certainly also "contributed to declines in fish". This seems to be a *significant omission* of Delta infrastructure that is part of the Delta's "highly altered environment" referenced on line 15 and the "physical disturbances within the Delta" referenced on line 20 that have also "contributed to declines in fish" referenced on line 21.	

Bay Delta Conservation Plan
Review Document Comment Form

Document: 1st Draft Adaptive Management in Chap. 3 Conservation Strategety

Name: Melinda Terry **Affiliation:** NDWA

Date: 11/16/08

Please use this form to document your comments to the above document. Please number your comments in the first column and indicate the page, section, and line number (if provided) that reference the comment's location in the review document in the next three columns. **Return completed comment forms to Rick Wilder (wilderrm@saic.com) and Pete Rawlings (rawlingsms@saic.com).**

To be of the greatest value to the document development process, please make your comments as specific as possible (e.g., rather than stating that more current information is available regarding a topic, provide the additional information [or indicate where it may be acquired]; rather than indicating that you disagree with a statement, indicate why you disagree with the statement and recommend alternative text for the statement). Do not enter information in the **Disposition** column. This column will be used by SAIC to record how each comment was addressed during the document revision process.

No.	Page #	Section #	Line #	Comment	Disposition
	2	3.6	3	Near top of page, add "scientific" so third line reads "Conservation Strategy as indicated by new ***scientific*** information"	
	3	3.6.1	8	Add ***scientific*** as follows: "for implementing a conservation measure based on new ***scientific*** information indicating"	
	3	3.6.1	22	"relevant new information developed by others to determine if changes in implementation of one or more Conservation Strategy elements would be desirable" seems to invite "junk science" to be inserted into the process. In particular "others" and "information" is too vague. I would recommend defining "others" so that it is clear who's information is qualified to be utilized in evaluating the effectiveness of measures implemented. The term "information" should also be defined to assure that quality science is the measure.	
	4	3.6.3	42	Add ***scientific*** as follows: "adaptive management experiments and relevant new ***scientific*** information"	
	4	3.6.3	42	Delete, "developed by others". Refer to item above regarding information by others. The quality of information in this process is important and should not be as broad as "others."	
	5	3.6.5		Question: What happens if a restoration measure ends up causing non-compliance/violation of water quality standards of the SWRCB or other state environmental law?	
	6	Table 3.X		Question: What happens if remedial measures in the future results in the abandonment of land due to circumstances may occur as identified in Table 3.X and replacement habitat is pursued instead? The original land converted to BDCP habitat restoration area will still need funding for management of the area and the payment of local tax assessments. Will these costs continue to be paid? Will the land be re-claimed to its	

Bay Delta Conservation Plan
Review Document Comment Form

Document: ADAPTIVE MANAGEMENT SECTION OF CHAPTER 3, CONSERVATION STRATEGY, FEBRUARY 27, 2009

Name: Melinda Terry **Affiliation:** North Delta Water Agency
Date: March 31, 2009

Please use this form to document your comments to the above document. Please number your comments in the first column and indicate the page, section, and line number (if provided) that reference the comment's location in the review document in the next three columns. **Return completed comment forms to Rick Wilder (wilderrm@saic.com) and Pete Rawlings (rawlingsms@saic.com).**

To be of the greatest value to the document development process, please make your comments as specific as possible (e.g., rather than stating that more current information is available regarding a topic, provide the additional information [or indicate where it may be acquired]; rather than indicating that you disagree with a statement, indicate why you disagree with the statement and recommend alternative text for the statement). Do not enter information in the **Disposition** column. This column will be used by SAIC to record how each comment was addressed during the document revision process.

No.	Page #	Section #	Line #	Comment	Disposition
	2	3.6	16	**Adaptive Management** - The document fails to describe how monitoring will be designed to establish cause and effect relationships between implementation of specific conservation measures and the type and magnitude of human impacts from those measures such as economic and public safety.	
	2	3.6	25	Document gives examples of a tidal marsh restoration project being reduced or discontinued or water operation being modified if its providing little benefit to covered species, however it does not explain what will happen if a habitat project or water operation results in causing economic or physical harm to humans in the Delta.	
				Following are examples of potential negative human impacts that could occur as a result of implementation of habitat restoration projects or altered water operations:	
				1) Water operations and/or restoration project results in lowering water elevations in the North Delta sloughs/channels and landowners can't divert water as its below their diversion facility's elevation.	
				2) Delta homes with wells have their water become too salty for human use and there's no alternative municipal water supply available. Or if source is available at what cost and who pays? What if drinking water for cities such as Stockton or Rio Vista become too salty for drinking? This is a significant public health problem.	
				3) What if water too salty for farming in Delta? Agriculture is the main economic driver of the region.	
				4) What if tidal marshes result in growth in significant populations of mosquitoes and they transfer diseases to the	

				Delta's human or terrestrial populations? These diseases can be fatal to the young and elderly.	
				5) What if sustainable funding is not available to keep a riparian forest from growing in the middle of the Yolo Bypass, resulting in reduced flood capacity. This could cause levee failures, flooding, and possible human deaths.	
				This is just a short list of the many unforeseen possibilities that could occur as unintended consequences. Just as there is an adaptive management process for responses by covered species to the Plan's implementation, there also needs to be an adaptive management process to respond to negative human impacts caused by the Plan's implementation. Otherwise, this is NOT a complete Adaptive Management Plan.	

NORTH DELTA
WATER AGENCY

CITY OF ANTIOCH 1872 CALIFORNIA

CONTRA COSTA WATER DISTRICT

December 10, 2009

Mr. Jerry Johns
Deputy Director
California Department of Water Resources
P.O. Box 942836, Room 1115-9
Sacramento, CA 94236-0001

Subject: BDCP Modeling for Modelers Meeting Follow-up

Dear Jerry:

Thank you for organizing the BDCP Modeling for Modelers meeting on October 28th. We appreciate the effort to address the concerns of our agencies and hope that this will evolve into a closer working relationship to ensure the BDCP modeling tools and documentation meet the needs of the BDCP Steering Committee and stakeholders.

As we discussed at the meeting, we have two primary concerns: (1) the validation of new modeling tools; and (2) the evaluation of effects to Delta water quality and water levels. We recommend the following path to address each of these concerns.

First, the new modeling tools should be validated before model results are relied upon to guide decisions of the BDCP Steering Committee. As technical memos are developed by the project team to support the new modeling tools, the technical memos should be released to the BDCP Steering Committee for review. This level of review is necessary before the Steering Committee can approve any proposed project. We request the release of technical memos detailing the following issues:

- Incorporation of the 2008/09 FWS/NOAA Biological Opinions into the water operations model CALSIM II;
- Calibration and validation of Delta modeling tools to simulate new tidal marsh, including a sensitivity analysis on the placement, size, and timing of tidal marsh construction;
- Transformation of monthly flow output by the operations model to daily flows;
- Training of Artificial Neural Networks (or ANNs) to estimate Delta salinity within the operations model; and
- Other technical memos on the development, calibration, validation, or assumptions of analytical tools.

Second, modeling results should contain sufficient information to validate the new modeling tools and determine the impacts of the BDCP on Delta water quality and water levels. The attached document includes a detailed list of requested output from BDCP operations, hydrodynamic, and water quality modeling that will allow for adequate evaluation.

Finally, as preliminary modeling runs are now complete (presented to BDCP Steering Committee on December 3, 2009), we request another "BDCP Modeling for Modelers" meeting to discuss the results. Melinda Terry will contact you to coordinate schedules for the next meeting.

Thank you for your attention to these comments. We look forward to continuing a productive dialogue.

Sincerely,

Melinda Terry
Manager
North Delta Water Agency

Phil Harrington
Director of Capital Improvements/Water Rights
City of Antioch

Greg Gartrell
Assistant General Manager
Contra Costa Water District

Cc: BDCP Steering Committee
Armin Munevar, CH2M HILL

Attachment: Requested Output from BDCP Operations, Hydrodynamic, and Water Quality Modeling

Requested Output from BDCP
Operations, Hydrodynamic, and Water Quality Modeling

In order for the BDCP Steering Committee and stakeholders to evaluate potential effects of the BDCP, we request the following information from the BDCP modeling effort.

Specific Scenarios (CALSIM and DSM2)
The following scenarios are requested base cases to be used for calibration and validation of the new modeling tools and comparison to the with BDCP project cases.

- Historical Operations in recalibrated Delta model (DSM2 only)
- D1641 operations without BDCP project
- 2008/09 FWS/NMFS BO operations without BDCP project
- 2008/09 FWS/NMFS BO operations, with Delta geometry changes for BDCP Near-term tidal marsh (to determine the effect of near-term marsh alone)
- 2008/09 FWS/NMFS BO operations, with Delta geometry changes for BDCP Long-term tidal marsh (to determine the effect of long-term marsh alone)
- Near-term BDCP proposed operations, except using the D1641 implementation of the X2 standard for February through June, with Delta geometry changes for BDCP Near-term tidal marsh (to determine the effect of five month averaging X2)

Specific Output
The following output is requested from each base case and with project scenario. Many of these outputs are already defined in the Common Assumptions tools. We request the full time series output, not just summarized tables and charts.

- <u>Operations Modeling (CALSIM)</u>
  - End of Month Reservoir Levels
    - Shasta
    - Oroville
    - Folsom
    - San Luis Reservoir
    - New Melones Reservoir
    - Los Vaqueros Reservoir
  - All Delta Inflows - monthly and transformed daily, where appropriate (include diversions and return flows used in DSM2 preprocessing)
    - Sac R near Freeport and Hood (C169, C640)
    - Yolo (C157)
    - Mokelumne and Consumnes Rivers (C504, C501, C503)
    - Calaveras R (C508, R514)
    - San Joaquin R near Vernalis (C639)

Requested Output from BDCP Operations, Hydrodynamic, and Water Quality Modeling

- All Delta Exports and Diversions - monthly and transformed daily, where appropriate
  - North of Delta exports (D418_IF, D419_IF)
  - South of Delta exports (D418_TD, D419_TD)
  - Freeport exports and diversions (D168A, D168B, D168B_EBMUD, D168C)
  - Vallejo diversions (D403A)
  - NBA diversions (D403B, C, D)
  - CCWD diversions (D408_RS, D408_OR, D408_VC, D406A_MS, D168B_CCWD)
  - Antioch diversions (D406B)
  - Stockton diversions (D514A, B)
  - Upstream Diversions (North of Delta and east San Joaquin Valley senior water rights diversions)
  - Gross DCU (D404, D410, D413, D412)

- Delta Outflow Information
  - Required Delta Outflow (D407)
  - Net Delta Outflow (C407)
  - Delta Surplus

- Operations Parameters and Criteria
  - X2
  - QWEST
  - Old and Middle River
    - Required
    - Computed
  - Export/Inflow Ratio
  - Delta Cross Channel Operations (transformed to daily)

- Salinity
  - San Joaquin R at Vernalis
  - All ANN locations

- <u>Delta Modeling (DSM2, RMA, UnTRIM, etc)</u>

  - Tidal flow and velocity (15min)
    - At tidal marsh breach locations
    - Upstream and downstream of each new North Delta diversion
    - Old and Middle River compliance locations (channels 106, 144, and 145)
    - City of Antioch

Requested Output from BDCP Operations, Hydrodynamic, and Water Quality Modeling

- Select locations with relevant historical monitoring data
  - Lower Sacramento
    - Port Chicago (RSAC064)
    - Collinsville (RSAC081)
    - Emmaton (RSAC092)
  - Delta Outflow split
    - Three Mile Slough (SLTHM004)
    - Rio Vista (RSAC101)
    - SJR at Jersey Point (RSAN018)
    - Dutch Slough (SLDUT007)
  - DCC split
    - Sac at Georgiana (RSAC123)
    - Sac above DCC (RSAC128)
    - DCC (CHDCC000)
    - Georgiana Slough (SLGEO019)
  - Steamboat and Sutter Sloughs
    - 3 USGS meter locations (channels 379, 383, and 388)
    - Sac above Sutter Slough
    - Sac below Steamboat Slough
  - Franks Tract
    - False River (channel 279)
    - Old River at SJR (channel 124)
    - Old River at Holland Cut (ROLD041)
    - Old River at Mandeville (channel 119)
  - Central Delta
    - SJR above RRI (RSAN063)
    - Middle River (RMID005, 015)
    - Old River (ROLD024, 034)
  - Suisun Marsh
    - Montezuma Slough (SLMZU003, 011, 025, 032)

- Water level (1hour)
  - At tidal marsh breach locations
  - Upstream and downstream of each new North Delta diversion
  - North Delta
    - Sacramento River
      - Freeport
      - Hood
      - Walnut Grove
      - Rio Vista
      - Collinsville
    - Sutter Slough

        - Steamboat Slough
        - Prospect Slough
        - Cache Slough
        - Lindsey Slough
        - Montezuma Slough

    - South Delta irrigation level concerns
        - Middle River at Mowery
        - Old River at Tracy
        - San Joaquin River at Brandt Bridge

    - All barrier locations (upstream and downstream)

    - All Delta drinking water intakes
        - CCWD Rock Slough, Old River, Victoria Canal, and Mallard Slough Intakes
        - Freeport Regional Water Project
        - North Bay Aqueduct
        - City of Vallejo
        - City of Antioch
        - City of Stockton
        - CCFB Inflow
        - CVP Tracy Pumping Plant
        - New North Delta diversion locations

- EC
    - 15-min data
        - City of Antioch

    - Daily average
        - All Delta drinking water intakes (see above)
        - Supplemental locations for intakes on dead-end sloughs
            - Old River at Rock Slough (ROLD024)
            - Lindsey Slough at Cache Slough (node 322)

        - All D1641 standard locations

        - All DWR contract locations (ECCID, NBA, Antioch, Mallard Slough, NDWA)

        - All IEP River Kilometer Index (RKI) stations

        - Low Salinity Zone (every DSM2 node along specific reach)
            - Sacramento River: Martinez to Rio Vista
            - San Joaquin River: Confluence to Prisoners Point

- Volumetric fingerprinting
  - Recommended source fingerprinting locations:
    - Sacramento River at Freeport
    - Yolo Bypass
    - San Joaquin River at Vernalis
    - Martinez
    - Eastside Streams (Mokelumne, Consumnes, and Calaveras)
    - Sacramento Regional WWTP Discharge
    - Stockton WWTP Discharge
    - Other In-Delta WWTPs (to the extent these are distinguishable in DICU)
    - All other in-Delta discharge in DICU
  - Requested output locations
    - Hourly average
      - City of Antioch
    - Daily average
      - All Delta drinking water intakes (see above)
      - Supplemental locations for intakes on dead-end sloughs
        - Old River at Rock Slough (ROLD024)
        - Lindsey Slough at Cache Slough (node 322)
      - All D1641 standard locations
      - All DWR contract locations (ECCID, NBA, Antioch, Mallard Slough, NDWA)
      - Biologically relevant locations

Bay Delta Conservation Plan
Document Review Comment Form

Document: Working Draft Chapter 1 Introduction, August 26, 2010 version

Name: Melinda Terry **Affiliation:** North Delta Water Agency

Date: November 4, 2010

Please use this form to document your comments to the above document. Please number your comments in the first column and indicate the page, section, and line number (if provided) that reference the comment's location in the review document in the next three columns. **Return completed comment forms to Rick Wilder (wilderrm@saic.com) and Pete Rawlings (rawlingsms@saic.com).**

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No.	Section #	Page #	Line #	Comment	Disposition
	1.1	2	18-19	The reference to "rather than" makes it sound like BDCP is not going to address or manipulate Delta flow patterns. RECOMMENDATION: Line 18, delete "rather than" and replace with in combination with.	
	1.1	5	23-25	It is true that the Steering Committee is the principal **public** forum, but it is *not* the only forum where key policy and strategy issues pertaining to the development of BDCP are discussed or decided. In fact, most key decisions regarding Plan development are made *before* being discussed in the SC public forum. Steering Committee may be "intended" to serve as the principal forum, however in reality the "Management Team" makes key policy and strategy decisions regarding, what and when, the Steering Committee will discuss. Examples of the Management Team's role in developing the Plan can be found in the October 5, 2007 Steering Committee meeting notes, page 4, which states: "In the next two weeks, the BDCP Management Team will **explore concepts** for the official process for selecting an option [conveyance] and **suggest them to the full membership**." And also on page 4, "The **BDCP Management Team will serve as the hub for caucus discussions** on "framework" development process. The consultant team will propose an outline/table of contents for the framework document to be produced in the next few months." In addition, another group was formed in 2010, the Principals Group, to make key decisions regarding BDCP. In fact, Secretary Snow's letter to Senator Wolk, dated September 23, 2010, states: " . . .these meetings are a key procedural component of the public BDCP Steering Committee **process**	

				designed to achieve the comprehensive strategy . . ." and " . . .**provide policy guidance** on elements of a draft Plan." While these Principal meetings are open to all signatories to the BDCP Planning Agreement, they were not open to the general public and not all Steering Committee members were allowed to be participants, but instead were relegated as observers. Since participants in the Principals Group represents a majority of the Steering Committee members and are the bosses of representatives serving on the Steering Committee, the decisions the Principals Group make in their private meetings are unlikely to be overruled by their staff at the public Steering Committee meeting, so the decisions are already made before being discussed at Steering Committee. In the January 7, 2010 Draft Meeting Notes, under *Presentation: Overview of Proposed BDCP Site-Specific Near-Term Habitat Restoration Projects* says "A question was raised where these project proposals came from. Mr. Rawlings responded that teams for each Restoration Opportunity Area (ROA) looked at possible projects within the ROA's. These were projects proposed within agencies or opportunities identified by the BDCP Habitat Restoration Technical Team." I could not find any evidence that the HRTT or ROA meetings were noticed to the public or other members of the Steering Committee, so not sure whether other projects should have been included in the recommendation to the Steering Committee or how they made the decision on which projects to bring forward to SC. The February 4, 2010 Draft Meeting Notes even have following concern regarding recommendations to Steering Committee: "An opinion was expressed that getting recommendations from subject-matter experts through presentations at Steering Committee meetings was not enough input upon which to make informed decisions." June 3, 2010 Draft Meeting Notes Roger Patterson discussed the progress of the Governance/Implementation Structure Workgroup, but I could not find any evidence that other SC members or public were notified of Governance Workgroup meetings. May 20, 2010 Draft Meeting Notes, Tina Cannon Leahy expressed her "hope that Chapter 9 will clearly describe how decisions were made and what information was used to make those decisions." An example of a significant BDCP decision being made outside of the Steering Committee was the change in the Project Purpose made by permit applicants in February 2010. The use of discreet groups or committees to make management decisions is common in development of HCPs, therefore we should strive to be as accurate as possible in describing the public process and not overstate its openness or inclusiveness on how decisions made. RECOMMENDATION: Line 23, add <u>public</u> after "principal" and before "forum". Line 25, add the following sentence after "be discussed and considered: <u>In order to streamline the workload and maintain permit applicant's project goals, key policy and strategy issues pertaining to BDCP development were decided by a select and discreet group of Steering Committee members who served on a Management Team, Principals Group, and Oversight Committee. These meetings were private, but the decisions and outcomes were eventually brought forward to Steering</u>	

				Committee to be discussed in a public forum.	
	1.1	5	25-27	Many members of the Steering Committee, including NDWA, signed the Planning Agreement and joined as members of the SC much later than December 2006. RECOMMENDATION: Line 25, after "December 2006, the" add original. After "development of the BDCP" on line 27 add following sentence: The Steering Committee was expanded with the addition of new members, as noted in Table 1.1, after the development and approval of the Planning Agreement.	
	1.1	6	1	This table makes it appear that all members of the Steering Committee have been involved since 2006, but many members were added later. RECOMMENDATION: Modify Table 1-1, BDCP Steering Committee Members, to add the dates that each member joined the SC, so that it's clear which members were original and when later members joined.	
	1.3.3	13	19-22	This language seems to reach conclusions and declare the BDCP to address "all" requirements of NCCPA and then seems to imply that Dept of Fish and Game must therefore issue permits. This assumes facts not yet in evidence, since none of the chapters are complete documents yet. RECOMMENDATION: Line 19, delete "The BDCP addresses" and replace with The BDCP intends to address.	
	1.3.4	14	1-5	The first sentence includes language, "measures that adequately minimize and fully mitigate the effects of Covered Activities", however this once again assumes facts not yet in evidence, since SC has not yet seen complete or sufficient effects analysis information necessary to reach that conclusion. RECOMMENDATION: Line1, delete "incorporates" and replace with "intends to incorporate".	
	1.3.9.7	20	25-29	This sentence seems to imply that SWRCB's participation in development of BDCP assumes the Board is then obligated to approve actions in BDCP. This is inappropriate since the SWRQB is an independent public agency that must follow their guiding laws and regulations when considering BDCP Conservation Measures. Although they attend Steering Committee meetings and offer verbal comments, I am not aware that they have been "extensively" involved in the plan development and environmental review process and am not aware of them even providing written comments on the conservation measures. RECOMMENDATION: Delete the last sentence, starting on Line 25 and ending on line 29 and replace with: In order to provide consistency between the actions described in the BDCP and those required by the State Water Board as part of its water quality control planning and implementation activities, particularly with respect to those measures identified to protect fish and wildlife beneficial uses, the Board has participated on the Steering Committee to allow them insight and a voice in the BDCP development.	
	1.4.1	21	20-22	Any changes to the scope of the Plan Area during implementation of the Plan, particularly expansion of the boundaries, should be done through a Plan Amendment and should be done through an open, transparent, public process with the input and participation of stakeholders in the area to be added. RECOMMENDATION: Line 22, after Plan, add: through an amendment to the Plan, that includes an open, transparent, public process with the input and participation of	

				stakeholders in the area to be added to the Plan Area.	
	1.5.1	32	12-13	Ditto our comments above on Section 1.1, page 2, that what, how, and when decisions regarding development of the Plan were made "primarily" by Management Team *before* being brought forward to Steering Committee. In addition, the Principals Group was formed to make "key decisions" to "guide" the development of the Plan. The Management Team's role in the development of the Plan should be properly recognized and reflected as part of the process that guided the development of the Plan. RECOMMENDATION: Line 13, after "Table 1.1" add ,with direction from a Management Team and Principles Group.	
	1.5.1	33	4	There were other Technical Teams that met including "Effects Analysis" and "Synthesis Team" which is mentioned on page 39, line 3 of this document, and possibly others that I don't even know about. RECOMMENDATION: After line 3 add new bullets for other work groups added in 2009 or 2010, including: Effects Analysis Work Group After line 11 add new bullets for other technical teams added in 2009 or 2010, including: Synthesis Team (which is mentioned on page 39, line 3 of this document).	
	1.5.2	33	16-18	According to members of the general public, specifically residents in the Delta, it was difficult to find dates/times/locations/documents of Steering Committee and work group/committee meetings in 2006 and 2007, so unable to provide input during the "initial stage" of the "course of its development." May 20, 2010 Draft Meeting Notes, General Public Comment section, Osha Meserve commented: "On the alternatives to take topic, the public had no role in the 2007 development of the 17 criteria used to select BDCP plan components, and had no role in the development of the BDCP purpose and need statement. Karen Scarborough (chair) responded that the Steering Committee meetings at which these elements were developed were, and have always been, public. Ms. Meserve countered that accessibility to BDCP documents was not as easy in 2006 as it is no with the established BDCP website." In reviewing the past minutes and list of attendees from 2006 and 2007, it appears that there were several organizations and entities attending the Steering Committee, but not any local residents from the Delta. In fact, the November 16, 2007 Steering Committee meeting notes, page 2, have a bullet regarding a press conference by Public Officials for Water and Environmental Reform (POWER), which included several BDCP SC members in attendance, regarding the importance of communication of the BDCP process to the public. As a result, the BDCP public outreach consultants, BDCP Public Outreach workgroup and Resources Agency Deputy Secretary of Communications, were tasked with developing appropriate outreach material for the BDCP. Believe a website for BDCP was not developed until sometime in 2008. Section 7.4.1.3 of the BDCP Planning Agreement states that a list of Interested Observers will be maintained on the BDCP website, however I could find no such list on the website, so I'm not sure how extensive the outreach and notification of interested parties and Delta residents was made. If there was in fact some difficulties in getting notification to	

				residents and stakeholders in the Delta up and running in the beginning of the SC, then maybe best to describe properly that it was a building process. RECOMMENDATION: Line 17, delete "the public has been afforded" and replace with: efforts were pursued to build a public outreach program to provide the public	
	1.5.2	33	20-21	All meetings of the Working Groups and Technical Teams being open to the public is NOT true. Even as a Steering Committee member I often hear about work group or technical meetings occurring after the fact, however I never received notification or invitation to attend, so I am sure the public was not notified or invited either. In fact, if you check the website today (11/4/10), it indicates that there are three work groups currently active: Metrics, Governance, and Terrestrial. Yet according to the BDCP calendar these work groups have not had any meetings in 2010. To find noticed meetings of these work groups, you have to go back to October 2009. It has been mentioned at several Steering Committee meetings that these work groups have met (after the fact) and their work product has been brought forward to the Steering Committee for consideration, but the public and Steering Committee members not on the work group were never notified or invited to those meetings. Based on the record, the public was NOT invited or allowed to attend any work group meetings in 2010 at all. This should be properly reflected as a matter of accuracy. RECOMMENDATION: Lines 20-21 delete ", as well as Working Groups and Technical Teams,". Line 21, after "open to the public." add following new sentence: Working Groups and Technical Teams were generally open to the public, particularly during the early development of the Plan in 2008 and 2009.	
	1.5.2	33	23-25	Article 7.4.1.3 of the BDCP Planning Agreement says, "A list of Interested Observers will be maintained on the BDCP website." However, I could not find this list on the website. Again, pursuant to my comments in prior item, I can find no evidence that an electronic listserve was used to send an invite to the public to ANY work group or technical team meetings in all of 2010, except for a modeling for modelers meeting in January 2010, which was on the BDCP calendar. Clearly announcements of public forums were somehow advertised as hundreds of people managed to attend some of the public forums, but it is not apparent that a list of these attendees was maintained to inform them of Steering Committee or committee/work group meetings. If notification of Steering Committee meetings means the agenda being sent out to list of interested observers, then this was not done until the afternoon the day before the meeting, so that's not adequate notice to review agenda and decide if want to attend. Therefore, it is not appropriate to say that "interested members of the public were adequately notified of upcoming meetings", however this statement is true regarding notification of Steering Committee meetings. RECOMMENDATION: Line 24, delete "adequately" and after "upcoming" add Steering Committee	
	1.5.2	34	24-25	One of the biggest complaints by interested members of the public has been the lack of "details" regarding the conservation measures. RECOMMENDATION: Line 24, delete "details	

				of" and replace with updated information on.	
	1.5.3.2	38	29-33	Descriptions and evaluation results of conceptual models is NOT sufficient "to serve as a foundation for the evaluation process." NDWA repeatedly requested, including a joint letter on December 10, 2009 for modeling inputs, assumptions, and data to evaluate the adequacy of the effects analysis. Unfortunately, we have not received most of that requested information. Meanwhile, the American Rivers, The Bay Institute, Defenders of Wildlife, Environmental Defense Fund, The Nature Conservancy, and the Natural Resources Defense Council submitted a letter to the Steering Committee, dated November 3, 2010, stating that "The current incomplete, draft Effects Analysis is seriously and systemically flawed" and that "Conclusions that are not supported by analysis." The letter goes on to say, "Only when the effects analysis is grounded in a comprehensive and scientifically credible approach will the decision-makers and the public have any assurance that all of the impacts have been identified – a necessary step *before* the project description is finalized." The NDWA agrees with the above referenced comments, and therefore questions the adequacy of "the current scientific understanding regarding how the Delta ecosystem works" as stated on lines 29-30. RECOMMENDATION: Line 29, after "conceptual models" add: attempt to and on line 30, delete "were designed" and replace with are intended.	
	1.5.3.2	38	34-37	Pursuant to comments/issues above, the adequacy of "the likely magnitude of the ecological outcomes and the certainty of those outcomes" mentioned on lines 34-35 are in question. We agree with NGOs that a thorough, credible, and comprehensive revision of the EA needs to include a transparent review and assessment of each plan element including both positive and negative outcomes of proposed actions before can agree on "the likely magnitude of the ecological outcomes and the certainty of those outcomes." RECOMMENDATION: Line 34, delete "Results" and replace with Preliminary, but not yet verified, results in Appendix A. Line 36, prior to "However," add following new sentence: The methodology used to produce these preliminary results will be refined and modified to improve the quality, accuracy, and scientific credibility of the effects analysis to allow the conservation measures to be evaluated and modified prior to completion of the Draft Plan and the issuance of permits.	

Bay Delta Conservation Plan
Review Document Comment Form

Document: **CHAPTER 7. IMPLEMENTATION STRUCTURE, JUNE 3, 2011, VERSION DISCUSSED AT THE JUNE 9, 2011 BDCP GOVERNANCE WORK GROUP**

Name: Melinda Terry **Affiliation:** North Delta Water Agency

Date: June 17, 2011

Please use this form to document your comments to the above document. Please number your comments in the first column and indicate the page, section, and line number (if provided) that reference the comment's location in the review document in the next three columns.

To be of the greatest value to the document development process, please make your comments as specific as possible (e.g., rather than stating that more current information is available regarding a topic, provide the additional information [or indicate where it may be acquired]; rather than indicating that you disagree with a statement, indicate why you disagree with the statement and recommend alternative text for the statement). Do not enter information in the **Disposition** column. This column will be used by SAIC to record how each comment was addressed during the document revision process.

No.	Page #	Section #	Line #	Comment	Disposition
				Issues/Items not addressed in this document that need to be for it to be considered adequate: 1) Declare policy of "willing seller" for habitat restoration acres, except when requested by the landowner. 2) Needs to include process for considering and paying for third party impacts resulting in plan implementation 3) Include responsibility for implementing and enforcing EIR/EIS conditions. ***Willing Seller*** – Willing Seller is the foundation of trust for environmental land acquisition. It is inappropriate for the BDCP to use police powers to condemn land not just for its massive pump, canal-tunnel, and power line infrastructure, but to take 80,000 + acres of "habitat," privately owned lands that have been managed for productive agriculture for generations. Most of the terrestrial and wetland habitat in the Central Valley is protected by private landowners, waterfowl clubs, land trusts and local HCPs. The remaining local state and federal wildlife refuges suffer from a lack of adequate funding and increasing responsibilities. In contrast, the state and federally managed water projects are partially responsible for the decline of threatened and endangered species as documented by the recent biological opinions. The aquatic habitat being proposed in the Delta under the BDCP is so the existing and new water pumps can operate with ESA take authority. The burdens of the water projects can't fairly be placed on the backs of the very people who have protected the habitat and managed sustainable agriculture for the past 130 years. Taking private land for	

				habitat projects that benefit regions outside of the Delta sends exactly the wrong message to Delta communities. The Delta Conservancy has been designated by statute as a primary State agency to implement ecosystem restoration in the Delta. Under PRC 32366, the Delta Conservancy is required to follow policy of "willing seller", so this should be recognized and committed to in Chapter 7. Failure to require "willing seller" for acquirement of lands for enhancement and restoration of habitat within the identified restoration opportunity areas (ROAs), conservation zones, and other areas in Plan Area will set a precedent that likely will have a chilling effect on public acceptance of HCPs proposed in future. "Willing sellers" is universally accepted as the policy to be followed in HCPs for acreage needed for habitat, therefore it would be a misuse of eminent domain powers to acquire land for habitat in such a hostile way. This is NOT good business for implementation of BDCP as it will increase confrontation with Delta residents and public agencies instead of cooperation. We urge the BDCP to formally recognize willing seller as policy in Chapter 7. ***Third Party Compensation*** – According to a letter dated September 27, 2010 by Congressmen Dennis Cardoza and Jim Costa and recent newspaper articles, the implementation of the San Joaquin River Restoration Program has resulted in adverse impacts to landowners and water users that need to be redressed. NDWA anticipates similar adverse impacts to our landowners and water users, therefore, we request the Governance Chapter 7 include a claims process to compensate for damages caused by BDCP implementation. EIR/EIS – Enforcement of mitigations and standards in EIR/EIS should be done by same entity charged with responsibility for implementing/enforcing HCP/NCCP which is the Implementation Board. This is necessary component of accountability that the statutory co-equal goal of protecting "Delta as a Place" is in fact done.	
	1		9-16	***EIR/EIS Oversight*** - This section says the implementation structure is intended to ensure the terms and conditions of the plan and its associated regulatory authorizations, however there is nothing in this governance structure or Implementation Office or the Implementation Board that indicates how the requirements, conditions, and mitigations in the EIR/EIS will be implemented and enforced. This is a fatal flaw as issues related to protecting Delta as a Place: economic considerations, flood protections, water elevations, consolidation of in-Delta intakes, etc are all issues that will be in EIR/EIS and need to have oversight of Governance Entity, and the Implementation Board appears to be the appropriate entity in the structure provided in this document. You CANNOT separate the implementation of mitigation in the EIR/EIS as they are mitigating the impacts of the Conservation Measures, so the governance entity will have to oversee	

				implementation of all of the CMs ***and*** their associated mitigation and impacts to neighboring properties.	
	2		16-34	We are concerned that Authorized Entities are the only ones given authority to assist the Program Manager with plan implementation. The Delta residents also have a lot at stake in terms of Plan Implementation and Delta residents are required to pay for Plan's Conservation Measures by giving up land, livelihoods, and economic revenues. There are other entities such as NDWA, CCWD, City of Antioch and Brentwood that are also water contractors with SWP/DWR and should be added to the Implementation Board. NDWA Contract states: 1) The State will operate the SWP to provide water qualities at least equal to the better of: SWRCB standards or the Contract criteria, Article 2; 2) The State agrees not to alter the Delta hydraulics in such a manner as to cause a measurable adverse change in the ocean salinity gradient or relationship among the various monitoring locations; 3) the State shall NOT convey SWP water so as to cause a decrease or increase in the natural flow, or reversal of the natural flow direction, or to cause the water surface elevation in Delta channels to be altered, to the detriment of Delta channels or water users within the Agency; 4) if diversion facilities must be modified as a result of water surface elevations as a result of the conveyance of water from the SWP, the State shall repair or alleviate the damage, shall improve the channels as necessary, and shall be responsible for all diversions facility modifications required. These are certainly "implementation issues" and warrant representation on the Implementing Board since failure of the SWP to meet these criteria results in the mandatory ceasing of all diversions, storage, and export of SWP from Delta channels pursuant to Article 12 of the 1981 Contract.	
	4		1-2	This sentence is clear that the Implementing Office will oversee and implement ***all*** aspects of plan implementation. We agree that Plan Implementation means oversight for ***ALL*** issues in regards to implementation of Conservation Measures and CANNOT be selective and only want oversight for water ops or how many acres of habitat built. Consequently, either the Implementation Board or another Implementation entity needs to be created to deal with EIR/EIS mitigation implementation as well as third party impacts caused by implementation of any BDCP Conservation Measures.	
	4		34-35	We are concerned with this language to allow DWR and Reclamation to contract with "other entities" to operate the projects. The Authorized Entities should NOT be allowed to operate the water operations as this is a serious conflict of interest. If the AEs are not happy with DWR or Reclamation operating the projects, then a new "independent" third party government entity such as the PUC should be created and put in charge of project operations to prevent undue influence or outright violation of the operating rules. This arms length seems particularly important in light of many entities that are AEs supporting HR 1837 (Nunes) to eviscerate significant	

				Delta protections found in the CVPIA, San Joaquin River Settlement Agreement, and Biological Opinions, as well as some of the AEs filing a recent lawsuit to override a key provision on the current coordinated operations of the CVP and SWP, and the CVPIA. Do their current water contracts give them operational decision making authority? If not, then why should the BDCP provide this new authority for new facilities? Will this operational authority extend to the South Delta Pumps as well, since it will be a dual-operation scenario? Again, this is not appropriate. There is no separation of powers and an unacceptable conflict of interest to allow State and Federal Water Contractors to operate the SWP or CVP. If these are State facilities, then they should be operated by the State. Turning over operation of the SWP to State and Federal Water Contractors is not compatible with the interests of the NDWA and our 1981 Contract.	
	7 8	7.1.2	14-37 1-4	This **draft is a step backwards** because it is defaulting to the water contractors receiving regulatory take authority as individual entities *and* being on the Implementation Board. This is far more authority and power than they currently have over operation of the SWP and CVP, and is a line that should not be crossed. This is same problem as assuming a 15,000 cfs conveyance around the Delta is a given fact, rather than a controversial option to be analyzed. This issue was unresolved last year, and received much debate in the Principal Group meetings. Therefore, it is inappropriate to automatically add it into this newly revised version. It should not be added in until a final decision is made. If the Resources Agency and Reclamation are asserting such a final decision already as the preference based on inserting this placeholder language, then that should be disclosed to stakeholders and the general public.	
	9	7.1.3	18-25	This section needs to include responsibility for implementing, coordinating, overseeing, and reporting on all aspects of EIR/EIS implementation/mitigation and third party impacts, to ensure it is properly and fully implemented. As the entity responsible for implementation of all of the Conservation Measures, including 'habitat acquisition and restoration targets' mentioned on line 22, the IB must be responsible for ***all*** facets and impacts that result from the CMs, including third party impacts. This duty needs to be clearly spelled out and a process for applying for impact compensation set up in the Governance ***prior*** to implementation of any CMs. Based upon the experience of farmers dealing with crop damages from seepage due to the release of water under the San Joaquin River Settlement and past problems with seepage for Ryer Island when Prospect Island had water on it, these are issues that need to be figured out in Governance ***before*** creation of any new aquatic habitat.	
	9	7.1.3	17-32	Are they required to hold their meetings in the Delta or anywhere in the State? Since many of the Conservation Measures use or affect major components of the Sacramento Flood Control System, the Implementation Board should include a board member from the Central Valley Flood Protection Board and at least three representatives from Delta	

				Reclamation Districts.	
	10	7.1.3.1	9-11	This sentence says that the SWP will remain under the control and responsibility of DWR, however this sentence and commitment is in conflict with other sections that indicate other entities may be allowed to operate the SWP, such as page 4, lines 34-35 and page 11, lines 25-28, which says water facilities and water operations may be contracted out by DWR to other 'entities.' This is more authority than State and Federal Water Contractors currently have over the operations of the SWP or CVP and seems to be a line that should not be crossed, otherwise the Governance is specifically creating a conflict of interest.	
	10-11	7.1.3.2	31-36 and 3-13	Pages 10-11, Lines 33-36 and 1-2 respectively, the limitations on the two criteria for objections seems too narrow, subjective, and it is not clear ***who*** makes the decision on whether either of those criteria have been met. Determined by who?? Page 11, Lines 9-10 includes SFWCA and the State or federal water contractors individually, which seems to make them both judge and jury for decision making since they also are on the Implementation Board who's decision is being sent to dispute resolution.	
	11	7.1.4	25-29	Do not think it is appropriate for DWR or Reclamation to contract with or designate other 'entities' to operate the SWP or CVP facilities. This goes far beyond existing authorities and creates conflicts of interests if the operation of these facilities is turned over to State or Federal Water Contractors.	
	10	7.1.3.2	31-36	What will the disposition process be for input provided by the Stakeholder Committee to the IO? It is meaningless if they offer input and suggestions, but there is no process or requirement for them being acted on by IO.	
	12	7.1.5	5-14	ESA/CESA take authority should also be shared with local flood control agencies to allow for maintenance and improvement of levees necessary for the conveyance of SWP or CVP water through the Delta.	
	12 and 13	7.1.5.1 And 7.1.5.2	23-26 And 1-23	It is one thing to have DFG consulting with authorized entities, but it is inappropriate to have their "participation" in real-time operations. The word "participation" should be deleted from page 12, line 25; page 13, line 3; and page 13, line 16.	
	12	7.1.5.1	28-32	Creating agreements for DFG to operate and maintain habitat areas, ***MUST*** include a requirement it is only if the agreement includes a funded and securitized endowment to pay for the ongoing maintenance and local taxes/assessments prior to construction and implementation. DFG does not receive sufficient funding in the State Budget to cover these costs, so they ***must*** be included in the Agreement.	
	13	7.1.5.3	19-23	There is no mechanism for local government agencies to make federal government pay their local assessments, so any Agreement for the USFWS to operate and maintain habitat areas ***must*** include a funded and securitized endowment fund prior to construction and implementation.	
	13	7.1.6	25-34	Since most of the Conservation Measures in the BDCP are in fact flood control projects that propose modification of Project Levees and or flood Bypasses, how will agencies such as the	

				U.S. Army Corps of Engineers and the CA Central Valley Flood Protection Board 'participate in the governance of plan implementation' mentioned on line 30?	
	14	7.1.6	3-10	Should include the Delta Protection Act and PRC Section 32322, 32364.5, 32366, and 32370.	
	14	7.1.7	19-21	This section should either specifically identify which Conservation Measures the State and Federal Water Contractors will have responsibility for implementing or which CMs they will ***not*** have responsibility for, such as water operations of SWP and CVP. It is unclear why State and Federal Water Contractors should have a role in implementation of habitat measures the General Public will be paying for??	
	15	7.1.8	9-11	Having the Stakeholder Committee simply be a 'forum' for the 'discussion' of matters is not sufficient. This group will include landowners and Delta entities that are directly impacted and burdened by CMs that benefit other areas of the state, so they need to be able to make recommendations for changes to CMs that are detrimental to the Delta's regional economy and Delta as a place as defined in PRC Sectoin 32322. Also needs to define how their input will be dealt with by the Implementation Board and IO.	
	15	7.1.8.1	12-33	How many total members? How will membership be divided between the different categories on lines 17-33? Not sure why there is cross-over on entities that serve on the Implementation Board ALSO get to serve on the Stakeholder Committee. If they get to cross-over to the Stakeholder Committee, then the locals on the Stakeholder Committee should also cross-over and have representation on the Implementation Board. Since most of the CMs are flood projects, the Central Valley Flood Protection Board and at least six representatives of Delta Reclamation Districts should be included. Since significant agriculture acres will either be converted or have ESA/CESA and detrimental impacts such as seepage, the Committee should include representatives from either the County Ag Commissioners or County Farm Bureaus for each of the five Delta Counties (five reps total). Also missing representatives from sport and recreational fishing, boating and marinas, Delta Chambers of Commerce, and Delta Conservancy.	
	16	7.1.8.2	1-21	Will the meetings convened pursuant to this section be open to the public? Will the communication and regular update documents required in this section be made available to the public? Will the recommendations of the Stakeholder Committee be made available to the public?	
	16	7.1.8.3	23-38	Lines 28-30, the limitations of these two criteria is too narrow, subjective, and it is not clear ***who*** makes the decision on whether either of those criteria have even been met. Lines 31-32, it is confusing how elevating an objection to the IB will result in an objective decision, since an element of their work plan is what is being elevated for objection. This extra process seems to add time to how long it will take to resolve dispute. The time period the IB has to act on an objection needs to be defined. How long does IB have to deal with the dispute before it can be elevated to the 'entity with the ultimate authority over the matter?' Failure of the IB to act on dispute in	

				a timely manner will lead to lawsuits. "Entity with the ultimate authority over the matter" needs to be better defined. Lines 35-36, the 'decision by the entity with ultimate authority over the matter' must also have a time limit, otherwise complainants will go to court due to unnecessary delays. Lines 36-38, should be amended to clarify the State and Federal Water Contractors have final say over responsibility for plan implementation and compliance <u>with permit conditions</u> as holders of the permits pursuant to Section 7.1.2.	
	20	7.2.9	26-30	As mentioned before, most of the BDCP's Conservation Measures are in fact flood control projects proposing the alteration of Project Levees and flood Bypasses for habitat purposes. These coordinating agencies should be on the Implementation Board due to their significant role in permitting these projects and for monitoring their maintenance.	
	22	7.3.1 and 7.3.1.1	3-18	Willing seller policy should be added in this section as follows: 1) Line 7, "These measures will primarily involve actions to acquire lands <u>from willing sellers except when requested by the landowner</u>, restore . . ." 2) Line 10, ... measures associated with habitat protection and restoration, <u>based on a willing seller except when requested by the landowner .</u>" 3) Line 13, ". . . acquire interests in real property <u>based on a willing seller except when requested by the landowner . .</u>" 4) Line 15-16, ". . . also may acquire interests in real property <u>based on a willing seller except when requested by the landowner,</u>"	
	22	7.3.1.1	25	Add two new bullets: * • <u>A funded and securitized endowment for the payment of ongoing maintenance, monitoring, and local taxes/assessments.</u> • <u>Be consistent with PRC Section 32322</u>	
	22	7.3.1.1	30-31	This language should specifically prohibit the conveyance of any lands to the Delta Conservancy, DFG, FWS, or other entities, ***<u>UNLESS</u>*** the property includes a funded and securitized endowment fund to pay for ongoing maintenance, monitoring, and local taxes/assessments as well as required to be consistent with PRC Section 32322.	
	23	7.3.1.2	15	Need to add several more bullets: • <u>Enforcement of easements</u> • <u>Monitoring of third party impacts, including seepage, erosion, and levee failures</u> • <u>Enforcement of Safe Harbor or Good Neighbor policies and agreements</u>	
	24	7.3.2.2	2-4	Page 12, line 25; page 13, line 3, and page 13 line 16 provide "***participation*** in real-time operations to Authorized Entities which seems inconsistent with the section on the "Real Time Operations Response Team."	
	24	7.3.2.2	17-21	Since page 4, lines 34-35 and page 11, lines 25-28 are just two of several places which say water facilities and water operations may be contracted out by DWR to other 'entities'	

				such as the State and Federal Water Contractors, then as operators of the water facilities, this section will require the water contractors to also "jointly agree" to an operational change proposed by a member of the Response Team. It is a conflict of interest to have the Water Contractors be operating the system ***and*** making fish decisions. As mentioned previously, this arms length seems particularly important in light of many entities that are AEs supporting HR 1837 (Nunes) to eviscerate significant Delta protections found in the CVPIA, San Joaquin River Settlement Agreement, and Biological Opinions, as well as some of the AEs filing a recent lawsuit to override a key provision on the current coordinated operations of the CVP and SWP, and the CVPIA.	
	28	7.3.5	31-37	In addition to an Adaptive Management Team, a Team to oversee the implementation of mitigations necessary to address third party impacts from implementation of Conservation Measures, including financial compensation if necessary.	
	29	7.4	17-21	This section should clarify that the Program Manager 's responsibilities for ongoing compliance includes EIR/EIS conditions and mitigations, as well as dealing with third party impacts from implementation of all BDCP Conservation Measures.	

NORTH DELTA WATER AGENCY

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LOCAL AGENCIES OF THE NORTH DELTA

1010 F Street, Suite 100Sacramento, CA 95814 (916) 455-7300

November 4, 2011

Mr. John Laird, Secretary
Dr. Gerald Meral, Deputy Secretary
CA Natural Resources Agency
1416 Ninth Street, 13th Floor
Sacramento, CA 95814

Mr. David Hayes, Deputy Secretary
U.S. Department of the Interior
Michael Connor, Commissioner
U.S. Bureau of Reclamation
1849 C Street, N.W.
Washington, DC 20240

Dear Gentlemen:

We find it necessary at this point in the Bay Delta Conservation Plan (BDCP) process to convey to you significant unaddressed issues to date as well as grave concerns regarding problems with the substance of the BDCP, its process, and its treatment of local Delta interests.

The North Delta Water Agency (NDWA) is a state water contractor with DWR pursuant to a 1981 Contract for the availability of suitable quantity and quality of water to all North Delta water users as well as DWR's responsibility for avoiding and mitigating detrimental impacts such as erosion and seepage damage, altered surface water elevations, and reverse flows associated with Delta water conveyance.

Local Agencies of the North Delta ("LAND") is a coalition comprised of eleven reclamation and water districts in the northern geographic area of the Delta.[1] LAND participant agencies have concerns about how the BDCP may eventually impact provision of water, and/or, drainage and flood control services to landowners within their respective districts. Six LAND member agencies have sought and received cooperating agency status under NEPA with the Bureau of Reclamation.

The September 30, 2011 letter by four environmental organizations raises many serious flaws and inadequacies of the BDCP documents and process which we agree need to be addressed in order to meet State and Federal laws governing HCPs and NCCPs. In addition to failing to improve the health of the estuary, we would add that the BDCP is headed toward the destruction of Delta as a Place, the Delta's vibrant economy, and the Delta's 150-year history of agriculture as the primary land use. Such a result is unacceptable.

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[1] / LAND member agencies include: Reclamation Districts 3, 150, 307, 551, 554, 755, 813, 999, and 1002. Some of these agencies provide both water delivery and drainage services, while others only provide drainage services. These districts also assist in the maintenance of the levees that provide flood protection to homes and farms.

The NDWA and LAND members have invested considerable time into participation in the BDCP process over the past four years. NDWA, moreover, was the ONLY Delta stakeholder on the BDCP Steering Committee prior to when it was dissolved by the new Governor Brown administration. Despite our attempts at active participation in this process, we continue to be disappointed by the BDCP's so-called inclusive process and the systemic, foundational, and persistent problems with the work product of the BDCP to date.

We particularly object to the following recent events associated with the BDCP:

Continued Exclusion of Delta Stakeholders from Key Meetings and Decisions

We are concerned that the BDCP process has deteriorated over the last few months and despite promises to be different than in the past, the BDCP continues to exclude and disenfranchise in-Delta stakeholders and disregards input provided by Delta stakeholders. As long as important discussions and decisions continue to be made behind closed doors, then the so-called public process and numerous public workshops being held are nothing more than a sham. Moreover, we still have no indication than any of our comments *over the last four years* have been considered as there is still no process for disposition of comments from stakeholders.

Washington D.C. Briefings

On October 3-4, 2011 a contingent of BDCP proponents and water contractors, apparently led by Natural Resources Deputy Secretary Jerry Meral, held private meetings with numerous members of Congress to provide an updated status of the BDCP development. Unfortunately, once again, and despite our previous requests to attend Congressional briefings, no local Delta stakeholders were invited to participate in these briefings. The lack of Delta stakeholder representation in these meetings is contrary to the commitment by Secretary Laird and Deputy Secretary Meral for the so-called "new process" to be open and inclusive. We hereby reiterate our request to be invited to attend any future Congressional or State Legislative briefings on the status of the BDCP.

MOA for Development of BDCP

In late August 2011 both DWR and the Bureau of Reclamation signed the First Amendment to the Memorandum of Agreement Regarding Collaboration on the Planning, Preliminary Design and Environmental Compliance for the Delta Habitat Conservation and Conveyance Program in Connection with the Development of the Bay Delta Conservation Plan (MOA). We raised concerns in the BDCP Governance Workgroup and Management Committee meetings regarding the need for public review of the MOA prior to execution by the agencies. Concerns were also raised regarding the "Public Water Agencies" (Water Contractors) becoming "permittees" of BDCP in a closed door process. The Fall 2011 memorandum written by Environmental Defense Fund, Defenders of Wildlife, and the Natural Resources Defense Council provided an analysis of why permittee status for Water Contractors is inappropriate.

Dr. Meral specifically assured us these decisions would be made with stakeholder input in an open process. Nonetheless, the MOA was executed without public review or input, as was the decision of the State and Federal governments to "support" permittee status for the Water Contractors (Section II, H). Despite our requests, the MOA language was never circulated to stakeholders until the already signed MOA was posted on the BDCP website, *after the fact*. This

is neither open nor inclusive and ultimately was done over the objections of Delta stakeholders and others.

The MOA also provides the state and federal water contractors unprecedented control of the BDCP, even more so than previously. Section II-K of the MOA explicitly grants the state and federal water contractors the right to not only see *all draft consultant work product* before the general public has access to it, but presumably the right to suggest or demand alterations to the work product before it is released to the public. This same section *also requires* that state and federal water contractors be included in addressing all *comments received* during the BDCP-DHCCP Planning Phase, including comments received during development of the BDCP and EIR/EIS. Our questions are: who is in charge of the process? How can the state and federal government agencies remain fair and impartial arbiters in a process corrupted by the control of only one stakeholder group whose interests are neither neutral nor impartial? How can in-Delta stakeholders trust their comments and concerns will be appropriately addressed in the BDCP or the EIR/EIS phases if water contractors are dictating the responses to comments received?

We understand that comments are now being requested on the MOA, now that it has already been approved by the State and Federal governments, as well as many of the Water Contractors. We will provide separate comments on the MOA, but it is clear that the recent decision to circulate an already approved MOA is too little and too late in terms of including the public in the decision-making process regarding the critical issues addressed in the MOA.

We also strenuously object to the state and federal water contractors continuing to be included in the lead agencies' monthly meetings to discuss BDCP-DHCCP Planning Phase Management unless these meetings are open to the public. The NDWA 1981 Contract with DWR makes it clear that DWR bears the responsibility of maintaining adequate water supply of a certain quality for all North Delta water users, as well as obligates DWR to avoid and mitigate detrimental impacts of erosion and seepage, altered water elevations, and creation of reverse flows associated with the SWP Delta water conveyance facilities. Therefore, NDWA and other local water agencies clearly have an interest in also participating in these monthly BDCP-DHCCP Planning Phase management meetings where the design of the projects, the project's impacts, and the proposed mitigation of in-Delta impacts will be discussed and decided. These meetings appear to be far more important and relevant to in-Delta water agencies than the work groups have been so far.

In addition, almost all Conservation Measures in the BDCP propose altering, breaching, and modifying project levees and bypasses that are part of the State Plan of Flood Control. This could have significant public safety implications if flood protections are reduced as a result of the BDCP activities. The Delta Reclamation Districts that have flood management responsibilities should also be included in important Planning Phase meetings to assure flood protection for the Delta and Sacramento region is not detrimentally affected.

PR Propaganda Apparently Approved by Resources Agency to Justify Elimination of Delta Agricultural Economy

At the September 27, 2011 BDCP Public Meeting a summary of the findings of a so-called study on BDCP job creation was presented. The presentation was both insulting and offensive, and

apparently given so that it could subsequently be used in public relation promotions touting job creation. To call this a 'study' or a 'report' is ridiculous. This is nothing more than a propaganda piece in support of a currently flawed Plan and is offensive to Delta stakeholders because it FAILS to discuss: (1) the number of JOB LOSSES in the Delta, the region, or the state pursuant to the BDCP actions; or (2) the greater potential for job creation from water/energy efficiency projects as compared to the jobs created by construction of a new BDCP tunnel.

This report was prepared at the request of the DHCCP and was presumably approved for presentation at the September 27, 2011 by the Natural Resources Agency. The report indicates that the Metropolitan Water District commissioned this "independent" research on DHCCP's behalf. Thus, we must question the impartiality of the State and Federal agencies in supporting such a lop-sided and insulting document. Why would the State and Federal agencies present such a skewed and piece at a BDCP public meeting?

Upon questioning, it was disclosed that a follow up study of the statewide economic impacts of the BDCP was underway. While a statewide perspective may be interesting, as local agencies in the BDCP project area, we are concerned about the negative economic and other impacts that will occur in the Delta from jobs lost as a result of the construction and operation of major new diversions/conveyance and conversion of mostly agricultural lands into 100,000+ acres of habitat. As explained at the public meeting, we request to participate in the development of the assumptions and inputs for the statewide study. We also request that information regarding local economic impacts be developed by BDCP for purposes of full disclosure and also as part of the socioeconomic effects analysis required for by the National Environmental Policy Act. The BDCP has as much potential to be an unemployment public works project as it does an employment boost, yet this was not presented on September 27, 2011. The exchange of sustainable long-term employment in agriculture and related activities with short-term construction jobs is not beneficial from our standpoint.

Substance of BDCP Still Lacking

While beyond the scope of this letter, we continue to have concerns about the substance of the BDCP, including:

- The HCP/NCCP standards regarding use of best available peer-reviewed science has been consistently ignored, which is of grave concern for a project of this magnitude.
- The alternatives under consideration for the effects analysis and for purposes of environmental review have been irrationally constrained. Specifically, all of the "dual conveyance" alternatives must include screening of the South Delta pumping facilities at flows of 3000 cfs, which would reduce take of covered species and allow higher pumping volumes in furtherance of a reliable water supply for export. Additionally, none of the project alternatives include the phasing of conveyance as requested by the fish agencies, which would provide an opportunity to gather data and make necessary modifications as necessary before commitment of resources to a 15,000 cfs facility.
- While the need for massive new diversions in the North Delta (and their designation as "conservation measures") is premised on the need to reduce entrainment in the South Delta pumps, Appendix B to the Effects Analysis claims that entrainment in the South Delta is not a significant problem in the Delta for the species of concern. Moreover, even

with screens in the new diversions, entrainment/entrapment will occur wherever water is diverted in large volumes.

- No pathway toward take coverage for other landowners and entities in the Plan area is provided, despite the fact that if successful, the project could directly increase the probability of take of protected species.
- BDCP includes no commitment to levee improvements even though it would continue to rely on pumping from the South Delta, which in turn requires that key levees be maintained to prevent saltwater intrusion.

Unlawful Use of Eminent Domain Laws to Further BDCP Goals and Timeline

The eminent domain process for just the *investigatory activities* of the BDCP is already causing difficulties. There are numerous stories of frustration from Delta landowners regarding their dealings with DWR on the Temporary Entry Permits for environmental surveys and subsequent actions by DWR to pursue eminent domain to conduct geo-technical drilling on private properties to support the preparation of the BDCP EIR/EIS. Despite alternative public lands nearby the privately-owned proposed drill sites, DWR does not appear to have actually investigated or pursued using those public lands as alternatives to disrupting and permanently altering people's private property.

DWR's drilling is in some cases exposing landowners to toxic clean-up liability. The geo-technical drilling pulls up a 200 foot tube of soil from properties and sends the soil to a lab for testing and is reported to the Department of Toxic Substance Control if any toxic chemicals are detected. No landowner can afford for the geo-technical drilling to cause their property to become a State Toxic Clean-up Site. DWR has refused to assume liability if the drilling and subsequent reporting results in a toxic clean-up liability; as a result, many landowners cannot agree to a Temporary Entry Permit.

The recent court decision clarified that geo-technical drilling is a "taking" of private property due to the permanent alteration of the property, so now DWR is pursuing the condemnation (eminent domain) of property in order to conduct this drilling. According to California law (Water Code Section 11580), however, eminent domain can only be pursued by DWR once a public project has been authorized and funded.

BDCP has not even released a draft EIR/EIS indicating various project alternatives and associated location of facilities, let alone a final EIR/EIS and Record of Decision. The MOA recently signed by DWR and the Bureau of Reclamation mentioned above makes it very clear that DWR may not commence with preparing "Public review draft of the BDCP and EIS/EIR" or the "Final BDCP and EIS/EIR," until and unless "the Public Water Agencies provide the Director of DWR with written authorization to proceed" (Section III-G-b, pp. 10-11).

Therefore, the State is proposing to condemn through eminent domain private property for a project that may not be completed if written authorization and funding is not forthcoming from the Public Water Agencies. Why should Delta landowners have their private property taken through eminent domain when the EIS/EIR is has not yet been completed and approved pursuant to Section III-G-b of the MOA? Moreover, Deputy Secretary Jerry Meral disclosed at the October 19, 2011, Legislative Oversight hearing, that more geotechnical information is not needed to complete the public draft EIS/EIR.

The California statute requiring approval of the project prior to exercise of eminent domain (BDCP) is in place in order to avoid this very circumstance of a public agency "taking" private property for a project that is ultimately never built. If DWR needs to obtain more engineering information via geo-technical drilling then it should either: (1) rely on existing information from drilling already conducted; (2) pursue drilling on public lands; or (3) put additional effort into pursuing cooperative negotiations with property owners with more favorable terms and financial compensation in order to secure voluntary agreement from the landowner.

Lack of Respect Toward Delta Landowners is Escalating Mistrust and Resentment

Unfortunately, there are the numerous examples of in-Delta stakeholders being excluded from important BDCP discussions and decisions, but they are also being treated in unprofessional and disrespectful manner in conducting geotechnical and other investigations for preparation of the BDCP EIR/EIS. In early October, two separate households were visited at night by employees of a company hired by the State of California to serve them with papers relating to permitting entry and investigation rights on their property for the Department of Water Resources. Arriving at people's home in the dead of night during a rain storm is neither professional nor respectful. The residents of the Delta deserve and demand better treatment from the government agencies sponsoring the BDCP.

Changes Needed for BDCP Success

We regret the use of such a critical tone in this letter, but we do not know how else to convey the ongoing and mounting level of concern we have regarding the inadequacy of the BDCP process, the continued commitment by the State and Federal agencies to unrealistic timelines, the pervasive exclusion of local Delta stakeholders as impacted parties, and the dismissive and unprofessional treatment of Delta landowners and their concerns. In our opinion, the BDCP process has deteriorated to the point that it is unworkable, and that continued participation in the "public process" may be a waste of our limited resources.

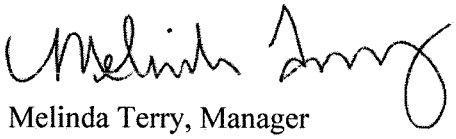
For the numerous grievances outlined in this letter, we must adamantly OPPOSE the BDCP product and process in its current form and encourage the State and Federal agencies to immediately engage in discussions with local stakeholders of assurances and protections that need to be incorporated into this Plan before the release of the public draft of the EIS/EIR in May 2012. This decision did not come lightly, but our extensive time and energy on the process appears to have resulted in little benefit despite stated commitments by State and Federal agencies for the public process to improve. Actions we request immediate attention by the State and Federal Co-Lead Agencies:

- Written disposition of all comments on the BDCP by Delta stakeholders.
- Review of task orders, draft documents and all documents made available to the state and federal water contractors.
- Convening of regular (at least monthly) Cooperating Agency meetings with all cooperating agencies.
- Access to all meetings where decisions are made.

- Rescind signatures of and provide an open and transparent process for public input and comment to the first Amendment to the MOA, which puts entirely too much decision-making authority in the water exporters despite the fact that BDCP is a public project with significant local impacts.

We look forward to your response on how and when the State and Federal governments plan to respond to the issues and concerns raised by the North Delta Water Agency, LAND and all Delta stakeholders that the BDCP affects.

Sincerely,



Melinda Terry, Manager
North Delta Water Agency

Osha R. Meserve, Representative
Local Agencies of the North Delta

cc:
Nancy Sutley, Chair, White House Council on Environmental Quality
U.S. Senator Barbara Boxer
U.S. Senator Dianne Feinstein
Representative Dennis Cardoza
Representative Jim Costa
Representative Jeff Denham
Representative John Garamendi
Representative Dan Lungren
Representative Doris Matsui
Representative Kevin McCarthy
Representative Tom McClintock
Representative Jerry McNerney
Representative George Miller
Representative Grace Napolitano
Representative Devin Nunes
Representative Jackie Speier
Representative Mike Thompson
Senator Mark DeSaulnier
Senator Darrell Steinberg
Senator Lois Wolk
Assemblymember Bill Berryhill

Assemblymember Bob Blumenfield
Assemblymember Joan Buchanan
Assemblymember Nora Campos
Assemblymember Paul Fong
Assemblymember Cathleen Galgiani
Assemblymember Mike Gatto
Assemblymember Linda Halderman
Assemblymember Roger Hernandez
Assemblymember Alyson Huber
Assemblymember Ben Huego
Assemblymember Jared Huffman
Assemblymember Brian W. Jones
Assemblymember Ricardo Lara
Assemblymember Kristin Olsen
Assemblymember Mariko Yamada
Supervisor Mike McGowan, Yolo County
Supervisor Don Nottoli, Sacramento County
Supervisor Mary Nejedly Piepho, Contra Costa County
Supervisor Jim Provenza, Yolo County
Supervisor Mike Reagan, Solano County
Supervisor Larry Ruhstaller, San Joaquin County
Supervisor Ken Vogel, San Joaquin County
Mark Cowin, Director of Department of Water Resources
Senate Committee on Energy and Natural Resources
Subcommittee on Water and Power
House Committee on Natural Resources
Subcommittee on Water Resources and the Environment
House Committee on Transportation and Infrastructure
Phil Isenberg, Delta Stewardship Council
Michael Machado, Delta Protection Commission
Barbara Barrigan-Parrilla, Restore the Delta
Greg Gartrell, Contra Costa Water District
Phil Harrington, City of Antioch
John Herrick, South Delta Water Agency
Dante Nomellini, Central Delta Water Agency
Mark Pruner, North Delta CARES
Gary Bobker, The Bay Institute
Kimberley Delfino, Defenders of Wildlife
Zeke Grader, Pacific Coast Federation of Fishermen's Associations
Cynthia Kohler, Environmental Defense Fund
Jonas Minton, Planning and Conservation League
Barry Nelson, National Resources Defense Fund

NORTH DELTA WATER AGENCY

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Melinda Terry, Manager

June 11, 2008

Karen Scarborough, Chair, Bay Delta Conservation Plan Steering Committee
California Resources Agency
1416 Ninth Street, Suite 1311
Sacramento, CA 95814

Dear Ms. Scarborough:

As the General Manager of the North Delta Water Agency (NDWA), I am writing to request that NDWA be made a member of the Bay Delta Conservation Plan (BDCP) Steering Committee. I am prepared to serve as NDWA's member representative, and Kevin O'Brien will serve as NDWA's alternate.

Comprising over 277,000 acres of land within the jurisdictional Delta, NDWA plays a substantial role in the quantity, quality, and beneficial use of water flowing in the Delta channels. The California Legislature formed NDWA by a special act in 1973 (North Delta Water Agency Act, Chapter 283, California Statutes of 1973) for the principal purpose of negotiating and executing a contract with the Federal and State governments to address the impacts that the Central Valley and State Water Projects have on water users within the Delta. NDWA ultimately executed such a contract with the Department of Water Resources in 1981, and since then has administered, performed and enforced the 1981 contract to protect the water supply of NDWA lands against intrusion of ocean salinity, and to assure the NDWA lands have a dependable supply of water of suitable quality sufficient to meet present and future needs.

In developing a plan to address the impacts of Delta-related water projects on listed species, the BDCP process raises numerous issues of significant concern to NDWA and the landowners within its boundaries. NDWA's principal interests concern the BDCP's potential effects on Delta water quality and on the supply of water for beneficial uses within the northern Delta. NDWA wishes to participate in the BDCP to, among other things, help ensure that the alternatives and mitigation measures being considered by the Steering Committee are tailored to ensure protection of the northern Delta water supply, will pose as small an impact on NDWA landowners as possible, and will be broad enough to provide take coverage for projects designed to further those landowners' interests.

At the same time, NDWA is committed to advancing the broad objectives of the BDCP. NDWA supports the assurance of a reliable water supply for California, the implementation of meaningful protections for species and aquatic ecosystems within the Delta, and development of

a plan that will serve as an HCP and potentially an NCCP. NDWA plans to participate fully in the BDCP process and will consider adopting appropriate policies that are consistent with the stated goals of the BDCP. NDWA has reviewed the BDCP Planning Agreement and is prepared to sign without requesting further changes.

NDWA's participation is sorely needed to lend balance to the Steering Committee and to ensure that the underrepresented Delta landowners have a voice in the BDCP process. Currently, virtually all members and alternates represent State regulatory agencies, environmental groups, and Federal and State water project contractors, and no agency on the Steering Committee represents the interests of Delta landowners.[1] NDWA is singularly situated to speak for these underrepresented members of the Delta community. NDWA's boundaries cover approximately half of the jurisdictional Delta, and has significant resources to lend to the BDCP process. NDWA has institutional and engineering expertise regarding Delta water quality and supply issues, is well acquainted with the lands and water channels of the Delta, and has strong ties to the numerous landowners and reclamation districts within its boundaries. NDWA has repeatedly served as a local forum for discussion on Delta issues, and that role has been expanding in response to recent developments, including the recent rulings in *NRDC v. Kempthorne* or *PCFFA v. Gutierrez*. NDWA has also provided comments on the scope of the BDCP Environmental Impact Report / Environmental Impact Statement and previously submitted comments to the Delta Vision Task Force.

NDWA believes its participation is critical to ensuring that the Steering Committee will develop a plan that can be adopted by consensus of all significant interests that will be affected by the BDCP.

I await your decision on NDWA's request for membership on the Steering Committee and look forward to helping develop the BDCP and thereby address matters of critical concern to the future of the Delta.

Very truly yours,

Melinda Terry,
General Manager, NDWA

cc: Board of Directors, NDWA

[1] A small portion of the water service area of Steering Committee Member Contra Costa Water District extends into the westernmost part of the Delta.

Bay Delta Conservation Plan
Review Document Comment Form

Document: Other Stressors Conservation Measures, June 3, 2009

Name: Melinda Terry **Affiliation:** North Delta Water Agency

Date: June 12, 2009

Please use this form to document your comments to the above document. Please number your comments in the first column and indicate the page, section, and line number (if provided) that reference the comment's location in the review document in the next three columns. **Return completed comment forms to Rick Wilder (wilderrm@saic.com) and Pete Rawlings (rawlingsms@saic.com).**

To be of the greatest value to the document development process, please make your comments as specific as possible (e.g., rather than stating that more current information is available regarding a topic, provide the additional information [or indicate where it may be acquired]; rather than indicating that you disagree with a statement, indicate why you disagree with the statement and recommend alternative text for the statement). Do not enter information in the **Disposition** column. This column will be used by SAIC to record how each comment was addressed during the document revision process.

No.	Page #	Section #	Line #	Comment	Disposition
	3-22	3.4.3	1-3	NDWA agrees with BDCP Implementing Entity funding fish screens, diversion relocation and consolidation, however we disagree with the local cost share and alteration of Delta diversions during the months of January-July.	
	3-22	3.4.3	11-15	The NDWA's 1981 Contract with DWR states that "water users within the Agency have the right to divert, are diverting, and will continue to divert, for reasonable beneficial use, water from the Delta that would have been available therein if the FCVP and SWP were not in existence . . ." The Contract also states that "The State recognizes the right of the water users of the Agency to divert from the Delta channels for reasonable and beneficial uses for agricultural, municipal and industrial purposes on lands within the Agency, and said diversions and uses shall not be disturbed or challenged by the State . . ." The creation of high quality habitat through habitat conservation measures proposed in the BDCP will result in "disturbing" "said diversions and uses" if it is successful in enticing the presence of listed species as the BDCP habitat measures intend. NDWA does not believe that North Delta water users should have to cost share the removal, relocation, consolidation of individual non-project diversions. They should not incur costs of moving/changing their diversion facilities to avoid entrainment of listed species due to BDCP habitat measures that are implemented to create high quality habitat for listed species near their diversion facility. The creation of this high quality fish habitat is being funded by the BDCP in order to mitigate the entrainment of fish at the South Delta pumps and the new North Delta pumps and canal. The new fish habitat benefits the PREs, not the North Delta water users, therefore	

				the costs of moving/modifying/screening the North Delta water users' diversion facilities and the ongoing operation and maintenance costs of fish screens should be fully funded by the BDCP Implementing Entity. If these activities are fully funded by the BDCP Implementing Entity then you are likely to get the participation and cooperation of willing non-project diverters in the North Delta.	
	3-23	3.4.3	11-14	The same aforementioned comments and Contract provisions apply regarding the proposal to alter non-project Delta diversion operations to avoid impacting covered species. This is contrary to the right of North Delta water users to access and utilize their water for agricultural purposes. This proposal should be limited to altering diversion operations of the new North Delta diversions that will be part of the SWP.	

NORTH DELTA WATER AGENCY

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Melinda Terry, Manager

May 13, 2009

Via E-mail:
BDCPcomments@water.ca.gov

Ms. Delores Brown, Chief
Office of Environmental Compliance
Department of Water Resources
State of California
P.O. Box 942836
Sacramento, CA 95814

Re: SCOPING COMMENTS OF NORTH DELTA WATER AGENCY BAY DELTA CONSERVATION PLAN ENVIRONMENTAL IMPACT REPORT/ENVIRONMENTAL IMPACT STATEMENT

Dear Ms. Brown:

The North Delta Water Agency ("NDWA") respectfully submits these scoping comments on the Bay Delta Conservation Plan Environmental Impact Report/Environmental Impact Statement (EIR/EIS).

HISTORY OF THE NORTH DELTA WATER AGENCY

NDWA was formed by a special act of the Legislature in 1973. (North Delta Water Agency Act, Chapter 283, Statutes of 1973). Its boundaries encompass approximately 277,000 acres including all of that portion of the Sacramento-San Joaquin Delta, as defined in Water Code Section 12220, that is situated within Sacramento, Yolo and Solano Counties. Also included within NDWA's boundaries are certain lands in northeastern San Joaquin County comprising New Hope Tract, Canal Ranch and Staten Island.

Beginning approximately 160 years ago, farmers within the area now comprising NDWA began reclaiming lands from flooding, appropriating water to beneficial use and establishing vibrant agricultural communities. The Bureau of Reclamation (Bureau) began constructing the Central Valley Project (CVP) in the late 1930s, damming the major tributaries on the Sacramento River and holding back substantial quantities of the Delta water supply. As it did with landowners along the Sacramento River, the United States conducted extensive studies and negotiations to ensure a sufficient supply for water right holders in the northern Delta. Discussions with Delta landowners were protracted, however, due to the complex issues of both water quantity and

quality, and the issues only intensified with the construction of the State Water Project by the California Department of Water Resources (DWR).

Against this backdrop, NDWA was formed to represent northern Delta interests in negotiating a contract with both the Bureau and DWR in order to mitigate the water rights impacts of the Projects. From 1974 to 1979, North Delta, the Bureau and DWR determined the outflow necessary to meet water quality standards for irrigated agriculture and reviewed the paramount water rights of landowners within North Delta's boundaries. The agencies also evaluated the Delta channels' historical function as natural seasonal storage. Before the Projects began withholding much of the Sacramento River system's high winter flows, the Delta channels stored sufficient fresh water to sustain water quality in the northern Delta throughout and often beyond the irrigation season. Since the Projects commenced, however, the Delta functions more like a flowing stream and, as a result, relatively minor decreases in outflow can have a serious impact on northern Delta water quality.

In 1981, DWR and NDWA executed a Contract for the Assurance of a Dependable Water Supply of Suitable Quality (1981 Contract), a copy of which is enclosed. The crux of the 1981 Contract is a guarantee by the State of California that, on an ongoing basis, it will ensure that suitable water will be available in the northern Delta for agriculture and other beneficial uses. The 1981 Contract requires DWR to operate the State Water Project to meet specified water quality criteria while providing enough water to satisfy all reasonable and beneficial uses of water within NDWA's boundaries. (1981 Contract, Art. 2) In return, North Delta makes an annual payment to DWR. (*Id.* Art. 10). The 1981 Contract remains in full force and effect.[1]

Although the two signatories are public agencies, the 1981 Contract also extends to individual landowners who, under the terms of the Contract, have executed Subcontracts guaranteeing that their lands will receive all the benefits and protections of the 1981 Contract. (*Id.* Art. 18) Many of these Subcontracts have been signed and recorded, enabling the subcontractors to enforce the terms of the 1981 Contract.

The 1981 Contract contains provisions that expressly protect NDWA and its landowners from harm caused by changes in State Water Project (SWP) water conveyance infrastructure. For

[1] In connection with the hearings that preceded the State Water Resources Control Board's adoption of Water Right Decision 1641, DWR and NDWA entered into a memorandum of understanding dated May 26, 1998 (MOU), which provides that DWR is responsible for any obligation imposed on NDWA to provide water to meet Bay-Delta flow objectives, so long as the 1981 Contract remains in effect. In Decision 1641, the State Water Board made the following findings and determinations: "Based on the agreement, the SWRCB finds that the DWR will provide the backstop for any water assigned to the parties within the NDWA as specified in the MOU. This decision assigns responsibility for any obligations of the NDWA to the DWR consistent with the MOU." (Decision 1641 at 66). The latter findings and determinations were upheld by the trial and appellate courts that subsequently reviewed Decision 1641.

example, Article 6 of the 1981 Contract provides:

> "The State shall not convey SWP water so as to cause a decrease or increase in the natural flow, or reversal of the natural flow direction, or to cause the water surface elevation in Delta channels to be altered, to the detriment of Delta channels or water users within the Agency. If lands, levees, embankments, or revetments adjacent to Delta channels within the Agency incur seepage or erosion damage or if diversion facilities must be modified as a result of altered water surface elevations as a result of the conveyance of water from the SWP to lands outside the Agency after the date of this contract, the State shall repair or alleviate the damage, shall improve the channels as necessary, and shall be responsible for all diversion facility modifications required." (emphasis added)

NDWA will take all steps necessary to ensure that the protections embodied in Article 6 and the other provisions of the 1981 Contract are adhered to in connection with the BDCP process and any subsequent processes, proceedings or activities undertaken by the State of California.

SCOPING COMMENTS OF NORTH DELTA WATER AGENCY

1. Any Delta solution must include guarantees that lands within NDWA will continue to receive both the quantity and quality of water guaranteed under the 1981 Contract and under other applicable law, including but not limited to the Delta Protection Act, Cal. Water Code §§ 12201-12204 and the area of origin laws, Cal. Water Code §§ 11460-11465. Accordingly, the EIR/EIS must: (A) include a comprehensive description of the 1981 Contract including but not limited to its water quality requirements and the Article 6 protections quoted above; (B) identify the 1981 Contract as a significant legal constraint on the discretion of the State to implement any project involving the modification of SWP water conveyance infrastructure within the northern Delta; and (C) identify in the EIR/EIS how all BDCP projects and actions will assure water supply reliability, availability, and quality for all North Delta water users.

2. Consistent with Comment 1 above, all hydrologic and hydraulic modeling undertaken as part of the BDCP process must assume, as the "baseline" condition, that the terms and conditions of the 1981 Contract, including but not limited to its water quality requirements, will remain in full force and effect. NDWA is informed and believes that the modeling work undertaken to date in support of the BDCP process does not utilize the water quality and water supply provisions of the 1981 Contract as the baseline for analysis of environmental impacts; instead the modeling work utilizes the water quality objectives contained in the current Water Quality Control Plan for the Delta as the baseline condition. The latter objectives differ in certain key respects from the water quality requirements of the 1981 Contract particularly the period from mid-August through March where the 1981 Contract requirements are more stringent from a

water quality standpoint. Use of the wrong environmental baseline would skew the analysis of environmental impacts associated with the proposed project(s) and render the EIR/EIS vulnerable to attack. In addition, the hydrologic and hydraulic modeling undertaken as part of the BDCP process should fully analyze all water quality impacts relating to the proposed creation of fishery habitat areas within the Yolo Bypass and Cache Slough areas. In order to provide the baseline data referenced above and to analyze the impacts from all projects and operational actions identified in a final EIR/EIS, the proposed project EIR/EIS must include the installation of salinity and hydrodynamic monitoring stations in the Yolo Bypass and Cache Slough as well as other sloughs and canals throughout the North Delta to guide future adaptive management of BDCP actions that may result in violating the provisions of the 1981 Contract.

3. Consistent with Comments 1 and 2 above, changes in the water surface elevations, natural flows and flow directions within the NDWA would potentially result in violation of Article 6 of the 1981 Contract. All hydrologic and hydraulic modeling should include an analysis of the changes identified in the preceding sentence as well as the potential for seepage and erosion within the NDWA related to any isolated water conveyance facility and associated diversion facilities, proposed changes in water operations and new habitat measures. The EIR/EIS should address not only the potential impacts to water surface elevations, flows and flow direction, increased seepage and erosion resulting from various alternatives, but also the costs associated with these changes including but not limited to repairs, modifications, or replacement of existing diversion facilities and levees and added operating costs, as required under Article 6 of the 1981 Contract.

4. Also consistent with Comment 1 above, the discussion of alternatives in the EIR/EIS must focus on alternatives that are potentially feasible in light of the requirements of the 1981 Contract. Inclusion of an alternative in the EIR/EIS that would result in a violation of the 1981 Contract's water quality, Article 6 or other obligations would violate the requirements of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). "[T]he discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, <u>even if these alternatives would impede to some degree the attainment of the project objectives or would be more costly</u>." (CEQA Guidelines § 15126.6(b)). In the present context these requirements clearly indicate that the EIR/EIS must consider, as one alternative, a project that involves the improvement of through-Delta water conveyance capacity coupled with continued adherence to the water quality and other requirements of the 1981 Contract, with no so-called "isolated facility."

5. To the extent that any of the project alternatives analyzed in the EIR/EIS would cause productive agricultural land within NDWA to be taken out of production, or would cause environmental problems to be re-directed into the NDWA, CEQA and NEPA impose an obligation to analyze the effects (direct and indirect) associated with such changes, and to mitigate for significant effects. The following comments examine the nature and extent of this obligation in further detail.

(a) It is well-established that NEPA is focused not just on physical impacts but on "human" impacts as well. For example, the definition of "effects" contained in NEPA refers to "economic, social or health" effects. 40 C.F.R. § 1508.8. NEPA's focus on the human consequences of environmental effects derives from the statutory reference to the "*human* environment." 42 U.S.C. § 4332(C)(emphasis added). Accordingly, the EIR/EIS must include an analysis of the direct and indirect economic, social, public safety and health effects of the proposed action(s) on the Delta residents and economy and such effects in the Delta must be mitigated in accordance with applicable law.

(b) In the present context, NDWA is concerned that the massive new water conveyance infrastructure being considered by BDCP for the northern Delta will not only have the obvious effect of taking large tracts of agricultural land out of production; it will also have the more insidious, long-term effect of eroding the economic viability of the agricultural economy of the north Delta region and the social and economic viability of north Delta communities. In a similar vein, current BDCP proposals would, in effect, dissect certain of the reclamation districts within the northern Delta that provide flood protection to Delta lands and communities, potentially eliminating vital flood protection. All of these in-Delta "human" impacts must be thoroughly analyzed in the EIR/EIS. Moreover, to the extent that implementation of a Delta project causes harm within NDWA in the form of a diminution in the value of land or business assets, the State of California will be subject to liability under state and federal law for inverse condemnation damages. It is essential that BDCP, in determining the full cost of any Delta project(s), take these additional costs and liabilities into account. The core principle which BDCP should apply and follow throughout its process is that landowners and residents within NDWA must be made whole for <u>all</u> harm (direct and indirect) associated with the implementation of any particular Delta infrastructure project.

(c) Landowners and water users within NDWA should be protected from short-term and long-term "collateral damage" arising from BDCP habitat restoration efforts. This includes, but is not limited to, regulatory actions that may affect the right to divert (i.e. fish screen requirements) and the timing of diversions. Any Delta solution must include robust and secure "take" authorization for existing, in-Delta covered activities. Assurances must be flexible and open-ended, and must not shift the risk for changed conditions away from the State of California.

(d) In order to comply with CEQA and NEPA, any project must include adequate, reliable, and permanent financing mechanisms (i.e. an endowment, annuity, or dedicated stream of revenue), especially for maintaining project-related properties and habitat so that they do not impact neighboring land uses and land values. In a similar vein, existing local taxes and assessments must be maintained so that northern Delta cities, counties and special districts (including reclamation districts, fire protection districts and NDWA) will remain economically viable. Removing even a small part of the local funding for these agencies would compromise their ability to execute critical roles in community governance. NDWA is concerned that BDCP's proposals to convert massive tracts of land within NDWA from private ownership to public ownership for water conveyance and habitat purposes may seriously erode NDWA's

assessment base. Even assuming, for the sake of discussion, that arrangements could be made to reduce NDWA payments to DWR under the 1981 Contract for lands taken out of private ownership, the remaining private landowners within NDWA would be left with a proportionately higher share of NDWA fixed and administrative costs. Over time, this cost burden would undermine the viability of the agricultural economy within NDWA, so must be avoided.

(e) The EIR/EIS must consider public health and safety effects associated with the proposed project including (i) mosquito-borne diseases such as malaria or West Nile virus associated with new water impoundments, and (ii) flood risks.

6. The EIR/EIS must avoid the tendency, evident in other BDCP planning documents, to overstate the presumed benefits to migratory and pelagic fish species arising from the implementation of specific projects or project elements (including conservation measures) and to underestimate potential detrimental effects. Presumed benefits of conservation measures are impossible to evaluate in the absence of specific performance targets. The EIR/EIS may not, consistent with applicable law, presume benefits to migratory or pelagic fish species based on assumptions regarding underlying biological mechanisms that are untested or poorly supported.

7. The EIR/EIS must avoid the tendency, evident in other BDCP planning documents, to assume that the populations of covered species are limited principally by food resources available in the Delta. There is no support for this assumption.

8. The EIR/EIS must be based on the best available science. Given the accelerated BDCP schedule, it is perhaps not surprising that the best available science has not always been adequately considered during the course of the BDCP process. However, NEPA and CEQA require that the best available science be considered and incorporated into the analysis contained in the EIR/EIS.

9. The EIR/EIS must contain a comprehensive discussion of the various options regarding size and configuration of Delta conveyance facilities and the impacts associated with each option. Size of facilities cannot be properly evaluated without some range of operating parameters.

10. The EIR/EIS must avoid the tendency, evident in other BDCP planning documents, to assume that the historic reclamation of much of the Delta for agriculture and ongoing agricultural operations within the Delta amount to a "stressor" on covered species. This is not the case and there is no scientific evidence supporting this assumption. The operation of the export facilities cause or exacerbate nearly every problem impacting the covered species in the Delta and the EIS/EIR should so state.

It is unclear from a scientific standpoint whether diverting water from locations north of the Delta will improve overall ecosystem functioning. The new North Delta diversion facilities may in fact result in harm to pelagic and anadromous fish species due to entrainment or predation.

The EIR/EIS should so state. Based on the limited scientific support validating species benefits from new North Delta diversions, all assumptions regarding the ecosystem benefits of north of Delta diversions should be removed from BDCP draft documents and not included in the EIR/EIS if they cannot be clearly identified and supported by published scientific data or peer-reviewed scientific research and reports.

12. The adaptive management process proposed in BDCP draft documents fails to describe how monitoring will be designed to establish cause and effect relationships between implementation of specific conservation measures or operation of new conveyance facilities and the type and magnitude of human impacts from those measures such as economic and public safety. Draft documents gives examples of a tidal marsh restoration project being reduced or discontinued or water operation being modified if its providing little benefit to covered species, however it does not explain what will happen if a habitat project or water operation results in causing economic or physical harm to humans in the Delta. In addition, actions proposed in BDCP draft documents could also result in violating assurances and provisions included in the NDWA 1981 Contract. Due to the significant scientific uncertainties regarding the impacts from the construction and operation of new conveyance facilities and the implementation of habitat conservation measures in the Delta, the EIR/EIS must include an adaptive management process that includes modification of any conveyance or habitat project that result in violating the provisions of the 1981 Contract and the human consequences mentioned in number 5 above. Just as there is an adaptive management process for responses by covered species to the Plan's implementation, there also needs to be an adaptive management process to respond to negative human impacts caused by the Plan's implementation. Otherwise, this is not a complete adaptive management plan.

13. NDWA agrees with previous commenters that water quality considerations in relation to Delta Cross Channel operations and a potential Three-Mile Slough gate are important in evaluating the benefits and impacts of water export operations in the Delta. The EIR/EIS must include a comprehensive discussion of water quality, hydrodynamics and the water quality impacts associated with the various project alternatives. As noted above, the EIR/EIS should evaluate such impacts in light of, among other things, the water quality requirements of the 1981 NDWA-DWR Contract.

Finally, it is impossible to provide comprehensive or complete comments on the Bay Delta Conservation Plan Environmental Impact Report/Environmental Impact State or evaluate the cumulative impact of various projects to be in a final EIR/EIS due to the lack of a project description or specific performance targets such as, but not limited to, bypass flows and outflows, greenhouse gas impacts, or seismic stability. The purpose of an EIR is to provide State and local agencies and the general public with detailed information on the potentially significant environmental effects which a proposed project is likely to have and to list ways which the significant environmental effects may be minimized and indicate alternatives to the project. The lack of specificity or details on the proposed project prevents the Association from being able to

identify the significant environmental effects of the project action or how to avoid any significant environmental effects, or how to mitigate those significant environmental effect, where feasible, pursuant to the basic purpose and goals of CEQA. We therefore expect to be provided the opportunity in the future to see and comment on a detailed project description, alternatives, and proposed mitigations before a final EIR/EIS is approved.

Thank you for the opportunity to submit these scoping comments.

Very truly yours,

Melinda Terry
General Manager

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Melinda Terry, Manager

July 30, 2009

Bay-Delta Conservation Plan (BDCP) Steering Committee
c/o California Resources Agency
1416 Ninth Street, 13th floor
Sacramento, CA 95814

Re: Proposed Water Operations Criteria for In-Delta Water Quality

Dear BDCP Steering Committee Members:

The North Delta Water Agency ("NDWA") is providing this letter to memorialize and expand upon the concerns expressed at the July 16, 2009 meeting of the Steering Committee regarding the Department of Water Resources' proposal to relax D-1641 salinity standards in connection with the BDCP. Specifically, DWR staff suggested at that meeting that the proposed relaxation of D-1641 salinity standards is being undertaken at the request of NDWA, in order to meet the requirements of the NDWA-DWR 1981 Contract. This is not the case.

BACKGROUND

NDWA was formed by a special act of the Legislature in 1973. (North Delta Water Agency Act, Chapter 283, Statutes of 1973). Its boundaries encompass approximately 277,000 acres including all of that portion of the, as defined in Water Code Section 12220, that is situated within Sacramento, Yolo and Solano Counties. Also included within NDWA's boundaries a portion of the Sacramento-San Joaquin Delta located within northeastern San Joaquin.

The NDWA was formed to represent north Delta interests in negotiating a contract with both the Bureau and DWR in order to mitigate the water rights impacts of the state and federal water projects (SWP & CVP). In 1981, DWR and NDWA executed a Contract for the Assurance of a Dependable Water Supply of Suitable Quality (1981 Contract). The crux of the 1981 Contract is a guarantee by the State of California that, on an ongoing basis, it will ensure that water of adequate quality and quantity will be made available by DWR in the north Delta for agriculture and other beneficial uses. With respect to water quality, the 1981 Contract contains specific salinity criteria that must be met by DWR at different monitoring stations in the north Delta.

NDWA will take all steps necessary to ensure that the protections embodied in the 1981 Contract

are adhered to in connection with the BDCP process and any subsequent processes, proceedings or activities undertaken by the State of California.

COMMENTS

The 1981 NDWA-DWR Contract contains specific water quality criteria that were established in 1981 and includes DWR's agreement to operate the SWP to provide water qualities at least equal to the better of either the water quality criteria in the Contract or water quality standards adopted by the State Water Resources Control Board (SWRCB). The SWRCB adopted the Bay-Delta water quality control plan ("Plan") on May 22, 1995. The Plan contains, among other things, specific salinity requirements that must be met at Emmaton. In 1998, the NDWA and DWR entered into a Memorandum of Understanding (MOU) in which DWR agreed it is responsible for any obligation imposed on NDWA water users to provide water to meet the 1995 Bay-Delta flow objectives.[1]

The 1981 NDWA-DWR Contract specifies *different* water quality criteria and *different* monitoring locations than D-1641. Unlike D-1641 the 1981 Contract criteria is based on the Four-River Index and is year-round. (Graphs depicting the water quality criteria contained in the 1981 Contract are enclosed with this letter.) Pursuant to a 1997 Contract Amendment, the 1981 NDWA-DWR Contract currently requires specific water quality criteria to be met at Three-mile Slough. DWR was able to realize significant water savings by buying a substantial portion of Sherman Island and changing NDWA's monitoring station from Emmaton to Three-Mile in 1997. DWR now proposes to save additional water by changing the salinity requirement under D-1641 so that salinity requirements must be met at Three-mile Slough rather than Emmaton.

The proposal to shift D-1641 monitoring from Emmaton to Three-Mile will allow the SWP & CVP to once again save thousands of acre-feet of water for water exporters. This proposal is not related to the 1981 NDWA-DWR Contract, does not benefit NDWA and was not requested by NDWA. It is inaccurate and misleading to suggest that the proposed change is being made in order to meet the requirements of the 1981 NDWA-DWR Contract. At the July 16, 2009 Steering Committee meeting, DWR staff vociferously attributed the proposal to change the D-1641 water quality requirements to NDWA. As NDWA's representative on the BDCP Steering Committee, I tried unsuccessfully to correct the record and to ascertain the true reason for the inclusion of this proposal. As a matter of clarification and transparency for all Steering Committee members and the public, the NDWA requests the record be corrected regarding the reason for this proposal (biological or water supply reliability) and confirmation that the water

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[1] In connection with the hearings that preceded the State Water Resources Control Board's adoption of Water Right Decision 1641, DWR and NDWA entered into a memorandum of understanding dated May 26, 1998 (MOU), which provides that DWR is responsible for any obligation imposed on NDWA to provide water to meet Bay-Delta flow objectives, so long as the 1981 Contract remains in effect. In Decision 1641, the State Water Board made the following findings and determinations: "Based on the agreement, the SWRCB finds that the DWR will provide the backstop for any water assigned to the parties within the NDWA as specified in the MOU. This decision assigns responsibility for any obligations of the NDWA to the DWR consistent with the MOU." (Decision 1641 at 66). The latter findings and determinations were upheld by the trial and appellate courts that subsequently reviewed Decision 1641.

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Melinda Terry, Manager

September 16, 2009

Karen Scarborough, Undersecretary
CA Natural Resources Agency
1416 – 9th Street, Room 1311
Sacramento, CA 95814

SUBJECT: Comments - Draft Proposed BDCP Near-Term Conservation Measures for Hydrodynamic Modeling and Analysis

Dear Ms. Scarborough:

The North Delta Water Agency (Agency) requested membership on the Bay-Delta Conservation Plan Steering Committee to be an active and constructive participant in the successful development of a comprehensive, science-based conservation plan for the Delta. As such, we would offer the following comments and concerns regarding the recent proposal by SAIC to analyze a menu of near term conservation measures identified in the "Draft Proposed BDCP Near-Term Conservation Measures for Hydrodynamic Modeling and Analysis."

As I said at last week's Steering Committee meeting, "every action has a reaction." Modeling is a tool to help analyze the impacts that are to be expected from individual actions/projects as well as the cumulative impacts of several actions/projects that are being done together. Unfortunately, there is nothing "dynamic" about this modeling proposal. It is not a robust enough proposal to result in modeling output to allow the Steering Committee to make an informed decision on the final conservation measures to be included in a final Chapter 3.

Designing a modeling run to only analyze two beneficial goals of the Plan seems to be an effort to confirm and endorse actions that have been pre-selected, rather than an un-biased, independent analysis of all possible impacts of proposed actions if implemented individually or collectively. Allowing us to know all of the possible impacts including the negative impacts, not just whether they achieve two beneficial goals, will allow a more thoughtful selection process of actions/measures to move forward with, rather than a rubber-stamp of pre-selected actions/measures based on a very narrow criteria.

The BDCP has one large project (around Delta canal and new diversion facilities and pumps), changing tidal prism and tidal dynamics, changes to operational rules, and numerous conservation measures, many that are flood projects, that individually and collectively will have significant impacts on the Delta ecosystem and economy. Therefore, modeling done for the

BDCP needs to be sure to provide an analysis of how each of these individual actions as well as the cumulative impacts of these combined actions will have on existing agriculture practices, human health and safety, resident species other than aquatic, and local government services. Currently, this modeling only seems to analyze the benefits of achieving the two co-equal goals and in support of pre-determined and preferred actions, but fails to inform decision makers of other negative results that may occur if one or more of the measures are implemented. Selecting measures to be included in the BDCP needs to include the benefits and detrimental effects of all proposed measures, so that decision makers can determine which ones to select, which to do in combination with each other, which ones need to be modified, and which ones need to be discarded as its detrimental impacts outweigh its benefits to fish and water supply reliability. The analysis needs to provide decision makers all of the down side of doing an action, not just the upside.

With the large scale of all of the proposed projects and measures currently in draft Chapter 3 (47 mile canal built in a floodplain, five new in-river diversions and pumping plants, 100,000 acres of restoration, and another 50,000 to 100,000 acres of mitigation required for canal) it is important to know all of the very large and significant impacts that they are likely to have on terrestrial species, Delta water supply availability and quality, water elevations, reverse flows, salmon habitat upstream of the Delta, etc, not just whether they achieve two of the beneficial goals of the plan. Modeling that tells me if it's good for fish and provides enough water for export reliability, does NOT tell me or my Agency if the project/action is appropriate for selection or whether it should be modified. The current proposal does not have enough depth in what it is being modeled or analyzed to allow the Steering Committee to make an informed decision of whether individual or combined actions should be selected.

Following are concerns, issues and requests that we have for this proposal as we understand it at this point:

- We would like to ensure that modeling results show impacts to salinity, changes in flow patterns, velocities that create erosion, volumes and resident times that cause seepage, and changes to water elevations that are detrimental to North Delta water users.
- We would request that the modeling is done to show a "layering" of each of these measures one-by-one on existing conditions, so that we can understand the incremental effects of each major change.
- Biological Objective 4 only has D-1641 as an assumption. Water quality monitoring must include all locations identified in the NDWA 1981 Contract.
- Managing D-1641 X2 requirements as an average over a five month period (Objective 5) allows for a wide swing in water quality. Is this assumption being proposed in order to benefit fish or to allow for increased water exports?
- Since the near term actions to be modeled were selected by the consultants rather than the BDCP Steering Committee members, the menu of near term actions may be incomplete, therefore we hope there will be opportunity for additional near term actions to be added if necessary.
- Because meeting X2 requirements in the fall affects upstream reservoir storage (Objective 6), there may be effects to upstream carryover storage, cold water pools, and river temperatures. This could affect spawning habitat for salmon. A decrease in water supply due to satisfying fall X2 requirements may impact ability to satisfy fishery objectives, including smelt, in subsequent years. These effects should be included in the expected outcomes, metrics, and monitoring.

- Why should PREs have a say in CVP & SWP contract supplies that is in Objective 6 Assumptions?
- Changes in upstream reservoir operations may be needed to provide adequate flows for the Yolo Bypass (Objective 9 and 15). These changes may affect upstream reservoir storage, cold water pools, and river temperatures. The effects to upstream river temperatures and reservoir conditions should be included in the metrics. There may be adverse effects to Salmon.

While we do not want to delay the modeling of some of the conservation measures being proposed by the consultants, we do not want our willingness to pursue the development of data and analysis of impacts as an endorsement of the completeness or adequacy of this modeling and analysis proposal. We look forward to working on the Steering Committee to ensuring a comprehensive analysis of how the significant changes to the Delta system that are being proposed in the BDCP will impact the Delta ecosystem including terrestrial and plant species, water quality, land uses, utility and transportation infrastructure, and flood protection.

Sincerely,

Melinda Terry
Manager

NORTH DELTA WATER AGENCY

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Melinda Terry, Manager

April 27, 2011

Secretary John Laird
CA Natural Resources Agency
1416-9th Street, Room 1311
Sacramento, CA 94814

Dear Secretary Laird:

Thank you for meeting with us last month to discuss the 1981 Contract "For the Assurance of a Dependable Water Supply of Suitable Quality" between the CA Department of Water Resources and the North Delta Water Agency (NDWA).

We appreciate the support you expressed regarding the importance of the 1981 Contract as an effective model of the State's past and future commitment to maintain a reliable supply of suitable quality water for North Delta water users. Unfortunately actions speak louder than words. Based upon the Dept. of Fish and Game's vote against the financial support of the very contract that provides water supply reliability for the North Delta, this commitment is clearly ***not*** shared by departments within your own agency. This is particularly concerning in light of the BDCP's goal for the State to acquire additional acres for habitat within the North Delta in order to secure water supply reliability for the rest of the state.

As we discussed in March, the 1981 Contract serves to resolve many of the issues regarding water supply reliability, quality, and the mitigation of negative impacts within the North Delta from the operation of the State Water Project and is an important component as development of the Delta Plan and BDCP move forward. There are however, new impacts being proposed in BDCP, such as conversion of agriculture land to aquatic habitat and subsequent enticement of listed species into the North Delta that were not under consideration when the 1981 Contract was negotiated. These issues need to be discussed and addressed before the BDCP planning process progresses too much further.

The NDWA must also express its serious concern over being continually excluded from BDCP meetings, including the April 26th meeting with Secretary Hayes to which organizations that do not serve on the BDCP Steering Committee were invited. The exclusion of the NDWA from this meeting is inconsistent with your comments at the public meeting the day before that the BDCP process would be more inclusive. We would remind you that the NDWA is not merely a Delta constituency, but has a water supply contract with the state and therefore should be included at the same table with other state water contractors.

We believe our issues deserve further discussion and look forward to the opportunity to meet with you regarding NDWA's role in developing the complicated and often contentious solutions to achieve a reliable water supply, healthy Delta ecosystem, and economically viable Delta.

Sincerely,

Melinda Terry, Manager
North Delta Water Agency

Cc: Jerry Meral, BDCP
Mark Cowin, DWR
John McCamman, DFG
Phil Isenberg, DSC
David Hayes, DOI
Senator Lois Wolk
Assemblymember Yamada
Assemblymember Huber
Supv. Mike McGowan, Yolo County
Supv. Don Nottoli, Sacramento County
Supv. Mike Reagan, Solano County

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Melinda Terry, Manager

November 15, 2011

David Hayes, Deputy Secretary
U.S. Department of the Interior

John Laird, Secretary
CA Natural Resources Agency

Delivered via email to: BDO@usbr.gov

Dear Gentlemen:

The North Delta Water Agency (NDWA) appreciates the opportunity to comment on the "First Amendment of the Memorandum of Agreement (MOA) Regarding Collaboration on the Planning, Preliminary Design and Environmental Compliance For the Delta Habitat Conservation and Conveyance Program in Connection with the Development of the Bay Delta Conservation Plan" (BDCP MOA).

General Comments

The NDWA questions the value and purpose of providing comments on a BDCP MOA that is unlikely to be amended since it has already been signed by the CA Department of Water Resources (DWR), the U.S. Bureau of Reclamation (USBR), and many of the water export agencies. The BDCP MOA was signed by DWR and USBR on August 31, 2011, posted on the BDCP website on September 6, 2011 after the public demanded its posting, and the BDCP's call for public comment on the MOA was sent out on October 28, 2011. Do the math. The public was asked to provide comments *58 days after the BDCP MOU was already signed.*

The NDWA and other in-Delta stakeholders specifically requested in BDCP Governance Work Group meetings that the elements to be adopted in the new BDCP MOA not be finalized or signed by the state and federal government until the elements of the MOA were presented and discussed at an open and inclusive public meeting. Despite the commitment by Jerry Meral to comply with this request, the signed BDCP MOU was released without prior public discussion of its contents. To request public comments ***after*** the MOU has been signed by the state and federal governments and the water export agencies is a breach of this commitment and disrespectful to the viewpoints of other affected stakeholders. Approval of this document represents several steps backwards in terms of the open and transparent process promised to all stakeholders and reduces the level of trust in the quality of the BDCP document as it moves forward.

The approval of such a one-side document providing inappropriate and unacceptable preference to only one stakeholder group, the water exporters, over the express objections of other

stakeholders, is however, another concrete example memorialized in black and white of how in-Delta stakeholders' express input has been ignored and how we are not being provided equal access or input into the development of the BDCP. We have been promised by both the State and Federal Administrations to have an open, transparent and inclusive process -- not a pay-to-play process.

Therefore, our first question of the state and federal government is will the public comments result in amendment to the BDCP MOA? If so, then will the discussion of the public comments and decisions on amendments to the MOA be conducted in an open, inclusive, and transparent public process before they are finalized with signatures? If not, then we must oppose the BDCP MOA for the following reasons:

Unrealistic Timelines

The NDWA objects to the unrealistic timelines committed to in Exhibit 1 and in Section II(D) of the BDCP MOA to "release the public draft of the EIR/EIS in May 2012" and "result in a ROD by February 15, 2013. The deadlines should be discussed and revised to a more realistic timeline in an open and transparent public forum and the MOA amended accordingly.

Quality is being sacrificed for expediency. The commitments to arbitrary and unrealistic timelines will only result in a flawed document that fails to meet the laws governing HCPs and NCCPs, fails to meet the co-equal goals mandated in state law, fails to mitigate its impacts, and is therefore legally vulnerable to challenge. We do not see the wisdom of spending a quarter of a billion dollars on developing a document that is unlikely to be implemented because it fails to meet the law in terms of environmental improvement or protection of the Delta through assurances and mitigation. We would suggest that spending $250,000,000 on a Plan that is incomplete or insufficient to comply with the law would be better spent by urban water districts in the export area to fund local water supply reliability projects to increase water use efficiency, conservation, and water recycling technologies to reduce their reliance on the Delta.

Schedule is Already Behind. There have been at least eleven (11) public work group and public meetings of the BDCP *cancelled or postponed* since DWR and USBR signed the new BDCP MOA and committed to aggressive and unrealistic timelines. This either means that the BDCP development has been at a standstill for two months with nothing being done and therefore schedule slippage is already occurring or that discussions and decisions are being made behind closed doors instead of in public meetings, just as the approval and signature of the MOA was done over the objections of many Delta stakeholders. It is difficult to imagine how the NDWA or any in-Delta stakeholder can have any meaningful input into the "1st Admin Draft and Review" scheduled for release on February 27, 2012 with at least one third of the public work groups/meetings being cancelled or postponed between August 31st and today. With the holiday season starting at the end of this month, there is less than 70 work days to conduct these public meetings, make key decisions in an open and transparent manner, and complete the Admin Draft.

Unfair and Unequal Access, Input, and Control

The NDWA objects to sections II(H) and II(K) of the new BDCP MOA which creates an unlevel playing field with unprecedented access, input, and control by one stakeholder group, the water

exporters, to the exclusion of significantly impacted in-Delta stakeholders, including other SWP such as the NDWA. We recommend the MOA be amended to delete both Section II(H) and II(K) and Section II(L) be amended to exclude water export agencies from monthly meetings.

Exporters Provided Assurances Beyond Other Cooperating Agencies
Section II(H) and II(J) provide water exporters assurances that go beyond those provided in their Cooperating Agency MOUs with the BDCP Lead Agencies, and are more than being offered to other Cooperating Agencies. Section II(J) "will give priority" and has the "goal of developing" the "equivalent of the assurances that are provided under ESA section 10" to CVP Contractors, but to no other stakeholders.

The water export agencies are customers of the State Water Project (SWP) and the Central Valley Water Project (CVP) and beneficiaries of the new water conveyance facilities being proposed in the BDCP, but their elevation to the same "permittee" status of the state and government agencies that own and operate these facilities is required to be supported by DWR and USBR under Section II(H) of the MOA. Supporting such an action would grant water export agencies equal status to state and federal government agencies in implementation and administration, decision-making authority over water project operation and supply, as well as say in contractual claims and litigation. To state it more plainly, it is inviting the fox in to guard the hen house. This provision undermines the confidence in the BDCP process and is likely in violation of state and federal law. The NDWA is also a Water Contractor (1981 Water Supply and Quality Contract) with the SWP, but we have not been offered or provided a similar elevated status as other SWP and CVP Water Contractors. We believe this action critically impairs the role of the state and federal government as independent agencies charged with administering the BDCP to protect all interests, provide balance between competing co-equal goals, and protecting public trust resources. This provision should be deleted.

Exporters Provided Greater Access and Control than the Public
State and federal government agencies must maintain distance and independence from those they regulate and serve as customers, and *not* provide greater influence to one stakeholder group over the others. Again, the NDWA is a SWP Water Contractor and objects to other water contractors that export Delta water being "provided all draft consultant work product" and active participation and say "to address all comments received" on the BDCP and EIR/EIS (Section II(K) of the MOA). The NDWA strenuously objects to water exporters determining how to respond to comments made by in-Delta stakeholders or the public in general as they are neither impartial nor objective on the design or operation of the project in light of the express goal to "Increase total amount of water exports (relative to currently constrained export levels)" as stated in Table A-2 titled, "BDCP Conservation Measures that Address the Goals" on page A-4 of Appendix A, "Conceptual Foundation and Analytical Framework for Effects Analysis" of the Administrative Draft Bay Delta Conservation Plan. Draft consultant work product should ***only*** be released to ***all*** stakeholders and the public at the same time and ***no*** stakeholder group should be provided control over response to public comments on the BDCP.

Our questions are: Who is in charge of the process? Who makes final decisions regarding content, conservation measures, mitigation, and conditions in the Permits? How can the state and federal government agencies remain fair and impartial arbiters in a process

corrupted by the control of only one stakeholder group whose interests are neither neutral nor impartial? How can in-Delta stakeholders trust their comments and concerns will be appropriately addressed in the BDCP or the EIR/EIS phases if water contractors are dictating the responses to comments received?

Equal Access and Control

The three page 'White Paper' posted on the BDCP website states that "development of the EIS/EIR for the BDCP *must be* under the jurisdiction of the Federal and State lead agencies." However, Section II(L) mandates water export agencies be allowed to attend at least monthly meetings to discuss BDCP-DHCCP planning and management, including direction of work product, which offers more access than allowed to other Cooperating Agencies and oversteps the jurisdiction of the lead agencies to control the development of the EIS/EIR. In addition, Section II(K) clearly states that the Public Water Agencies (water exporters) ***shall*** be provided ***all*** draft consultant work product," which has not been provided to other Cooperating Agencies. As customers and water contractors of the SWP, the NDWA has not been offered or provided equal access or participation in these planning meetings. Either these meetings should be open to ***all*** stakeholders or open to none. The water exporters should hear about the progress and status of work product and schedule with the rest of the stakeholders in the public meetings.

Closing Comments and Recommendations

In closing, we recommend the BDCP MOA signed by DWR and USBR on August 31, 2011 be rescinded, so that it may be amended pursuant to public comments received by the close of the public comment period on November 16, 2011. We specifically recommend the following amendments to the MOA:

- Amend Exhibit 1 and in Section II(D) to reflect more realistic timelines.
- Delete Section II(H).
- Delete Section II(K).
- Amend Section II(L) to exclude water export agencies from monthly meetings.

We look forward to hearing how and when your agencies intend on incorporating the comments and recommendations for changes/amendments to the new BDCP MOA.

Sincerely,

Melinda Terry, Manager

NORTH DELTA WATER AGENCY

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Melinda Terry, Manager

November 17, 2011

Jerry Meral, Deputy Secretary
CA Natural Resources Agency
1416 Ninth Street, Suite 1311
Sacramento, CA 95814

Dear Mr. Meral:

We received your letter dated November 4, 2011 announcing a newly revised public meeting component of the BDCP, which appears to reduce the level of engagement and input of the North Delta Water Agency (NDWA).

The new BDCP public meetings specifically exclude any focus on the development of specific chapters of the BDCP Habitat Conservation Plan (HCP) or of the Environmental Impact Report/Environmental Impact Statement (EIR/EIS), but instead will discuss "issues of interest."

In light of the new MOA signed by DWR and the U.S. Bureau of Reclamation on August 31, 2011 committing to aggressive timelines to have a "1st Admin Draft and Review" by February 27, 2012 and to "release the public draft of the EIR/EIS in May 2012," we would like to see a public forum established to discuss, provide input, and help shape and develop the BDCP Chapters and EIR/EIS. Otherwise, the three years we spent participating on the Steering Committee in good faith have been a waste of time for our Agency. Frankly, we question what other "issues of interest" there are besides the development of the BDCP chapters (Conservation Measures) and EIR/EIS.

There have been at least eleven (11) public work group and public meetings of the BDCP *cancelled or postponed* since DWR and USBR signed the new BDCP MOA and committed to aggressive and unrealistic timelines. This either means that the BDCP development has been at a standstill for two months with nothing being done and therefore schedule slippage is already occurring or that discussions and decisions are being made behind closed doors instead of in public meetings, just as the approval and signature of the MOA was done over the objections of many Delta stakeholders. It is difficult to imagine how the NDWA or any in-Delta stakeholder can have any meaningful input into the "1st Admin Draft and Review" scheduled for release on February 27, 2012 with at least one third of the public work groups/meetings being cancelled or postponed between August 31st and today. With the holiday season starting at the end of this

month, there are less than 70 work days to conduct these public meetings, make key decisions in an open and transparent manner, and complete the Admin Draft.

The NDWA has been clear from the beginning that we want to be an *active and constructive participant in the development* of a comprehensive, science-based conservation plan for the Delta and have consistently asked how and when our specific concerns will be addressed.

It is our understanding that at the October 19, 2011 BDCP Management Team meeting, you told attendees that Karla Neumuth would email out to all stakeholders conceptual ideas for modifying the structure of the public meetings, presumably to solicit our input on the best way to improve public participation and input into the development of the BDCP and EIR/EIS. However, instead we received your letter announcing the new format and identifying the groups allowed to participate in this new effort (limited to pre-determined number of representatives for each group).

Maybe you can provide further clarification on the purpose and specific "issues of interest" contemplated for discussion at the newly revised BDCP public meetings? What is this new group to be called? What is the scope of their work? What is the goal of this group? Are any decisions contemplated to be made by this new group? How will any comments provided by participants in this new group be dealt with by the BDCP Lead Agencies? When and where can we participate in discussions regarding the development of the BDCP Chapters, EIR, and EIS? When, where, and by whom will "key decisions" be made regarding BDCP Conservation Measures and implementation and how can we be involved in the development of these decisions? When and where will the BDCP Conservation Measures be discussed and their benefits, risks and impacts be evaluated against each other so the final suite of Conservation Measures can be selected? Who will make the decision of how to integrate and modify the various Conservation Measure options if not the Steering Committee?

Finally, if the CA Natural Resources Agency and the U.S. Bureau of Reclamation is sincere about having in-Delta participation at its BDCP public meetings, then they should ***not*** be scheduled at the same time other critical BDCP related meetings are being held. The NDWA could not participate in either the October 19, 2011 BDCP Management Team meeting or the November 16, 2011 BDCP public meeting because those meetings conflict with the CA Water Commission meetings where condemnation through eminent domain of parcels in the North Delta for preliminary engineering needed for the BDCP EIR/EIS were being decided.

Although we do not see benefit of participating in the newly revised BDCP public meetings, we will continue to participate in meetings where we can provide input and influence in the development of the BDCP Chapters, EIR, and EIS. We look forward to hearing from you regarding when and where meetings to evaluate risks and benefits of each Conservation Measure and the necessary mitigation actions to address negative impacts to Delta communities will be discussed.

Sincerely,

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Manager

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Melinda Terry, Manager

September 21, 2012

Secretary Ken Salazar
U.S. Department of the Interior
1849 C Street, N.W.
Washington DC 20240

Secretary John Laird
CA Natural Resources Agency
1416-9th Street, Suite 1311
Sacramento, CA 95814

SUBJECT: Request for Comprehensive Socioeconomic Benefit-Cost Analysis of the BDCP

Dear Secretaries Salazar and Laird:

Before the Draft BDCP EIR/EIS documents are released for public review and comment, the North Delta Water Agency (NDWA) formally requests the U.S. Bureau of Reclamation (USBR) and the CA Department of Water Resources (DWR) to conduct a comprehensive benefit-cost and socioeconomic impact analysis consistent with the federal *Economics and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G)* adopted by the U.S. Water Resources Council in 1983 and the *Department of Water Resources Economic Analysis Guidebook* updated in 2008.

The NDWA is a SWP contractor with a water supply availability and quality contract with DWR since 1981 and is a Cooperating Agency under a MOU with the U.S. Bureau of Reclamation for the Bay-Delta Conservation Plan (BDCP).

To date, the BDCP has merely produced a "Cost-effectiveness" financial analysis that compares the project financial costs to project revenues, taking into account the availability of funds. However, the complexity and importance of the water conveyance and habitat projects being planned under the BDCP warrant the more comprehensive "Benefit-cost" analysis to determine whether the direct social benefits of the proposed projects under BDCP outweigh the social costs over the analysis period (50 years) and a "Socioeconomic Impact" analysis that also identifies the direct and indirect positive and negative effects of the BDCP actions or projects in the benefitted and project areas of the state.

According to DWR, their 2008 *Guidebook* is supposed to be used in conjunction with the federal *P&G* in the preparation of project feasibility and socioeconomic impact analyses that evaluate what the *Guidebook* calls the "Three E's": 1) Environment; 2) social Equity; and 3) Economy.

DWR's *Economic Analysis Guidebook* specifically states: "DWR should also broaden the economic analysis to include regional economic development (RED) or other social effects (OSE) accounts, which can significantly assist in the decision-making process. The RED account is particularly important if a proposed plan will have significantly different effects upon regions that might otherwise be irrelevant to the NED national perspective." The BDCP certainly represents different benefits and impacts between Northern and Southern California.

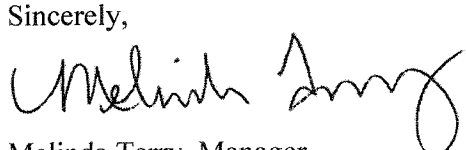
As DWR's *Guidebook* says: "It is possible for projects to be economically feasible but financially infeasible, or vice versa. For example, a project can be shown to have economic benefits that exceed costs at the statewide level, but there may be no sponsors willing or able to finance it. On the other hand, it may not be possible to demonstrate positive net economic benefits for a project, but a sponsor may still be willing to finance and implement the project." Either way, in light of the significant impacts to taxpayers and ratepayers, the public deserves to have sufficient information to make an informed decision on such a costly project that will have both positive and negative economic impacts in different regions of the state.

This comprehensive benefit-cost analysis should be done prior to the release of the Draft BDCP EIR/EIS because as DWR's *Guidebook* points out: "Economic analysis is a critical element of the water resources planning processes because it not only evaluates the economic justification of alternative plans but it can assist in plan formulation." In this regard, the *Guidebook* suggests that a proper "economic analysis should answer questions such as, Should the project be built at all?, Should it be built now?, Should it be built to a different configuration or size?, Will the project have a net positive social value for California irrespective of to whom the costs and benefits accrue?"

We simply request that DWR and the USBR follow their own policies utilizing the highest and most comprehensive and rigorous economic analysis in light of the significant scope and importance of this multi-objective and multi-regional plan, actions, and projects. Additional questions that should be answered by analyzing the distribution effects are: Are some groups more likely to benefit from a project when compared with others?, Does the project result in an *equitable* distribution of benefits and costs?, Does the project result in an *inequitable* distribution of negative impacts?

We look forward to your response on when this comprehensive socioeconomic cost-benefit analysis will be completed; and when the concepts, methods, tools and results will be made available to the public; or the reasons for not complying with your own federal and state policies in a timely manner to allow the public to effectively evaluate the merits of the proposed projects.

Sincerely,



Melinda Terry, Manager
North Delta Water Agency

cc: Deputy Secretary Jerry Meral, Natural Resources Agency
Director Mark Cowin, DWR
Mr. Phil Isenberg, Chair, Delta Stewardship Council
Mr. Chris Knopp, Executive Officer, Delta Stewardship Council
Mr. Doug Brown, Delta County Coalition
Ms. Barbara Barrigan-Parrilla, Restore the Delta
Ms. Osha Meserve, Landowners of the North Delta
Mr. John Herrick, South Delta Water Agency
Mr. Dante Nomellini, Central Delta Water Agency
U.S. Senator Boxer
U.S. Senator Feinstein
Rep. Denham
Rep. Garamendi
Rep. Matsui
Rep. McNerney
Rep. Miller
Rep. Thompson
Sen. Desaulnier
Sen. Steinberg
Sen. Wolk
Asm. B. Berryhill
Asm. Buchanan
Asm. Galgiani
Asm. Huffman
Asm. Huber
Asm. Hueso
Asm. Jim Nielsen
Asm. Yamada

October 17, 2012

Secretary Salazar

As a Cooperating Agency under NEPA with the U.S. Bureau of Reclamation for the Bay Delta Conservation Plan (BDCP), the North Delta Water Agency (NDWA) formally requests the Draft EIR/EIS not be released for public review and comment until the CA Department of Water Resources (DWR) has completed geotechnical explorations to gather geotechnical information necessary to determine pipeline/tunnel and diversion intake feasibility, engineering, design, and locations.

On July 25, 2012 Governor Brown and Interior Secretary Salazar made an announcement regarding the path forward for the BDCP, including the expectation to "issue a draft Bay Delta Conservation Plan and corresponding Environmental Impact Report/Environmental Impact Statement for public review this fall." However, DWR has yet to gain access to approximately fifty North Delta properties it petitioned for eminent domain in 2011 in order to conduct exploratory geotechnical drilling activities to determine location of water conveyance facilities proposed in Conservation Measure 1 in the BDCP.

In testimony before the CA Water Commission (CWC) on September 21, 2011, the lead engineer for the DHCCP, Gordon Enos, told the commissioners the condemnation of approximately fifty North Delta properties was necessary to acquire data and preliminary engineering information to evaluate the BDCP project. He further stated that the geotechnical borings and soil testing was necessary to support preparation of the BDCP EIR/EIS and/or preliminary design of the BDCP facilities, "due to a lack of existing geotechnical information in the location of the proposed project." He said the type of information they hoped to glean from this geotechnical exploration would provide them information regarding the gradation, strengths and permeability of the soils in order to allow them to consider "what or how to build on these soils."

When questioned by Commissioner Saracino on whether it was possible for the DHCCP to collect the necessary engineering information without drilling into the soils, "such as using seismic-fraction testing," Mr. Enos answered "no, we need to take samples." DWR's attorney Ward Taber additionally told the CWC that the property they've requested condemnation for geotechnical exploration has been identified as "necessary for the project" and that "to design works, we need to have access to determine if feasible."

This geotechnical information is critical to the design, engineering and location of facilities since the Delta soils are known to have a 10-20 foot top layer of peat soil that may not have the strength to support water intakes or pumping plants and sandy loose soils below that DWR has expressed previous concerns of significant liquefaction in a seismic event.

The NDWA submitted comments as a Cooperating Agency on the BDCP EIR/EIS Administrative Draft on April 16, 2012 pursuant to the request of the USBR. In those comments we pointed out that the February 2012 Admin Draft lacked sufficient documentation or details

regarding the specific location, size, design, and engineering of the water conveyance facilities proposed in Conservation Measure 1 (CM1) for the BDCP project applicants to make project specific determinations that are permit ready or of sufficient detail to allow the NDWA to evaluate the impacts and adequacy of the proposed mitigations.

Once the geotechnical exploration data is completed and available, then the DHCCP can determine if proposed locations are feasible and to offer appropriate mitigations to eliminate or reduce such impacts pursuant to CEQA. Changing of the size, location, and design of CM1 facilities would likely result in significant changes in impacts and mitigations that would necessitate reissuance of a Draft EIR/EIS for public comment.

Waiting for the geotechnical data to allow more specific and definitive information regarding the location, size, design and engineering associated with the project will save money and time if one Draft is released instead of two.

Under the Cooperating Agency MOU between the USBR and the NDWA, the USBR is "responsible for the preparation, quality, and content of the Draft and Final BDCP EIR/EIS." The NDWA responsibilities under the MOU include among other things: providing technical information and expertise directly associated with its statutory responsibilities or related experience; raising issues as early in the process as reasonably feasible to avoid delay and inefficiency; and identifying data and analysis in the EIR/EIS that may be needed to fulfill its role as potential responsible agencies under CEQA.

Two of the NDWA's two primary statutory responsibilities are: "to protect the water supply of the lands within the agency against intrusion of ocean salinity" and "to assure the lands within the agency a dependable supply of water suitable quality sufficient to meet present and future needs." The exact location, size, design and operation of the CM1 facilities proposed to be located in the North Delta will have a direct bearing on the Agency's ability to fulfill its statutory responsibilities. Therefore, in accordance with Article IV(b)(6) and (7) of the BDCP Cooperating Agency MOU, the NDWA hereby requests the information that DWR claimed in its testimony before the CWC and its declarations regarding condemnation litigation that geotechnical data and analysis is required to support the project specific proposals associated with the CM1 facilities.

The NDWA would like to go on record as declaring the Draft EIR/EIS quality will be insufficient in terms of project specific details associated with the facilities proposed in CM1 without the geotechnical data and evaluation requested on North Delta properties in order to determine proper location, design and size of proposed facilities. Releasing a Draft EIR/EIS without sufficient geotechnical information to provide specific and accurate information regarding project facility locations and impacts would likely cause a second Draft EIR/EIS to be released creating unnecessary "delay and inefficiency."

Thank you for considering our request to wait for geotechnical information to be completed and evaluated so that the accuracy of the site specific project impacts and mitigations can be evaluated by the public for adequacy.

Sincerely,

Melinda Terry

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Melinda Terry, Manager

February 6, 2013

Dr. Jerry Meral
CA Natural Resources Agency
1416 Ninth Street, Suite 1311
Sacramento, CA 95814

SUBJECT: Comments on Task Order ICF-11 and Amendment 1
Cost-Benefit Study Scope of Work for the BDCP

Dear Dr. Meral:

The North Delta Water Agency (NDWA) appreciates the BDCP pursuing a cost-benefit analysis as the NDWA requested in our September 21, 2012 letter and our previous November 4, 2011 letter askng to participate in the development of the assumptions and inputs for a statewide comprehensive cost-benefit study. We also appreciate the opportunity to comment on the proposed scope of work contract Task Order ICF-11 and methodology to be followed in the development of this cost-benefit analysis pursuant to the January 23, 2012 BDCP Finance Work Group meeting and presentation by ICF International and The Brattle Group. As we have stated previously, the quality of the final study is only as good as the quality of the assumptions and inputs used in developing the study.

While we recognize and appreciate the willingness of the BDCP to conduct a cost-benefit analysis, we do have concerns regarding its development. The information presented to date on the methodology and how the assumptions being used were made is superficial and general, rather than specific. Therefore, it is difficult to evaluate the quality, impartiality, equity and efficacy of the inputs and consequently the overall credibility of the results cannot be verified. Based on the Task Order and presentations, we are concerned the effort will not be as comprehensive, robust, independent, or as impartial as it should. The failure to meet the highest standards of objectivity and equality in identifying both the positive and negative impacts will have little value to decision makers or those impacted if it falls short in terms of day-lighting the true costs of the project and impacts, including significant negative impacts to the Delta region.

It is critical for the BDCP cost-benefit analysis to be an unbiased and accurate assessment of the individual and cumulative positive and negative impacts that will result in the different regions

of the state as well as the different economic sectors. Economic elements that should be included in the cost-benefit analysis Task Order to assure its impartiality and validity include:

- Economic Impact Analysis with equitable level of analysis between regions, export and the in-Delta water users, and primary economic sectors
- Sensitivity and Uncertainty Analyses
- Peer-Review of the Cost-Benefit Analysis and all related data and assumptions after Draft Technical Report is "edited" pursuant to Task 3 Deliverables and before public distribution and posting pursuant to Task 4.

Areas of concern with the BDCP cost-benefit analysis and methodology as currently described include:

- Failure to provide an equal level of effort to analyze the in-Delta impacts compared to the export water agencies
- Bias towards inflating benefits and diminishing or omitting analysis of negative impacts
- Failure to include common economic methods in the process (peer review, sensitivity and uncertainty analyses)
- Lacks independence and objectivity with work dictated and revised by non-objective, non-economists
- Failure to analyze major BDCP components independently
- Range of alternatives to be analyzed is too narrow, skewing the outcome in favor of a preferred project
- Manipulation of the No Action Alternative to favor an outcome supporting a preferred project
- Earthquake risks methodology is flawed
- Uses questionable discount rate which is not only inconsistent with the BDCP EIR/EIS, but inappropriately creates a bias in favor of a preferred project
- Non-Market values are insufficient and biased towards analyzing benefits and ignoring negative impacts

We offer the following comments and recommendations to assure the economic analysis is as comprehensive and balanced as possible, so the BDCP's true costs and benefits are depicted in an impartial and peer reviewed documents that all impacted parities can trust.

ECONOMIC ANALYSIS STANDARDS

History

It is interesting to note that the Army Corps of Engineers (USACE) initiated the use of cost-benefit analysis in the U.S., after the Federal Navigation Act of 1936 effectively required cost-benefit analysis for proposed federal waterway infrastructure. The Flood Control Act of 1939 was instrumental in establishing cost-benefit analysis as federal policy. The use for broader public policy started from the work of Otto Eckstein, who in 1958 laid out a welfare economics foundation for cost-benefit analysis and its application for water resource development. Over the 1960s, cost-benefit analysis was applied in the U.S. for water quality. This is most relevant to the BDCP since most of the Conservation Measures (CMs), and particularly CM1 to build the

new water conveyance facilities, propose to alter, modify, and build on USACE's Project Levees which now comprise California's State Plan of Flood Control system.

Purpose

A cost-benefit analysis is a systematic process for calculating and comparing benefits and costs of a project, decision or government policy and has two purposes:

1. To determine if the project is a sound investment/decision (justification/feasibility)
2. To provide a basis for comparing projects that involves comparing the total expected cost of each option against the total expected benefits to see whether the benefits outweigh the costs, and by how much.

An additional outcome of a comprehensive, unbiased cost-benefit analysis is the identification of who the benefits accrue to and who is harmed by the project.

Value and Accuracy

The cost-benefit analysis is supposed to measure the positive or negative consequences of a project, which may include:

1. Effects on users or participants
2. Effects on non-users or non-participants
3. Externality effects
4. Option value or other social benefits.

The value of a cost-benefit analysis depends on the accuracy of the individual cost and benefit estimates. Comparative studies have shown that such estimates are often flawed, preventing improvement in the Pareto efficiency.

The Pareto efficiency or Pareto optimality is a concept in economics with applications in engineering. In a Pareto efficient economic allocation, no one can be made better off without making at least one individual worse off. A change to a different allocation that makes at least one individual better off without making any other individual worse off is called a Pareto improvement.

The widely accepted common causes of inaccuracies in the individual cost and benefit estimates analyzed to determine if projects are a sound investment/decision are:

1. Overreliance on data from past projects
2. Use of subjective impressions by assessment team members
3. Inappropriate use of heuristics (a.k.a: rule of thumb, educated guess, common sense, professional judgment) to derive money cost of the intangible elements
4. Confirmation bias among project supporters (looking for reason to proceed)

Additional inaccuracies may occur due to interest groups attempting to include or exclude significant costs from an analysis to influence the outcome.

Unfortunately, the cost-benefit analysis study proposed in the Task Order and as presented at the January 23, 2012 BDCP Finance work group meeting appears to suffer from all of the above in the following ways:

BDCP PROPOSED VALUATION METHODOLOGY

Inconsistencies with BDCP EIR/EIS

One of the biases being built into the BDCP cost-benefit analysis is using data/inputs that are different than the BDCP permit and the EIR/EIS, which appear to be subjective manipulations to influence the outcome of the cost-benefit analysis to favor the Preferred Project. There may be more inconsistencies in the assumptions the cost-benefit analysis consultants are using and the BDCP and EIR/EIS, but it is difficult to know until we are provided the complete data used to develop assumptions and values for the methodology. Following are just few examples of such manipulation:

Discount Rate – The BDCP February 2012 Admin Draft Section 8.3.4 Financial Assumptions (page 8-4) says the BDCP "assumes" a "nominal discount rate of 4.375% and a long-term inflation rate of 2.1%" and states the rate was selected to "match the fiscal year 2010 rate that the U.S. Army Corps of Engineers (USACE) and the U.S. Bureau of Reclamation (Reclamation) are required to use for developing and evaluating proposed plans for water project plan formulation and evaluation." The footnote on the discount rate says: "The published rate of 4.0% (rounded) does not include any adjustment that may be needed to show the maximum rate of change of 0.25 of 1% per year. The Fiscal Year 2009 rate was 4.625%; hence, the adjusted Fiscal Year 2010 rate **cannot to be less than 4.375%**." [*emphasis added*] It further states the long-term inflation rate is based on the spread between nominal and inflation-indexed 30-year U.S. Treasury notes (U.S. Office of Management and Budget 2008) with cost reported in constant 2010 dollars. Therefore, Dr. Sunding's justification for an unusually low discount rate of 2.25% at the 1/23/13 BDCP Finance Work Group meeting conflicts with the BDCP EIR/EIS and Reclamation's requirements on discounting. To avoid the possibility of bias that could influence or manipulate the outcome of the cost-benefit analysis, the assumptions used in the BDCP cost-benefits should NOT deviate from the BDCP and EIR/EIS or Reclamation's guidelines for evaluating water projects.

No Action Alternative (NAA) – BDCP EIR/EIS Appendix 3D Section 3D.3.1.2 Existing Conditions Assumptions for State Water Project and Central Valley Project (page 3D-3) states the assumptions for the existing conditions used for the NAA related to the operations of SWP/CVP are described in the "Biological Assessment on the Continued Long-Term Operations of the Central Valley Project and the State Water Project," August 2008, prepared by Reclamation (2008 BA) as modified by the NMFS BiOp and U.S. Fish and Wildlife service BiOp (USFWS BiOp). The Task Order mentions revising the NAA and at the 1/23/13 BDCP Finance Work Group meeting Dr. Sunding indicated the NAA alternative may be revised to lower water supply deliveries below the 4.7 maf average and the levels allowed under the BiOps to potentially as low as 3 maf. This number is substantially lower than existing conditions, arbitrary, and inconsistent with the BDCP EIR/EIS No Action Alternative. To avoid the possibility of bias that could influence or manipulate the outcome of the cost-benefit analysis the assumptions used in the BDCP cost-benefits should NOT deviate from the BDCP and EIR/EIS.

Inequitable Level of Analysis

Favors Quantifying Benefits, While Ignoring Harm – Unfortunately, both the previous work done by the consultants, the 1/23/13/ presentation, and the Task Order indicate a greater level of effort in researching, analyzing, and quantifying the positive impacts (benefits) versus the negative impacts of the project. This inequitable level of effort weights the outcomes in favor of the project, making it lopsided and therefore does not provide an unbiased quantification or comparison of negative versus positive impacts. Both documents are replete with references to measuring impacts that include positive modifiers such as, "improving," "increased" and "benefits," but are woefully silent on mentioning, let alone, measuring and quantifying the negative impacts. Areas where consultants are favoring quantifying positive impacts or over-estimating them without equal quantification of negative impacts to in-Delta and other impacted parties include: water quality and reliability, construction emissions, soil erosion, flood risk, and GHG benefits. Ignoring measuring and quantifying negative impacts will unduly skew the cost-benefit analysis to influence the outcome in favor of the Preferred Project. To be balanced and equitable, the same level of effort needs to be applied in measuring and quantifying the harm that result from this project as will be given to quantifying the positive benefits. Then the positive and negative impacts can be compared against each other in an equitable manner.

Greater Emphasis on Quantifying Impacts for Exporters Than Delta/ Other Impacted Parties Unfortunately, both the previous work done by the consultants and the Task Order provide a greater level of effort in researching, analyzing, and quantifying the positive impacts (benefits) to the water exporters than is given to quantify the negative impacts that will occur to in-Delta water users or other impacted parties. Each of the impacts to the export areas/water users includes an adjective (increased/reduced) indicating an improvement or beneficial impact export water users. In contrast, the impacts to the in-Delta and other Delta users included no such adjective denoting benefits or negative impacts, except for the urban water treatment in the West Delta which would analyze the negative impact of increased salinity, but not for the whole Delta. So we are left to conclude the cost-benefit analysis is starting off with biased subjective impressions by the consultants. This inequitable level of effort weights the outcomes in favor of the water exporter, making the cost-benefit analysis lopsided and unable to provide an unbiased quantification or comparison of who benefits and who is harmed by the project.

In some cases, the documents presented by consultants make subjective assumptions that attribute benefits to the in-Delta community that are speculative, biased, and completely inaccurate. For instance, the Task Order calls the *permanent* conversion of over 45,000 acres of Delta farmland to aquatic and terrestrial habitat a "short-term" loss of cultivated land. Permanent means forever, so under BDCP these substantial acres are gone for good and so is the food grown on those acres. Adding insult to injury, the Task Order claims the BDCP will provide positive impacts (benefits) to Delta farmers by *increasing* the protection of cropland in the Delta from development because the Project will permanently preserve an equal amount of ag land as habitat. This is incorrect and should not be counted as a positive impact to Delta agriculture. Existing voluntary (Williamson Act/conservation easements) and regulatory (Delta Plan, FEMA/NFIP, Delta Protection Act) development restrictions in the Delta already prevent most all development outside of existing communities and are enforced by the counties, FEMA, Delta Protection Commission, and the Delta Stewardship Council. Therefore, the BDCP provides no additional protection of agricultural lands in the Delta and should not be counted as such in the cost-benefit analysis. In total, the BDCP proposes creating 100,000 acres of habitat, most of which is in the NDWA boundaries which is 300,000 acres (1/3 of the acreage). An

assumption should be added to the methodology of how changing land use on 100,000 acres out of the total 750,000 acres of Delta lands will impact the counties and the region as a whole.

Another example of inequitable level of analysis is the improved water quality for Delta exports (reduced salinity) at the expense of worsening the water quality (increasing salinity) for the in-Delta water user. The consultants have already spent a great deal of effort in measuring and quantifying the value of the benefits for the water quality improvements that accrue to water exporters. The bias and inequity inherent in the scope of work for the analysis is evident in the 1/23/13 powerpoint which states the study will measure increased water supply reliability and reduced salinity of water exports, but for in-Delta water quality the only mention is "BDCP may change the salinity of the Delta." The water quality impacts associated with providing this reduction in salinity to export water agencies needs to be analyzed for how the rest of the in-Delta water users, taking into account the NDWA 1981 water supply and water quality Contract with DWR are affected. Impacts to ground water quality and availability should also be analyzed since many Delta residences rely on wells for their drinking water.

To be balanced and equitable, the same level of effort needs to be applied in measuring and quantifying the water quality impacts to in-Delta water users under this Project. Then the positive and negative impacts can be compared against each other in an equitable manner.

Inadequate Alternatives, Preventing Accurate Comparison to Other Viable Projects
Numerous stakeholders and impacted parties have identified alternative projects to improve water supply reliability and improve the Delta ecosystem, including Dr. Pyke's Western Delta Intake, DWR's DRMS Trial Scenario 2, and the Portfolio Alternative from NRDC et. al. In addition there are other options such as a no-tunnel with seismic levee upgrade improvements coupled with investments in water supply projects in export areas and reduced Delta pumping, and variations on tunnel size and configurations coupled with local water supply investments. The options would need to be paired with the appropriate level of habitat needed to meet the requirements of an HCP under ESA/CESA. Only comparing the Preferred Project to a No Action Alternative is insufficient as it fails to compare the Preferred Project to another proposal that uses a different mix of actions that may even be quicker and less expensive to achieve the same goals. Failure to compare the total expected cost of various viable options against the total expected benefits to see whether the benefits outweigh the costs for each and by how much does not meet the objective standards necessary to properly evaluate the proposed project. If DWR, Reclamation, and water exporters are confident the BDCP is in fact the *best* option (project) from an environmental, water supply, Delta-as-Place, and cost-benefit, then there should be no fear of comparing the BDCP to other viable options in the cost-benefit analysis.

It is important to assure a proper range of BDCP alternatives are analyzed against the Preferred Project in order to avoid undue bias that would influence the analysis to favor an outcome. Releasing a report that is inherently flawed would render the document useless and further alienate and infuriate Delta residents who are being asked to bear the burden of having these projects built in their area to benefit other regions of the state.

Biased Assumptions
Unfortunately, both the Task Order and the presentation by consultants on 1/23/13 both contain numerous examples of the consultants using biased, speculative, and one-sided assumptions on construction and operating costs of the project, impacts to the Delta economy, and in valuing non-market environmental impacts.

Reduced Seismic Risks to Export Water Supply
The methodology assumes benefits of increased water supply reliability to water exports from reduced seismic risks to the state and federal projects based on questionable/debatable assumptions regarding the probable risks of an earthquake occurring, the resulting damage, and that the new isolated conveyance will in fact protect water exports from earthquake induced outages. These assumptions are flawed for the following reasons:

Dual Conveyance – The BDCP proposes dual conveyance water operations with continued reliance/use of existing South Delta pumps. Therefore, even with the new tunnel, water exports would be reduced under a multi-levee failure, because the pumping restrictions of the North Delta intakes are limited at most times of the year to meet Sacramento River bypass flow requirements and would not necessarily be able to make up any South Delta pumping losses. This water supply impact could be addressed if the BDCP included a Conservation Measure to upgrade conveyance levees to a seismic standard – but it doesn't, so water reliability is still vulnerable to reductions even with the new intakes.
Tunnel Also Vulnerable to Earthquake – Although the new conveyance tunnels would be constructed to modern engineering standards, the tunnels and new intakes will still be vulnerable to earthquake damage because the location of the North Delta intakes and tunnel have the same risk of earthquake as the South Delta pumps – because they are being built in the same high-risk earthquake area known as the Delta. In addition, because the tunnel is subterranean (200+ feet underground) and earthquakes occur underground, the new conveyance facility may have *greater* risk of seismic failure than the Delta conveyance levees.
Vulnerability of Current SWP/CVP to Earthquake - The assumption that BDCP provides a benefit of increased water supply reliability to water exporters from reduced seismic risks to state and federal projects, is flawed unless the methodology equally analyzes the risks/potential for water outages from earthquake damage to the rest of the SWP/CVP water storage and conveyance facilities. For instance, the California Aqueduct is 701 miles of open canals and pipelines which may in fact be at greater risk to earthquake damage than existing Delta infrastructure due to its proximity to the San Andreas Fault. Research has shown the Southern segment from Parkfield in Monterey County to the Salton Sea is capable of a Richter scale 8.1 magnitude earthquake, Parkfield in the Central Valley has had six successive magnitude 6.0 earthquakes occur on the fault at unusually regular intervals between 12 and 32 years with an average of every 22 years between 1857 and 1966 with the most recent in 2004, and the Central segment exhibits a phenomenon called aseismic creep where the fault slips continuously without causing earthquakes. Therefore, it can be presumed a 6.0 or larger quake in the Parkfield area will occur twice during the 50-year life of the BDCP, in 2030 and 2052 based on 22-year average. Interestingly, the next "Big One" near Parkfield is expected to occur just after the cost-benefit analysis presumes operation of the new BDCP tunnel. In addition, a recent study by Yuri Fialko in 2006 concluded the San Andreas Fault has been stressed to a level sufficient for the next "Big One," that is, a magnitude 7.0 or greater and further concluded that the risk of the "Big One" may be increasing more rapidly than researchers had previously believed.
No Recorded Delta Levee Failures Caused by Earthquakes - Despite the occurrence of past earthquakes on faults near the Delta, including the 1906 San Francisco earthquake when the levees were less robust, there has been no levee failure attributed as a result of the quakes. Table 9.6 in Chapter 9 of the EIR/EIS cites eight large, devastating earthquakes experienced in the San Francisco Bay region from 1868 to 1989 with lost lives and billions of dollars of damage, but *NO* levee failures in the Delta. We would like to know if Dr. Sunding factored in factual earthquake

statistics as shown in the EIR/EIS into the model he used to derive the value of BDCP's water supply benefits for exporters based on seismic risk reductions? Any inputs/assumptions used in Dr. Sunding's analysis should be consistent with the data in the BDCP and EIR/EIS. Additionally, researchers from the University of California, Los Angeles, have twice set up a shaking machine on Sherman Island to simulate an earthquake, to see how levees made of peat soils would perform. The Eccentric Mass Shaker shook the model levee as hard as the 1989 Loma Prieta earthquake and then with the force of a magnitude 7.0 rupture directly atop the Hayward Fault. Each time the result was the same – visible waves rolled along the ground, work trucks bounced on their springs and the levee tossed about and eventually settled back into place, only sinking about a quarter of an inch – *but did not fail.* The simulation results appear to show the levee foundations are surprisingly resilient, casting doubt on the assumption that Delta levees are highly vulnerable to massive failures from an earthquake as posed in Dr. Sunding's analsysis.

Selective Assumptions Used in BDCP Methodology - The presentations by Dr. Sunding on earthquake risk indicate his methodology assumes 2025 (the same date he assumes the tunnels will be completed) as the predicted date of an earthquake causing a catastrophic multi-levee failure in the Delta, an event which has *never* happened before. Using the year 2025 as an assumption input in the model inappropriately results in generating the largest possible numbers for the table. We were also concerned he is presenting the earthquake risk reduction benefits as raw numbers without multiplying by the probability that it happens, which results in exaggerating the benefits. The assumed 2 and 3 year export water delivery outages used in his methodology are considered by many to be highly improbable, and inappropriately assumes the state will not eliminate the earthquake risk to water exports through levee updgrades in the No Action Alternative which is inconsistent with the BDCP EIR/EIS Appendix 3D, page 3D-15, which says the NAA assumes continued operations of flood management facilities by the federal, state, and local agencies.

Other Comparisons – The water supply benefits from reduction of seismic risk presented by Dr. Sunding fails to recognize the benefits of improving levees to seismic standards as possibly being equal to building new North Delta conveyance facilities and therefore a viable alternative to the isolated tunnel. Even DWR's *State Water Project Final Delivery Reliability Report 2011* (published June 2012) mentions (page 35) the DRMS Phase 2 report on Trial Scenario 2 *Armored Pathway/Through-Delta Conveyance* findings that this scenario "would have the joint benefit of reducing the likelihood of levee failure from flood events and earthquakes and of significantly reducing the likelihood of export disruptions." In addition, recent studies done by the Metropolitan Water District of Southern California found that a promising way to resume water exports after a multi-levee failure would be to place structural barriers at selected channel locations in the Delta and complete strategic levee repairs, thus isolating an emergency freshwater conveyance "pathway" through channels that may be surrounded by islands flooded with saline water.

BDCP Increasing Risk of Levee Failure – In determining the water supply value of avoiding water delivery outages from levee failures, an assumption should be included in the methodology that the BDCP has the potential to increase the risk of levee failures in the Delta. Failure to include a BDCP Conservation Measure that contributes funding towards the ongoing upgrade and maintenance of levees used to convey water to South Delta pumps which will still be used under BDCP's dual conveyance water operations, maintains the risk of temporarily shutting down the South Delta pumps due to levee failures. In addition, the increased risk of levee failures from seepage caused by aquatic habitat CMs and the new North Delta 750-acre 4-story dam holding 5,250 acre feet of water are significant possibilities that should be factored into the model. The vulnerability of Delta levees may be further compromised by BDCP construction exacerbating land subsidence by lowering land elevations on Delta islands from construction

activities: 1) digging large borrow pits; 2) excavation and grading; 3) an underground tunnel causing land above to settle and sink. These are essentially a man-made contribution to increasing land subsidence in the Delta, which can be a negative impact on export water supply that should be considered in the assumptions and methodology.

Manipulation of Water Supply Deliveries
Discussion at the 1/23/13 presentation and language in the Task Order, "This analysis will reflect refinements in how the no action alternative (NAA) is framed for the purpose of this analysis in construction and operation costs" led many in attendance to believe that Dr. Sunding is considering lowering the assumptions for export water supply delivery from below the current BiOps annual amounts to potentially as low as 3.0 maf, which is a distortion of current conditions. As Dr. Jeffrey Michaels with UOP has pointed out, one could argue an equal and possibly more likely probabability of a potential increase in water exports based on pending litigation by the water exporters seeking higher levels of export than the existing Biological Opinions restrictions currently allow. The numbers for assumptions used in the cost-benefit analysis should match the numbers in the BDCP EIR No Action Alternative which is based on the BiOps water operations being in place and followed. Manipulation of the underlying assumptions in the No Action Alternative beyond those used in the BDCP EIR is inappropriate.

Flawed Construction Emission Values and Assumptions - Non-market environmental impacts in Section 2.3 of the Task Order present a flawed assumption that the implementation of BDCP conservation measures may partially offset the environmental impact of the GHG pollutants created by the conveyance construction and cites the establishment 5,000 acres of riparian habitat (trees) will be able to absorb the BDCP construction pollutants. There are three serious flaws with this assumption: 1) the U.S. Army Corps has strict vegetation policy on Project Levees which limits the ability to plant trees, which may result in only a few hundred acres of riparian acres being planted under BDCP; 2) ESA restrictions may also limit the number of riparian acres that can be planted; 3) there are not enough trees or tules that can be planted under the BDCP to offset the significant amount of *daily* pollutants to be created by BDCP construction over a TEN YEAR period.

According to the CA Air Resources Board (CARB) the top three 2004 Emissions by Sector were: Transportation 38%, Electricity Generation 25% (import and in-state combined), and Industrial 21%, all of which are significant actions/impacts in the BDCP. In addition, according to CARB, approximately one-fifth of the electricity and one-third of the non-power plant natural gas consumed in the state are associated with water delivery, treatment. According to Chapter 3 of the BDCP EIR/EIS dewatering pumping for the multiple intakes may occur 24 hours per day, 7 days per week, would continue throughout intake construction, and be powered by electric-powered dewatering wells installed throughout the site with diesel-powered standby generators (page 3-57, 3-58) and continuous truck transport of tunnel muck (7,000 cubic yards per day, EIR/EIS page 3-59). Also, new power line supply and grid connections will be built to supply power for operations of the new conveyance facilities under BDCP. Due to the amount of concrete to be used during construction of conveyance facilities concrete batch plants and fuel stations will be built (page 3-50). CARB has identified the cement manufacturing industry as a major source of carbon dioxide (CO2) emission.

In addition, the most abundant greenhouse gas in Earth's atmosphere is water vapor (H2o), accounting for 36-72% contribution, followed by carbon dioxide (9-26%), methane (4-9%) and

ozone (3-7%). Therefore, the conversion of farmland to aquatic habitat (water) may also result in an increase in GHG contributions of the BDCP's other CMs and should be accounted for in the cost-benefit analysis. And finally, any potential BDCP habitat benefits will not be available for possibly several years after the construction of the conveyance facilities (CM1) because habitat will only have Programmatic EIR/EIS review and will NOT be project ready on the same timeline as the conveyance project, and in fact some of the expected habitat acres may in fact NEVER be created if project-specific EIR/EIS is not approved later. This level of uncertainty for habitat creation must be compared against the higher level of certainty for the conveyance project due to the differing levels of environmental review between the two in the BDCP.

Non-market Environmental Benifits – Benefits in the 1/23/13 presentation identified impacts to be measured as *reduced* soil erosion, *reduced* flood risk, greenhouse gas *benefits*. Using the terms *reduced* and *benefits* presumes an expected positive outcome before measuring and comparing the positive and negative consequences of a project. Because almost all of the BDCP CMs propose to modify or build on Project Levees that are part of the State Plan of Flood Control system with the intake structures permanently changing existing substrates and local hydraulic conditions (BDCP page 3-57), the BDCP may in fact increase flood risks in the Delta. In addition, increased seepage from new BDCP aquatic habitat and 750 acre 4-story dam (forebay) could cause levee failures. Cumulatively, the BDCP CMs may result in long-term increases to flood risk to in-Delta residents and export water supply. These are just a few examples of significant negative impacts associated with implementation of BDCP, so it is difficult to agree with the BDCP consultants that only positive soil erosion, flood, and GHG "benefits" should be measured in the cost-benefit analysis.

GHG Values and Assumptions for BDCP Habitat - Any potential BDCP habitat benefits will not be available for possibly several years or decades after the construction of the conveyance facilities (CM1) because CMs 2-22 will only have Programmatic EIR/EIS review and will NOT be project ready on the same timeline as conveyance construction, or ever since the BDCP does not include site-specific designs for CMs 2-22. This level of uncertainty of habitat creation must be compared against the higher level of certainty for the conveyance project due to the differing levels of environmental review between the two in the BDCP. In addition, the most abundant greenhouse gas in Earth's atmosphere is water vapor (H2o), accounting for 36-72% contribution, followed by carbon dioxide (9-26%), methane (4-9%) and ozone (3-7%). Therefore, the conversion of 65,000 acres farmland to aquatic habitat (water) may also result in an increase in GHG contributions of the BDCP's other CMs and should be accounted for in the methodology.

Unrealistic GHG Carbon Credit Assumptions - There are several concerns with having the cost-benefit analysis focus time and attention in trying to determine a value for carbon credits in the BDCP methodology: 1) there is currently NO carbon credit protocol for wetlands in California and it will take years to develop and be adopted into the CA Climate Registry for trading, so it is a "Maybe Someday, Might Happen Wish and a Prayer," not a near-term reality that should be researched and quantified in the BDCP cost-benefit analysis; 2) a baseline of carbon storage in wetlands must first be determined which could take years; 3) it will take several decades before additional carbon storage could be grown in enough quantity to produce tradable amounts of credit, which will occur sometime after the 50-year BDCP permit since the habitat CM1 are NOT permit ready (10-30 years to build BDCP habitat and another 30 years to grow sufficient biomass of carbon storage; 4) any credit can *only* be counted for *additional and verifiable* voluntary carbon storage created, not carbon stored pursuant to following practices already

required by law. Therefore, the acres of wetlands created as mitigation for CM1 (conveyance facility construction) in the BDCP EIR/EIS or to comply with the federal fishery Biological Opinions and possibly the CVPIA, ***cannot be counted as credits***; 5) TEN YEARS of emitting *daily* GHG pollutants during construction would already be occurring prior to the potential BDCP wetlands being created in great enough masses to qualify as credits. The proposed cost-benefit valuation of BDCP carbon credits is like Alice chasing the white rabbit down the hole and is deeply concerning since the ***consultants time would be better spent on researching and quantifying real and near-term impacts, including negative, to in-Delta residents as a result of implementing BDCP.*** Therefore, it is inappropriate for consultants to spend undue time researching and quantifying GHG benefits associated with "someday, but maybe never hope and prayer" possibility of protocols and carbon trading being developed for wetlands in California, especially due to the BDCP long-term timeline for building any significant wetland acres, let alone the additional decades it will take to grow sufficient quantities of biomass to sell.

Silent on Delta Local Government and Community Impacts

There is nothing in the Task Order that specifically focuses on identifying impacts to counties and other local government agencies and special districts. This is a significant omission in light of the impacts and commitments made to the Delta Counties Coalition by the BDCP managers.

Local Tax and Assessment Revenue Losses – The acquisition and conversion of up to 100,000 acres of property in the Delta to create habitat will result in the property transferring from private to public ownership. Unfortunately, neither the federal nor state governments have a good track record of paying their local taxes/assessments to the counties, cities, reclamation districts or other special districts. In fact, the three largest delinquent landowners who have not paid the NDWA assessment are State Agencies. Section 8.4.3.2 Property Tax and Assessment Revenue Replacement Section of the BDCP indicates the intent that local taxes and assessments will be offset by BDCP, but lacks a mechanism to implement according to the same section which also says that no determination on how payments will be made has been identified. Therefore, the cost-benefit analysis should assume no payments of local taxes/assessments will be made based on existing non-payment of local assessments and quantify those financial impacts to each Delta county. This could be resolved if BDCP identified a funding source to fund a non-wasting endowment to last over the course of the 50-year plan to cover these revenues.

Delta Crop Choices - Impacts to Delta agriculture in Task 2.1 asserts that the conversion of over 45,000 acres of farmland to habitat in the BDCP results in a "short-term" net loss of cultivated land which is ridiculous since the conversion is permanent and those 45k acres of land will *not* be farmed ever again. It further asserts that BDCP proposes to also substantially increase the protection of cropland in the Delta which is factually incorrect as those Delta ag lands are already preserved in other state and local programs, so this myth and absurd assumption must be removed from any economic model and the decrease to county revenues from the loss of farm production on 45,000 acres must be researched, quantified and added as an assumption.

Job Losses – The analysis of job losses in the Delta region, primarily farm labor and recreation, should also identify the increase in each county's unemployment rate and the impact to county budgets, particularly the potential increases in social services/welfare and other county services. This calculation should be calculated for all 50 years of the Plan.

Public Safety Services – Blocking and re-routing of roads in the Delta during BDCP's ten year construction phase can result in adding up to 60 minutes of response time for emergency vehicles

such as fire and ambulances due to alternate routes resulting in having to drive around an island to find another route. The loss of life and property should be calculated based on an assumption of longer emergency response times for the ten year conveyance construction (CM1) period and outlying years from habitat construction.

Increase in Vehicle Miles Travelled – Blocking and re-routing of roads in the Delta during BDCP's ten year construction phase can result in adding up to 60 minutes of drive time for Delta residents commuting to work and maneuvering through their community which will affect and contribute to the local air quality attainment standards the county must meet, resulting in substantial fines which must be accounted for in the assumptions.

Increase in Emergency Room Visits – According to the U.S. EPA, breathing air containing ozone can reduce lung function and increase respiratory symptoms. Ozone exposure also has been associated with increased susceptibility to respiratory infections, medication use by asthmatics, doctor visits, and emergency department visits and hospital admissions for individuals with respiratory disease. Ozone exposure may contribute to premature death, especially in people with heart and lung disease. High ozone levels can also harm sensitive vegetation and forested ecosystems. The ozone pollution created by BDCP construction on a *daily* basis for the 10 year construction period may result in more medical treatment, emergency room visits and deaths. The analysis should research and quantify the county costs for hospital visits and increased medical costs for Medicare patients and include in the assumptions/model.

Exacerbate County Non-Attainment – On April 15, 2004 EPA issued designations on attainment and nonattainment of the 8-hour ozone standard for the Sacramento/Yolo areas. EPA also issued a new rule classifying areas by the severity of their ozone conditions and establishing the deadline state and local governments must meet to reduce ozone levels. The ozone pollution created by BDCP construction on a *daily* basis for a *ten year* construction period may result in fines and penalties against the counties and should be included in the assumptions/model.

Questionable and Missing Assumptions

Export Water Demand – An important assumption is missing from BDCP methodology for determining the value on water supply: a realistic assessment of demand and commitment to pay for future State Water Project costs. Each water district in export areas have local water supply development options that compare favorably to the future MWD imported water costs if BDCP is implemented and have been investing money to develop/build these alternative water supplies because they are considered more reliable than Delta import water. MWD's water sales have declined 32% since 2008. MWD had their lowest water sales in more than two decades in 2011, with 300,000 af less in sales than budgeted by their board. At the same time, MWD's rates have risen 55% since 2008, possibly creating an elasticity problem in terms of future rates to pay their portion of BDCP. MWD's projected sales in 2020 are 24% lower than 2000-2009 average. MWD's rate structure is an unstable source of funding because it does not have water purchase contracts with its 26 member agencies to back up its "Take-or-Pay" SWP Supply Contract, which means its costs could be more than revenues in any given year over the 40-year bond repayment window. The consultants should research the realistic water demands of both urban and agricultural export water agencies and add an assumption to the methodology regarding those findings to the BDCP cost-benefit analysis.

Impacts to Labor Markets – The 1/23/13 presentation recognized the BDCP's potential to cause large changes in employment in the Delta region, both positive and negative. However, it failed to mention the methodology and assumptions to be used in the BDCP cost-benefit analysis. This is very important as there is a very big difference between the short term impacts and the long term impacts. For instance, the positive impacts that may occur in the Delta region are probably only short-term due to temporary construction jobs to build the conveyance facilities, but the negative labor impacts to the Delta are permanent. Therefore, the level of impact is not apples to apples. The long term affects of permanent job losses would likely outweigh the short-term benefits of temporary construction jobs, but it is unclear whether this will be analyzed. Also, the cost-benefit analysis should analyze the ability of out of work farmers/farm workers, commercial fisherman, or Delta marina workers to find comparable work in the Delta region.

Soil Erosion Values and Assumptions - The reduced soil erosion values mentioned in Task 2.3 sound speculative and will need to be reviewed by the in-Delta agricultural community prior to being inserted into the model and should be put through an Uncertainty analysis and peer-reviewed prior to the cost-benefit analysis. In addition, their benefits will not be available for possibly several years after the construction of the conveyance facilities (CM1) because habitat will only have Programmatic EIR/EIS review and will NOT be project ready on the same timeline as the conveyance project, and in fact some of the expected habitat acres may in fact *never* be created pursuant to the Plan. This level of uncertainty of habitat must be compared against the higher level of certainty for the conveyance project due to the differing levels of environmental review between the two in the BDCP.

Water Quality Values and Assumptions - The water quality improvements from filtering and purification mentioned in Task 2.3 sound speculative and will need to be reviewed by the in-Delta water agencies and farmers prior to being inserted into the model and should be put through an Uncertainty analysis and peer-reviewed prior to the cost-benefit analysis. In addition, these speculative benefits will not be available for possibly several years after the construction of the conveyance facilities (CM1) because habitat will only have Programmatic EIR/EIS review and will NOT be project ready on the same timeline as the conveyance project, and in fact some of the expected habitat acres may in fact *never* be created pursuant to the Plan. This level of uncertainty of habitat must be compared against the higher level of certainty for the conveyance project due to the differing levels of environmental review between the two in the BDCP.

Flood Risks Values and Assumptions - Reduced flood risks mentioned in Task 2.3 are one-sided and biased, failing to identify and consider the negative flood impacts and increased flood risks created by the implementation of BDCP. The additional impacts that need to be analyzed include the increased chance of flooding to the population, agricultural lands, and businesses in the vicinity of the 750 acre 4-story dam (forebay) to be built in the North Delta if the dam fails, possibly due to an earthquake since its being built in the same high-risk earthquake area as the Delta levees. Seepage is a known stressor that can cause levee failure, so the risks of seepage and localized flooding caused by the forebay and new aquatic habitat projects in BDCP also need to be factored in as an assumption in the methodology. The Central Valley Flood Control Board, CA Central Valley Flood Control Association, and Delta reclamation districts should be consulted regarding the literature that should be used and/or avoided for source data for valuing flood control benefits and the assumptions to be used in the model.

PROCESS ISSUES

Peer Review – The Task Order does not include a requirement for the cost-benefit analysis report to be peer reviewed which is a common practice to validate the objectivity and ultimate credibility of the Study. The Draft Technical Report prepared under Task 3 should be amended to allow the Study to be peer-reviewed by an independent and impartial economic peer review team (Not the DSC Independent Science Board) prior to publication under Task 4 in order to give greater confidence to all interested/impacted parties in the report's credibility.

Sensitivity & Uncertainty Analyses – The Task Order does not call for Sensitivity or Uncertainty Analyses to be conducted which is important in order to test the robustness of the results of the model in the presence of uncertainty associated with the BDCP. This is a necessary step due to the uncertainty of BDCP CMs 2-22 and the consultants proposing very uncertain concepts and data to be inserted into the economic model including: earthquake risk reduction benefits; existing water supply deliveries; GHG credits associated with habitat CMs; skeptical non-market environmental impacts, and the potential use of biased data or subjective assumptions. The Task Order should therefore include the preparation of both Sensitivity and Uncertainty Analyses to test the results of the model.

Refinements to No Action Alternative - Task 2.1 of the Task Order states the analysis will reflect refinements in how the no action alternative is framed for the purpose of this analysis in construction and operation costs. Many impacted parties are concerned these "refinements" will: 1) be directed by Dr. Meral and the water export contractors who are neither economists nor impartial parties; 2) use a different annual water delivery amount than currently exists under current BiOps and is used as the assumption in the BDCP EIR/EIS No Action Alternative; 3) insert improbable assumptions about earthquake risks including using the year the collapse is predicted to occur, not multiplying by the probability collapse happens, using 2 and 3 year outages that are highly improbable and inconsistent with DWR reports. Assuming the state will not reduce the earthquake risk to water exports through levee maintenance and repair which *is* assumed in the BDCP No Action Alternative (EIR/EIS Appendix 3D, page 3D-15) and based on recent history of the investments over the last five years on Delta levees being higher than the total spent in thirty years before that combined. The cost-benefit analysis should match the BDCP EIR/EIS No Action Alternative with no "refinements" by the State, Bureau, or water contractors as allowed in the Task Order, that deviates from the EIR/EIS NAA.

Editing of Draft Technical Report – The Task 3 Deliverable contains concerning language to allow the Draft Technical Report to be released to DWR, Reclamation, and the water contractors involved in the BDCP for review *and editing*. In order for the BDCP cost-benefit analysis to be impartial, unbiased, and credible it must remain an independent economic analysis with no undue interference or influence by interest groups that would benefit from including or excluding significant costs from the cost-benefit analysis in order to influence the outcome. The Task Order should be revised to treat DWR, Reclamation, and water contractors like all other interest groups by removing their right for prior review and edit before the Final Technical Report is released to the public. They should have no greater ability to influence the outcomes of this Report than any other interest group or member of the public and should send comment letters on the cost-benefit analysis like everyone else.

Meetings and Coordination – We appreciate Task 5 to have the consultants schedule additional meetings with the BDCP Finance Work Group, Delta agricultural groups, and encourage these meetings to provide greater detail on ALL of the specific and final assumptions to be input into the economic analysis model to determine if they are inclusive of all issues that need to be analyzed and are characterized in an unbiased fashion to allow a credible product at the end that all impacted parties can trust. We would request: 1) adding the Delta Counties Coalition and Delta flood management groups to the list of impacted parties to meet with; 2) have the consultants make available the complete list of specific assumptions to be input into the model; and 3) allowing additional public comments on the development of the cost-benefit analysis once the next Administrative Draft of the BDCP is released later this month.

NDWA BACKGROUND

North Delta Water Agency Water Supply Reliability

The NDWA includes approximately 300,000 acres in the legal Delta and was formed by a special act of the Legislature in 1973 to negotiate an agreement to (a) protect the water supply of the lands within the NDWA against intrusion of ocean salinity and (b) assure the lands within the Agency of a dependable supply of water of suitable quality sufficient to meet present and future needs. In 1981, DWR and NDWA executed a Contract for the Assurance of a Dependable Water Supply of Suitable Quality (Contract). The purpose and intent of the 1981 NDWA/DWR Contract is a guarantee by the State of California that, on an ongoing basis, it will ensure that suitable water will be available in the northern Delta for agriculture and other beneficial uses.

In addition to being a water contractor with the Department of Water Resources, the North Delta is the location for all of the new water diversion intakes, new forebay, and a significant portion of the habitat restoration currently proposed in the BDCP, which individually and cumulatively have the potential to impact the criteria in our 1981 Contract. Any fixes pursuant to the 1981 NDWA/DWR Contract are requirements above and beyond the CEQA standard to simply mitigate the impacts.

Previous NDWA Comments

The NDWA and the Local Agencies of the North Delta (LAND) sent a joint letter on November 4, 2011 after listening to a BDCP economic presentation by Dr. David Sunding expressing our dismay at the lack of impartiality of the analysis and its one-dimension focus on benefits to export water contractors without any recognition of the negative impacts to the Delta region where the BDCP will be implemented. We additionally mentioned that the BDCP has as much potential to be an unemployment public works project due to permanent job losses in the Delta region as it does an employment boost from temporary construction jobs. Yet these same problems were still evident in the BDCP work product discussed presented at the 1/23/13 Finance work group economic briefing and therefore still persist.

In the NDWA September 21, 2012 letter, we stated it is critical for the economic study to accurately identify and fully analyze the direct and indirect positive and negative impacts of the BDCP actions (Conservation Measures) in the benefitted export areas and the project area in the Delta. Due to the significant impacts to taxpayers, ratepayers, environment, and economic sectors, the public deserves to have unbiased information to make an informed decision on such

a costly project that will have both positive and negative economic impacts in different regions of the state. Questions we said, and still believe, the economic study should answer include:

- Should the project be built at all?
- Should the project be built now?
- Should the project be built to a different configuration or size to reduce costs and avoid significant negative impacts.
- Will the project have a net positive social value for California irrespective of to whom the costs and benefits accrue?
- Are some groups more likely to benefit from the project when compared with other groups?
- Are some regions of the state more likely to benefit from the project when compared to other regions?
- Does the project result in an equitable distribution of benefits and costs between groups such as urban water v. ag water, or export water users v. in-Delta water users?
- Does the project result in an equitable distribution of benefits and costs between regions of the state, north v. south?
- Does the project result in an equitable distribution of negative impacts between groups such as urban water v. ag water, or export water users v. in-Delta water users?
- Does the project result in an equitable distribution of negative impacts between regions of the state, north v. south?

CONTRACTUAL AND STATUTORY REQUIREMENTS TO CONSIDER

NDWA Contract Compliance

The NDWA Contract has specific impacts caused by the operation of the SWP that are to be avoided, prevented, or mitigated not only in the Sacramento River but in ALL channels of the North Delta. Specifically:

1) State shall not convey SWP water so as to cause:
- Decrease in natural flow detrimental to ND water users
- Increase in natural flow detrimental to ND water users
- Reversal of natural flow direction
- Alteration in water surface elevations in Delta channels to the detriment of Delta channels or water users within the Agency

2) Seepage or erosion damage to lands, levees, embankments, or revetments adjacent to Delta channels with Agency:
- State shall repair or alleviate the damage
- State shall improve the channel as necessary
- State shall be responsible for all diversion facility modifications required (hundreds of them in ND)

These 1981 NDWA/DWR Contract provisions are NOT discretionary for DWR as they are part of their assurances provided to the North Delta in the agreement. DWR's costs to purchase the majority of land on Sherman Island in the late 90's as an alternative to building a costly overland water supply to Sherman Island water users (Contract Amendment) could be used in developing

an assumption regarding potential implementation costs if Contract violations occur throughout the 50-year BDCP permit time period.

The Contract also requires water of such quality (as specified in the Contract criteria) to be in the Delta channels for reasonable and beneficial uses and prevents local diversions and uses from being disturbed or challenged by the State. If you couple these two provisions with the State being responsible for SWP diversion facility modifications required from detrimental impacts experienced by North Delta channels and water users from seepage, erosion, and altered water surface elevations due to the operation of the SWP (and BDCP as part of the SWP), then there are potential costly fixes depending on whether the plumbing changes and habitat trigger any 1981 NDWA/DWR Contract provisions.

Finally, the enforcement provisions of the 1981 NDWA/DWR Contract states that if the State fails to maintain water quality criteria (as specified in the Contract or standards adopted by SWRCB, whichever is better, and a 1998 MOU with DWR), then the State ***shall***:

- Cease all diversions to storage
- Increase releases of stored water from SWP reservoirs
- Cease all export by the SWP from Delta channels
- Or any combination of these

Therefore, an assumption regarding the probability/risk of export water supply deliveries being reduced if BDCP water operations result in violating water quality provisions in the 1981 NDWA/DWR Contract and the associated increase in costs to export water should be considered in the methodology. An assumption of the potential increased BDCP construction costs if 1981 NDWA/DWR fixes are necessary from damage caused after construction and implementation of BDCP CM1 may also warrant consideration. These possibilities have just as much likelihood of occurring as the multi-level levee failure from an earthquake.

Delta Reform Act Compliance

The CA Water Code Section 85320(b) states that the public benefits associated with the BDCP ***shall not*** be eligible for state funding unless the BDCP does all eight items specified in the law.

One of the eight items that ***must*** be included in the BDCP in order for the habitat projects (public benefits of Conservation Measures 2-22) to be eligible for state funding, including bond money, is:

- A reasonable range of flow criteria, rates of diversion, and other operational criteria required to satisfy the criteria for approval of a NCCP
- Other operational requirements and flows necessary for recovering the Delta ecosystem and restoring fisheries under a reasonable range of hydrologic conditions
- Identify the remaining water available for export and other beneficial uses

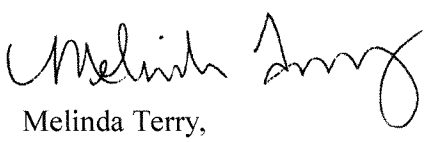
Currently the BDCP does not identify the remaining water available for export and other beneficial uses or rates of diversion, which would make the costs for CMs 2-22 ineligible for state funding. Therefore, one of the assumptions used in the methodology should be the

potential that the BDCP will *not* receive *any* state funding for CMs 2-22 and how that impacts the per acre cost of water and total debt financing for water exporters.

CONCLUSION

Despite our concerns about the approach the BDCP cost-benefit analysis has taken in the Task Order, we appreciate the opportunity for the public, particularly the Delta agriculture groups to provide input on the development of the Study. We hope your consideration of all written public comments as well as the additional coordination with impacted parties will lead to the correction of current deficiencies in the Task Order and ultimate BDCP Cost-Benefit Analysis Report. We welcome the opportunity to discuss in further detail any of the numerous issues raised in this letter. Please feel free to contact me if you have any questions regarding these comments and suggestions.

Sincerely,



Melinda Terry,
Manager

cc: Commissioner Michael L. Connor, MLConnor@usbr.gov

SOLURI MESERVE
a law corporation

tel: 916.455.7300 · fax: 916.244.7300
1010 F Street, Suite 100 · Sacramento, CA 95814

February 6, 2013

SENT VIA EMAIL TO BDCP.Comments@resources.ca.gov

Bay Delta Conservation Plan
California Natural Resources Agency
1416 Ninth Street, Suite 1311
Sacramento, CA 95814

RE: Comments on Task Order ICF-11 and Amendment 1
Benefits and Costs of the Bay Delta Conservation Plan

Dear Dr. Meral:

This letter provides comments on Task Order ICF-11 and Amendment 1 Benefits and Costs of the Bay Delta Conservation Plan ("Cost Benefit Study") on behalf of Stone Lakes National Wildlife Refuge ("Stone Lakes NWR") Association.

Established by the U.S. Fish and Wildlife Service ("USFWS") in 1994, Stone Lakes NWR is one of the few urban wildlife refuges in the nation. It is also a key part of the Pacific Flyway providing over 6,400 acres of critical habitat for waterfowl and other migratory birds of international concern, as well as a number of endangered plant and animal species. Stone Lakes NWR and its surrounding agricultural areas are home to several species that are endangered and threatened or of special status concern including, the tri-colored blackbird, greater sandhill crane, white-tailed kites, Swainson's hawk and long-billed curlew. In 2005, USFWS designated it as one of the six most threatened refuges among the 540 refuges nationwide. (See *State of the System: An Annual Report on the Threats to the National Wildlife System*, National Wildlife Refuge Association (2005), at p. 9, available at: http://refugenet.org/new-pdf-files/BeyondtheBoundaries.pdf; see also http://www.fws.gov/stonelakes/ccp.htm.) This designation was primarily based on impacts from surrounding urbanization.

Now, the Bay Delta Conservation Plan ("BDCP"), particularly the infrastructure component, threatens the continuing viability of Stone Lakes NWR. The Association is concerned that the new northern diversion facilities, including a massive new forebay directly adjacent to Stone Lakes NWR, will alter habitat conditions within the Delta in a manner that would negatively impact wildlife that use Stone Lakes NWR and the surrounding area. Moreover, conversion of current agricultural lands to tidal and other wetlands under BDCP will destroy important feeding and foraging habitat for migratory birds. According to the 2012 Administrative Draft BDCP and EIR/EIS, the BDCP would

have negative impacts on the viability of Swainson's hawk, sandhill crane and the tricolored blackbird due to conversion of cultivated land.

Contrary to these initial findings, in the *Impacts to Delta agriculture* section on page 3, the Scope of Work states that:

> BDCP proposes to also permanently preserve in agriculture use an equivalent amount to provide habitat value for crop-dependent species such as Swainson's hawk and sandhill crane. While in the short-term there may be a net loss of cultivated land, BDCP proposes to also substantially increase the protection of cropland in the Delta, ensuring that it will not be converted to other uses. This section of the report will consider the economic significance of these changes.

The Scope of Work is incorrect to assume neutral or positive effects on Swainson's hawk and sandhill crane for the following reasons:

(1) BDCP cannot "substantially increase the protection of cropland in the Delta" because the Delta is already protected from large scale development and conversion by the Delta Protection Commission's existing Resource Management Plan, combined with individual County land use designations, as well as probable additional restrictions to be adopted this year in the Delta Stewardship Council's Delta Plan. Because of the existing restrictions on urban development in the Delta, there is little threat of future urbanization in the Delta. Moreover, BDCP has so far not proposed to help protect the Refuge from urbanization of adjacent areas outside the legal Delta, such as Elk Grove, which are still subject to development pressures and are not currently restricted.

(2) Even if protection of habitat for crop-dependent species is provided in the long term under BDCP, it is not clear when, if ever, that will occur. Meanwhile in the short term, BDCP will certainly destroy thousands of acres of habitat for crop-dependent species as a result of construction of the new water intakes, forebay and associated facilities. Moreover, changes in water quality, such as increased salinity, as a result of the new diversions, would further limit the local cultivation of wildlife friendly crops. With only programmatic review and no identified funding source for protection of cropland in conjunction with the habitat component of BDCP, it is unclear when, if ever, this habitat will be available. In the meantime, construction and operation of the BDCP conveyance facilities will certainly remove migratory bird habitat in the short term.

Thus, it is not reasonable to assume any benefit to crop-dependent species as a result of BDCP in the Cost Benefit Study.

The Association is also concerned that the Cost Benefit Study accurately characterize *Impacts to recreational activities in the Delta*, as mentioned on page 4 of the Scope of Work. Stone Lakes NWR just opened a new visitor center in 2012 and is working to increase accessibility to the public. A ten-year construction period for BDCP conveyance facilities directly adjacent to the Refuge will disrupt and interfere with visitor experiences. Moreover, operation of these same facilities will change the character of the Refuge and the new Visitor Center. These negative impacts to recreation should be considered. To the extent other recreational activities could be enhanced in the future as a result of BDCP, those benefits should only be taken into account if an identified funding source for those visitor facilities exist. Fundamentally, placing major statewide water infrastructure in a wildlife viewing and bird watching area is not a benefit.

The Association disagrees, moreover, with the lack of analysis of alternatives to the core BDCP proposal in the Cost Benefit Study. The Association and others have been requesting that BDCP conduct an optimization study to guide the design of the diversions and associated facilities. The proposed 750-acre forebay directly adjacent to the edge of the Refuge that removes essential foraging habitat and brings noise, light, traffic and power lines into an important habitat area is particularly troubling. The BDCP, however, has systematically failed to use modern engineering practices to develop a practical project while minimizing the impacts on the Refuge. The Association therefore requests that the Cost Benefit Study compare the costs and benefits associated with a more carefully designed facility with those of the currently proposed BDCP.

The Cost Benefit Study should also specifically address the costs associated with bird strikes from new transmission lines needed for the pumping facilities. Under the proposed tunnel alternative, an interconnection line would run from I-5 through the center of the Stone Lakes NWR boundary to supply power to pumping stations and the Intermediate Forebay. Power poles and associated power lines impact avian species by increasing the risk of electrocution and collisions by obstructing flight paths and exposing birds to hazardous perch sites.[1] As a result, any new powerlines to serve BDCP facilities must be placed underground to reduce human, bird, and landscape impacts, as was done recently with a 230 kV powerline in Hillsborough.[2]

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[1] See Avian Power Line Interaction Committee website, available at: http://www.aplic.org/; see also FWS Avian Protection Plan Guidelines, available at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/APP/AVIAN%20PROTECTION%20PLAN%20FINAL%204%2019%2005.pdf.

[2] See CPUC Decision 04-08-046, available at: http://docs.cpuc.ca.gov/published/FINAL_DECISION/39122.htm.

Thank you for your attention to these matters, which requires that the Scope of Work be amended to more accurately reflect costs of the BDCP in terms of damage to biological and recreational resources of Stone Lakes NWR. Please feel free to contact my office should any further information be required.

Very truly yours,

SOLURI MESERVE
A Law Corporation

By: Osha R. Meserve

cc: Commissioner Michael L. Connor, MLConnor@usbr.gov

LOCAL AGENCIES OF THE NORTH DELTA

1010 F Street, Suite 100, Sacramento, CA 95814 (916) 455-7300
deltalandcoalition@gmail.com osha@semlawyers.com

February 6, 2013

SENT VIA EMAIL TO BDCP.Comments@resources.ca.gov

Dr. Jerry Meral
Bay Delta Conservation Plan
California Natural Resources Agency
1416 Ninth Street, Suite 1311
Sacramento, CA 95814

RE: Comments on Task Order ICF-11 and Amendment 1
Benefits and Costs of the Bay Delta Conservation Plan

Dear Dr. Meral:

Thank you for the opportunity to provide comments on the Task Order/Scope of Work for the benefit cost analysis of the Bay Delta Conservation Plan ("BDCP"). These comments are being provided on behalf of Local Agencies of the North Delta, ("LAND"), which is a coalition comprised of reclamation and water districts covering approximately 90,000 acres in the northern geographic area of the Delta.[1] LAND participant agencies have concerns about how the Task Order will prejudice or otherwise pre-determine the outcome of the cost-benefit analysis. That analysis, if not done in a robust and transparent manner, using reasonable assumptions, could mislead the public as to the potential costs and benefits of the BDCP, which threatens to ultimately impair agricultural productivity and/or the provision of water according to established water rights, and/or, drainage and flood control services to landowners within LAND's respective districts.

General Comments on Process and Cost Benefit Approach

Initially, we have a concern with the manner in which stakeholders are being asked to participate. According to the January 23, 2013 letter to North Delta Water Agency District Manager, Melinda Terry, from Department of Interior Commissioner

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[1] LAND participants include: Reclamation Districts 3, 150, 307, 317, 407, 551, 554, 755, 813, 999, 1002, 2067 and the Brannon-Andrus Levee Maintenance District. Some of these agencies provide both water delivery and drainage services, while others only provide drainage services. These districts also assist in the maintenance of the levees that provide flood protection to homes and farms.

Michael Connor, "The development of [the] cost-benefit analysis will be conducted in an open, transparent manner with regular updates to the Finance Working Group." That is an interesting statement considering the following:

- There have been a total of only six Finance Working Group meetings since the group's inception in 2011.
- The initial "Benefit" Analysis was conducted without any stakeholder input on methodology, despite requests dating back to the first BDCP Public Meeting under the Brown Administration from local interests to provide such input.
- The current Task Order ICF-11 and Amendment 1 was not provided to stakeholders until *after* the most recent Finance Working Group meeting. In fact the verbal notice that it was released minutes before the meeting came as surprise to the attendees.[2]
- The study of benefits and costs authorized by Task Order ICF-11 and Amendment 1 appears to already be underway, prior to the opportunity for stakeholders and others to comment on the approach to the analysis.
- Besides committing to "post" comments, there is no indication that public comments will actually be incorporated into the Scope of Work described in Task Order ICF-11 and Amendment 1.

Thus LAND requests that all comments on the Scope of Work be made publically available on the website and then discussed in substance at a Finance Workgroup meeting prior to completion of additional analysis of BDCP costs and benefits.

Additionally, the Finance Working Group meetings themselves are typically an hour or more of recitation of prior meetings and prior results, and a very short period of time for dialog and discussion. This appears to be a deliberate practice of withholding information, then filibustering to avoid any significant discussions. Unfortunately, this approach to public input is *worse not better* than what occurred under the Schwarzenegger Administration.

We also note that the continued lack of availability of environmental review makes it difficult to assess the usefulness of some of the measures of cost and benefit discussed in the Task Order. While ICF is apparently participating in the development of the Cost Benefit Analysis and supplying data and conclusions from the EIR/EIS, the

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[2] LAND has repeatedly requested that detailed agendas be prepared and the content of presentations be made available at least a couple of days before the meetings. The BDCP has a constant pattern and practice of withholding the information which prevents meeting preparation.

public does not have access to that foundational information. Thus, any assumptions made now for purposes of analysis Costs and Benefits will need to be verified later.

As we commented at the finance Workgroup meeting, the overall structural approach of this analysis uses project assumptions that lead inexorably to the desired conclusions. The reference baseline is inadequate for purposes of comparison, called in this case the no action alternative ("NAA"); the NAA fails to parse out key features of the individual project alternatives or any alternate proposals. LAND again formally calls for an optimization of the project elements to assess what project features lead to which costs and which benefits. The proposed approach cannot lead to an understanding of how to maximize the potential project benefits and how to minimize the social, environmental and economic costs. Strikingly, the Task Order assumes implementation of a developed restoration program even though no specific restoration projects are proposed under the BDCP and such restoration is only analyzed at the program level in the EIS/EIR.

LAND strongly advises that the structure of the Cost Benefit Analysis approach be corrected prior to proceeding further. Specifically, each BDCP component, as well as alternatives to each component, must be analyzed independently. Such an analysis would inform the selection of project components that are likely to actually have benefits justifying their costs, which should be the point of conducting a cost benefit analysis.

Specific Comments on Scope of Work

Notwithstanding the structural defects in the current approach, LAND offers the following specific comments on the Scope of Work.

The Task Order divides costs and benefits into three broad categories: (1) Construction and operating costs of proposed project; (2) Impacts to Delta-dependent economic activities; and (3) Non-market environmental impacts. We believe that the Impacts to Delta-dependent economic activities are inadequately described and formulated. In particular, these impacts are inaccurately described in a manner that demonstrates project benefits. Moreover, the non-market environmental impacts described are largely trivial and poorly defined.

With respect to *Increased water supply reliability to south of Delta water agencies* (p. 2), this task question fails to address differences between water supply reliability within, and upstream of, the Delta as a result of the project. How will upstream and in-Delta water supply reliability be impacted? While the Task Order later references *Impacts to Delta agriculture* and *Increased salinity and urban water treatment in the west Delta* (p. 3), the costs of changes in water quality throughout the Delta from the BDCP must be considered in the analysis.

When considering water supply issues, the Task Order also must consider the water demands of the habitat component of BDCP. Water use by the newly created habitat could affect availability of water for export, as well as for use within the Delta. It should not be assumed that habitat creation is water supply neutral. Indeed, evapotranspiration in newly created habitat areas will be significant.

Though *Reduced seismic risks to state and federal projects* (p. 3) assumes that such risks will in fact be reduced as a result of BDCP, that conclusion is questionable. In particular, the state of the current infrastructure for the SWP/CVP is not discussed, nor is the engineering standards for the proposed project. What is the seismic design standard for each of the project conveyance elements, e.g., powerlines, substations, fish screens, tunnels, vents? What is the current seismic status of the existing infrastructure associated with the remainder of the existing statewide water storage and conveyance facilities? The SWP/CVP rely on antiquated infrastructure, most of which is not proposed for upgrading under the BDCP. It is incorrect to assume, as the Task Order appears to, that the entire SWP/CVP conveyance system could withstand a design level earthquake after implementation of the BDCP.

The Task Order also assumes *Reduced salinity of Delta exports* (p. 3). But what are the costs associated with increased salinity of the watershed downstream of the proposed intakes? Costs associated with new water diversions from the North Delta include agricultural crop declines, including permanent crops such as dichondra, grapes and pears; reduced ability to meet discharge requirements; possible violation of existing water quality standards and agreements (e.g., D-1641 and NDWA contract); increased water treatment needs in the Delta (not just in the western Delta); increased *Corbula-Corbicula* infestation; continued selenium contamination of the South Delta from CVP water deliveries to the West Side of the San Joaquin Valley. BDCP habitat creation will also cause increased mercury contamination from the Yolo Bypass and elsewhere, leading to additional costs that must be considered.

For *Impacts to Delta Agriculture* (p. 3), the Task Order discusses conversion of 45,000 acres of cropland. It is not clear how 45,000 acres of conversion of cultivated land was derived, especially since it appears that most habitat will need to be created on private lands and over 100,000 acres of new habitat are proposed. Moreover, Delta farmland is not currently under threat of development other than from the BDCP. Indeed, existing development restrictions in the Delta prevent most all development outside of existing communities. It is therefore incorrect to assume that BDCP, through the purchase of easements or other mitigation, would result in greater protection of cropland.

With respect to *Impacts to recreational activities in the Delta* (p. 4), the basic assumption seems to be that there is a resource availability limitation, basically that there

is some constraint on recreation or its access in the Delta. The recent marina operator comments show strong visitor use correlates to fuel price, so it is unclear how the BDCP would improve anything that would have a net positive on recreational uses. For example, the purported habitat (since it is strictly programmatic) benefits associated with increased birding are predicated on an unsubstantiated assumption that somehow access is currently limited and that more acres would somehow bring in more visitors. The Delta, however, already has visitor infrastructure in place for birding and there is no evidence that that is saturated. Indeed, the project will have significant negative impacts on cranes and riparian bird species near the proposed intakes and forebay. Those aspects of the BDCP would result in costs, not benefits in terms of recreational activities.

Conclusion

Despite our concerns about the approach to Cost Benefit analysis taken in the Task Order, we appreciate the inclusion of the public, and particularly delta agriculture and special districts, as described in Task 5, Meetings and Coordination. We hope consideration of written public comments as well as the coordination described in Task 5 will lead to correction of the current deficiencies in the Task Order. We are available to consult further on the issues raised in this letter. Please feel free to contact my office should any further information be required.

Very truly yours,

SOLURI MESERVE
A Law Corporation

By: Osha R. Meserve

cc: Commissioner Michael L. Connor, MLConnor@usbr.gov

RECLAMATION DISTRICTS 3, 150, 551, 999
NORTH DELTA WATER AGENCY
COOPERATING AGENCIES WITH BUREAU OF RECLAMATION FOR BDCP EIR/EIS

SENT VIA EMAIL (fbarajas@usbr.gov)

May 7, 2013

Federico Barajas
Deputy for BDCP
U.S. Bureau of Reclamation
Bay-Delta Office
801 I. Street, Suite 140
Sacramento, California 95814

RE: Request for More Effective Engagement with Cooperating Agencies of the Bay Delta Conservation Plan Administrative Draft EIR/EIS

Dear Federico,

This letter is written on behalf of the cooperating agencies, Reclamation Districts 3, 150, 551 and 999, as well as the North Delta Water Agency ("NDWA"). We recently received copies of the Administrative Draft EIR/EIS dated March 2013. We previously provided comments on the February 2012 Draft BDCP EIR/EIS for our respective cooperating agencies. You have requested feedback as to how to proceed in a productive manner with the cooperation process.

Thus far, the formal cooperation process has not been of substantive value to our agencies because we have not been provided with enough specific information to fully assess project impacts on our agencies. While these comments are aimed at improving that process, we cannot improve the situation alone. The Bureau of Reclamation itself must assign staff time to the cooperation process to work with cooperating agencies. Moreover, relegating cooperation wholly to the EIR/EIS consultant does not show good faith. As with the BDCP public engagement process, so far the cooperating agency process has been limited to only discussing broad benefits of the BDCP, rather than the specifics of direct, indirect, and cumulative impacts of the BDCP as called for in Article IV(a)(4) of the MOU in terms of the project location, intensity, duration, and scale. Nor has there been any attempt by the Bureau or its consultants to utilize the BECT meetings to engage cooperating agencies in a dialogue of the opportunities to avoid, minimize, or compensate for significant adverse effects due to federal actions pursuant to Article IV(a)(5) of the Cooperating Agency MOU.

First, we reiterate our April 11th request for a draft table of all impacts and mitigation measures for Alternative 4. This information is required to be included in every executive summary pursuant to CEQA for very practical reasons. (14 Cal.Code Regs., § 15123, subd. (b)(1) (must identify "each significant effect with proposed mitigation measures and alternatives that would reduce or avoid that effect").) While the preparation of such a table may technically be delayed until release of the final public draft, such a table would greatly facilitate review of the administrative draft EIR/EIS by cooperating agencies and others for both CEQA and NEPA purposes. Such a compilation allows impacted parties such as our cooperating agencies to see a summary of each impact alongside proposed mitigation, facilitating a quick determination of where to find further detail in the individual resource chapters. As stated previously, we are not requesting a complete executive summary, just the impact and mitigation measure list for Alternative 4.

Secondly, we request a written response regarding the disposition of our prior comments on the partial EIR/EIS draft from 2012, and the locations of where our changes were incorporated into the March 2013 Administrative Draft, if any. These comments were prepared in good faith and should have been considered in the development of the current draft document. This information would help focus our review of the current draft document provided in April and avoid commenting again on issues of concern that have already been addressed. If we learn that our previous comments were not considered by the Bureau in preparing the March 2013 Administrative Draft, it is possible we will decline to put further effort into providing a second round of comments on this revised draft as such an effort would be a waste of limited resources that our agencies cannot afford. We will also consider discontinuing further participation as a cooperating agency due to the failure of the process to allow cooperating agencies any meaningful input into the development of the BDCP on ways to avoid, minimize, or compensate for significant adverse effects due to federal actions.

As far as your question regarding a possible meeting, we reiterate that we are not interested in another broad overview meeting. The cursory and consultant-driven process so far has sidelined effective engagement on the project specifics that our agencies need to effectively cooperate with the Bureau on the EIR/EIS. Given the rigorous timeline being discussed for release of the public draft, it is time to talk about the specific project being proposed, specific project impacts and the adequacy of the proposed mitigations for those impacts. To date, we have only received a broad overview of anticipated project activities and benefits, but have had no discussion of any negative impacts associated with ten years of construction or any specific Conservation Measure impacts related to CEQA or NEPA.

The following is a summary of the items we are interested in receiving information on at the next cooperating agency BECT meeting:

- In accordance with our MOU's Article IV(a)(4) regarding the Bureau's commitments, we request the potential direct, indirect, and cumulative impacts of each Conservation Measure, including the 10-year construction activities within our agencies' territories, as well as proposals to mitigate those impacts. In addition to the service area of the NDWA, we also request specific information regarding potential BDCP direct, indirect, and cumulative impacts on RDs 3,150, 551 and 999 for both the project-level and program-level aspects of the BDCP. For purposes of our review we are focusing on Alternative 4, with a lesser emphasis on the other alternatives. Reclamation districts have statutory responsibilities for maintaining and operating facilities and enforcing right of way easements associated with controlling flood waters on lands within their jurisdiction. Permits for conducting any type of activity within the prism of reclamation districts' rights of way easement are required, and may require the additional permitting or approval of the State Central Valley Flood Control Board or U.S. Army Corps of Engineers (USACE) before construction activity can proceed.

- A preliminary list of specific impacts with which we are concerned and the associated specific mitigation measures proposed in the EIR/EIS to avoid, minimize, or compensate to be identified for each Conservation Measure include, but are not limited to:

  - Location, duration, scale, and intensity, for potential changes in water quality (salinity), identified by time of year and water year type;
  - Changes in water surface elevations in any channels in the 300,000 acres of North Delta boundaries, including location, time of year, water year types impacted in, and duration;
  - Whether local water diversions are being disturbed or stranded due to changes in water surface elevations, and the locations, time of year, water year types experienced, and extent of damages;
  - Location of RD drainage facilities/systems, including drainage lines, canals, and pump stations that will be disrupted, damaged, or relocated during construction;
  - Listed species presence effect on local water diversion locations;
  - Amount of water required for and plan to obtain water for aquatic habitat CMs;

- Groundwater disruption or contamination, including water wells used by residents for drinking water, from de-watering, drilling/tunneling, muck storage activities, or other construction activities;
- Location, scale, duration, and intensity of any potential changes in natural flows (including reversal) in the vicinity of North Delta water users;
- Location, scale, duration, and intensity of any potential seepage or erosion damage to lands, levees, embankments or revetments next to North Delta channels;
- Geotechnical and other stability impacts of heavy traffic use, barge mooring, and sheet pile driving with 21,000 daily strikes (average 10 piles per day, with 700 strikes each, at three locations) to adjacent levees;
- Transportation impacts on local roads during construction and operation of all CMs, including the potential degradation to levee structure and stability underneath the road pavement and impacts to levee's eligibility under USACE's PL 84-99 program or FEMA accreditation;
- Number of, locations, sizes, and impacts associated with concrete batch plants for CM 1 construction;
- Number of, locations, sizes, and impacts associated with borrow pits and spoils storage areas;
- Impacts of vegetation growth in Yolo Bypass on the flood flow capacity associated with CM 2; and
- Physical interference with reclamation districts' ability to inspect, repair, improve, or floodfight on a levee.

We believe a series of meetings are necessary to allow a detailed focus into the impacts of each of the various conservation measures, including construction impacts and mitigation. Such meetings should be appropriately staffed, with individuals familiar with those project impacts and the mitigation approach. A smaller meeting focusing on impacts in the North Delta for all cooperating agencies within the North Delta may be appropriate.

We hope this information is helpful in planning for a more meaningful, productive and worthwhile cooperation process with affected local entities. Please feel free to call either of us to further discuss the requests described in this letter.

Very truly yours,

LOCAL AGENCIES OF THE NORTH DELTA

By: Osha R. Meserve

Osha R. Meserve,
Representative

NORTH DELTA WATER AGENCY

By: Melinda Terry

Melinda Terry,
Manager

cc: David Nawi
Patti Idlof
Other Local Cooperating Agencies

NORTH DELTA WATER AGENCY

San Joaquin Tributaries Authority

June 25, 2013

Jerry Meral
Deputy Secretary
California Natural Resources Agency
1416 9th Street, Suite 1311
Sacramento, CA 95814

Dear Dr. Meral:

The undersigned entities represent a diverse group of agricultural, municipal and industrial water suppliers from throughout the state that are reviewing the documents and technical modeling for the Bay Delta Conservation Plan (BDCP). Unfortunately, the baselines chosen for and being utilized by the BDCP are now outdated, making it impossible for our entities to understand how the BDCP will affect statewide water operations and potentially alter the water supply and water quality for our customers.

We respectfully request that your agencies, as part of the BDCP process and related programs, provide us with an updated baseline model as described below. Each of our agencies will be using technical expertise to analyze the modeling based on our respective place in the Bay-Delta watershed; yet for today, we are all seeking the same foundational information that we believe is missing from the BDCP modeling we have been provided. A better understanding and alignment of the baselines and various assumptions will be essential for water suppliers and others (both upstream of and in the Delta) to have a common understanding of the proposed actions in BDCP, as well as the other state and federal programs involving the Delta.

We have been working with MBK Engineers and Dan Steiner to analyze the models and to help answer specific questions we have with respect to the BDCP baseline. More specifically, there is a need for mutually agreed-upon CalSim II Baseline simulations to evaluate proposed actions and projects under BDCP and related programs. To determine how current and future operations may change, settings must be identified that adequately depict current and future operations. The assumptions for these settings must include the regulatory requirements, facilities, and operating criteria currently in place and for the future setting changes to those assumptions that are reasonably foreseeable.

Thank you for your attention to providing this information as soon as possible. We have appreciated the initial discussions with the agency modelers and operators and we would welcome the opportunity to collaborate further in the development of these baselines. This cooperation will help provide confidence

to water suppliers and other interested parties that the proposed operations under BDCP and related actions will not result in adverse operational impacts to upstream water suppliers; and ideally, could provide a platform for developing solutions and operating scenarios for our mutual benefit.

Please let us know if you have any questions or would like to discuss this further.

Sincerely yours,

Contra Costa Water District
East Bay Municipal Utility District
Friant Water Authority
North Delta Water Agency
Northern California Water Association
San Joaquin River Exchange Contractors Water Authority
San Joaquin Tributaries Authority
Tehama Colusa Canal Authority

cc: Secretary Laird
Director Cowin
Director Bonham
Commissioner Conner
Regional Director Murillo

BDCP EIR/EIS Review Document Comment Form

Document: ***Administrative Draft***

Comment Source: North Delta Water Agency (NDWA)
Submittal Date: April 16, 2012

No.	Page	Line #	Comment	ICF Response
1	Gen	Gen	**General Comments:** Overall, the EIR/EIS as currently presented is insufficient for NDWA as a Cooperating Agency or an agency with a water supply contract upon which DWR has certain obligations to evaluate or provide meaningful comments for the following reasons: 1) EIR/EIS does not provide sufficient or adequate documentation to support conclusions regarding impacts and proposed mitigations. 2) For many chapters the EIR/EIS fails to provide accurate assessment of location, size, duration, or level of severity of the anticipated and foreseeable impacts for each individual Conservation Measure (CM) or the cumulative impacts if they are all implemented during the 50-year life of the plan. Although CM 2-22 are only being evaluated at program level, since the ecological benefits of CM 1 rely on implementation of CMs 2-22, they need to be analyzed to a level of detail to at least indicated the total amount of cumulative effects anticipated. 3) EIR/EIR fails to quantify the duration and severity of impacts associated with the "temporary" construction activities for each of the CMs. We could only find one reference in Chapter 1 to the "temporary" construction period lasting almost a decade (9 years). 4) EIR/EIS fails to clearly identify or quantify the comparison of the alternatives in terms of varying levels of impacts for each CM. **Recommendations:** 1) Add more documentation as appendices for each chapter that support the conclusions made in all alternatives; 2) The EIR/EIS, both project and program level, should at least provide an in depth and accurate cumulative effects analysis as if all CMs 1-22 were implemented over the life of the Plan to give Delta communities and landowners an idea of the worst	

			case scenario; 3) Make each alternative impact in each chapter clarify how long each impact will occur and quantify the severity in terms of risk to life, loss of property, and harm to Delta economy and ecosystem; 4) Each chapter should include a new table, a matrix grid, that identifies the various impacts associated under each alternative for that chapter, so can compare side-by-side how each of them fare in terms of individual impacts for that chapter.	
1.1	Gen	Gen	**General Comment** – Fundamental flaw is having half the Plan proposing project level facilities/operations and programmatic level projects. This is particularly troubling since the Plan proposes the new water conveyance facilities as a Conservation Measure (CM1) that is permit ready, yet its ability to provide any measurable benefit to fish and therefore qualify as a Conservation Measure cannot be realized until habitat restoration projects which are programmatic and not permit ready are constructed and implemented. If CMs 2-22 which are only evaluated at the program level are not implemented, then CM1 will have detrimental impacts on species. **Recommendation:** Remove CM1 as a Conservation Measure and instead have it properly identified as a Covered Activity that needs to be mitigated.	
1.2	Gen	Gen	**Individual County Impacts** – The BDCP is a large HCP, probably the largest in the state, proposing significant land modifications in five counties. There are both temporary and permanent land disturbance/conversions that will have significant impacts on the counties' economics and ability to provide basic services to its constituency. For instance, impacts from temporary construction (which we're told is a nine year period) and long-term operations activities of the BDCP conveyance and ecosystem restoration facilities are anticipated to directly or indirectly affect local surface water resources relating to: 1) substantial alterations of existing drainage patterns or increased rate or amount of runoff that would result in localized flooding; 2) increased runoff which would exceed the capacity of existing or planned stormwater systems and create localized flooding; 3) expose people or structures to a significant risk of loss, injury or death involving flooding as a result of the failure of a levee modified under the BDCP or the new 4-story ring dam (forebay) planned near Courtland; 4) significant land and daily activities of Delta citizens and county emergency services in	

			certain counties will be disturbed due to disruptions for the decade-long construction period such as: re-routed roads including Hwy. 160; productive crops destroyed by staging areas, concrete batch plants, fuel stations, spoils disposal areas, borrow pits, transmission lines, access roads, earthen embankments, pumping plants, setback levees, canals, tunnel access shafts, forebays, temporary drainage bypass facilities, long-term cross drainage facilities, dispersion facilities, excavation, grading and other impacts. These disruptions, disturbances and destruction will have a significant detrimental effect on the counties' economy and their ability to provide emergency services due to road closures and re-rerouting, school bus detours, prevent localized flooding, etc. **Recommendation** – In light of the significant effects each Delta county is likely to incur, yet the difficulty they face in identifying the cumulative impacts by county in such a large regional document, the EIR/EIS should disclose the total temporary construction and permanent impacts associated with the implementation of the BDCP alternatives in each of the five Delta counties relating to transportation, emergency services, water supply, drainage and flood protection, agricultural production, and water quality. Separating each county and listing the total impacts to each county for each alternative will allow each county to easily see the impacts and assess if the proposed mitigations are appropriate. Suggest a summary list of all potential environmental and economic impacts and mitigation be broken out by county either in the 'summary of the alternatives screening or impacts and mitigation measures related to BDCP alternatives' currently being developed for the Executive Summary OR create a new Chapter to the EIR/EIS which breaks down the individual impacts/mitigation for each county.	
2	ES-2	17-18	**Plan Goals** - The description in this section describes problems rather than goals. **Recommendation** - Should indicate this section will describe goals that are clear and measurable, so know what the Plan is trying to achieve.	
3	1-2	26-27	**Detailed descriptions** – It is incorrect to say that specific components and detailed descriptions and timing and implementation of CM 2-22 are provided, since they are only evaluated at the program level and lack specific project information to allow an adequate impact analysis, effects, or appropriate level of mitigation. In fact, page 1-13,	

			lines 12-14 states: "Design information for CM2-CM22, which include restoration and conservation strategies for aquatic and terrestrial habitat and other stressor reduction measures, is currently at ***more of a conceptual level***." [emphasis added] Further, page 1-13, lines 18-19 states: "authorization of CM2-CM22 may not occur until a later date, ***when more detailed design information is available***. [emphasis added] **Recommendation** – Modify wording to make clear the components and descriptions of CM 2-22 are neither specific or detailed as they still require additional study, design, and EIR before implementation because they are only evaluated at the program level and not designed at a level to be permitted.	
4	1-4	19-26	**Water Supply Management** – Since the list of 'BDCP Proponents' includes public water agencies which are contractors serving urban and agricultural areas in the Central Valley, Bay Area, Central Coast, and Southern California, it is inappropriate to say water supply projects, operations, and facilities in those regions such as groundwater storage, conservation, water use efficiencies, hydropower, project and system re-operation, desaliniation, recycling, and reuse are considered 'independent' but 'relevant' to the BDCP. Since the water agency contractors as 'BDCP Proponents' are seeking a 'comprehensive conservation strategy' (page 1-1) to advance a planning goal of 'improving water supply reliability' (page 1-1), then it only seems logical that one of the BDCP Project alternatives should be to identify and analyze water supply reliability projects in those regions to reduce their dependence on water exported from the Delta ecosystem which is identified as 'vitally important in the Plan (page 1-2). These local water supply reliability projects in the export areas are certainly measures that can contribute to 'minimize and mitigate potential SWP and CVP impacts' (page 1-7) by reducing the annual amount of water exported from the Delta. Even the Delta Reform Act (Water Code 85004(b) states that "Providing a more reliable water supply for the state involves implementation of water use efficiency and conservation project, wastewater reclamation projects, desalinization, and new and improved infrastructure, including water storage and Delta conveyance facilities." Yet, the BDCP EIR fails to analyze these other methods of achieving reliable water supply as one of the alternatives and instead mainly focuses the majority of alternatives	

			on the new conveyance facilities in CM 1. **Recommendation** - These local water supply projects should not be independent from the BDCP, but added as an alternative to be analyzed in conjunction with habitat restoration projects to reduce the environmental impacts of the South Delta pumps on Delta species and ecosystem. Due to the detrimental environmental impacts to fisheries of CM1, it would also be appropriate to add an alternative that analyzes CM 2-22 with screening of South Delta pumping facilities.	
5	1-6	25-34	**CALFED ROD** – As stated in this section, a 30-year plan and EIR/EIS to improve the Delta's ecosystem, water supply reliability, water quality, and levee stability was prepared under CalFED. Unfortunately, the BDCP is *not* the 'comprehensive conservation strategy' (page 1-1) that it claims, as it does not include levee stability in its purpose and goals as CalFED did. The failure to include levee stability is a glaring omission since page 1-5, lines 20-23 of the Plan states: "Besides degradation of water quality, levee failure could also result in flooding of Delta communities, farmland, and habitat; exposure of adjacent islands to increased seepage and wave action: and impacts on water supply, communication, and energy distribution systems" and because the disruption of water exports due to levee failures is one of the main justifications given for pursuing CM1. **Recommendation** - The BDCP should be revised to include levee stability in its purpose and goals since they contribute to Delta ecosystem health and water supply reliability and will continue to be used to convey water in both the short term and life of the 50-year plan under dual conveyance.	
6	1-9	9-14	**Measurable Definitions** – The BDCP pursues the concepts presented in the Delta Vision Strategic Plan, but unfortunately neither the BDCP nor Delta Vision defines in specific measurable terms what exactly constitutes a 'reliable water supply for California' or a 'Delta ecosystem health.' "Water supply reliability" will have a different definition to every person in this state, unless it is properly defined for purposes of this Plan. Until both of these co-equal goals are quantitatively identified, there is no way for this Plan to achieve them, because there's no way to know if the BDCP's long-term conservation strategy achieves the quantifiable goal. For instance, does 'water supply reliability for California' mean: 1) reduced reliance on imported water and increased reliance on local water supply; 2) a water conveyance system	

			protected from earthquakes and floods; or 3) a lower, but consistent amount of water exported each and every year into water storage facilities? **Recommendation** – BDCP and EIR/EIS should define in quantifiable and measurable terms and goals what 'water supply reliability' and 'Delta ecosystem health' actually mean.	
7	1-10	10-11	**Available for Export** - We couldn't find reference in either the BDCP Plan or EIR/EIR to "identify the remaining water available for export and other beneficial uses" pursuant to the Delta Reform Act. **Recommendation** - This quantifiable annual water amount that remains for export should be identified in Chapter 5 based on varying water year types in Chapter 5 and for purposes of implementing CM1.	
8	1-12	6-11	**HCP/NCCP Compliance** - Since 21 Conservation Measures in this EIR/EIS fail to provide site-specific design and operation or environmental analysis, they cannot be implemented without additional information and/or documentation necessary for consideration of permit applications. Therefore, it is difficult to agree that this document provides sufficient CEQA and NEPA support for approval of the BDCP (or an alternative) as a functioning HCP and NCCP. In fact, page 1-13, lines 12-14 states: "Design information for CM2-CM22, which include restoration and conservation strategies for aquatic and terrestrial habitat and other stressor reduction measures, is currently at ***more of a conceptual level.***" [emphasis added] This is particularly troubling since the Plan proposes the new water conveyance facilities as a Conservation Measure (CM1) that is permit ready, yet its ability to provide any measurable benefit to fish and therefore qualify as a Conservation Measure cannot be realized until habitat restoration projects which are programmatic and not permit ready are constructed and implemented. Which begs the question: what if only a couple or NONE of CM 2-22 get implemented? If CMs 2-22 which are only evaluated at the program level are not implemented, then CM1 will have detrimental impacts on species. Since CM1 does NOT have ecosystem benefits without implementation of habitat projects, CM1 cannot be considered a Conservation Measure and should instead be identified as a Covered Activity to be mitigated. **Recommendation** – Eliminate the new Delta water conveyance facilities and operations (CM1) as a Conservation Measure and instead identify the conveyance facilities as a Covered Activity, and	

			then analyze the BDCP to see if it meets HCP and NCCP permit requirements.	
9	1-13	8-20	**Insufficient Project Info** - It is difficult to see how the CEQA and NEPA lead agencies can have sufficient information to make a decision on whether to approve the SWP/CVP water conveyance without implementation of the habitat project since the conveyance measure is detrimental to fish with habitat implementation. Page 1-13, lines 12-14 states: "Design information for CM2-CM22, which include restoration and conservation strategies for aquatic and terrestrial habitat and other stressor reduction measures, is currently at ***more of a conceptual level***." [emphasis added] Permitting a conveyance project that is detrimental to some fish species with only the hope and promise of implementing habitat projects that are only conceptual to offset these negative impacts does not sound consistent with HCP and NCCP requirements. **Recommendation** – Continue development of at least some of the habitat projects that offset the negative species impacts of CM1 to a project level before releasing a draft Plan and EIR/EIS.	
10	1-14	9-10	**Guiding Preparation** – NDWA disagrees with statement that as an organization it is helping to "guide the preparation of the BDCP." For a couple of years the NDWA participated as a member of the BDCP Steering committee to help guide the preparation of the BDCP, but since the Steering Committee was disbanded and has not met since late 2009, NDWA has felt less informed and less involved in development of the BDCP. Tracking content and changes to the Plan has been difficult since 2009 and progress in having NDWA's recommended changes adopted into the Plan has not proven very successful. NDWA has also applied and been accepted as a Cooperating Agency under NEPA, but has not found the process conducive to "helping to guide the preparation of the BDCP" either. NDWA has never found itself on equal footing with "BDCP Proponents" when it comes to "guiding" the development of the BDCP as a Steering Committee member or a Cooperating Agency under NEPA. **Recommendation** – To clarify the actual influence NDWA has had in guiding preparation of the BDCP we would suggest deleting: "These organizations are helping to guide the preparation of the BDCP."; and replace it with: "These organizations have played and active but limited role in helping to guide the preparation of the BDCP through public	

			processes."	
11	1-18	5	**Table 1-3** – The Delta does not have sufficient electrical power supply to operate a 15,000 cfs Intermediary pumping plant, five 3,000 cfs diversion intakes, or other facilities associated with CM1. Therefore, it seems that the BDCP may also need permits from FERC and/or state agencies to permit new power lines and electrical power stations for these facilities. Also, what about FEMA? Most if not all of the Plan Area is likely to be mapped by FEMA as Special Flood Hazard Areas which will subject to the strict NFIP building standards which would result in needing to raise each and every BDCP structure above the floodplain on elevated dirt mounds or certification of FEMA 100-year levees to protect the structures/facilities associated with CM1. The Project may also require surface mining permits for the borrow pits, excavation, concrete batch plants, and soil spoils areas, from the CA Department of Conservation. Fuel stations may also require permitting from federal or state agencies. **Recommendation** – Add federal, state, and local regulatory agencies that permit electrical power lines and substations, have regulatory control over building standards and fuel stations, or mining permitting authority for CM1.	
12	1-21		**Cooperating Agencies** – Typo, Reclamation District 550 should be changed to 551 which is the currently identified location of the forebay, spillway, intermediary pumping plant and at two intakes. Also, we don't believe the complete number of Reclamation Districts are identified as needing to provide Easement/Right Away based on recent locations of geo-tech drilling done thru eminent domain for the BDCP or the thousands of acres proposed to be converted to habitat under the Plan. **Recommendation:** Correct RD 551 typo and identify all of the Reclamation Districts likely to need easement/right away associated with all 22 CMs. There are probably another dozen RDs that need to be added.	
13	1-22	18-20	**Mitigation of BDCP Effects:** This section states that significant "environmental" effects of the BDCP will be mitigated to "the extent feasible." What about the significant "economic" impacts caused to the region by BDCP? Those also need to be mitigated, but this section only mentions environmental effects. And who decides what "extent" is "feasible?" The people in the Delta certainly have a different definition of what is	

			feasible or equitable than the BDCP Proponents. **Recommendation:** The vague term "extent feasible" needs to be defined and the mitigation and compensation to Delta residents and regions for the socio-economic effects, not just environmental must be properly identified and funded.	
14	1-23	5-7	**Flood Management:** The Delta region will also be subjected to localized flooding due to the potential of the Plan's facilities to "block, reroute, or temporarily detain and impound surface water in existing drainages" (page 6-54, lines 6-9). "These activities would result in temporary and long-term changes to drainage patterns, paths and facilities that would in turn, cause changes in drainage flow rates, directions and velocities" (page 6-54, lines 3-5). "Alternative 1A facilities could temporarily and directly affect existing water bodies and drainage facilities, including ditches, canals, pipelines, or pump stations." (page 6-54, lines 13-14) Temporary under this plan means the construction phase which is anticipated to be 9 years, so these disruptions to existing drainage systems to prevent localized flooding will be effected for a decade. "Paving, compaction of soil and other activities that would increase land imperviousness would result in decreases in precipitation infiltration into the soil, and thus increase drainage runoff flows into receiving drainages." (page 6-54, line 22-24) The result of this increase in runoff flows will be increased localized flooding, which could damage property and possibly cost lives. "Groundwater removed during construction would be treated as necessary and discharged to local drainage channels or rivers. This would result in localized increase in flows and water surface elevations in the receiving channels." (page 6-54, lines 26-29) Again, this means more localized flooding impacts. So, flood impacts are NOT just caused by changes in flow regimes are modification of existing levees as indicated in this section, but by many more of the activities of the BDCP, yet are not properly recognized. **Recommendation:** Add wording to also identify localized flood impacts associated with disruption, blockage, and over-taxing existing drainage systems.	
15	1-23	14-17	**Socioeconomics:** There are additional significant socioeconomic impacts not identified in this section. We also anticipate significant third party impacts/damages to crops and property caused by seepage, erosion, and poor water quality and need	

			to be compensated during construction and operation of BDCP. **Recommendation:** Add the following language to this section: *"Significant economic losses would result from damage to crops and property caused by seepage, erosion, and crop damage from poor water quality."*	
16	1-23	38-42	**Growth:** The new water conveyance facilities proposed in the BDCP EIR do NOT create one drop of more water than what exists today, so allowing growth in the export areas should only be allowed if those areas can create local water supplies through conservation, desalinization, contaminated groundwater clean-up, storm water capture and re-use, water recycling or other local water supply projects. The BDCP project is unlikely to increase reliability of water transportation as the new water conveyance facilities are being built in the same floodplain and vulnerable to the same earthquakes and floods the existing export facilities are in. **Recommendation:** Language should be added to recognize that new BDCP facilities will still be as vulnerable to floods and earthquakes as existing facilities and that no additional water is created by the new facilities to supply/support population growth in export areas.	
17	1-23	42	**Additional Issues of Controversy:** Two new issues of known controversy should be added: 1) Delta Assurances; 2) Benefit versus Burden. The current Plan fails to provide adequate protections and assurances to the Delta region in terms of protecting their water availability and quality or their recreation and agricultural economy. The BDCP HCP fails to provide or share benefits in terms of regulatory certainty or ESA protections in the whole Plan area, mainly providing benefits to areas to which Delta water is exported. **Recommendation:** Add "Delta Assurances" and "Benefits v. Burden" sections.	
18	1-24	9-10	**Construction Period:** The "9-year-long construction period" is the timeline associated to "temporary effects" and "temporary impacts" mentioned throughout this Plan, yet it is never really made clear that these "temporary" disruptive activities will last for a decade in the individual chapters. We do not believe than any rational human being would consider 9 years to be "temporary." This is subterfuge of the realities of the impacts at its worst and is offensive and wrong. **Recommendation:** This plan should STOP using the term "temporary" in terms of effects and	

			impacts and should replace with more transparent description of "decade long construction" effects and impacts.	
19	1-25	2-9	**Related Actions:** There are several habitat and water conveyance projects that are proceeding through separate permitting and EIR processes with the intention of being in construction prior to the final approval (ROD) for the BDCP. However, these early implementation projects are also mentioned in the BDCP as Conservation Measures or covered activities and the habitat projects in particular are intended to be used as environmental credits to meet HCP and NCCPA requirements to gain approval of the BDCP. These projects include the North Bay Aqueduct and habitat projects to comply with the Federal BiOps such as the Yolo Ranch (Lower Yolo Bypass) and Prospect Island. This EIR/EIS claims that CM 2-22 are only evaluated at a program level in this Plan because they are only conceptual, yet there are at least two habitat projects which are developing separate environmental documents (EIR) and seeking authorization before the BDCP is approved and permitted, yet this EIR fails to provide site specific mitigation or appropriately analyze their cumulative impacts. **Question:** Can these early implementation habitat projects which are being done to comply with existing BiOps be double-counted in terms of meeting HCP and NCCPA requirements under this BDCP and the BiOps? Or are these early implementation projects that intend to be incorporated into and credited under this BDCP considered "related actions, interrelated actions, or connected actions?" **Recommendation:** Please explain how these early actions with EIRs underway will be dealt with in the BDCP and include their site specific info and mitigations in the BDCP EIR.	
20	1-25	10-23	**Related Planning Efforts:** There are several other related planning efforts occurring in the planning area that will have effects on or be effected by the BDCP which are not mentioned: Central Valley Flood Control Plan, Delta Plan, USACE Delta Levee Feasibility Study, and the USACE Levee Vegetation ETL. There may also be others that should be added. **Recommendation:** Add to the list of additional activities on line 12: Central Valley Flood Control Plan, Delta Plan, USACE Delta Levee Feasibility Study, and the USACE Levee Vegetation ETL.	
21	1-27	1-35	**Appendices:** Line 1 says these appendices are to	

			"support the various chapters." Unfortunately, 14 of the 26 (MORE THAN HALF) listed on this page are NOT currently available. Therefore, there is insufficient background and supporting documentation on which to make any reasoned evaluation of the adequacy of this Plan or the EIR/EIS and its evaluation of alternatives. The 12 appendices on this page that are available for review equal 1,117 pages when combined. Therefore it is feasible that the remaining 14 appendices will likely be between 1,000-2,000 pages, which we will need more time to analyze. **Recommendation:** Provide additional time during the review of the Draft EIR/EIS to Cooperating Agencies so we can review all new appendices once they are available.	
21.1	1-27	17	**Chapter 5 Appendices:** The BDCP will have a significant effect on in-Delta water supply availability and reliability. Supporting documentation should show all of the existing in-Delta water diversion intakes and evaluate if they will be negatively impacted by implementation of BDCP. The NDWA Contract requires that water of such quality ***shall*** be available in the Delta channels for reasonable and beneficial uses and that local diversions and uses ***shall not*** be disturbed or challenged by the State. This EIR/EIS needs to evaluate the availability of water in ALL Delta channels and ALL existing water diversion intakes in the North Delta at the very least to assure compliance with the Contract, but it should analyze for the whole Delta so that landowners and counties can evaluate the impacts and determine if the mitigation provided in the BDCP EIR/EIS is sufficient. **Recommendation:** The EIR/EIS needs to add appendices analyzing all of the existing water diversion intakes in the Delta and how they will be impacted by CM 1-22 of the BDCP, this should include water surface elevation modeling for each water year type.	
22	1-27	18-19	**Chapter 6 Appendices:** There is no appendices identified for Chapter 6, Surface Water. The NDWA and other in-Delta stakeholders needs to see the modeling tools, assumptions used, and results for hydraulic and hydrology modeling to evaluate the Plan's effects on water surface elevations (seepage, flooding, and stranding of in-Delta water diversion intakes), water velocities (erosion), and natural flow direction. This data and analysis is critical to providing the information necessary to determine if the BDCP Project will be meet the	

			criteria and provisions in the NDWA 1981 Contract Agreement with DWR. Failure of the BDCP implementation to maintain the NDWA Contract criteria for water quality will result in DWR: ceasing all diversions to storage; increasing releases of stored water from SWP reservoirs; ceasing all export by the SWP from Delta channels; or any combination of these. Since the SWP and CVP are now jointly operated (page 5-17, lines 34-40), the CVP may share responsibility for meeting these Delta standards pursuant to the Coordinated Operations Agreement (COA) signed in 1986. **Recommendation:** The EIR/EIS must add appendices to Chapter 6 that show analysis and modeling tools, assumptions used, and results for hydraulics and hydrology for water surface elevations, flows and velocities. The EIR/EIS should provide all documentation and analysis that supports the conclusions made in this chapter in regards to implementation of all CMs 1-22 and compares the impacts between each of the alternatives, including impacts in years 1-50 of the Plan.	
22.1	1-27	19	**Groundwater Modeling:** Since many of the homes in the Delta use well water, the modeling in Appendix 7A needs to identify and evaluate the impacts to the drinking water in the Delta pursuant to implementation of CMs 1-22 of the BDCP. **Recommendation:** The EIR/EIS should provide all documentation and analysis that supports the conclusions made in this chapter in regards to implementation of all CMs 1-22 and compares the impacts between each of the alternatives, including impacts in years 1-50 of the Plan	
23	1-27	35	**Chapter 9 Appendices:** One of the primary reasons/justifications given for the need for the BDCP Project is the risk to the current thru-Delta water conveyance system from catastrophic flood or earthquake. Yet, despite the severe risk from earthquake damage promoted by DWR and other BDCP Proponents, there are no appendices of data, analyses, modeling or any other scientific information to support this hyperbolic hypothesis. Since the Alternatives analyze a thru-Delta and No Action options, then it seems the supporting documentation is necessary to at least evaluate those alternatives. In addition, since all of the new water conveyance facilities and habitat projects (CM 1-22) are being built in the same area claimed to be at risk of a catastrophic earthquake, then the supporting documents should be provided in the	

			EIR/EIS that clearly show how the new facilities would be impacted by such an event. Failure to do so will mean the permitting agencies or the public will have insufficient information on which to analyze each alternative against each other or to approve a final project (ROD). In addition, the Plan currently proposes building a 4-story ***unlined*** 750-acre forebay on soils that are permeable and may be unable to hold the weight of the amount of water impounded in such a ring dam. The 15,000 cfs intermediary pumping plant is also planned on these same permeable soft sandy soils and in the same earthquake zone as existing SWP conveyance facilities, so the Geology and Seismicity seem important issues that warrant supporting data in appendices to the EIR/EIS. **Recommendation:** The EIR/EIS must add data, documentation, modeling and any other scientific analysis and information regarding the stability and suitability of the soils where intakes, pumping plants, and forebays are planned in the BDCP and whether they would be subjected to the same earthquake risk as existing facilities. The EIR/EIS should provide all documentation and analysis that supports the conclusions made in this chapter in regards to implementation of all CMs 1-22 and compares the impacts between each of the alternatives, including impacts in years 1-50 of the Plan.	
24	1-28	1-35	**Appendices:** Line 1 of this section says these appendices are to "support the various chapters." Unfortunately, 11 of the 27 appendices listed on this page are NOT available. Therefore, there is insufficient background and supporting documentation on which to make any reasoned evaluation of the adequacy of this Plan or the EIR/EIS and its alternatives. The 12 appendices on this page that are available for review, combined they equal 1,117 pages. Therefore it is feasible that the remaining 14 appendices will likely be between 1,000-2,000 pages and require more time to evaluate once they become available. **Recommendation:** Provide additional time during the review of the Draft EIR/EIS to review currently unavailable supporting documentation/appendices.	
25	1-28	10-11	**Chapter 13 Appendices:** There are no appendices for Chapter 13, Land Use identified. Due to the significant "temporary" (9 years) land disturbance caused by construction and implementation and the long term conversion of land from current uses to conveyance facilities or habitat, this should	

			warrant the addition of appendices with supporting analysis regarding land use. This supporting documentation should analyze impacts to: operation of local RDs and floodplain management; urbanization in the secondary zone; existing vegetation patterns and abundance; loss of Primary Ag land; and Delta lands protected by easements/Williamson Act. Without providing the actual data and analysis on how conclusions in this chapter were made, there is no way for a cooperating agency or the public to determine if the analysis is adequate or accurate, or whether the proposed mitigation is appropriate and sufficient. **Recommendation:** The EIR/EIS should provide all documentation and analysis that supports the conclusions made in this chapter in regards to implementation of all CMs 1-22 and compares the impacts between each of the alternatives, including impacts in years 1-50 of the Plan.	
26	1-28	11	**Appendix 14A:** Analyzing individual crop effects is insufficient to analyze BDCP CMs 1-22 impacts. The Delta ag lands are identified by the State as Primary Ag lands. The Primary Ag lands throughout the State have been eliminated over several years, and the additional loss should be documented and analyzed. Without providing the actual data and analysis on how conclusions in this chapter were made, there is no way for a cooperating agency or the public to determine if the analysis is adequate or accurate, or whether the proposed mitigation is appropriate and sufficient. **Recommendation:** The EIR/EIS should add additional analysis/data regarding the loss of Primary Ag Land in the BDCP Planning Area pursuant to implementation of CMs 1-22 of the BDCP and compares the impacts between each of the alternatives, including impacts in years 1-50 of the Plan. The Delta Protection Commission's recent "Land Management Plan" and "Economic Sustainability Plan" should be used as a source.	
27	1-28	24	**Chapter 19 Appendices:** More than a traffic study needs to be analyzed in the EIR/EIS. The re-routing of roads during the 9-year-long construction phase will impact school transportation, create longer commutes and GHG impacts by residents, longer response times for emergency services such as firetrucks and ambulances and school buses. Also, transportation analysis should include shipping commerce since there are two major shipping ports in the Delta that rely on the Sacramento River for navigation and delivery of goods. The	

			construction of the intakes for conveyance and breaching of levees for habitat could create significant navigation obstructions or hazards. Without providing the actual data and analysis on how conclusions in this chapter were made, there is no way for a cooperating agency or the public to determine if the analysis is adequate or accurate, or whether the proposed mitigation is appropriate and sufficient. **Recommendation:** EIR/EIS needs to add appendices analyzing transportation patterns for cars and emergency service vehicles which includes a GHG analysis and one analyzing the navigation and commercial shipping impacts, including to the Stockton and Sacramento Ports, and supports the conclusions made in this chapter in regards to implementation of all CMs 1-22 and compares the impacts between each of the alternatives, including impacts in years 1-50 of the Plan.	
28	1-28	25-26	**Chapter 21 Appendices:** The EIR/EIS should provided the supporting data, modeling tools, assumptions used, and modeling outputs associated with evaluating each of the BDCP alternatives. Operation of a 15,000 cfs intermediary pumping plant and five 3,000 cfs pumping plants requires a great deal of annual energy and the building of transmission and distribution lines and electrical power substations. The analysis of the information/data/modeling referenced in this chapter should be supported by the corresponding Appendices with graphs, charts, data, assumptions, and comparative analyses of the EIR/EIS alternatives. Without providing the actual data and analysis on how conclusions in this chapter were made, there is no way for a cooperating agency or the public to determine if the analysis is adequate or accurate, or whether the proposed mitigation is appropriate and sufficient. **Recommendation:** EIR/EIS should add all documentation and analysis that supports the conclusions made in this chapter in regards to implementation of all CMs 1-22 and compares the impacts between each of the alternatives, including impacts in years 1-50 of the Plan.	
29	1-28	27-28	**Chapter 23 Appendices:** The "temporary" construction period is mentioned as being 9-years earlier in this chapter which is a long time. The Delta is primarily a quiet agrarian area with pockets of industrialization in the urban areas. The EIR/EIS should provide the supporting data, modeling tools, assumptions used, and modeling outputs	

			associated with evaluating each of the BDCP alternatives. The analysis of anticipated noise increases in terms of decibels, location, and duration should be shown for both during the decade-long construction phase and the permanent operation of five new intakes and an intermediary pumping plant. Without providing the actual data and analysis on how conclusions in this chapter were made, there is no way for a cooperating agency or the public to determine if the analysis is adequate or accurate, or whether the proposed mitigation is appropriate and sufficient. **Recommendation:** EIR/EIS should provide all documentation and analysis that supports the conclusions made in this chapter in regards to implementation of all CMs 1-22 and compares the impacts between each of the alternatives, including impacts in years 1-50 of the Plan.	
30	1-28	29-30	**Chapter 25 Appendices:** The EIR/EIS should provide the supporting data, modeling tools, assumptions used, and modeling outputs associated with evaluating implementation of all CMs 1-22 and a comparison of the BDCP alternatives and their impacts on human health and safety. There are significant potential public health risks associated with methyl mercury creation, deadly diseases spread by mosquitoes, and contamination of in-Delta drinking water wells, all of which can be hazardous or deadly to human health. Analysis should be provided indicating the location and size of potential hot spots for methyl mercury and mosquito breeding as well as the location and number of drinking water wells that may be contaminated or damaged by BDCP construction, implementation, or operation of CMs 1-22. The data should provide the data, modeling, assumptions, and analysis that supports the conclusions made in this chapter and provide a comparison of the health impacts between each of the alternatives. The analysis should identify impacts in years 1-50 of the Plan. **Recommendation:** EIR/EIS should provide all documentation and analysis that supports the conclusions made in this chapter in regards to implementation of all CMs 1-22 and compares the impacts between each of the alternatives, including impacts in years 1-50 of the Plan.	
31	1-29	General Comment	**General Comment:** Converting 100,000 acres from current uses to either habitat or conveyance facilities, reducing flows in the Sacramento River and surrounding channels by pumping up to 15,000	

			cfs of water out of the system for transport to areas outside of the Delta, installing water diversion intakes which have ten times the current pumping capacity of the largest urban intakes currently located in the Delta, and a construction period that lasts for a decade will have numerous, significant, and permanent impacts in the Delta that will be damaging and costly in terms of devastating the local economy to benefit economies in other areas of the State where the water will be exported. In order for Cooperating Agencies, local governments, state and federal permitting agencies, and the public to properly analyze the true impacts of this proposed project the EIR/EIS needs to provide more transparency by disclosing: data, reports, modeling, baseline data used, assumptions used, modeling results, analysis of implementation of each and combined CMs 1-22, and the comparison done of these impacts for each of the Plan's alternatives including in all years 1-50, which the EIR/EIS relied on to support the conclusions made in each of the chapters. For CM1 which is supposed to be analyzed in sufficient detail to gain project-level approval of new conveyance facilities, the analysis needs to provide specific location and size of all facilities, detailed operation criteria, as well as the specifics of all "temporary" construction activities including site locations, size duration, and severity of activities, including all site-specific mitigation for CM1 and its associated construction impacts. For the programmatic level analysis of CMs 2-22, the EIR/EIS should provide analysis of the anticipated and reasonably foreseeable environmental and economic impacts as if all CMs are in fact implemented over the 50-year life of the Plan, providing anticipated impacts and mitigation for each decade. Otherwise, the cumulative economic and environmental impacts of each and the combined CMs 1-22 cannot properly evaluated by the public. In addition, the EIR/EIS should incorporate the site-specific details of separate EIRs being done on any of the CM 1-22 of the BDCP, including but not limited to: North Bay Aqueduct, Yolo Ranch (Lower Yolo Bypass), Fremont Weir, Prospect Island, and Cache Slough Complex. Any and all EIRs currently in development by any BDCP Proponent (lead agencies and water contractors) or trustee agencies should have any information, analysis, and site-specific impacts and mitigation already developed incorporated into the Draft EIR/EIS of the BDCP since it is foreseeable. If a conclusion in a	

			chapter fails to also provide the data/analysis that supports that conclusion, then it is insufficient in which the Cooperating Agencies, local governments, state and federal permitting agencies, and the public can properly evaluate the adequacy of conclusions and proposed mitigations. Therefore, all chapters should have the data/analysis/modeling to support all conclusions in that chapter. **Recommendations:** 1) Provide more transparency in how conclusions in each chapter were made by adding appendices for each and every chapter that provides the data/reports/analysis/modeling that supports the conclusions and compares the impacts between each alternative including for each decade of the 50-year plan; 2) Each chapter should indicate the impacts/mitigations associated with the project-level *and* programmatic level Conservation Measures; 3) Each chapter should indicate the impacts/mitigations for both the decade-long "temporary" construction and the permanent implementation and operation of all CMs 10-22 so that it's clear which impacts are permanent; 4) Incorporate the site-specific details, analysis, modeling, data, assumptions, results associated with any/all EIR/EIS currently under development by DWR, water contractors or any other lead or trustee agency of the BDCP, particularly any habitat projects being developed to comply with federal BiOps which are referenced in the BDCP; 5) Provide additional appendices for each and every chapter that supports the conclusions made in each chapter; and 6) Add matrix grid to each chapter that shows the impacts of implementation of each CM.	
32	1A-2	13-25	**Water Developed:** This section fails to mention that water supply projects originally designed as part of the conveyance system were not and can never be completed and recognize how much water was actually developed versus how much was supposed to be developed under the original design. **Recommendation:** This section should also identify the amount of acre feet of water these combined existing projects developed when completed with recognition that they were supposed to develop 8 MAF of water but only developed over 4 MAF of water because the projects were never and can never be completed as originally designed. Should also state how many acre feet of water were sold in contracts and when, showing how more water is contracted for delivery	

			than what the system can produce. Should identify how much of the water is limited to "surplus" water allocations.	
33	1A-2	1-32	**Developed Water:** This section fails to mention how much water was designed to be developed versus what was actually developed and sold in long term water contracts. **Recommendation:** Bullets should be added that state when the projects were completed, how much water these projects developed/created, when the water was sold in contracts, and how many annual acre feet of water were sold in these contracts. Should identify how much of the water is limited to "surplus" water allocations.	
34	1A-2	9-25	**Water Developed and Sold:** Fails to identify how much water was developed versus how much water was sold and when. **Recommendation:** Language should be added which clarifies how many annual acre feet of water were sold under contract and when. Is the amount of water under contract greater or less than the amount of the water that was developed or was it based on the amount that was to be developed if the Plan was completed? Should identify how much of the water is limited to "surplus" water allocations.	
35	1A-5	42-44	**Contracted Water:** This section fails to mention how much water is contracted to water districts. **Recommendation:** State how much water was developed by the building of the New Melones Dam and Powerplant and how much water is contracted to water districts, and when contracts were signed. Should identify how much of the water is limited to "surplus" water allocations.	
36	1A-6	12-17	**Contracted Water:** This section is too vague and needs to be more specific as it relates to and is pertinent to: "The controversy surrounding California's water supply has primarily revolved around distribution and the ***sharing of a limited resource***." [emphasis added] The concept of priority rights and use of "surplus" water are important elements of sharing the limited resources. Also, this section doesn't identify the amount of water that CVP is required to dedicate/deliver annually to the environment/fish. **Recommendation:** This wording should be expanded to clarify how much in acre feet is developed water the CVP facilities create annually and how much water is contracted to be sold annually, and explain the amount it must deliver based on water rights and contracts pursuant to delivery limitations of available surplus water. And	

			should also identify how much water annually CVP must deliver for environmental purposes. A table should also be added to show all of the Contracts and Commitments (laws, agreements, MOUs, BiOps) for water deliver that apply to the CVP.	
37	1A-6	30-32	**Contracted Water:** In acre feet per year, how much water was sold in contracts and how much water did the SWP develop as currently completed? **Recommendation:** If the project was not completed as designed, then this section should explain how much water was developed versus what was sold in contracts and correctly identify the water shortage created by selling water without completing the project as originally designed.	
38	1A-8	24-33	**Contracted Water:** Fails to describe in acre feet terms how much water was actually developed versus what was originally designed, but never completed. This is a glaring omission since the failure to complete the project is a major contributor to the state's ability "to reduce the frequency and magnitude of variations in supply and provide more reliable and consistent deliveries" as stated on lines 24-25 of this page. **Recommendation:** Describe in more detail just how much acre feet of water the completed SWP facilities developed and how much annual water the SWP is contracted to deliver each year.	
39	1A-8	29-33	**Additional Water Supply Contracts:** This section fails to mention subsequent water supply contracts entered into by DWR for SWP water including the NDWA 1981 Contract. To provide an accurate picture of all those who have contractual rights for SWP water this section must be expanded to include NDWA Contract. The context of the NDWA Contract signed in 1981 is directly relevant to the proposal to build a peripheral canal/Delta water conveyance facilities in the North Delta and needs to be prominently mentioned and the assurances that were provided to in-Delta water users via that Contract. **Recommendation:** Add language identifying water supply contracts signed by DWR for SWP subsequent to the 1960s, including but not limited to, the NDWA 1981 Contract. A table should be added showing all of the Contracts and water amounts.	
40	1A-8	34-41	**Available Water:** This section states that "the actual supply to contractors is variable and depends on the amount of water available." However, this section fails to define what	

			"available water" means. **Recommendation:** Expand this section to describe and define what is meant by "amount of water available" for delivery by SWP. Should also define any other obligations and commitments DWR has to deliver water to others, including water for the environment.	
41	1A-18	9-12	**Delta Levees:** Stating that levee damage from a large earthquake would take years to fix and may not be worth fixing is not substantiated by the facts. Therefore, much of the representation of risks of multiple levee failures in this section is unsubstantiated speculation at best and hyperbolic misrepresentation at worst, and is an inappropriate basis on which to justify the need to divert water around the Delta. FACT: There is not ONE documented levee failure caused by an earthquake, let alone multiple levee failures alluded to in Section 1A.2. FACT: Levee failures DO NOT take years to repair. The Upper Jones Tract repair referenced on line 4 took one month to repair, so reality is 30-DAYS, not years to repair for one of the largest breaches in history. The restoration of the island did take longer, about 8 months to pump water off. FACT: Even during the worst flood events over the last 150 years there have been only between 1-5 levee failures during any given flood event, so not the wide-spread catastrophic multiple levee failure alluded to in Section 1A.2. FACT: The Delta has experienced less frequent levee failures since the establishment of the Delta Levees Subvention Program in 1973, and had no Delta levee failures in 2006 which had the highest recorded water surface elevations in the Central and West Delta. **Recommendation:** *Delete entire first sentence starting on line 9.*	
42	1A-18	14-16	**Land Subsidence:** There are several misrepresentations regarding the extent, severity, and continuation of land subsidence in this section. First, based on 2007 DWR LiDAR data there are only 96,000 acres (14% of the entire Delta) below 12 feet NGVD or more and only 57,000 acres (8.1% of the entire Delta) 15 feet NGVD or more below sea level. Therefore, it is incorrect to state that "many" of the Delta lands "now lie 25 feet or more below sea level." Using the LiDAR data, there does NOT appear to be ongoing subsidence on 8-92% of the entire legal Delta. Secondly, a comparison of the 2007 LiDAR data to the USGS Quadrangle maps surveyed between 1974 and 1977 showed that subsidence did NOT occur in areas that are	

			currently at elevation minus 10 feet below sea level and above. In addition, it's incorrect to say "increased in severity over time" in line 14 as this very statement is contradicted by language in line 32 below that states "destructive farming practices have ceased, ***slowing down the rate of subsidence***" [emphasis added]. **Recommendation:** *Correct the first sentence in lines 14-16 to clarify that there are areas of subsidence in the interior of some islands, but represent less than 14% of the entire Delta.*	
43	1A-18	16-18	**Excavation Causes Subsidence:** This sentence states that the excavation of dirt/soils from the interior of Delta islands for use in building/elevating levees was one of the causes of previous subsidence/lowering elevation of Delta islands. Yet, the BDCP relies on borrowing/excavating dirt from the interior of Delta islands to be used to build levees to protect conveyance structures, build 40-foot-high (four story) ring levee/dam around a 750-acre forebay, and to build 15-25 foot dirt pads to elevate ALL of the water conveyance structures, parking areas, electrical substations, and any other BDCP structures to meet FEMA building standards. The BDCP should avoid excavating any dirt/soils/materials from the interior of any Delta islands as it will cause a higher percentage of Delta lands to subside below sea level compared to current conditions. The BDCP will need to identify the other areas of the State from which it will "borrow" dirt for the above mentioned levees/dam and elevated dirt building pads. **Recommendation:** This section should identify any BDCP excavation of the interior Delta islands as being a major contributor to reducing the land elevation of Delta islands and consider adopting a policy of avoiding the use of any Delta island dirt/materials for the BDCP project in order to prevent further subsidence of Delta lands.	
44	1A-18	21-24	**Historical Farming Practices:** These lines mention historical farming crops and practices which no longer are used, therefore are irrelevant to the ongoing and/or future contribution to subsidence. This is especially true since lines 31-32 in the same section state that, "some of the more destructive farming practices have ceased, slowing down the rate of subsidence." **Recommendation:** *Delete line 21-24 in their entirety.*	
45	1A-18	25-27	**Subsidence Effects on Levee Stability:** We are unaware of any study or report that subsided land	

			increases hydraulic load on levees and compromises their stability. Therefore, this statement is unsubstantiated by facts and therefore speculation, and should NOT be used as the basis for justifying re-routing export water around the Delta. This is particularly true since the BDCP proposes to exacerbate land subsidence by removing dirt from the interior of Delta islands to build facilities associated with CM1-22. **Recommendation:** *Delete in its entirety the first sentence on line 25.* If the EIR/EIS wants to mention any relationship between subsidence and levee stability in this guidance policy, then it should be done in the context of wanting to support a study to determine the relationship between subsidence, sea level rise, and levee stability. In addition, the EIR/EIS should mention as a significant impact the removal of dirt/material from the interior of Delta islands and indicate it will exacerbate land subsidence and potentially contribute to reducing levee stability.	
46	1A-20	Appendix Table 1A-1	**NDWA 1981 Contract:** In 1981, DWR and the NDWA signed the "Contract between State of California Department of Water Resources and North Delta Water Agency for the Assurance of a Dependable Water Supply of Suitable Quality." The NDWA is related to the operation of the SWP as failure to maintain the Contract water quality criteria, the State ***shall***: 1) cease ***ALL*** diversions to storage; 2) increase releases of stored water from SWP reservoirs; 3) cease ***ALL*** export by the SWP form Delta channels; and 4) or any combination of these. The water quality criteria in the Contract are different than D-1641 and are year-round. In addition, the Contract states the State shall not convey SWP water so as to cause: 1) decrease in natural flow; 2) increase in natural flow; 3) reversal of natural flow direction; or 4) alteration in water surface elevation in Delta channels to the detriment of Delta channels or water users within the Agency. Also, the State shall repair or alleviate damage, improve channels as necessary due to seepage or erosion damage to lands, levees, embankments or revetments adjacent to Delta channels within the Agency, and is responsible for ***all*** diversion facility modifications required. In light of this agreement's effects on the operation of the SWP, the NDWA Contract should be added to this Table. **Recommendation:** *Add the NDWA 1981 Contract to Appendix Table 1A-1.*	
47	1A-22	18-21	**Water Quality Objectives:** DWR is also obligated	

			to meet certain water quality objectives (salinity levels) as part of its 1981 Contract with NDWA. As stated in comment 46 above, SWP operations are affected if NDWA water quality objectives are not met year-round. **Recommendation:** Add language recognizing water quality objectives under the 1981 NDWA Contract.	
48	1A-24	19-33	**In-Stream Flows:** Why doesn't the BDCP establish a pilot program with minimum in-stream flows that exceed state and federal requirements as was done in the Yuba Accord? May be a good way to test species response and impacts of new facilities associated with CM1. **Recommendation:** Add a pilot program to BDCP with minimum in-stream flows that exceed state and federal requirements.	
49	1A-25	9	**Annual Water Supplies of COA:** What are the annual water supplies identified in COA? **Recommendation:** Add language here to specify the annual water supplies in COA.	
50	1A-26	4	**Allowed Incidental Take:** What is the amount of incidental take allowed for the Delta export facilities? **Recommendation:** Add language identifying the amount of take currently allowed at existing export facilities.	
51	1A-27	16-38	**Salinity Requirements:** What are the number of days that must be met in the standard tables? What happens if the number of X2 days required by regulatory standard tables are not met even after using credits from previous month? What happens if the salinity starting gate requirements are not met? **Recommendation:** Identify the penalties or operational changes to CVP and SWP that occur if number of X2 days or salinity starting gate is not met.	
52	1A-28	4-21	**Export/Inflow Ratio:** What are the penalties or operational changes to CVP and SWP for exceeding D-1641 Export/Inflow ratio export restrictions? **Recommendation:** Identify the penalties or CVP and SWP operational restrictions that apply if export/inflow ratio export restrictions are exceeded.	
53	1A-28	23-31	**VAMP Results:** Since 2012 is the end of the 12-year experimental management program to evaluate how salmon survival rates change in response to alteration in San Joaquin River flows and SWP/CVP exports with the installation of the Head of Old River Barrier, it seems appropriate to identify the preliminary results of this management	

			experiment. If successful, then this management action should be considered for inclusion in the BDCP implementation and operation of CMs 1-22, and explained why it's not proposed if it's not included in the Draft Plan. The VAMP results should be used in the BDCP effects analysis. **Recommendation:** Add language informing us of the preliminary results of this long-term management experiment to benefit juvenile Chinook salmon migration. Consider inclusion of this long-term management program to benefit juvenile Chinook salmon or explain why it's not incorporated into the BDCP Plan as a Conservation Measure.	
54	1A-28	33	**Minimum Delta Outflow:** What is the minimum monthly Delta outflow required under D-1641? This seems important and related to how CM1 will "improve the amount of flow through the Delta" as stated on page 1-2, lines 15-16 of this EIR/EIS. **Recommendation:** Add language explaining what the D-1641 outflow requirements are currently.	
55	1A-41	12-19	**DSC's Delta Plan's Projects:** Like the BDCP, the DSC Delta Plan proposes projects to achieve co-equal goals and has an EIR that is programmatic in nature. Many of the projects in the DSC's Delta Plan overlap with the BDCP CMs 1-22. What is the relationship between BDCP EIR/EIS and Delta Plan EIR? We would like to know if they have exact same projects, impacts, and mitigations or how their similar projects in same locations differ from each other and which document supersedes the other in terms of project design and mitigation. **Recommendation:** Expand this section to describe the project similarities and differences between Delta Plan and BDCP CMs 1-22 and clarify which EIR will supersede the other on the event they are both adopted.	
56	1A-41	35-40	**Delta Conservancy:** What is the relationship between the projects and activities in the Conservancy's strategic plan and the BDCP? Are Conservancy projects similar to BDCP CMs? If so how are they the same and how do they differ? Which Plan supersedes the other if both are adopted? **Recommendations:** Expand this section to describe the similarities and differences between Conservancy Strategic Plan projects/activities and BDCP EIR/EIS and how the two Plans coordinate or incorporate the other in their Plans.	
57	2-1	29-40	**Project Objectives, Purpose, Need:** This section declares "continuing subsidence of lands within the Delta, increasing seismic risks and levee failures" as	

			factors that contribute to conflicts over Delta water supply and the Delta's ecological health and as a basis for justification for re-designing the water conveyance system (CM1). Recent UCLA earthquake tests in the Delta of a 7.0 earthquake seem to suggest otherwise. As stated earlier in NDWA's comments #41-45, using continuing subsidence and increasing seismic risks for levee failures as justification for implementing CM1 lacks scientific documentation to support such a claim. These hyperbolic claims only serve to create a Chicken Little mentality to scare people into believing the sky is falling (or levees in this case) in order to justify and convince the public to pay for such a costly endeavor which is an old 20th Century design. In addition, as NDWA comment #43 points out, the excavation and removal of soil materials from the interior islands to build CM1 will in fact exacerbate an increase in Delta land subsidence and consequently increasing the risk of levee failure if the premise on lines 29-40, page 2-1 are in fact correct. **Recommendation:** The BDCP Purpose and Need and Project Objectives should be modified to eliminate continuing subsidence of Delta lands and increasing seismic risks of levee failures as justification for BDCP in general and CM1 specifically unless validated scientific documentation is provided to support such claims.	
58	2-3	13-16	**See NDWA comment # 57**	
59	2-4	10-25	**Restore Full Contract Amounts:** The very fact that lines 15-25 attempt to clarify and/or moderate lines 10-14 are an indication that it is inappropriate for this Conservation Plan to state delivery of up to full contract amounts as a Purpose. This Purpose is also in conflict with existing CA law, the Delta Reform Act, which includes provisions for reducing the reliance on the Delta for water supply and the identification of reasonable Delta flows and operations which will also identify the remaining water available for export and other beneficial uses. By committing to delivery of up to full contract amounts, this BDCP Purpose, inappropriately could result in putting junior right water holders in a higher priority than senior right holders. It is inappropriate for unachievable expectations to be permitted or even promised to BDCP Proponents (water exporters) as it prevents the BDCP Proponents from accurately determining whether the water delivery costs pursuant to implementation of BDCP are "not so high as to preclude, and in amounts that are sufficient to	

			support, the financing of the investments necessary to fund construction and operation of facilities and/or improvements" as stated in the Project Objectives on lines 20-25, page 2-3. **Recommendation:** Delete lines 10-14 and replace with language that balances water export supply availability with other competing beneficial uses based on water right seniority and provide clarity regarding actual "surplus water" available for export needs.	

BDCP EIR/EIS Review Document Comment Form

Document: ***Preliminary Administrative Draft***

Comment Source: North Delta Water Agency, Chapters 1, 1-A, 2, 4 and 31
Submittal Date: April 16, 2012

No.	Page	Line #	Comment	ICF Response
1	Gen	Gen	**Insufficient for Analysis:** Overall, the EIR/EIS as currently presented is insufficient for NDWA as a Cooperating Agency to properly evaluate or provide meaningful comments for the following reasons: 1) The EIR/EIS does not provide sufficient or adequate documentation (half of appendices are currently not available) to support conclusions regarding impacts and proposed mitigations in either the narrative or appendices. 2) For many chapters, the EIR/EIS fails to provide an assessment of specific location, size, duration, or level of severity of the anticipated and foreseeable impacts in enough detail for each individual Conservation Measure (CM) or the cumulative impacts of the 50-year Plan. Since the very limited biological benefits of CM1 rely on implementation of CMs 2-22 in order to achieve a benefit to listed fish species, they need to be analyzed to a level of detail to at least indicate the total amount of cumulative effects anticipated and to justify the implementation of CM1. 3) The EIR/EIS fails to quantify in sufficient detail the duration and severity of impacts associated with all of the "temporary" construction activities for each CM. We could only find one reference in Chapter 1 to how long the "temporary" construction period lasts – which is almost a decade (9 years). The duration of these "temporary" impacts should be made clear in every action. 4) The EIR/EIS lacks sufficient documentation supporting conclusions made in each chapter and fails to provide an adequate comparison of the alternatives to each other in terms of the severity of impacts expected to occur due to implementation of each CM. **Recommendation:** 1) Add more documentation as appendices for each chapter that support the	

			conclusions made in all alternatives; 2) the EIR/EIS, both project and program level, should at least provide an in depth and accurate cumulative effects analysis as if all CMs 1-22 were implemented over the 50-year life of the Plan to give Delta communities and landowners an idea of the worst case scenarios; 3) Make each alternative impact in each chapter clarify how long each temporary impact will occur and quantify the severity in terms of risk to life, loss of property, and harm to Delta economy and ecosystem; 4) Each chapter should include a new table (a matrix grid) that identifies the various impacts associated under each alternative, and their proposed mitigation, for that chapter, so they can be compared side-by-side on how each of them fare in terms of individual impacts for that chapter. Otherwise, it's difficult to determine which alternatives are superior to the others. This was done for the DSC EIR.	
2	Gen	Gen	**CM 1 a Covered Action, Not a Conservation Measure:** A fundamental flaw of the BDCP and EIR/EIS is having half the Plan proposing project level facilities/operations (CM 1)and the other half only analyzing habitat/stressor projects (CM 2-22) at a programmatic level. This is particularly troubling since the Plan proposes the new water conveyance facilities as a Conservation Measure (CM1) that is permit ready, yet its ability to provide any measurable benefit to fish and therefore qualify as a Conservation Measure cannot be realized until habitat restoration projects which are programmatic and not permit ready are constructed and implemented. Thus, the BDCP lacks balance as it focuses on implementing the goals of water supply over the ecosystem. If CMs 2-22 which are only evaluated at the program level are not implemented, then according to the effect analysis, CM 1 will have detrimental impacts on species. Consequently, we contend that CM 1 is improperly identified in the BDCP as a Conservation Measure, instead of appropriately being listed as a Covered Action that must be mitigated. This inequitable and uneven treatment of water supply versus ecosystem restoration is a systemic problem in the BDCP due to the Notice of Intent project purpose which provides clear and measurable objectives for water supply to deliver up to full contract amounts, but only contains vague direction on ecosystem. As a result, the BDCP ends up only being a take permit for water conveyance operations and a long list of potential	

			ecosystem management tactics with no clear over-arching or cohesive strategy or certainty regarding their implementation. **Recommendation:** Remove CM1 as a Conservation Measure and instead have it properly identified as a Covered Activity to be mitigated. The BDCP and EIR/EIS should condition the implementation of CM 1 until a level of benefits to listed fish species is offset by species benefits from implementation of habitat/stressor projects (CM 2-22). Since the BDCP anticipates the construction of CM 1 to take nine years, that is plenty of time to see if the CMs which are currently at a programmatic level (CM 2-22) can be analyzed to a project level and implemented to provide species benefits before the implementation and operation of CM 1 is allowed to proceed.	
3	Gen	Gen	**Vague, Unmeasurable Objectives & Goals:** To use a GPS analogy: it is impossible for a car to navigate its driver to their intended location without first inputting a specific address. The BDCP suffers from this same navigation problem. The BDCP and EIR/EIS is unlikely to be able to achieve improvement from the status quo as it fails to provide/define specific, measurable, and clear objectives and goals for recovery and restoration of the Delta's ecosystem or water supply. The BDCP and EIR/EIS need to add quantified objectives and associated performance targets and metrics as a pre-requisite to designing, evaluating and selecting the suite of Conservation Measures that will ultimately become the Plan. Quantified objectives, targets and metrics are necessary to measure how successful the Plan's implementation is over the 50-year life of the Plan. **Recommendation:** Develop and insert quantified and measurable objectives, targets and metrics for each CM and the Plan as a whole.	
4	Gen	Gen	**Water Supply Delivery v. Reliability:** The BDCP fails to define what is meant by water supply reliability in terms of this Plan, other than in the Purpose to "deliver full contract amount." Failure to define "water supply reliability" is problematic since each person in the state probably has a different definition of what it means. The BDCP should put more emphasis on decreasing annual export diversion amounts and reducing the physical vulnerability of existing conveyance facilities instead of building new facilities in the same risk prone area that would ultimately be vulnerable to same chance of earthquake and flood damage.	

			Recommendation: Provide a quantifiable and measurable definition of water supply reliability.	
5	Gen	Gen	**Broader Range of Alternatives:** Consistent with Water Code 85021 to reduce reliance on the Delta in meeting California's future water supply needs, the BDCP should evaluate adding Conservation Measures to increase regional investments in water efficiency, wastewater recycling, improved groundwater management, urban stormwater capture, and other effective regional water supply tools or analyze funding a suite of these activities in the export areas as an EIR/EIS alternative. Including increased investments in regional self-reliance would reflect recent history in terms of urban water districts' long term water supply plans and investments in local water supply infrastructure. This alternative analysis should analyze the costs of building such regional water supply projects and measure in terms of how much acre feet per year of water they develop/create so that can be compared to how much new water is created by CM1 and its cost. Combining water supply projects in export areas with habitat projects in the BDCP, may warrant a smaller, and maybe even eliminate the need for, new in-Delta water conveyance facility. **Recommendation:** Add Conservation Measures to BDCP to build regional water supply projects in the export areas.	
6	Gen	Gen	**Screening Conservation Measures:** The BDCP does not provide any sort of analysis of how each of CM1-22 relate to each other. Every action, or in this case Conservation Measure, causes a reaction. Yet, the BDCP fails to analyze how each CM1-22 react to each other, conflict with each other, or complement each other. In addition, it's unclear how the BDCP's authors and Plan development decision-makers synthesized the hydrologic, geologic, and ecological interactions that led to the selection of CMs 1-22. The BDCP's CMs 1-22 are simply a list of menu items that are disconnected, poorly integrated, and not justified with supporting documentation or comparison of how they are better than other options. The following excerpt from the DRERIP emphasizes this point: "Collectively, the synthesis team concluded that a number of the conservation measures have the potential for additional synergistic effects that can raise or lower the value of some individual conservation measures when implemented concurrently with other actions. The complexity of various trade-offs between expected positive and	

			negative effects make it difficult to predict the biological responses to concurrent multiple measures." The BDCP still suffers from this synthesis problem and needs to provide explanation of how and why measures were chosen and how they interact with each other when implemented in order to support the collective CMs proposed in the Plan and allow a Preferred Project to be selected. **Recommendation:** Add a Chapter to the EIR/EIS that shows what action and reaction each of the CMs have to each other and how/why the Plan's Proponents selected the current CMs 1-22.	
7	Gen	Gen	**Nexxus:** The BDCP needs to provide a clearer picture and analysis of how each of the CMs interact with each other and how the BDCP interacts with different planning efforts in the Delta and how they all fit together. This is a systemic problem that needs to be remedied in order for the BDCP to work as a comprehensive Plan, otherwise it is impossible to evaluate the effects of projects (CMs) that would achieve the goals because it is impossible to identify the consequences that would be deemed acceptable if these projects are implemented. **Recommendation:** Provide clearer nexus between each CM and between the BDCP and other efforts being implemented in the Delta.	
8	Gen	Gen	**Alternative Analysis:** The analysis of each alternative is not as robust or equitable as it should be. **Recommendation:** Each round of effects analysis should include the same level of analysis for each of the alternatives, not just for the preferred alternative.	
9	Gen	Gen	**Effects Analysis:** As currently written the BDCP and EIR/EIS is simply an incidental take permit that identifies and analyzes a pre-selected project of a new 15,000 cfs water conveyance facility and operations with conservation measures to minimize and mitigate the water supply project's adverse impacts, rather than a habitat conservation plan to protect, restore and enhance the ecosystem while providing regulatory certainty to permit applicants. Unfortunately, from the beginning the BDCP started with a proposed solution (15,000 cfs conveyance around the Delta estuary) and then designed the effects analysis to reach a preferred outcome, instead of conducting effects analysis first to help define and develop solutions/projects to benefit the species and improve water supply reliability.	

			Recommendation: The BDCP analysis should be revised to perform an objective effects analysis on the causes of the species' declines, then design a proposed alternative to current operations to help reverse those declines, and then perform a second effects analysis on the probable effects of the proposed alternative. Until and unless this new method of effects analysis is done, the BDCP will only serve as an application for a permit to incidentally taking listed species for purposes of increasing export water supplies, rather than a conservation plan to protect, restore and enhance the Delta ecosystem.	
10	Gen	Gen	**How much is enough?:** It is difficult to determine what the actual volume, in acre feet per year, is to be diverted in each of the alternatives. The Plan and EIR/EIS speaks to facility size and conveyance capacities in terms of cubic feet per second (cfs), but not the actual amount (acre feet) of water to be diverted annually through implementation of each CM and alternative. **Recommendation:** Identify in acre feet per year (for all water year types) the annual amount of water to be diverted with implementation of CM1 and EIR/EIS alternatives.	
11	Gen	Gen	**Habitat Prioritization:** The BDCP provides no guidance on which actions (CMs) are most important, which actions are more feasible, which species are more or less susceptible to extinction if CMs implemented, which restoration efforts are most difficult, or which actions might be most easily and immediately implemented. BDCP lacks a strategic plan or timeline for moving habitat measures from being just conceptual to implementation. Therefore, as stated earlier, the BDCP fails to integrate and coordinate water supply and ecosystem measures into one plan as long as have BDCP split into two: Project Level and Program Level. Without timeline and prioritization schedule that is directly tied to the implementation of CM 1 (similar to double-joining legislative bills), the habitat/species measures are relegated to a "trust us" status for implementation. **Recommendation:** Need to specifically detail the order of prioritization with a timeline that is directly linked to the completion of CM 1 (one does not happen without the other). Add information to the Plan that provides guidance on: which actions (CMs) are most important and why, which actions are more feasible, which species are more or less still susceptible to extinction under this Plan, which restoration efforts are most difficult or costly to	

			implement, or which actions might be most easily and immediately implemented.	
12	Gen	Gen	**Individual County Impacts:** The BDCP is a large HCP, probably the largest in the state, proposing significant land modifications in five counties which is uncommon in other HCPs. There are both temporary and permanent land disturbances/conversions that will have significant impacts on the counties' economics and ability to provide basic services to their constituencies. For instance, impacts from the decade –long "temporary" construction (9 years) are anticipated to directly or indirectly affect local surface water resources relating to: 1) substantial alterations of existing drainage patterns or increased rate or amount of runoff that would result in localized flooding; 2) increased runoff which would exceed the capacity of existing or planned stormwater systems and create localized flooding; 3) expose people or structures to a significant risk of loss, injury or death involving flooding as a result of the failure of a levee modified under the BDCP or the new 4-story ring dam (forebay) planned near Courtland; 4) significant land and daily activities of Delta citizens and county emergency services in certain counties will be disrupted. These detrimental impacts due to disruptions for the decade-long "temporary" construction period include: re-routed roads including Hwy. 160; productive crops destroyed by staging areas, concrete batch plants, fuel stations, spoils disposal areas, borrow pits, transmission lines, access roads, earthen embankments, pumping plants, setback levees, canals, tunnel access shafts, forebays, temporary drainage bypass facilities, long-term cross drainage facilities, dispersion facilities, excavation, grading and other impacts. These disruptions, disturbances, and destruction will have a significant detrimental effect on the counties' economy and their ability to provide emergency services due to road closures and re-rerouting, school bus detours, provide local drainage to prevent local flooding, etc. **Recommendation** – In light of the significant effects each Delta county is likely to incur, yet the difficulty they face in identifying the cumulative impacts for each county in such a large regional document, the EIR/EIS should disclose the total temporary construction and permanent impacts associated with the implementation of the BDCP alternatives in each of the five Delta counties relating to transportation, emergency services,	

			water supply, drainage and flood protection, agricultural production, groundwater, and water quality. Separating each county and listing the total impacts to each county for each alternative will allow each county to easily see the impacts and assess if the proposed mitigations are appropriate. Suggest a summary list of all potential environmental and economic impacts and mitigation be broken out by county either in the 'summary of the alternatives screening or impacts and mitigation measures related to BDCP alternatives' currently being developed for the Executive Summary OR create a new Chapter to the EIR/EIS which breaks down the individual impacts/mitigation for each county.	
13	ES-2	17-18	**Plan Goals** - The description in this section describes problems rather than goals. **Recommendation** - Should indicate this section will describe goals that are clear and measurable, so know what the Plan is trying to achieve.	
14	1-2	26-27	**Detailed descriptions**: It is incorrect to say that specific components and detailed descriptions and timing and implementation of CM 2-22 are provided, since they are only evaluated at the program level and lack specific project information to allow an adequate impact analysis, cumulative effects, or appropriate level of mitigation. In fact, page 1-13, lines 12-14 states: "Design information for CM2-CM22, which include restoration and conservation strategies for aquatic and terrestrial habitat and other stressor reduction measures, is currently at ***more of a conceptual level***." [emphasis added] **Recommendation**: Modify wording to make clear the components and descriptions of CM 2-22 are neither specific or detailed as they still require additional study, design, and EIR before implementation because they are only conceptual, evaluated at the program level, and not designed at a level to be permitted.	
15	1-4	19-26	**Water Supply Management**: Since the list of 'BDCP Proponents' includes public water agencies which are contractors serving urban and agricultural areas in the Central Valley, Bay Area, Central Coast, and Southern California, it is inappropriate to say water supply projects, operations, and facilities in those regions such as groundwater storage, conservation, water use efficiencies, hydropower, project and system re-operation, desaliniation, recycling, and reuse are considered 'independent' but 'relevant' to the BDCP. Since the water agency contractors as 'BDCP Proponents' are seeking a	

			'comprehensive conservation strategy' (page 1-1) to advance a planning goal of 'improving water supply reliability' (page 1-1), then it only seems logical that one of the BDCP Project alternatives should be to identify and analyze water supply reliability projects in those regions to reduce their dependence on water exported from the Delta ecosystem which is identified as 'vitally important in the Plan (page 1-2) and is required in the Delta Reform Act of 2009. These local water supply reliability projects in the export areas are certainly measures that can contribute to "minimize and mitigate potential SWP and CVP impacts" (page 1-7) by reducing the annual amount of water exported from the Delta. Even the Delta Reform Act (Water Code 85004(b) states that "Providing a more reliable water supply for the state involves implementation of water use efficiency and conservation project, wastewater reclamation projects, desalinization, and new and improved infrastructure, including water storage and Delta conveyance facilities." Yet, the BDCP EIR fails to analyze these other local water supply methods of achieving reliable water supply as one of the alternatives and instead mainly focuses the majority of alternatives on the new conveyance facilities proposed as CM1. In fact, according to lines 24-26, page 3-1 of the EIR/EIS, "The 15 action alternatives are variations of conservation plans that primarily differ in the location, design, and operation of conveyance facilities implemented under BDCP Conservation Measure (CM) 1." **Recommendation**: These local water supply projects in water export service areas should not be independent from the BDCP, but added as an CMs or an alternative to be analyzed in conjunction with habitat restoration projects to reduce the environmental impacts of the South Delta pumps on Delta species and ecosystem. Due to the detrimental environmental impacts to fisheries of CM1, it would also be appropriate to add an alternative that analyzes CM 2-22 with screening of South Delta pumping facilities, without CM1.	
16	1-6	25-34	**CALFED ROD**: As stated in this section, a 30-year plan and EIR/EIS to improve the Delta's ecosystem, water supply reliability, water quality, and levee stability was prepared and approved under CalFED. Unfortunately, the BDCP is *not* the "comprehensive conservation strategy" (page 1-1) that it claims, as it does not include levee stability in its purpose and goals as CalFED EIR did. The failure to include levee stability is a glaring omission since page 1-5, lines	

			20-23 of the Plan states: "Besides degradation of water quality, levee failure could also result in flooding of Delta communities, farmland, and habitat; exposure of adjacent islands to increased seepage and wave action: and impacts on water supply, communication, and energy distribution systems." Under the BDCP, the Delta levees will continue to be part of the dual water conveyance system for the SWP and CVP. In addition, due to the BDCP's significant impact on State Plan of Flood Control project levees and non-project levees, they should be included in the BDCP as covered activities. **Recommendation**: The BDCP should be revised to include levee stability in its purpose and goals since they contribute to Delta ecosystem health and water supply reliability and will continue to be used to convey water in both the short term and life of the 50-year Plan under dual conveyance proposed in CM 1.	
17	1-9	9-14	**Measurable Definitions**: The BDCP pursues the concepts presented in the Delta Vision Strategic Plan, but unfortunately neither the BDCP nor Delta Vision defines in specific measurable terms what exactly constitutes a 'reliable water supply for California' or 'Delta ecosystem health.' "Water supply reliability" will have a different meaning to every person in this state, unless it is properly defined for purposes of this Plan in measurable and quantifiable terms. Until both of these co-equal goals are quantitatively defined, there is no way for this Plan to achieve them, because there's no way to know if the BDCP's long-term conservation strategy achieves the quantifiable goal. For instance, does 'water supply reliability for California' mean: 1) an increase in water supply infrastructure in export service areas to reduce reliance on imported water; 2) a water conveyance system protected from earthquakes and floods; or 3) a lower, but consistent amount of water exported each and every year into water storage facilities? **Recommendation** – BDCP and EIR/EIS should define in quantifiable and measurable terms and goals what 'water supply reliability' and 'Delta ecosystem health' actually mean.	
18	1-10	10-11	**Available for Export**: We could not find reference in either the BDCP Plan or EIR/EIR to "identify the remaining water available for export and other beneficial uses" pursuant to the Delta Reform Act. **Recommendation**: This quantifiable annual water amount that remains for export should be	

			identified in Chapter 5 based on varying water year types in chapter 5 and for purposes of implementing CM1.	
19	1-12	6-11	**HCP/NCCP Compliance** - Since 21 Conservation Measures in this EIR/EIS fail to provide site-specific design and operation or environmental analysis, they cannot be implemented without additional information and/or documentation necessary for consideration of permit applications. Therefore, it is difficult to agree that this document provides sufficient CEQA and NEPA support for approval of the BDCP (or an alternative) as a functioning HCP and NCCP. In fact, page 1-13, lines 12-14 states: "Design information for CM2-CM22, which include restoration and conservation strategies for aquatic and terrestrial habitat and other stressor reduction measures, is currently at ***more of a conceptual level.***" [emphasis added] This is particularly troubling since the Plan proposes the new water conveyance facilities as a Conservation Measure (CM1) that is permit ready, yet CM1's ability to provide any measurable benefit to fish and therefore as a Conservation Measure cannot be realized until habitat restoration projects which are programmatic and not permit ready are constructed and implemented. Which begs the question: what if only a couple or NONE of CM 2-22 get implemented? If CMs 2-22 which are only evaluated at the program level are not implemented, then CM1 may have detrimental impacts on species. Since CM1 does not appear to have ecosystem benefits without implementation of habitat projects, CM1 cannot be considered a Conservation Measure and should instead be identified as a Covered Activity to be mitigated. **Recommendation** – Eliminate the new Delta water conveyance facilities and operations (CM1) as a Conservation Measure and instead properly identify the conveyance facilities as a Covered Activity, and then analyze the BDCP to see if it meets HCP and NCCP permit requirements.	
20	1-13	8-20	**Insufficient Project Info:** It is difficult to see how the CEQA and NEPA lead agencies can have sufficient information to make a decision on whether to approve the SWP/CVP water conveyance without implementation of the habitat projects (CM 2-22) since the conveyance measure (CM 1) appears to be detrimental to fish without implementation of CM 2-22. Permitting a conveyance project that is detrimental to some listed fish species with only the hope and promise of implementing habitat projects that are only	

			conceptual to offset these negative impacts does not sound consistent with HCP and NCCP requirements. **Recommendation:** Continue development to a project level of at least some of the habitat projects that offset the detrimental listed species impacts associated with implementation of CM1, before releasing a draft Plan and EIR/EIS.	
21	1-14	9-10	**Guiding Preparation:** NDWA disagrees with the statement that as an organization it is helping to "guide the preparation of the BDCP." For a couple of years the NDWA participated as a member of the BDCP Steering Committee, but the BDCP Management Team were the primary decision-makers on the BDCP project definition/purpose and analysis, not Steering Committee members. NDWA and other environmental Steering Committee members had less access to information and influence over decision-making in guiding the development of the Plan than the Management Team. The Steering Committee was disbanded and has not met since 2009, resulting in the NDWA feeling less informed and less involved in development of the BDCP since then. The BDCP public process has been nothing more than a delivery system to disseminate information on how the BDCP Proponents have developed the Plan, rather than an opportunity to "help guide development." The BDCP process fails to provide a mechanism for interested and affected Delta stakeholders to have their input incorporated into the Plan or help guide which Conservation Measures are appropriate. NDWA has also applied and been accepted as a Cooperating Agency under NEPA, but has not found the process conducive to "helping to guide the preparation of the BDCP" either. The BDCP Proponents have always and continue to dominate the "guiding" of Plan development. **Recommendation:** To clarify the actual influence NDWA and other stakeholders have had in guiding preparation of the BDCP we would suggest deleting: "These organizations are helping to guide the preparation of the BDCP."; and replace with: *"These organizations have played an active but limited role in helping to guide the preparation of the BDCP through public processes."*	
22	1-18	5	**Table 1-3:** The Delta does not have sufficient electrical power supply to operate a 15,000 cfs intermediary pumping plant, five 3,000 cfs diversion intakes, or other facilities associated with CM1. Therefore, it seems that the BDCP may also	

			need permits from FERC and/or state agencies to permit new power lines and electrical power stations for these facilities. Also, what about FEMA? Most if not all of the Plan Area is likely to be mapped by FEMA as Special Flood Hazard Areas which will be subject to the strict NFIP building standards which would result in needing to raise each and every BDCP structure above the floodplain on elevated dirt mounds or building levees to meet FEMA 100-year standard to protect the structures/facilities associated with CM1. The Project may also require surface mining permits for the borrow pits, excavation, concrete batch plants, and soil spoils areas from the CA Dept. of Conservation. Fuel stations may also require permitting from federal or state agencies. **Recommendation:** Add federal, state, and local regulatory agencies that permit electrical power lines and substations, have regulatory control over building standards in a floodplain or fuel stations, or mining permitting authority for CM1.	
23	1-21		**Cooperating Agencies:** Typo, Reclamation District 550 should be changed to 551 which is the currently identified location for the forebay, spillway, intermediary pumping plant and at least two intakes. Also, we don't believe the complete number of Reclamation Districts are indentified for Easement/Right of way based on recent locations of geo-tech drilling eminent domain proceedings or the thousands of acres proposed to be converted under CM 2-22 for habitat. **Recommendation:** Correct RD 551 typo and identify the complete list of Reclamation Districts likely to need easement/right of way associated with all 22 CMs. There are probably another dozen RDs that need to be added.	
24	1-22	18-20	**Mitigation of BDCP Effects:** This section states that significant "environmental" effect of the BDCP will be mitigated to "the extent feasible." What about the significant "economic" impacts caused to the region by the BDCP implementation? Those also need to be mitigated, but this section only mentions environmental effects, completely omitting economic effects. And who decides what "extent feasible" means? The people in the delta certainly have a different definition of what is feasible than the BDCP Proponents. **Recommendation:** The vague term "extent feasible" needs to be defined in the Plan and EIR/EIS and the mitigation and compensation to Delta residents and regions for the socioeconomic impacts, not just environmental must be properly	

			identified and funded.	
25	1-23	5-7	**Flood Management:** The Delta region will also be subjected to localized flooding due to the potential of the Plan's facilities to "block, reroute, or temporarily detain and impound surface water in existing drainages." (page 6-54, lines 6-9) "These activities would result in temporary and long-term changes to drainage patterns, paths and facilities that would in turn, cause changes in drainage flow rates, directions and velocities." (page 6-54, lines 3-5) "Alternative 1A facilities could temporarily and directly affect existing water bodies and drainage facilities, including ditches, canals, pipelines, or pump stations." (page 6-54, lines 13-14) Temporary under this plan means the construction phase which is anticipated to be 9 years, so these disruptions to existing drainage systems to prevent localized flooding will be affected for a decade. "Paving, compaction of soil and other activities that would increase land imperviousness would result in decreases in precipitation infiltration into the soil, and thus increase drainage runoff flows into receiving drainages." (page 6-54, lines 22-24) the result of this increase in runoff flows will be increased localized flooding, which could damage property and possibly cost lives. "Groundwater removed during construction would be treated as necessary and discharged to local drainage channels or rivers. This would result in localized increase in flows and water surface elevations in the receiving channels." (page 6-54, lines 26-29) Again, this means more localized flooding impacts. So, flood impacts are NOT just caused by changes inflow regimes or modification of existing levees as indicated in this section, but also by many BDCP activities, yet are not properly recognized in this section. **Recommendation:** Add wording in this section to also identify localized flood impacts associated with disruption, blockage, and over-taxing existing drainage systems with implementation of BDCP.	
26	1-23	14-17	**Socioeconomics:** There are additional significant socioeconomic impacts not identified in this section, most notably detrimental third party impacts/damages to crops and property caused by seepage, erosion, and poor water quality and need to be compensated during construction and operation of BDCP. **Recommendation:** Add the following language to this section: *"Significant economic losses would result from damage to crops and property caused by seepage, erosion, and poor water quality."*	

27	1-23	38-42	**Growth:** The new water conveyance facilities proposed in the BDCP EIR do NOT create one drop of more water than what exists today, so allowing growth in the export areas should only be allowed if those areas can create local water supplies through conservation, desalinization, contaminated groundwater clean-up, storm water capture and re-use, water recycling or other local water supply projects. The BDCP project is unlikely to increase reliability of water transportation from the existing system as the new water conveyance facilities are to be built in the same floodplain and vulnerable to the same earthquakes and floods the existing export facilities are in. An unlined forebay located on an island with existing seepage problems and soft sandy soils is likely particularly vulnerable to earthquakes and subsequent disruptions of any water deliveries from proposed new North Delta intakes. **Recommendation:** Language should be added to recognize that new BDCP facilities will still be as vulnerable to floods and earthquakes as existing facilities and that no additional water is created by the new facilities to supply/support population/building growth in export areas.	
28	1-24	9-10	**Construction Period:** The "9-year-long construction period" is the timeline associated to "temporary effects" and "temporary impacts" mentioned throughout this Plan, yet it is never really made clear in the individual chapters that **these "temporary" disruptive activities will last for a decade**. We do not believe that any rational human being would consider 9 years to be "temporary." This is subterfuge of the realities of the impacts at its worst and wrong to not be more transparent in the disclosure of true length of these impacts. **Recommendation:** This plan should STOP using the term "temporary" in terms of impacts and should replace it with more transparent description of "decade long construction" effects and impacts.	
29	1-25	2-9	**Related Actions:** There are several habitat and water conveyance projects that are proceeding ahead of the BDCP through separate permitting and EIR processes with the intention of being in construction prior to final approval and implementation of BDCP. However, these early implementation projects are also mentioned in the BDCP as Conservation Measures or covered activities and the habitat projects in particular are intended to be used as environmental credits to	

			meet HCP and NCCPA requirements necessary to gain approval of BDCP. These projects include the North Bay Aqueduct and habitat projects to comply with the Federal BiOps such as the Yolo Ranch (Lower Yolo Bypass) and Prospect Island. This EIR/EIS claims that CM 2-22 are only evaluated ata program level in this Plan because they are only conceptual, when in fact there are at least two habitat projects which are developing separate environmental documents (EIR and seeking authorization before the BDCP is approved and permitted, yet this EIR fails to provide site specific mitigation or appropriately analyze their cumulative impacts as reasonably foreseeable projects. **Question:** Can these early implementation habitat projects which are being done to comply with existing BiOps be double-counted in terms of meeting HCP and NCCPA requirements under this BDCP and the BiOps? Or are these early implementation projects that intend to be incorporated into and credited under this BDCP considered "related actions, interrelated actions, or connected actions?" **Recommendation:** Please explain how these early actions with EIRs underway will be dealt with in the BDCP and include their site specific info and mitigations in the BDCP EIR.	
30	1-25	10-23	**Related Planning Efforts:** There are several other related planning efforts occurring in the Plan Area that will have effects on or be affected by the BDCP which are not mentioned: Central Valley Flood Control Plan, Delta Plan, USACE Delta Levee Feasibility Study, and the USACE Levee Vegetation ETL. There may also be others that should be added. **Recommendation:** Add to the list of additional activities on line 12: Central Valley Flood Control Plan, Delta Plan, USACE Delta Levee Feasibility Study, and the USACE Levee Vegetation ETL.	
31	1-27	1-35	**Appendices:** Line 1 says these appendices are to "support the various chapters." Unfortunately, 14 of the 26 appendices (MORE THAN HALF) listed on this page are NOT currently available for review. Therefore, there is insufficient background and supporting documentation on which to make any reasoned evaluation of the adequacy of this Plan or the EIR/EIS and its evaluation of alternatives and mitigation. The 12 appendices on this page that are available for review equal 1,117 pages when combined. Therefore, it is feasible that the remaining 14 appendices will likely be up to 2,000	

			pages which we will need more time to analyze. **Recommendation:** Provide additional time before the release of the Draft Plan for cooperating agencies to review all new appendices once they are available.	
32	1-27	17	**Chapter 5 Appendices:** The BDCP will have a significant effect on in-Delta water supply availability and reliability. Supporting documentation should show all of the existing in-Delta water diversion intakes and evaluate if they will be detrimentally impacted by implementation of BDCP. The NDWA contract requires that water of such quality ***shall*** be available in the Delta channels for reasonable and beneficial uses and that local diversions and uses ***shall not*** be disturbed or challenged by the State. This EIR/EIS needs to evaluate the availability of water in ALL Delta channels and ALL existing water diversion intakes in the North Delta at the very least to assure compliance with the Contract, but it should also analyze for the whole Delta so that landowners and counties can evaluate the impacts and determine if the mitigation provided in the BDCP EIR/EIS is sufficient and appropriate. **Recommendation:** The EIR/EIS needs to add appendices analyzing all of the existing water diversion intakes in the Delta and how they will be impacted by CM 1-22 of the BDCP, this should include water surface elevation modeling for each water year type.	
33	1-27	18-29	**Chapter 6 Appendices:** There are no appendices identified for Chapter 6, Surface Water, despite the significant impacts identified in that chapter. The NDWA and other in-Delta stakeholder need to see the modeling tools, assumptions used, and results for hydraulic and hydrology modeling to evaluate the Plan's impacts on water surface elevations (seepage, flooding, and stranding of in-Delta water diversion intakes), water velocities (erosion), and natural flow direction. This data and analysis is critical to providing the information necessary to determine if the BDCP Project will meet the criteria and provisions in the 1981 NDWA Contract Agreement with DWR. Failure of the BDCP implementation to maintain the NDWA Contract criteria for water quality will result in DWR: ceasing all diversions to storage; increasing releases of stored water form SWP reservoirs; ceasing all export by the SWP form Delta channels; or any combination of these. Since the SWP and CVP are now jointly operated (page 5-17, lines 34-40), the CVP may share responsibility for meeting these	

			NDWA standards pursuant to the Coordinated Operations Agreement (COA) signed in 1986. **Recommendation:** The EIR/EIS must add appendices to Chapter 6 that show analysis and modeling tools, assumptions used, and results for hydraulics and hydrology for water surface elevations, flows and velocities. The EIR/EIS should provide all documentation and analysis that supports the conclusions made in this chapter in regards to implementation of all CMs 1-22 and compares the impacts between each of the alternatives, including impacts in years 1-50 of the Plan.	
34	1-27	19	**Groundwater Modeling:** Since many of the homes in the rural Delta use well water for their drinking water, the modeling in Appendix 7A needs to identify and evaluate the impacts to the drinking water in the Delta pursuant to implementation of CMs 1-22 of the BDCP. **Recommendation:** The EIR/EIS needs to provide all documentation and analysis that shows how Delta's drinking water is impacted and supports the conclusions made in Chapter 7 in regards to implementation of all CMs 1-22 and compares the impacts between each of the alternatives, including impacts in years 1-50 of the Plan.	
35	1-27	35	**Chapter 9 Appendices:** One of the primary reasons/justifications given for the need for the BDCP Project (Chapter 2) is the risk to the current thru-Delta water conveyance system from catastrophic flood or earthquake. Yet, despite the severe risk for earthquake damage promoted by DWR and other BDCP Proponents, there is no appendices of data, analyses, modeling or any other scientific information to support this hyperbolic hypothesis. Therefore it lacks credibility as a valid justification for Need or Purpose as stated in Chapter 2 of the BDCP EIR/EIS. Since all of the new water conveyance facilities (CM1) and habitat projects (CM2-12) are to be built in the same area claimed to be at risk of a catastrophic earthquake, then the supporting documents should be provided in the EIR/EIS that clearly show how the new facilities would be more resistant to earthquake damage than existing levees which have never had a documented levee failure caused by an earthquake. Failure to do so will mean the permitting agencies or the public will have insufficient information on which to analyze each alternative against each other or to approve a final project ROD. In addition, the Plan currently proposes building a 4-story ***unlined*** 750-acre	

			forebay (ring dam) on soils that are permeable, known to have seepage issues. The 15,000 cfs intermediary pumping plant is also planned on these same permeable soft sandy soils and in the same earthquake zone as existing SWP conveyance facilities, so the Geology and Seismicity seem important issues that warrant supporting data in appendices to the EIR/EIS. **Recommendation:** The EIR/EIS must add data, documentation, modeling and any other scientific analysis and information regarding the stability and suitability of the soils where intakes, pumping plants and forebays are planned in the BDCP and whether they would be subjected to the same earthquake risk as existing facilities. This information is available from the geo-technical drilling done pursuant to eminent domain. The EIR/EIS should provide all documentation and analysis that supports the conclusions made in this chapter in regards to implementation of CMs 1-22 and compare the impacts between each of the alternatives, including impacts in years 1-50 of the Plan.	
36	1-28	1-35	**Appendices:** Line 1 of this section says these appendices are to "support the various chapters." Unfortunately 11 of the 27 appendices listed on this page are NOT currently available. Therefore, there is insufficient background and supporting documentation on which to make any reasoned evaluation of the adequacy of this Plan or the EIR/EIS and its alternatives. **Recommendation:** Provide additional time before the release of the Draft Plan for cooperating agencies to review all new appendices once they are available.	
37	1-28	10-11	**Chapter 13 Appendices:** There are no appendices for Chapter 13, Land Use identified, despite the significant land use changes that would occur if BDCP and CMs 1-22 are implemented. Due to the significant "temporary" (9 years) land disturbance caused by construction and implementation of CMs 1-22 and the long term conversion of land from current uses to conveyance facilities or habitat under the BDCP, this should warrant the addition of appendices with supporting analysis regarding land use and economic impacts and how the BDCP will comply with the Delta Reform Act to protect and preserve the Delta as an evolving place. This new appendix should evaluate impacts to: operation of local RDs and floodplain management; urbanization in the secondary zone; loss of Prime Ag Land; and Delta lands protected by	

			easements/Williamson Act. **Recommendation** Without providing the actual data, assumptions and analysis on how conclusions in this chapter were made, there is no way for a cooperating agency or the public to determine if the conclusions and proposed mitigation are appropriate and sufficient. The EIR/EIS should provide all documentation and analysis that supports the conclusions made in this chapter in regards to implementation of all CMs 1-22 and compare the impacts between each of the alternatives, including impacts in years 1-5 of the Plan.	
38	1-28	11	**Appendix 14A:** Analyzing individual crop effects is insufficient to analyze BDCP 1-22 impacts on agriculture. The Delta ag lands are identified by the State as Prime Ag Lands which statewide have been declining over the last few years due to development and other activities that convert these lands to non-ag uses, including habitat restoration projects. The additional loss of Delta Prime Ag Lands should be documented and analyzed in terms of a statewide impact due to such a large loss from one project. Without providing the actual data, assumptions and analysis on how conclusions in this chapter were made, there is no way for a cooperating agency or the public to determine if the conclusions and proposed mitigation are appropriate and sufficient. **Recommendation:** The EIR/EIS should add additional analysis/data regarding the loss of designated Prime Ag Land in the BDCP Plan Area pursuant to implementation of CMs 1-22 of the BDCP and compare the impacts between each of the alternatives years 1-50. The Delta Protection Commission's recent Land Use and Management Plan and Economic Sustainability Plan should be used as a source for this additional appendix.	
39	1-28	24	**Chapter 19 Appendices:** More than a traffic study needs to be analyzed in the EIR/EIS. The re-routing of roads, including Hwy 160, during the decade long construction phase will impact school transportation, increased trucking of BDCP materials, create longer commutes and GHG impacts by residents, longer response times for emergency services such as firetrucks and ambulances. Also, transportation analysis should include shipping commerce since there are two major shipping ports in the Delta that rely on the Sacramento River for delivery of goods. The construction of the intakes for conveyance with coffer dams choking the width of the Sacramento	

			River and breaching of levees for habitat could create significant navigation obstructions or hazards for ships. Without providing the actual data, assumptions and analysis on how conclusions in this chapter were made, there is no way for a cooperating agency or the public to determine if the analysis is adequate or accurate, or whether the proposed mitigation is appropriate and sufficient. **Recommendation:** The EIR/EIS needs to add appendices analyzing altered transportation patterns and distances for cars and emergency service vehicles which includes a GHG analysis and one analyzing the navigation and commercial shipping impacts, including to the Stockton and Sacramento Ports. These appendices should support conclusions in this chapter for CMs1-22 with comparison of alternatives.	
40	1-28	25-26	**Chapter 21 Appendices:** The EIR/EIS should provide the supporting data, modeling tools, assumptions used, and modeling outputs associated with evaluating each of the BDCP alternatives for energy use increases. Operation of a 15,000 cfs intermediary pumping plant and five 3,000 cfs pumping plants, and the building of transmission and distribution lines and electrical power substations requires a great deal of additional annual energy creation and consumption. Without providing the actual data, assumptions and analysis on how conclusions in this chapter were made, there is no way for a cooperating agency or the public to determine if the conclusions and mitigation are appropriate and sufficient. **Recommendation:** The EIR/EIS should add all documentation and analysis that supports the conclusions made in this chapter regarding implementation of CMs 1-22 and comparing the alternatives.	
41	1-28	27-28	**Chapter 23 Appendices:** The "temporary" construction period is mentioned briefly as being 9-years which is a long time to deal with noise impacts associated with this Project. The Delta is primarily a quiet agrarian area with pockets of industrialization in the urban areas. The EIR/EIS should provide all data associated with evaluating each of the BDCP alternatives and CMs for their impacts on humans and animals in terms of increased noise. The analysis of anticipated noise increases in terms of decibels, location, and duration should be shown for both during the decade-long construction phase and the	

			permanent operation of CM1 facilities. Without providing the actual data, assumptions and analysis on how conclusions in this chapter were made, there is no way for a cooperating agency or the public to determine if the analysis is adequate or accurate, or whether the proposed mitigation is appropriate and sufficient. **Recommendation:** The EIR/EIS should provide all documentation and analysis that supports the conclusions made in Chapter 23 for implementation of CM 1-22 and comparison of alternatives.	
42	1-28	29-30	**Chapter 25 Appendices:** The EIR/EIS should provide the supporting data, assumptions and outputs associated with evaluating human health impacts if CM 1-22 are implemented. There are significant public health risks associated with methyl mercury poisoning, deadly diseases spread by mosquitoes, and contamination of in-Delta drinking water wells, all of which can be hazardous or deadly to humans. Analysis should be provided indicating the location and size of potential hot spots for methyl mercury and mosquito breeding as well as the location and number of drinking water wells that may be exposed to contamination or damaged by construction or implementation of CM 1-22. This appendix should include the data that supports the conclusions in Chapter 25. **Recommendation:** The EIR/EIS should provide all documentation and analysis that supports the conclusions made in Chapter 25 in regards to implementation of CM 1-22 and comparing alternatives in the EIR.	

43	1-29	Gen	**General Comment:** Converting 100,000 acres from current uses to either habitat or conveyance facilities, reducing flows in the Sacramento main stem of the river and surrounding Delta channels by pumping up to 15,000 cfs of water out of the system for transport to areas outside of the Delta, installing five water diversion intakes which individually have ten times the current pumping capacity of the largest urban intakes currently located in the Delta, and a "temporary" construction period that lasts for a decade will have numerous, significant, and permanent impacts in the Delta that will be damaging and costly in terms of devastating the local Delta economy to benefit economies in other areas of the State where the water will be exported. In order for Cooperating Agencies, local governments, state and federal permitting agencies, and the public to properly analyze the true impacts of this proposed project, the EIR/EIS needs to provide more transparency by disclosing: data, reports, modeling assumptions and results, analysis of implementation of each and combined CMs 1-22, and the comparison done of these impacts for each of the Plan's alternatives including in all years 1-50, for which the EIR/EIS relied on to support the conclusions made in each chapter. For CM1 which is supposed to be analyzed in sufficient detail to gain project-level permit approval for new conveyance facilities, the analysis needs to provide specific location and size of all facilities, detailed operation criteria, as well as the specifics of all "temporary" decade-long construction activities including site locations, size, number of, duration, and severity of activities associated with implementing CMs 1-22. Like the Delta Stewardship did in the EIR for the Delta Plan, the BDCP EIR/EIS should provide an analysis for the programmatic level CMs 2-22, based on the anticipated and reasonably foreseeable environmental and economic impacts as if all CMs are in fact implemented over the life of the 50-year Plan. Otherwise, the cumulative economic and environmental impacts of each and combined CMs 1-22 cannot properly be evaluated by the public. In addition, the EIR/EIS should incorporate the site-specific details of separate EIRs being developed for projects that are to be credited as conservation measures or protected as covered actions in the BDCP later, including but not limited to: North Bay Aqueduct, Yolo Ranch (Lower Yolo Bypass), Fremont Weir, Prospect Island, and Cache Slough Complex. Any and all EIRs currently in development	

			by any BDCP Proponent (lead agencies and water contractors) or trustee agencies under BDCP should have the BDCP EIR/EIS provide site specific info on these projects since they are clearly foreseeable and beyond a programmatic conceptual stage. If a conclusion in the BDCP EIR/EIS Chapters fails to also provide the data/analysis that supports that conclusion, then it is insufficient in for the Cooperating Agencies, local governments, state and federal permitting agencies, and the public to properly evaluate the adequacy of conclusions and proposed mitigations for CMs 1-22. **Recommendation:** 1) Provide more transparency in how conclusions in each chapter were made by adding appendices for each and every chapter that provides the data/reports/analysis/modeling that supports the conclusions and compares the impacts between each alternative; 2) Each chapter should indicate the impacts/mitigations associated with the Project-level *and* Programmatic-level Conservation Measures; 3) Each chapter should indicate the impacts/mitigations for temporary and permanent impacts in a more clear fashion; 4) Incorporate the site-specific details and other data associated with any/all EIR/EIS currently under development by DWR, water contractors or any other BDCP Proponent, particularly any habitat projects being developed to comply with federal BiOps which are referenced in the BDCP; 5) Provide additional appendices for each and every chapter that supports the conclusions made in each chapter; and 6) Add a matrix grid to each chapter that shows the impacts and corresponding mitigation associated with each alternative so can compare each alternative against each other in terms of specific and cumulative impacts.	
44	1A-2	13-25	**Water Developed:** This section fails to describe in acre feet terms how much water was actually developed versus what was originally designed, but never completed. This is a glaring omission since the failure to complete the project's utilizing of additional Northern California watersheds is a major contributor to the state's difficulty "to reduce the frequency and magnitude of variations in supply and provide more reliable and consistent deliveries" as stated on lines 24-25 of page 1A-8. **Recommendation:** This section should also identify the amount of acre feet of water these combined existing projects developed when completed with recognition that they were supposed to develop 8 MAF of water but only	

			developed somewhere over 4 MAF of water because the projects were never and can never be completed as originally designed.	
45	1A-6	12-17	**Contacted Water:** This section is too vague and needs to be more specific as it relates to and is pertinent to: "The controversy surrounding California's water supply has primarily revolved around distribution and the **sharing of a limited resources**." [emphasis added] Should identify how much water the CVP yields each year for different water years types, so can see the fluctuations caused by nature. Also, this section doesn't identify the amount of water that the CVP is required to dedicate/deliver annually to the environment/fish. **Recommendation:** This wording should be expanded to clarify how much in acre feet is developed water the CVP facilities create annually and identify how much water annually CVP must deliver for environmental purposes.	
46	1A-8	29-33	**Additional Water Supply Contracts:** This section fails to mention subsequent water supply contracts entered into by DWR for SWP water including the NDWA 1918 Contract. To provide an accurate picture of all water users who have contractual rights for SWP water, this section must be expanded to include NDWA Contract. The content of the NDWA Contract signed in 1981 is directly relevant to the BDCP proposal to build a peripheral canal/tunnel and North Delta water conveyance facilities and therefore needs to be prominently mentioned and the assurances provided by DWR to in-Delta water users discussed in detail. **Recommendation:** Add language identifying water supply contracts signed by DWR for SWP water deliveries subsequent to the 1960's original contracts, including but not limited to, the NDWA 1981 Contract.	
47	1A-18	9-12	**Delta Levees:** Stating that levee damage from a large earthquake would take years to fix and may not be worth fixing is not substantiated by the facts or peer-reviewed science. Therefore, much of the representation of risks of multiple levee failures in this section is unsubstantiated speculation at best and hyperbolic misrepresentation at worst, and is an inappropriate basis on which to justify the need to divert water around the Delta's naturally functioning estuary. FACT: There is not ONE documented levee failure in the Delta caused by an earthquake, let alone multiple levee failures alluded to in Section 1A.2. FACT: Levee failures DO NOT take years to repair. The Upper Jones Tract repair, which was one of the largest breaches in	

			Delta history and took one month to repair, so the reality is 30-DAYS, not years to repair as referenced on line 4. The restoration of the island did take longer, about 5 months to pump the flood water off of the island. FACT: Even during the worst flood events of the past 150 years, there have only been between 1-5 simultaneous levee failures during any given flood event, so again there's not a history of the of the wide-spread double-digit multiple levee failure alluded to in Section 1A.2. FACT: The Delta has experienced less frequent and less severe levee failures since the establishment of the Delta Levees Subvention Program in 1973, and had no Delta levee failures in 2006 which had the highest recorded water surface elevations in the Central and West Delta, so the Delta levees are better today, not worse and therefore should not be represented as not worth maintaining and improving. **Recommendation:** Stop trying to invent and promote Chicken Little 'the sky is falling' (or levees in this case) scenarios to justify CM1 or to scare people into supporting and paying for CM1. *We suggest you delete the entire first sentence starting at line 9.*	
48	1A-18	14-16	**Land Subsidence:** There are several misrepresentations regarding the extent, severity, and continuation of land subsidence and its potential risk to levees in this section. First, based on 2007 DWR LiDAR data there are only 96,000 acres (14% of the entire Delta) below 12 feet NGVD or more and only 57,000 acres (8.1% of the entire Delta) 15 feet NGVD or more below sea level. Therefore, it is incorrect to state that "many" of the Delta lands "now lie 25 feet or more below sea level." Using the LiDAR data, there does NOT appear to be ongoing subsidence on 86%-92% of the entire legal Delta. Secondly, a comparison of the 2007 LiDAR data to the USGS Quadrangle maps surveyed between 1974 and 1977 shows that subsidence did NOT occur in areas that are currently at elevation minus 10 feet below sea level and above. Therefore, it is incorrect to say "increased in severity over time" in line 14 as this very statement is contradicted by the LiDAR and the language in line 32 below that states "destructive farming practices have ceased, **slowing down the rate of subsidence.**" [emphasis added]. In addition, the BDCP EIR/EIS cannot promote Delta land subsidence as an unacceptable risk to current Delta levees as water conveyance system and propose in the BDCP EIR/EIS to	

			increase Delta land subsidence by lowering interior land elevations by excavating Delta island soild to build foundations and protective levees for new structures in CM 1. Can't have it both ways. Either the Delta land subsidence causes risk to existing levees still needed under BDCP to convey water and puts new CM 1 facilities at risk, which means the BDCP ***cannot*** use Delta island soils to build CM 1 facilities and EIR/EIS must show importing dirt from elsewhere. Or, if BDCP CM 1 must lower the Delta islands land elevation further below sea level by excavating Delta island dirt to build CM 1, then it cannot also claim Delta land subsidence as a justification for building CM 1 in the first place. **Recommendation:** Stop trying to invent and promote Chicken Little 'the sky is falling' (or levees in this case) scenarios to justify CM1 or to scare people into supporting and paying for CM1. *Correct the first sentence in line 14 to clarify that there are patches of subsidence in the interior of some islands, but they represent less than 14% of the entire Delta and are not currently increasing in severity.*	
49	1A-18	16-18	**Excavation Causes Subsidence:** This sentence states that the excavation of dirt/soils from the interior of Delta islands for use in building/elevating levees was one of the causes of historical subsidence/lowering elevation of Delta islands. Yet, CM1 of the BDCP and EIR/EIS relies on borrowing/excavating dirt from the interior of several Delta islands to be used to build new levees to protect conveyance structures, build 40-foot-high (4-story) ring levee/dam around a 750-acre forebay, and to build 15-25 foot dirt pads to elevate ALL of the water conveyance structures, electrical substations, storage buildings, and any other BDCP structures associated with CM1 to meet FEMA's strict building standards in SFHA zones. Despite this significant environmental impact, the EIR/EIS fails to provide an appendix showing or analyzing the effects of further lowering Delta island elevations below sea level pursuant to implementation of CM1. The BDCP should avoid excavating any dirt/soils/materials from the Delta islands as it will cause a higher percentage of the Delta lands to subside significantly below sea level compared to current conditions, particularly in light of projected sea level rise. The BDCP should identify more appropriate areas than Delta islands from which it will excavate dirt for the implementation of CM1. **Recommendation:** This section should identify any	

			BDCP excavation of the interior Delta islands as being a major contributor to lowering Delta island land elevations below sea level and accelerating land subsidence in the Delta. The EIR/EIS should add an appendix identifying and analyzing the effect of the locations/amounts of dirt excavations on Delta lands to be done to implement CM 1-22. The BDCP should consider adopting a policy of avoiding the use of any Delta island dirt/materials for the BDCP CM 1-22 in order to prevent further subsidence of Delta islands, particularly in light of expectations for rising sea levels under climate change.	
50	1A-18	21-24	**Historical Farming Practices:** These lines mention historical farming crops and practices in the Delta which no longer are widely used, therefore are irrelevant to the ongoing and/or future contribution to subsidence. This is especially true since lines 31-32 of page 1A-18 states that, "some of the more destructive farming practices have ceased, slowing down the rate of subsidence." As mentioned in NDWA's comment #47 above, implementation of the BDCP's CM1 pose the most potential to contribute to the future subsidence of lands in the Delta, so are far more relevant to contributing to future Delta subsidence than abandoned farming practices. **Recommendation:** *Delete lines 21-24 in their entirety or add language about BDCP's future contribution to Delta land subsidence if the language is kept.*	
51	1A-18	25-27	**Subsidence Effects on Levee Stability:** We are unaware of any scientific study or report that shows subsided land increases hydraulic load on levees and compromises their stability. This statement is unsubstantiated by facts and therefore speculation, and should NOT be used as the basis for justifying re-routing export water around the Delta's natural tidal estuary. This is particularly true since the BDCP proposes to increase land subsidence by removing dirt from Delta islands to build facilities associated with CM 1-22, despite sea level rise projections over the 50-year life of this Plan. **Recommendation:** *Delete in its entirety the first sentence in line 25.* Stop trying to invent and promote Chicken Little 'the sky is falling' (or levees in this case) scenarios to justify CM1 or to scare people into supporting and paying for CM1. If the EIR/EIS wants to mention any relationship between subsidence and levee stability in this guidance policy, then it should be done in the context of fully	

			disclosing the BDCP and EIR/EIS future contribution to Delta land subsidence and wanting to support a study to determine the relationship between subsidence, sea level rise, and levee stability before excavating Delta islands as proposed in CM 1-22. The EIR/EIS needs to fully disclose in this section the significant impact CM 1-22 will have on lowering Delta island land elevations by increasing land subsidence in the Delta through implementation of this EIR/EIS and provide full analysis of how this increases risks of levee failures or other Delta damage in an appendix to the EIR/EIS.	
52	1A-20	Appendix Table 1A-1	**NDWA 1981 Contract:** In 1981, subsequent to the passage of SB 200 and ACA 90 authorizing the construction of a peripheral canal and guaranteeing certain protections and assurances to the Delta, DWR and the NDWA signed the "Contract Between State of California Department of Water Resources for the Assurance of a Dependable Water Supply of Suitable Quality." DWR's maintenance of the NDWA Contract's provisions is tied to the operation of the SWP. Failure by DWR to maintain the 1981 Contract water quality criteria provides that the State ***shall***: 1) cease ***ALL*** diversions to storage; 2) increase releases of stored water form SWP reservoirs; 3) cease ***ALL*** export by the SWP from Delta channels; and 4) or any combination of these. The water quality criteria in the Contract are different than D-1641 and must be met year-round. In addition, the 1981 Contract states the State shall not convey SWP water so as to cause a: 1) decrease in natural flow; 2) increase in natural flow; 3) reversal of natural flow direction; or 4) alteration in water surface elevations in Delta channels to the detriment of Delta channels or water users within the Agency. Also, the State shall repair or alleviate damage, improve channels as necessary due to seepage or erosion damage to lands, levees, embankments or revetments adjacent to Delta channels within the Agency, and is responsible for ***all*** diversion facility modifications required. In light of this agreement's effect on the operation of the SWP, the NDWA Contract should be added to Appendix Table 1A-1. **Recommendation:** *Add the NDWA 1981 Contract to Appendix Table 1A-1.*	
53	1A-22	18-21	**Water Quality Objectives:** DWR is also obligated under the 1981 NDWA Contract to meet certain water quality objectives (salinity levels). As stated in NDWA comment #50 above, the SWP operations	

			are affected if NDWA water quality objectives are not met year-round. **Recommendation:** Add language recognizing water quality objectives under the 1981 NDWA Contract.	
54	1A-25	9	**Annual Water Supplies of COA:** What are the annual water supplies identified in COA? At some point, the BDCP and EIR/EIS need to identify how much flow is needed to protect the Delta water quality and ecosystem health, in order to determine how much water is remaining for export, so identifying existing obligations would be important for the discussion. **Recommendation:** Add language in this section to specify the annual water supplies in COA.	
55	1A-26	4	**Allowed Incidental Take:** What is the amount of incidental take (number of fish) allowed for the Delta export facilities annually? **Recommendation:** Add language identifying the amount of incidental take (number of fish) currently allowed annually at existing export facilities.	
56	1A-27	16-23	**Salinity Requirements:** What are the number of days that must be met in the standard tables? What happens if the number of X2 days required by regulatory standard tables are not met even after using credits from previous month? What happens if the salinity starting gate requirements are not met? Have the number of X2 day required not been met by CVP/SWP in past 30 years? If so, how many times, for how many days, what was the remedy, and what was the penalty for the violation? Since the BDCP proposes changes in water operations and proposes to change existing water operations, including moving the D-1641 salinity criteria location from Emmaton to Three Mile Slough, it is important to understand how good of a job the CVP/SWP have historically done in meeting existing salinity requirements. **Recommendation:** If there have been violations of these salinity requirements, then add a Table to this section disclosing how many times and for how long these salinity requirements have been violated over the last thirty years. Identify the penalties or operational changes to CVP/SWP that occur if the number of X2 days or salinity starting gate requirements are not met.	
57	1A-28	4-21	**Export/Inflow Ratio:** What are the penalties or operational changes to CVP/SWP for exceeding D-1641 Export/Inflow ratio export restrictions? If they've ever been violated, then how often and for how long have they been violated over the last 30	

			years? **Recommendation:** If there have been violations of this ratio, then add a Table to this section disclosing how many times and for how long these ratios have been violated over the last 30 years.	
58	1A-28	23-31	**VAMP Results:** Since 2012 is the end of the 12-year experimental management program to evaluate how salmon survival rates change in response to alteration in San Joaquin River flows and SWP/CVP exports with installation of the Head of Old River Barrier, it seems appropriate to disclose in this section the preliminary results of this management experiment, since it would be relevant to the new water operations proposed in CM1. **Recommendation:** Add language to this section disclosing the preliminary results of this long-term management experiment to benefit juvenile salmon migration.	
59	1A-28	33	**Minimum Delta Outflow:** What is the minimum monthly Delta outflow required under D-1641. Important to have this information disclosed so can understand the difference between existing requirements and those proposed in the new water operations in CM1 and whether CM1's new water operations will "improve the amount of flow through the Delta" as stated on page 1-2, lines 15-16 of Chapter 1 of this EIR/EIS. **Recommendation:** Add language disclosing the monthly D-1641 outlfow requirements.	
60	1A-41	12-19	**DSC's Delta Plan's Projects:** Like the BDCP, the DSC Delta Plan proposes projects to achieve co-equal goals and has an EIR that is programmatic. Many of the projects in the DSC's Delta Plan overlap with the BDCP CMs 1-22. What is the relationship between BDCP EIR/EIS and Delta Plan EIR? Full disclosure should be made in the BDCP EIR/EIS of the similar nature of the conveyance and habitat projects, impacts, and mitigations and explain or how they differ from each other and which document and projects supersedes the other in terms of project design and mitigation. What are the consequences if BDCP conflicts with the Delta Plan? Also, this section fails to describe the DSC's role in implementation and governance of BDCP. Having too many entities with jurisdiction and overlapping responsibilities was one of the primary reasons given by the Legislature for creating the Delta Stewardship Council in 2009, yet it unclear how these two different EIRs will work together. **Recommendation:** Expand this section to describe	

			the conveyance and habitat similarities and differences between Delta Plan and BDCP CMs 1-22, and clarify which EIR will supersede/trump the other in the event they are both approved. Add language explaining the role the DSC plays in implementation and governance of BDCP.	
61	1A-41	35-40	**Delta Conservancy:** What is the relationship between the projects and activities in the Conservancy's strategic plan and the BDCP? Will the Conservancy have a role in the implementation of any BDCP CMs 1-22? If so, the Conservancy's duties, statutory directive and authority, and role in BDCP implementation should be explained in this section. What are the consequences, if any, if the BDCP CMs 1-22 and implementation conflict with the Conservancy's Strategic Plan? **Recommendation:** Expand this section to describe how the Conservancy's Strategic Plan relates to the BDCP and what role the Conservancy will play in governance and implementation of BDCP.	
62	2-1	29-40	**Project Objectives, Purpose, Need:** This section declares "continuing subsidence of lands within the Delta, increasing seismic risks and levee failure" as factors that contribute to conflicts over Delta water supply and the Delta's ecological health and as a basis for justification for re-designing the water conveyance system (CM1). Yet, the BDCP and this EIR/EIS does not propose to build the CM1 facilities outside of the earthquake area and floodplain, but instead proposes building the new conveyance facilities (CM1) in the same area the EIR/EIS claims is at great risk of earthquake and all facilities will be built in the same floodplain. In addition, the BDCP EIR/EIS CM1 proposes to excavate and "borrow" dirt/soils/materials from Delta islands which the BDCP EIR/EIS claims is one of the activities that caused historical Delta land subsidence which lowered Delta land elevations and increased the risk of flood. The BDCP EIR/EIS ***cannot*** have it both ways. The BDCP EIR/EIS cannot claim the risks of Delta earthquakes and floods as the justification for needing CM1 and then propose to build new facilities proposed in CM1 in an area with the ***same risk*** of earthquake and flood that currently exists. The BDCP EIR/EIS needs to choose either: 1) The Delta is too risky due to earthquakes and floods and therefore too dangerous a place to build the facilities proposed in the EIR/EIS and CM1 should be eliminated; or 2) The risk of catastrophic multiple levee failure from earthquakes and floods is not as great as this EIR/EIS claims and is therefore safe to build the	

			facilities in CM1 in the Delta and the BDCP EIR/EIS will need to offer alternate reasons for justifying the need to build the facilities in CM1 other than risk of earthquake and flood. As mentioned in earlier comments (#48-51), there are no recorded examples of levee failures from earthquakes and no scientific studies and reports showing subsided land increases hydraulic load on levees and compromises their stability. In fact, the most recent study of how Delta levees would fare in an earthquake was UCLA tests in the Delta of a 7.0 earthquake seem to show Delta levees hold up quite well in an earthquake event, so the BDCP EIR/EIS claim that the levees are falling lacks credibility. Therefore, the justification given for the need for CM1 of the BDCP EIR/EIS is not substantiated by facts or scientific studies and only serves to create a Chicken Little mentality to scare people into believing the sky is falling (or levees in this case) in order to justify and convince beneficiaries this project is need and to pay for such a costly endeavor which is an old 20th Century design which poses the same amount of risk to water supply reliability as the existing thru-Delta water conveyance system. In addition, as NDWA's comment #49 points out, the excavation and removal of soil materials from the interior Delta islands to build CM1 facilities will in fact exacerbate and increase land subsidence in the Delta and consequently increase the risk to the new CM1 facilities, particularly in light of sea level rise projections in the BDCP EIR/EIS. **Recommendation:** The BDCP Purpose and Need and Project Objectives should be modified to eliminate continuing subsidence of Delta lands and increasing seismic risk of levee failure as justification for BDCP in general and CM1 in particular unless validated scientific documentation is provided to support such claims and the BDCP EIR/EIS abandons its plan to use Delta island soils as building materials for CM 1 and finds these materials from another source that won't lower Delta land elevations further below sea level.	
63	2-3	13-16	**See NDWA comment #62.**	
64	2-4	10-25	**Restore Full Contract Amounts:** The very fact that lines 15-25 attempt to clarify and/or moderate lines 10-14 are an indication that it is inappropriate for this Conservation Plan to state delivery of up to full contract amounts as a Purpose. This Purpose was strenuously objected to by NDWA and other members of the BDCP Steering Committee, AFTER	

			it had already been decided and adopted by Project Proponents behind closed doors and without the benefit of public discussion or knowledge. The NDWA believes a Project Purpose that proposes significantly increasing water exports out of an already stressed estuary is the wrong policy and should be stricken from the BDCP. We agree with the California Supreme Court's following opinion voiced in its evaluation of the CALFED Bay Delta Program: "The CALFED Program is premised on the theory, as yet unproven, that it is possible to restore the Bay-Delta's ecological health while maintaining and perhaps increasing Bay-Delta water exports through the CVP and SWP. If practical experience demonstrates that the theory is unsound, Bay-Delta water exports may need to be capped or reduced." [emphasis added] The health of the Delta estuary's ecosystem has only declined since this opinion was rendered, therefore we contend it is inappropriate to have the BDCP Purpose propose the ability for higher amounts of Delta water to be exported on an annual basis. This Purpose is also in conflict with existing CA law, the Delta Reform Act, which includes provisions for reducing reliance on the Delta for water supply. By committing to delivery of up to full contract amounts, this BDCP Purpose, could inappropriately result in putting junior right water holders in a higher priority than senior water right holders which is also against state law. It is inappropriate for unachievable expectations to be permitted in an HCP or even promised to BDCP Proponents (water exporters in particular) as such false expectations prevents the BDCP Proponents from being able to accurately determine whether the water delivery costs pursuant to how much water can actually be delivered with implementation of BDCP are "not so high as to preclude, and in amounts that are sufficient to support, the financing of the investments necessary to fund construction and operation of facilities and/or improvements" as stated in the Project Objectives on lines 20-25, page 2-3. This creates an unacceptable tension that will result in either pressure for BDCP implementation to increase Delta water exports that could further harm the Delta ecosystem or a perceived failure to meet water supply expectations by the BDCP Proponents. If the BDCP keeps "deliver full contract amounts" as one of the Purposes of this Plan and EIR/EIS, then the EIR/EIS needs to add an alternative that analyzes the environmental and economic effects of the dual conveyance actually	

			delivering full contract amounts. **Recommendation:** Delete lines 10-14 and replace with language that balances water export supply availability with competing beneficial uses based on water right seniority and provide clarity regarding actual "surplus water" available for export needs. Add a new alternative to the EIR/EIS or modify existing alternatives to provide analysis of the environmental and economic impacts of the new CM1 conveyance facilities combined with existing South Delta facilities (dual conveyance) delivering full contract amounts.	
65	4-1	16-23	**Timeframes:** Agree that the BDCP CMs need to be phased in a balanced manner so the programmatic environmental commitments (CMs) and mitigation can occur before or concurrent with CM 1 water facilities. BDCP lacks a strategic plan or timeline for moving habitat measures from being just conceptual to implementation. Therefore, as stated earlier, the BDCP fails to integrate and coordinate water supply and ecosystem measures into one plan as long as have BDCP split into two: Project Level and Program Level. Without timeline and prioritization schedule that is directly tied to the implementation of CM 1 (similar to double-joining legislative bills), the habitat/species measures are relegated to a "trust us" status for implementation. **Recommendation:** Please reference where the schedule and deadlines for implementation of CMs 1-22 can be found.	
66	4-2	6-19	**See NDWA Comment #1,2, and11.**	
67	4-2	20-21	**CM 1 Design Info:** The Preliminary Draft BDCP and EIR/EIS lack sufficient design information, specific locations and size of CM 1 facilities for NDWA to properly evaluate this action's impacts. EIR/EIS needs to provide more detailed maps and appendices in order to have enough information for CM 1 to be ready for permitting at a project level. **Recommendation:** Release more maps and appendices which give more details and specifics regarding all of the components of CM 1, including temporary construction impacts.	
68	4-2	35	**SWP & CVP Operations:** This section fails to provide a bullet identifying in-Delta water supply availability and quality as being affected by changes in SWP & CVP facilities. **Recommendation:** Add a new bullet after line 35, "In-Delta water supply availability and quality."	
69	4-3	3-6	**Terminology:** The note to lead agencies indicates the termi 'constructability' refers to footprint of	

			ground disturbances that is both temporary and permanent impacts. However, the Note fails to mention how long "temporary" is under the BDCP construction phase, which results in a lack of transparency of the long-term nature (9-years) of impacts described as "temporary" in the Plan. **Recommendation:** This note should add language making clear that "temporary" footprint ground disturbances means impacts could continue/occur over a 9-year period.	
70	4-5	2-5	**Appendix 4B:** This *Modeling Tools* appendix containing detailed assumptions for the SWP and CVP operations is not available, therefore as mentioned previously prevents NDWA from offering its expertise on an issue which is vitally important to the NDWA Contract. **Recommendation:** Release all appendices, including 4B to Cooperating Agencies at least a month prior to release of the Draft EIR to the public, so we can analyze and comment on its adequacy.	
71	4-5	20-28	**Appendix 3D:** As part of existing programs, projects, and policies, Appendix 3D should include in its assumptions having to meet the water quality and availability criteria in the NDWA 1981 Contract. **Recommendation:** Make sure Appendix 3D includes meeting the NDWA 1918 water quality and availability criteria in its assumptions of existing conditions.	
72	4-8	7-8	**Environmental Commitments:** Appendix 3B is unavailable, so cannot determine if environmental commitments are sufficient. NDWA requests that Appendix 3B also contain 'economic commitments,' since this HCP will benefit areas outside the Plan Area and have significant and permanent detrimental impacts in the Delts (Plan Area). **Recommendation:** Expand Appendix 3B to include economic impact commitments.	
73	31-1	17	**Fulfills Commitments:** It is difficult to see how a 4-page Chapter for a five-county HCP with such a high level of uncertainty due to half the Plan being programmatic and the other being project-level with more than 100,000 plus acres proposed to be permanently converted from their current economic use can possibly "fulfill" the requirement to address irreversible and irretrievable commitment of resources. This Chapter is woefully inadequate and does not even begin to scratch the surface of addressing the significant permanent irreversible and irretrievable commitment of	

			resources associated with removing water from a natural estuary for export and the extensive footprint of converting land permanently and temporary (9-year) impacts of construction. More importantly, this Chapter fails to even mention one of the primary consumption of one resource: the removal of water from its natural estuary to be transported and consumed in other locations. Many others are either omitted or not discussed in enough detail. In light of the significant effects each Delta county is likely to incur, yet the difficulty they face in identifying the cumulative impacts for each county in such a large regional document, the EIR/EIS should disclose the total temporary construction and permanent impacts associated with the implementation of the BDCP alternatives in each of the five Delta counties relating to transportation, emergency services, water supply, drainage and flood protection, agricultural production, groundwater, and water quality. Separating each county and listing the total impacts to each county for each alternative will allow each county to easily see the impacts and assess if the proposed mitigations are appropriate. Suggest a summary list of all potential environmental and economic impacts and mitigation be broken out by county either in the 'summary of the alternatives screening or impacts and mitigation measures related to BDCP alternatives' currently being developed for the Executive Summary OR create a new Chapter to the EIR/EIS which breaks down the individual impacts/mitigation for each county. **Recommendation:** A great deal more work needs to be done on this Chapter to capture and quantify the extent of permanent impacts associated with such a large HCP which proposes such massive land use changes to benefit service areas outside of the Plan Area. Add a matrix grid or Appendix on the impacts for each CM broken down by each county.	
74	31-1	34	**Commitment of Resources:** The bullets in lines 25-34 fail to mention the consumptive use of water that is proposed to be removed from a new location in an already stressed natural estuary. **Recommendation:** A new bullet should be added after line 34: *Removal of water from natural estuary for consumptive use in arid areas of the State."*	
75	31-2	13-14	**Maintenance Services:** Since under BDCP, dual conveyance and therefore use of Delta levees for water conveyance is contemplated under all alternatives in the EIR/EIS, then levees should be	

			added to this bullet as needing an increased commitment of public maintenance services. **Recommendation:** Add "*levees*" to the examples in parentheses that require increased commitment to maintenance services.	
76	31-2	31-32	**Short Term:** A 9-year construction period is not short term in anyone's definition, therefore short term should be either dropped in reference to construction period or the 9-year duration clearly indicated. **Recommendation:** Change "Short Term" as the terminology for defining total duration of construction, to "Decade-long Construction Period," which more accurately depicts the duration of impacts.	
77	31-3	1-8	**Short Term Losses:** Again, as mentioned in NDWA comment #76, "Short Term" is an inaccurate and misleading term to use for these impacts since they will last for almost a decade (9 years).	
78	31-3	1-8	**Short Term Loss Examples:** The EIR/EIS fails to mention significant additional construction period losses: increased localized flooding; reduced Delta water quality for drinking, agriculture and other beneficial uses; reduced water availability due to altered surface and groundwater elevations; job losses in the Plan Area. **Recommendation:** Add new bullets to add more examples of losses: *increased localized flooding; reduced Delta water quality for drinking, agriculture and other beneficial uses; reduced water availability due to altered surface and groundwater elevations; job losses in the Plan Area.*	
79	31-3	9	**Short Term Benefits:** Reference to increased jobs and revenues should be clarified that these benefits may be offset by loss of jobs and revenues in the Plan Area. **Recommendation:** Make clear that increased jobs and revenues may be offset by job losses and revenues in the Plan Area caused by implementation of BDCP.	
80	31-3	10-19	**Long Term Losses:** The EIR/EIS fails to mention significant additional long term losses: increased localized flooding; reduced Delta water quality for drinking, agriculture and other beneficial uses; reduced water availability due to altered surface and groundwater elevations; job losses in the Plan Area. **Recommendation:** Add new bullets to add more examples of permanent losses: *increased localized flooding; reduced Delta water quality for drinking, agriculture and other beneficial uses; reduced water availability due to altered surface and*	

			groundwater elevations; job losses in the Plan Area.	
81	31-3	21	**Long Term Gains:** Improvement to water supply reliability is primarily attributed to service areas outside the Plan Area, and in fact, a reduction in water supply reliability may be experienced in Plan Area. **Recommendation:** Modify this statement on long term gains as one that primarily is to be experienced/gained by service areas outside of the Plan Area.	

BDCP EIR/EIS Review Document Comment Form

Document: 2nd *Administrative Draft—Chapter No. 5 Water Supply, 6 Surface Water, and General Comments - Part I*

Comment Source: North Delta Water Agency
Submittal Date: July 31, 2013

No.	Page	Line #	Comment	ICF Response
1	5-24	22-33	**5.1.2.6 REGIONAL AND LOCAL DIVERSIONS FROM THE DELTA** North Delta Water Agency - The description of the NDWA is missing some important Contract elements that are directly related to Chapter 5 Water Supply and adverse impacts to water supply availability for water users in the north Delta created by the implementation of BDCP. *RECOMMENDATION: We therefore request the description be modified as follows: The North Delta Water Agency (NDWA) which includes about ~~277,000~~ 300,000 acres within ~~the northern Sacramento and San Joaquin Delta~~ portions of Sacramento, San Joaquin, Solano, and Yolo counties, was created in 1972 by ~~an~~ a special act of the California Legislature. The majority of the lands within the NDWA are used for agricultural production, but the area also supports urban, commercial including the Deep Water Ship Channel and Sacramento Port, recreational and significant wildlife uses. These lands are dependent on water supply from in-channel Delta diversions for irrigation and other beneficial uses via numerous small pumps and siphons. NDWA's primary purpose is to ~~assure and protect the water supply and water quality for landowners within the agency boundaries~~ enforce an agreement entered into with the California Department of Water Resources (DWR) in 1981 wherein the State agreed not to alter the Delta hydraulics in such manner as to cause a measurable adverse change in the ocean salinity gradient and to assure the lands within the Agency of a dependable supply*	

			of water of suitable quality sufficient to meet present and future needs through year-round criteria monitored at seven locations. ~~*NDWA entered into a contract with the DWR in 1981 to assure a dependable water supply of suitable quality. The contract provides that all agency water users may divert water from Delta channels for reasonable and beneficial uses on lands within the agency boundaries for agricultural and M&I purposes.*~~ *The contract provides for annual payments by the Agency to compensate for the water required from the SWP to accomplish the water quality and quantity commitments contained in the contract. The* ~~*contract also provides*~~ *amount paid by the Agency to the State of California acknowledges the riparian and other water rights available to the lands within the Agency and only compensates the State for water from the SWP that DWR* ~~*shall*~~ *must furnish* ~~*as may be required*~~ *within NDWA to the extent not otherwise available under the individual water rights of the water users. The contract also provides that all water users within the Agency have the right to divert water from Delta channels for reasonable and beneficial uses on lands within the agency boundaries for agricultural and M&I purposes and obligates the State to defend the use of water required from the SWP to sustain the water quality criteria and usage of water within the NDWA. In a 1998 Memorandum of Understanding, DWR recognized its legal responsibility under Article 2 of the contract for meeting any water quality objectives that the State Water Resources Control Board may assign to any water right holders within the boundaries of NDWA. Under the terms of the contract the State shall not convey water so as to cause a decrease or increase in the natural flow, or reversal of the natural flow direction, or to cause the*	

			water surface elevation in Delta channels to be altered, to the detriment of Delta channels or water users within the Agency. If lands, levees, embankments, or revetments adjacent to Delta channels within the Agency incur seepage or erosion damage or if diversion facilities must be modified as a result of altered water surface elevations as a result of the conveyance of water from the SWP to lands outside the Agency, the State shall repair or alleviate the damage, shall improve the channels as necessary, and shall be responsible for all diversion facility modification required. ~~*The contract provides that water within the boundaries of NDWA will be of suitable quality through year-round criteria monitored at seven locations. These criteria prevent salt water intrusion or other factors from adversely affecting the quality of water within NDWA.*~~	
2	5-83 thru 5-86	All-inclusive	**IMPACT WS-2: CHANGES IN SWP/CVP WATER DELIVERIES** This mitigation needs to address ALL impacts to ALL parties, not simply mitigate adverse impacts to SWP/CVP facilities and water users. Impact WS-2 fails to recognize or identify the impacts to all beneficial uses or other SWP water contractors such as NDWA in the Delta region caused by BDCP operational changes in SWP and CVP deliveries. In light of the 1981 NDWA/DWR Contract mentioned previously, the Agency is particularly dismayed and troubled by the fact that Impact WS-2 fails to include a section recognizing the North Delta Agriculture and North Delta Municipal and Industrial Deliveries assured to all lands within the Agency or to identify how this region will be impacted by changes in water supply accessibility due to changes in Sacramento River and North Delta slough surface water elevation and flow changes mentioned in Chapter 5 of the Plan. The changes in the Delta stated in Chapter 5 Effects Analysis of the Plan that affect in-Delta water supply include, but are not limited to: • *BDCP will fundamentally change the hydrodynamics of the Delta.* ***Chap 5, page***	

			5.3-2. • *A decrease of 6,000 cfs in the Sacramento River could result in as much as a 3-foot reduction in river stage, although understanding of how notch flows would affect river stage is incomplete.* ***Chap 5, page 5C.5.4-6.*** • *Operations result in changes in flow and potentially changes in water quality, habitat, and predation.* ***Chap 4, page 4-20.*** • *Construction of facilities within or adjacent to waterways could change surface water elevations or runoff characteristics.* ***EIR/EIS Surface Water, page 6-43.*** • *The median diversions into Sutter and Steamboat Sloughs are lower under the evaluated starting ops because of the Fremont Weir notch increases the diversions to the Yolo Bypass and because north Delta intakes reduce the Sacramento River flow at these two sloughs. The reductions in the Sutter/Steamboat Slough diversions were about 40% of the simulated north Delta intake diversions.* ***Chap 5, page 5.3-10.*** • *Predicted reduced monthly median diversion flows to DCC and Georgiana Slough for evaluated starting ops because the north Delta intakes reduced the Sacramento River flow. The average annual diversions into the DCC and Georgiana Slough were about 3,750 TAF (24% of the Sacramento River flow at Freeport) for the existing conditions and were reduced to about 3,50 TAF (21% of Sac River flow) for the BDCP ops.* ***Chap 5, page 5.3-10.*** • *North Delta intakes combined with diversion of water into Yolo Bypass (CM2) inevitably would result in less Sacramento River flow below intakes with potential for greater incidences of Sac River flow reversals in the vicinity of Georgiana Slough and the DCC.* ***Chap 5, page 5C.4-78.*** • *In addition to flows from new north Delta intakes, BDCP habitat restoration may modify hydrodynamics in the Delta. These hydrodynamic changes in turn can change salinities, DO, turbidity, and flows.* ***Chap 5, page 5C.1-1.***	

			The changes in water elevations and Delta hydrodynamics (changes in natural flows) mentioned in Chapter 5 (see bullets above) of the Plan will not only result in a significant adverse impact on water deliveries for the numerous small pumps and siphons in the NDWA if they are stranded high and dry due to reduced surface water elevations in any rivers, channels, and sloughs in the NDWA under CEQA/NEPA, but this water conveyance impact is also covered in the 1981 contract as detrimental to NDWA water users and must either be avoided, repaired, and alleviated by the State as mentioned in Comment #1. Loss of availability/access - Chapter 5, Water Supply, fails to identify or discuss water supply impacts to in-Delta water users despite EIR/EIS chapters 6 (Surface Water) and 7 (Groundwater) making it clear that de-watering during construction of CM1 will result in lowering groundwater elevations by up to 10 feet and possibly stranding both ag and domestic water supplies and CM1 and CM2 combined result in lowering the Sacramento River by 3 feet and potentially stranding local diversion intakes in the river, channels and sloughs. The EIR/EIS fails to acknowledge, analyze, or mitigate these significant adverse water supply impacts. No impacts or mitigations identified for in-Delta water users. This is a HUGE omission of water supply disruptions that will be experienced by in-Delta water users due to stranding of local intakes from the lowering of Sacramento River/Delta channels and Delta groundwater levels due to CM1 construction and CM2 implementation. EIR/EIS needs to include the level of in-Delta water supply impacts and appropriate mitigations. *<u>RECOMMENDATION:</u> 1) Add new sections in Impact WS-2: Change in SWP and CVP deliveries to include changes in water deliveries to Delta water users as a result of changes in water elevations and natural flows identified in Chapter 5 of the Plan that would result in significant adverse impacts. 2) Add a mitigation that specifies the changes in BDCP water operations or additional physical features that will be added to CM1 to avoid, repair, and alleviate the detrimental effects on NDWA water users in accordance with the Contract. Providing*	

			this as part of the project mitigation now will be far less expensive than providing later as part of NDWA's enforcement of Contract provisions.	
3	5-83	19	**ALT 4 CHANGES TO DELTA REGULATORY REQUIREMENTS** What exactly are the "changes to regulatory requirements" under all four Alt. 4 scenarios that provide operational flexibility? Do these regulatory requirements for BDCP water ops include changing the current salinity compliance point for D-1641 from Emmaton to Three Mile Slough? These changes could have a significant adverse impact on the water deliveries to the water users in the Delta and should be identified, analyzed, and mitigation offered in the Water Supply Chapter. *RECOMMENDATION: 1) Explain/specify exactly what "changes to regulatory requirements" are included in Alt 4, including any changes in SWRCB D-1641 criteria such as moving salinity compliance point from Emmaton to Three Mile Slough. 2) Explain whether all of the "changes in regulatory requirements" included in Alt. 4 scenarios are changes that will be permitted in the BDCP HCP and NCCP or whether those changes will require additional action by other entities such as the SWRCB and are therefore not actual changes that will be made via the issuance of BDCP permits once a ROD is finalized. 3) Identify whether any of these changes in X2, D-1641, and other regulatory requirements assumed in Alt. 4 will have adverse impacts on in-Delta water users. 4) Provide mitigation for any significant adverse impacts that can be anticipated under implementation of the "changes in regulatory requirements" included in Alt. 4.*	
4	5-85	16-22	**IMPACT WS-2: CHANGES IN SWP/CVP WATER DELIVERIES** Analysis - <u>A lead agency must identify all significant effects on the environment caused by a proposed project that cannot be avoided. However, the EIR/EIS must first perform a rigorous analysis that discloses the nature and extent of the impacts to support the conclusion that impacts are significant and unavoidable in order to provide the public and cooperating agencies with adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action.</u>	

			This analysis needs to address ALL impacts to ALL parties, not simply mitigate adverse impacts to SWP/CVP facilities and water users. Impact WS-2 fails to identify all the potential adverse impacts to in-Delta and other senior water right holders. This section states that all four Alt 4 scenarios result in changes to CVP Settlement Contract deliveries during dry and critical years compared to existing conditions, ranging from a 2-3% decrease due to Shasta Lake storage declining to a dead pool more frequently. However, the section also states "There would be no changes in deliveries to CVP Exchange Contractors under Alternative 4." Either the exchange contractors are losing 29 TAF to 59 TAF in dry and critical years or they are losing zero TAF of water in those years. Which is it? The answer cannot be both. Does Alt 4 allow for dead pool storage in Shasta Lake in dry and critical years to be part of the BDCP permits? If the BDCP Alt 4 relies on allowing Shasta Lake storage to decline to a dead pool or to violate SWRCB water quality requirements in the Delta in order to avoid any changes in water deliveries in critical or dry years to the exchange contractors, then this needs to be explained more clearly and how those water ops affect other water users, particularly in-Delta and other senior water right holders. *RECOMMENDATION: 1) Clarify whether BDCP permits under Alt. 4 will allow for dead pool storage levels in Shasta Lake in dry and critical years or whether the exchange contractors will receive less water deliveries in those years. The conflict between meeting both storage and water deliveries needs to be clarified. 2) If the BDCP permits under Alt. 4 allow for Shasta Lake dead pool storage levels in dry and critical years, then Impact SW-2 needs to include the impacts to Delta water quality and in-Delta water users and other area of origin senior water right holders anticipated under Alt. 4.*	
5	5-89	36-43	**IMPACT WS-3: EFFECTS OF WATER TRANSFERS ON WATER SUPPLY** <u>A lead agency must identify all significant effects on the environment caused by a proposed project that cannot be avoided. However, the EIR/EIS must first perform a rigorous analysis that discloses the nature and extent of the impacts to support the conclusion that impacts are significant and</u>	

			unavoidable in order to provide the public and cooperating agencies with adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action. This analysis needs to address ALL water supply impacts to ALL parties, not simply acknowledge adverse impacts to SWP/CVP facilities and water users. Impact SW-3 fails to properly identify adverse water quality and supply impacts to in-Delta water users associated with Alt 4 in dry and critical years when additional water transfers will occur. Early calls for releases from reservoirs in the spring of 2013 may be partially due to the increase in water transfers this year and according to a joint letter by the USBR/DWR on May 27, 2013 expressed concern over changes in reservoir storage levels that threaten the cold water storage for fish, so it is not "speculative to conclude whether or not additional water transfers would occur" as stated on lines 39-40. The USBR/DWR specifically requested in their joint letter to change the water year classification under D-1641 from dry to critical in order to protect the cold water storage for fish, which is likely to result in decreases in water quality from salinity intrusion in the South and Central Delta. Lines 18-19 on page 85 indicate all four scenarios under Alt 4 result in Shasta Lake dead pool in dry and critical years, so it is also not "speculative" on "whether any potential adverse effects on water supply would occur under Alt 4. As stated on lines 39-41 on page 5-24 and lines 1-2 on page 5-24 and lines 1-8 on page 5-26, the lands in the Delta are dependent on in-channel water supply of certain quality in order to be beneficially used, otherwise increased salinity caused by protecting cold water pool without reducing exports from North and South Delta pumping facilities as proposed in Alt 4 would result in reduced water deliveries in the Delta due to poor water quality, because farmers and homes can't use the water if is poor water quality. *RECOMMENDATION: 1) Amend the language in lines 36-43 to reflect the fact that occurrences on Shasta Lake storage (cold water storage for fish) this year may in fact be partially due to the increase in the number of transfers requested this year and*	

			will in fact result in adverse impacts to Delta water users. 2) Expand Impact WS-3 to recognize adverse impacts to in-Delta water users in dry and critical years where there's an increase in water transfers and the water ops under Alt 4 are implemented. 3) Add a mitigation measure to address the adverse water quality impacts to in-Delta water users in dry and critical years where there's an increase in water transfers that makes supplies unusable.	
6	5B-11	39-43	**WATER SUPPLY IMPACT ANALYSIS - OMISSIONS** Because the EIR/EIS, specifically Alt. 4, fails to provide any funding to improve levees critical to conveyance of water to the South Delta pumps the project is deficient in meeting the Project Objectives and Purpose and Need as outlined in 35-39 of page 2-1, Chapter 2: • *"Other factors, such as the continuing subsidence of lands within the Delta, increasing seismic risks and levee failures, and sea level rise associated with climate change, serve to further exacerbate these conflicts. Simply put, the system as currently designed and operated does not appear to be sustainable from either an environmental or an economic perspective, and so the proposal to implement a fundamental, systemic change to the current system is necessary."* In addition, Alt 4 fails to meet the additional project objective to guide the development of the proposed project and alternatives identified on lines 33-36 of page 2-3, Chapter 2: • *"To make physical improvements to the conveyance system that will minimize the potential for public health and safety impacts resulting from a major earthquake that causes breaching of Delta levees and the inundation of brackish water into the areas in which the SWP and CVP pumping plants operate in the southern Delta."* Current funding used by the State to fund the levee improvement program in the Delta comes primarily from Propositions 1E which is due to be exhausted in 2016 and there is no additional funding for levees provided in the 2014 water bond approved by the Legislature. The EIR/EIS fails to identify and	

			analyze the financial ability of the State or local agencies to in fact fund these levee improvements necessary for the conveyance of water under BDCP, which is significant oversight since the BDCP fails to include any direct funding for the maintenance and improvements of conveyance levees prior to or during the plan's 50-year implementation period. The annual budgets of Delta reclamation districts is typically very small, about $200,000 for non-urban districts, and the State does not have surplus general funds to contribute to these levee programs, so by the time Alt 4 is constructed in 2027 the funding for levee improvements is anticipated to be minimal for the decade prior. The BDCP Project Objectives are not met by the Plan relying on the State or local agencies that do not have identified funding sources sufficient to fund necessary levee improvements to minimize increased risk of failure between now and when the BDCP is implemented or during the 50-year life of the BDCP, therefore the risk to the reliable SWP/CVP water supply will still exist under Alt 4 so the EIR/EIS should identify the environmental impacts associated with this residual risk. In addition, the water operations as proposed in Alt 4 will not be able to provide the same water deliveries to SWP/CVP water contractors identified in the EIR/EIS if levee failures from subsidence, earthquake, or sea level rise occur and cause the shut-down of pumping at South Delta pumps which are relied on 51-53% of the time in Alt. 4, so this should be identified as a significant adverse impact to water exporters. *RECOMMENDATION: 1) Alt 4 should include a new Conservation Measure 23 to provide funding for specified levees in the Delta that are critical to the conveyance of water through the Delta to the South Delta pumps. 2) Properly identify the residual risk of levee failures that will reduce water export from the South Delta pumps due to lack of State or local agency levee improvement funding prior to BDCP implementation or during the 50-year permits as an unavoidable significant adverse impact on SWP/CVP water deliveries if no levee funding is provided as mitigation for the impact in the EIR/EIS.*	

7	5B-12	16-18	**5B.2.2.1 SEISMICALLY INDUCED LEVEE FAILURES – WAIVER OF CURRENT LEGAL AND REGULATORY MANDATES** It is NOT reasonable for the EIR/EIS environmental analysis to: *"expect that long-standing and regulatory mandates could be altered to provide the ability to pump water for SWP and CVP under emergency conditions resulting from the reduced water supply conditions related to a seismic event."* Unless the specific alterations to these regulatory mandates are included in the BDCP permits, then this is NOT an action the EIR/EIS can "expect" to occur. This is an arbitrary and capricious assumption that the EIR/EIS inappropriately makes, obfuscating the actual significant environmental impacts to SWP/CVP water supplies. *RECOMMENDATION: 1) Delete the last sentence on page 5B-12, lines 16-18. 2) Either add an Impact to this chapter regarding the unavoidable significant adverse environmental impacts to water supply under Alt 4 due to residual risk of levee failures from earthquake or sea level rise that will result in a temporary shut-down of the South Delta pumps or provide a mitigation or new Conservation Measure to provide BDCP funding for improvement of Delta levees critical to the conveyance of SWP/CVP water supplies.*	
8	5B-12	34-39	**5B.2.2.2 FLOOD-RELATED FAILURES – LEVEE FUNDING OMMISSIONS** See Comment #6 regarding current Prop. 1E bond fund going away in 2016, no new Delta levee funding provided in the 2014 water bond approved by the Legislature, and insufficient State General Funds or local agency ability to provide funding to State programs, including Delta Levees Subventions and Delta Special Flood Control Projects Programs, so levee system maintenance, repair, and levee improvements can be made to assure stability and reliability of water conveyance to South Delta pumps to meet water delivery amounts anticipated in Alt. 4. *RECOMMENDATION: Either add an Impact to this chapter regarding the unavoidable significant adverse environmental impacts to water supply under Alt 4 due to remaining residual risk of levee failures from earthquake or sea level rise because*	

			no levee improvements included in any of the BDCP CMs, therefore the potential to result in a temporary shut-down of the South Delta pumps sometime during the 50-yr permit or provide a mitigation or new Conservation Measure to provide BDCP funding for improvement of Delta levees critical to the conveyance of SWP/CVP water supplies.	
9	5-33	10-18	**5.2.1.3 USACE - Permits** DWR may in fact require additional USACE permits for the SWP's diversions of 650,000 af of water from the Sacramento River into the Yolo Bypass under CM2 for purposes complying with federal BiOps to mitigate for jeopardy caused by the operation of SWP/CVP pumps in the South Delta. This is not only a new diversion point, but must be analyzed for the effects on other beneficial uses and water user of diverting 650,000 af of water into the Yolo Bypass as a habitat measure to create a fish farm on a flood control facility that is part of the State Plan of Flood Control as mitigation for water conveyance effects of SWP/CVP. This is a new diversion from the Sacramento River and should be analyzed as such. *RECOMMENDATION: Confer again with USACE to properly characterize the 650,000 af water diversion from the Sacramento River in the Yolo Bypass as a new diversion in order to provide mitigation for the operation of the SWP/CVP South Delta pumps as their permit conditions may alter SWP/CVP water supply deliveries.*	
10	5-40	19-28	**QUANTIFICATION OF SWP/CVP EXPORTS AND DELIVERIES** According to effects identified in Chapter 5 Effects Analysis of the Plan, the EIR/EIS is incorrect in its conclusion that there are no water supply effects or impacts associated with due to changes in Delta outflow and SWP/CVP upstream reservoir storage. As outlined in Comment #2, Chapter 5 Effects Analysis of the Plan clearly states in-Delta water supply is affected by changes in water surface elevations and natural flows when the existing siphons and intakes throughout the Delta are left high and dry from reduced Sac River levels of 3-feet (during periods 6,000 cfs diverted at Fremont Weir into Yolo Bypass under CM2) and more when combined with another 3,000-9000 cfs diverted into the new North Delta intakes. Therefore, the EIR/EIS analysis does NOT match the impacts identified in the Plan. Failure to properly identify,	

			analyze, or mitigate these impacts that are clearly mentioned in Chapter 5 of the Plan in the EIR/EIS is a major omission that must be corrected. *RECOMMENDATION: 1) Add a new Water Supply Impact to this chapter that properly identifies and analyzes the significant adverse impacts to in-Delta water supplies created when water elevations in the Sacramento River and channels are reduced by 3-feet or more, reverse flows are created, muting of tidal surges, and general changes in hydrodynamics as identified in Chapter 5 Effects Analysis of the Plan. 2) Add a new Mitigation Measure to address these significant adverse Water Supply Impacts to in-Delta water users.*	
11	6-44	4-8	**6.3.1.4 PROJECT AND PROGRAM-LEVEL COMPONENTS** <u>The EIR/EIS relies extensively on deflecting the responsibility of properly analyzing impacts by deferring the environmental analysis of CMs2-22 to a later time and onto other agencies, which leaves our agency with inadequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action under the Preferred Project.</u> Reliable surface water resources impacts to in-Delta water users cannot be accurately determined pursuant to this EIR/EIS because Section 6.3.1.4 discloses that the changes in SWP/CVF surface water resources under this analysis are only evaluated at project level if sufficient detail was available, and could only make assumptions regarding the location and extent of tidal marsh restoration because it is only analyzed at a programmatic level in this EIR/EIS. Therefore, the true environmental impacts on in-Delta water users is insufficient for our Agency to determine if the mitigations offered are sufficient or not until the project level environmental analysis is provided. The information is far too general, even for a programmatic document, to enable decision-makers to make findings as to whether particular mitigation measure would be effective and enforceable, much less whether they would be feasible. In addition, portions of this EIR/EIS are already being "piece-mealed" in accordance with EIR/EIS documents that are already in development and/or released to the public as part of BiOps/FRPA	

			implementation with project level analysis of projects that are substantially the same as the projects in CM 2 (Fremont Weir Notch/Yolo Bypass Inundation) and CM3 (Cache Slough Complex: Lower Yolo Restoration and Prospect Island Projects). Therefore, there is some "project level" environmental analysis on CM2 and CM3 that is in fact available to be included in the BDCP modeling runs and *Effects Analysis* in order to provide in-Delta water users a more accurate and reliable analysis of environmental impacts of BDCP as a whole on surface water resources and water supply reliability. *RECOMMENDATION: 1) Complete a project level analysis of all elements of CM 2-22 prior to implementation of CM1; or 2) add in the project level information from the individual EIR/EIS documents being prepared under BiOps/FRPA to the BDCP models and Effects Analysis modeling runs prior to selecting a Preferred Alternative.*	
12	6-97	10	**6.3.3.9 ALTERNATIVE 4 – DUAL CONVEYANCE WITH PIPELINE/TUNNEL AND INTAKES 2, 3, AND 5 (9,000 CFS, OPERATIONAL SCENARIO H)** It is inappropriate for the EIR/EIS to refer to the construction of **only** three intakes. This is a comparison between Alt 4 and Alt 1A, which is inappropriate as the correct comparison should be between Alt 4 and Existing Conditions which means the addition of three new intakes and the additional diversion of up to 9,000 cfs which does not occur under EC. *RECOMMENDATION: 1) Delete the word "only" from line 10, page 6-97.*	
13	6-98	28-30	**IMPACT SW-2: CHANGES IN SACRAMENTO RIVER AND SAN JOAQUIN FLOOD FLOWS** Sacramento River at Freeport - Missing an important word. The last sentence in this paragraph concludes Alt 4 would not result in impacts on "flow conditions" in the Sacramento River, which is incorrect in terms of this specific impact which relates to "flood flows" and because there will be adverse impacts on reduced flows conditions in the Sacramento River under Alt 4, so is necessary to specify "flood flows" in order to provide context of the limited meaning here. *RECOMMENDATION: Add the word "flood" after 'impacts on' in line 29.*	

14	6-99	25-27	**IMPACT SW-2: CHANGES IN SACRAMENTO RIVER AND SAN JOAQUIN FLOOD FLOWS** Sac River upstream of Walnut Grove - Missing word again. Same comment as above. *RECOMMENDATION: Add the word "flood" after 'impacts on' in line 26.*	
15	6-101	16-18	**IMPACT SW-2: CHANGES IN SACRAMENTO RIVER AND SAN JOAQUIN FLOOD FLOWS** Yolo Bypass at Fremont Weir - Ditto. *RECOMMENDATION: Add the word "flood" after 'impacts on' in line 17.*	
16	6-101	37-42	**IMPACT SW-2: CHANGES IN SACRAMENTO RIVER AND SAN JOAQUIN FLOOD FLOWS** Yolo Bypass at Fremont Weir - Misleading conclusions and missing other impacts associated with Alt 4 that would affect flood management adversely. Conclusions on line 37-39 are not quite accurate and therefore misleading. While it may be true that Alt 4 "would not result in adverse effects on flood management" or "an increase in potential risk for flood management" in terms of "Changes in Sacramento and San Joaquin River flood flows" as stated in the title of Impact SW-2 on line 12 of page 6-98, the current wording in lines 37-42 are broadly stated as if there is no other flood management risks created by Alt 4 which is not true. There are in fact other effects on flood management from Alt 4 from CM1-4 in particular associated with increased erosion and seepage which result in additional costs to local levee maintaining entity to repair and maintain. Yolo Bypass Flood Management, lines 38-40 states: "***CEQA Conclusion:*** Alternative 4 would not result in an increase in potential risk for flood management compared to Existing Conditions when the changes due to sea level rise and climate change are eliminated from the analysis." "No mitigation is required." Three problems with this CEQA conclusion: 1) particularly when determining flood risk you need to include, not eliminate, climate change and sea level factors as they may necessitate flood facilities improvements/modifications to keep up with their impacts; 2) sea level rise and climate change affect are factors that must be analyzed with the proposed project in terms of the cumulative	

			impacts; 3) this simple, narrow focus on only how much flood flow channel capacity the proposed project would utilize fails to recognize that the existing flood facility (Yolo Bypass) is already not performing to design conditions. The EIR/EIS should provide analysis regarding the current underperformance of the lower Bypass where narrows into a funnel at the bottom and has previously seen water levels go two feet above design stage in that area during flood events. The EIR/EIS should provide analysis and conclusion regarding how much the proposed water operations in Alt 4 increase flood risk above and beyond what is predicted impact from sea level rise/climate change. In addition, the EIR/EIS appears to have made the conclusions of no impacts from Sacramento River peak flows based on existing channel capacity and therefore failed to analyze what the new cfs flow on Sac River from Freeport to Courtland due to lost in-river channel capacity of 16.21 acres of in-water habitat during construction (9-10 years) and 12.3 acre in-water permanent footprint (EIR/EIS, Fish and Aquatic Resources Chapter, page Part 3 – 11-1). This narrowing of the Sac River will certainly constrain and reduce the current flood flow capacity, but does not appear to have been analyzed in the EIR/EIS. The narrowing of channel and reduction of cfs capacity for flood flows will put additional strain on levees in terms of erosion and available freeboard during a high water event. The reduced flood flow capacity in a four mile plus stretch of the Sac River due to construction of CM1 needs to be quantified, analyzed and mitigated with improvements to levee heights and stability which may require rocking or landside berms on both sides of the river to be paid for by BDCP. What will the width of the channel and the cfs capacity on the Sacramento River between Freeport and Courtland after conveyance facilities in CM1 are constructed? This is critical mitigation as the levees on both sides of the river are project levees that are part of the State Plan of Flood Control. *RECOMMENDATION: 1) Modify conclusion Impact SW-2 in line 37 to read: 'Alternative 4 would ~~not~~ result in adverse effects on ~~flood~~ the management of additional peak flood flows in the Sacramento and San Joaquin Rivers; 2) Amend first sentence starting on line 38 as follows: 'Alternative 4 would*	

			~~not~~ result in an increase in potential flood risk on the Sacramento River and for flood management costs associated with reduced channel flood flow capacity during high water events compared to Existing . . . . .'; 3) EIR/EIS needs to include an analysis of how much the Sac River is narrowed between Freeport and Courtland, quantify the loss of cfs capacity, identify any freeboard or levee stability/strength deficiencies that would be created due to more narrow channel to accommodate peak flood flows for levees on both sides of the rivers as well as upstream and downstream from CM1 facilities, and offer specific mitigations to address this reduced flood management capacity impact.	
17	6-102	1-2	**IMPACT SW-2: CHANGES IN SACRAMENTO RIVER AND SAN JOAQUIN FLOOD FLOWS** CEQA Conclusion - Disagree with the conclusion that Alt 4 would result in less-than-significant impact on flood management and the language also fails to specify the impact is specifically limited to impacts related to increased peak flood flows on Sacramento and San Joaquin River and cannot therefore be such a broad, sweeping statement of flood management generally. *RECOMMENDATION: 1) Amend conclusion on lines 1-2 as follows: '~~Accordingly,~~ Alternative 4 would result in ~~less-than-~~ significant adverse impacts on management of Sacramento River peak flood flows and flood management costs to local levee maintaining agencies. ~~No m~~Mitigation is required.*	
18	6-102	20-21 22-26	**IMPACT SW-3: REVERSE FLOW CONDITIONS IN OLD AND MIDDLE RIVERS** CEQA Conclusion - The conclusion here is in conflict with previous paragraph which states there will in fact be adverse impacts with all four scenarios with increased reverse flow conditions in Old and Middle Rivers in April under H1 and H3 and in May under all four scenarios. Reverse flows being "less likely under Alternative 4 on a long-term average basis" (line 5) except in April and May is NOT the same as "would not result in adverse impacts on Old and Middle River flow conditions" (line 20). The reverse flow conditions may be slightly better in 10 our twelve months, but it's worse for two months under two scenarios and worse for one month under all four scenarios. This begs the question in terms of analysis of how much	

			is the actual reduction in reverse flows and how much is the actual increase in reverse flows? Lines 22-26, CEQA Conclusion: Reverse flow conditions for Old and Middle River flows would be less likely under Alt 4 on a long-term average basis except in May in scenario H2 and H4 and in April and May in scenarios H1 and H3, compared to EC and NAA. Alt 4 would provide benefits related to reducing reverse flows in Old and Middle Rivers in June through March and adverse impacts in the form of increased reverse flow conditions in April and May, compared to EC. The CEQA Conclusion indicates adverse impacts in April and May, but FAILS to identify the CEQA level of significance or provide any mitigation. The Impacts should identify how much reduction in reverse flows (by frequency, severity, and percentage) in O&MR that is predicted under Alt 4 and conversely identify how much increase from EC and NAA would be experienced in April and May under Alt 4. The Impact should make clear whether the adverse impact (increase in reverse flows) in April and May are greater than the benefits (reduced reverse flows) in June thru March. Also, are there any other reverse flow conditions created by BDCP projects or water operations? If so, where are they? How frequent and significant are they? How long do the reverse flows last in each of these other areas? What are the water surface changes caused by the creation of these new reverse flows? How will the EIR/EIS propose to mitigate the impacts of the increase in reverse flows created in O&MR in April and May and in other areas of the Delta? In addition, this impact analysis should actually describe the impacts on water quality and aquatic species rather than simply referring to Chapters 8 and 11 to read those impacts as the context of whether the increase in reverse flows in April and May months may in fact outweigh any benefits from reduced flows in other months if April and May are critical to fish migration or water quality. *RECOMMENDATION: 1) Amend conclusion in lines 20-21 as follows: '~~Therefore,~~ Alternative 4 would ~~not~~ result in adverse impacts on Old and Middle River flow conditions <u>in April under scenarios H1 and H3 and in May under all four scenarios</u> as compared to the conditions without the project.'*	

19	6-102	25-26	**MITIGATION MEASURE SW-3: NONE PROVIDED.** Fails to identify CEQA or NEPA level of significance (is silent) of the impacts or to offer mitigation for impacts of increased reverse flows in April and May and instead refers reader to Chapters 8 and 11. If chapters 8 and 11 have mitigations to reduce impacts of increased reverse flows in April and May, then these mitigations should be mentioned here, if not, then a mitigation for this adverse impact needs to be quantified under CEQA/NEPA and mitigated here. *RECOMMENDATION: 1) Delete the last sentence of CEQA Conclusion and replace with following: 'Alternative 4 would result in significant adverse impacts on Old and Middle River reverse flow condition in April and May'; 2) Add a new sentence that states the specific Mitigation Measures from Chapter 8 and 11 that will address these significant adverse impacts and whether they will reduce the impacts to a level of insignificance.*	
20	6-103	1-8	**IMPACT SW-4: ALTER DRAINAGE PATTERNS AND INCREASE SURFACE RUNOFF RESULTING IN FLOODING FROM CONVEYANCE CONSTRUCTION** <u>Neither the Plan, this chapter, or Impact SW-4 contains a description of the baseline conditions that were used to determine the current drainage patterns on the islands where CM1 facilities will be constructed, hydraulics, surface runoff characteristics or where direct and indirect impacts will in fact occur. Without an adequate baseline, neither we as a Cooperating Agency, the Lead Agencies or the Permitting Agencies can adequately identify a complete list of all of the potential significant impacts, the severity of the impacts, or the ability of the project alternatives and mitigation measures to avoid or lessen such impacts.</u> CEQA Conclusion on lines 1-6 is incomplete and inadequate as it fails to identify baseline existing conditions, an accurate description of how and where the project will cause the adverse impact, or to include the other impacts that would occur as a result of altering existing drainage facilities, runoff characteristics, or river hydraulics. What about excessive runoff during non-peak flows that exceeds the area's drainage facilities? Adding to the system water amounts that exceed the system capacity during any time of the year has the potential to create	

			localized flooding. In addition, the analysis failed to: 1) study/review existing maps of the island drainage systems and determine where and for how long disconnections will occur and how they will affect the functionality of the rest of the drainage system to prevent localized flooding of entire island's population, structures, and farmland (drainage maps are readily available at DWR); 2) to provide a specific repair/reconstruction options to avoid/fix the disconnected drainage systems; 3) to provide assurance that the repairs will be paid for by BDCP; 4) to identify lands and land uses that will be adversely affected by localized flooding; 5) or disclose the nature and extent of any of these impacts. EIR/EIS fails to examine existing conditions in terms of existing drainage systems or whether construction will disconnect or disrupt the existing drainage facilities' ability to function/drain effectively. EIR/EIS fails to identify specific discharge locations, how many locations, the capacity of the discharge location or what its capacity availability is based on local usage/needs, or the discharge rates on a daily basis. Could significantly increase localized flooding if discharging into existing drainage facilities are already full with local discharges or if too small to handle proposed discharge rates even during "non-peak" conditions. EIR/EIS fails to identify how long dewatering and subsequent discharges will occur at each location. EIR/EIS fails to identify or analyze the additional maintenance works and costs BDCP will need to assume in order to keep the drainage facilities functioning in order to accommodate the dewatering discharges. Mitigation Measure SW-4 is inadequate and irrelevant because it does not account for impacts to ongoing ability of users/owners of existing drainage facilities to utilize their facilities. The drainage systems that currently exist on Delta islands, including where CM1 conveyance facilities will be built, are critical features necessary to keep the land behind the levees reclaimed for agricultural production. The importance of a functioning drainage system to agricultural activities is pointed out on page 7-5 of the EIR/EIS Groundwater Chapter: • *Maintaining groundwater levels below crop rooting zones is critical for successful agriculture,*	

			especially for islands that lie below sea level, and many *farmers rely on an intricate network of drainage ditches and pumps to maintain groundwater levels of about 3 to 6 feet below ground surface*. The accumulated agricultural drainage is pumped through or over the levees and discharged into adjoining streams and canal (U.S. Geological Survey 2000a). ***Without this drainage system, the islands would become flooded.*** [emphasis added] As stated in Chapter 7 of the EIR/EIS, the existing drainage facilities are "intricate networks," which means they have been carefully designed and located to work with the natural drainage patterns on the island and to function as a system. Therefore, any disconnection potentially renders the whole system inoperable. Since Chapter 7 further confirms that successful agriculture is dependent on the operation of this drainage system and clearly states the island will become flooded without the drainage system, the impacts identified on page 6-102, lines 36-37, are significant and adverse to the ongoing agricultural productivity of lands adjacent to the CM1 conveyance facilities: • *"result in temporary and long-term changes to drainage patterns, drainage paths, and facilities that would in turn, cause changes in drainage flow rates, directions, and velocities."* These impacts include: 1) localized flooding of homes/businesses and farmland that could result in loss of planted crops or prevent any crops from being planted that is exacerbated by the increase in runoff associated with the discharge of water from dewatering activities into local drainages (Impact SW-6) which increases the flows and water surface elevations; 2) increased costs to local landowners and reclamation districts to re-design and re-construct a functioning drainage system; 3) increased pumping costs to local landowners and reclamation districts to build new pumps in new areas and to drain the additional water put into the drainage system by CM1 dewatering activities. Therefore, the most significant impacts under SW-4 are <u>NOT</u> stormwater runoff from paved areas and sediment, but are long-term property and crop	

			damage (loss of beneficial use of the land) from localized flooding caused by the disconnection of the intricate drainage system that keeps the lands adjacent to the CM1 facilities reclaimed (drained and usable for historical and existing beneficial uses. <u>The conclusions in the EIR/EIS must be supported by substantial evidence – actual facts. They can be reasonable assumptions or expert opinions – but they must still be predicated and backed up by facts. Speculation does not constitute substantial evidence, and unsubstantiated narrative or expert opinion.</u> Lines 35-39 says Alt 4 would involve excavation, grading, stockpiling, soil compaction, and dewatering that would result in temporary and long-term changes to drainage patterns, drainage paths, and facilities that would in turn cause changes in drainage flow rates, directions, and velocities. Construction of cofferdams would impede river flows, cause hydraulic effects, and increase water surface elevations upstream. Fails to define "temporary" or "long-term" or what "changes" means in terms of specific locations of "changes", type of "change" (disconnect, overwhelm, reroute, destroy/eliminate, redirected impacts??), who will be impacted by these "changes", site-specific remedies/fixes, or who will pay the cost to fix damage/destruction/disconnection to existing facilities that constitute an inter-connected and coordinated drainage system. What is the definition of "temporary" and "long-term" in regards to changes to existing drainage systems? Does "temporary" mean the 10-year construction period? Does "long-term" mean permanent changes to the existing drainage systems? The EIR/EIS should be more specific about defining "temporary" and "long-term" in this regard. The EIR/EIS fails to identify a mitigation measure that will assure proper drainage is occurring during the "temporary" and "long-term" periods and should provide a Mitigation Measure such as BDCP paying to re-route/replace existing drainage system with a new system of pipes, canals, ditches, drainage pumps (including any increased pumping costs to the residents/RDs), et al that will keep the island properly drained to prevent localized flooding and allow productive agricultural activities to continues. The EIR/EIS fails to identify a mitigation measure to reduce to a level of insignificance of the reduced flood capacity in the Sacramento River, changes in water flow direction and	

			velocities, and increased water surface elevations upstream of the North Delta intakes resulting from the placement of cofferdams in the river. The EIR/EIS assumes, without evidentiary support in the record, that all the mitigation measures will be fully implemented where the project activities may have a direct or indirect effect and that the measures will in fact work to avoid or substantially reduce the significance of the adverse impacts, which may in fact not occur. The EIR/EIS additionally fails to account for and analyze impacts resulting from Project activities if the mitigation measures are not implemented or not working in terms of reducing the level of adverse impacts. Each RD has maps of the drainage systems and each will need to be consulted with regarding the best way to re-design in order to work with the island elevations and BDCP must pay for these new systems, their additional energy costs for pumping, and annual maintenance. BDCP will need to consult with the individual remaining farmers who are not eminent domained to find out where and how their irrigation facilities need to be re-built at full cost by BDCP. *RECOMMENDATION: Amend CEQA Conclusion as follows: "Alternative 4 would result in alterations to drainage patterns and drainage system performance, stream courses, and runoff; and potential to impede Sacramento River flows, cause hydraulic effects and for increased surface water elevations in the rivers and streams during construction and operations of facilities located within the waterway. Potential adverse impacts could occur due to: increased localized flooding due to disconnection of intricate existing drainage system necessary to keep island drained/reclaimed; damage to homes/structures and loss of crops; increased costs to local landowners and reclamation districts to re-construct a functioning drainage system and for additional pumping necessary to drain additional water from CM1 dewatering activities; and increased stormwater runoff from paved areas that could increase flows in local drainages, and from changes in sediment accumulation near intakes."*	
21	6-103	6-8	**MITIGATION MEASURE SW-4: REDUCE RUNOFF AND SEDIMENTATION** In order for a permitting agency to approve a project, the lead agency must provide feasible	

			mitigation measures or alternatives that would avoid or substantially lessen the adverse impacts of the project. Mitigation Measure SW-4 is not only insufficient, but it is disturbing because the mitigation appears to be one-sided in that it only addresses the impacts to the BDCP facilities in terms of reducing runoff from paved areas and removal of sediment to keep the intakes operational, while ignoring the significant damage caused to surrounding lands, structures, people, and economy. Since Impact SW-4 is very clear that the excavation, grading, stockpiling, soil compaction, and dewatering activities of CM1 will alter the intricate system of drainage patterns, paths, and facilities – then where is the mitigation to re-design and re-construct a new drainage system for the lands surrounding the CM1 facilities so that they can remain reclaimed and continue their current beneficial use of the land? Where is the mitigation to deal with the Impact SW-4 of changes in drainage flow rates, directions, and velocities caused by increased water added to the existing drainage system by dewatering activities? Where is the mitigation for impacts to species, recreation and in-Delta water supplies caused by impeding Sacramento River flows, creating changes in river/channel hydraulics, and increased water surface elevations? What about the impacts on local reclamation districts for increased levee maintenance costs for seepage and erosion damage caused by impeding river flows, changing hydraulic flows, and increasing water surface elevations? Sedimentation and surface runoff from pavement impacts pale in comparison to the significant adverse impacts from disconnecting the existing drainage system and increasing water surface elevations and hydraulics. As stated in Chapter 7 of the EIR/EIS, the existing drainage facilities are "intricate networks," which means they have been carefully designed and located to work with the natural drainage patterns on the island and to function as a system. Therefore, any disconnection potentially renders the whole system inoperable. Since Chapter 7 further confirms that successful agriculture is dependent on the operation of this drainage system and clearly states the island will become flooded without the drainage system, the impacts identified in SW-4 also apply to SW-5, and are significant and adverse to the ongoing agricultural	

			productivity of lands adjacent to the BDCP habitat restoration areas facilities. These impacts include: 1) localized flooding of homes/businesses and farmland that could result in loss of planted crops or prevent any crops from being planted that is exacerbated by the increase in runoff associated with the discharge of water from dewatering activities into local drainages (Impact SW-6) which increases the flows and water surface elevations; 2) increased costs to local landowners and reclamation districts to re-design and re-construct a functioning drainage system; 3) increased pumping costs to local landowners and reclamation districts to build new pumps in new areas and to drain the additional water put into the drainage system by any dewatering activities associated with habitat restoration. <u>This mitigation needs to address ALL impacts to ALL parties, not simply mitigate adverse impacts to BDCP facilities.</u> Mitigation Measure SW-4 (from Alt 1A) fails to meet this standard according to the following language used: • *"onsite drainage systems in areas where construction drainage is required."* ***Page 6-59, line 3.*** • *"for each construction location"* ***Page 6-59, line 4.*** • *"onsite stormwater detention storage is required"* ***Page 6-59, lines 6-7.*** • *"will be located within the existing construction area."* ***Page 6-59, lines 7-8.*** • *"for all water-based facilities"* ***Page 6-59, line12.*** The wording above appears to limit the study areas, management plan areas, and areas where the location of new drainage systems/measures/facilities, stormwater detention facilities, sediment removal actions, and measures to prevent a net increase in sediment dishcharges to only certain locations and only to BDCP facility areas, therefore excluding the construction/repair of existing drainage systems or other measures to avoid or mitigate flood and sediment impacts on adjacent to and surrounding (on same island) CM1 facilities. This measure needs to be corrected to properly identify specific measures to be implemented on lands surrounding the CM1 facilities and in-river activities that are adversely impacted under Impact SW-4.	

			If the impacts from localized flooding, repair and replacement of a functioning drainage system, loss of current beneficial uses of the land, and increased reclamation and levee maintenance costs are addressed in other chapters through other mitigation measures, then those specific mitigation numbers should be identified here in order to match up with the identified impacts in this chapter. Unmitigated impacts. Fails to identify impacts or give CEQA level of significance ranking for increased flood risk due to reduced flood capacity in Sacramento river, alteration of flow pattern and velocity, and increased water surface elevations upstream of north delta intakes resulting from installation of cofferdams for 10-years. Fails to identify impacts, give CEQA level of significance rankng, or mitigate for increased surface flooding risk to people and property or the soggy soils unsuitable for agriculatural activites that are caused by the disruption/disconnection of existing drainage systems (canals, pipes, ditches, pumping plants). <u>These mitigation measures need to be sufficiently specific and mandatory in order to be fully enforceable. Mitigation measures that defer the formulation of specific mitigation until some future date, when vague and ambiguous "plans" will be prepared, without imposing any detailed performance standards as to what those plans must do or show is a woefully insufficient and inappropriate level of mitigation.</u> Mitigation Measure SW-4 (from Alt 1A) fails to meet this standard according to the following language used: • *"will have to demonstrate"* ***Page 6-58, line 40.*** • *"no-net-increase in runoff"* ***Page 6-58, line 40.*** • *"will implement measures"* ***Page 6-58, line 41.*** • *"to prevent an increase in runoff volume and rate"* ***Page 6-58, lines 41-42.*** • *"to prevent an increase in sedimentation in the runoff"* ***Page 6-58, lines 42-43.*** • *"will design and implement"* ***Page 6-59, lines 2-3.*** • *"Drainage studies will be prepared"* ***Page 6-59, line 4.*** • *"to assess the need for, and to finalize,*	

			other drainage-related design measures" ***Page 6-59, lines 4-5.*** • *"Based on study findings, if it is determined"* ***Page 6-59, line 6.*** • *"will design measures"* ***Page 6-59, line 9.*** • *"prevent a net increase"* ***Page 6-59, line 10.*** • *"transport study"* ***Page 6-59, line 12.*** • *"will be conducted"* ***Page 6-59, line 12.*** • *"management plan will be prepared and implemented during construction."* ***Page 6-59, line 13.*** • *"will include"* ***Page 6-59, line 14.*** The wording above is replete with vague and ambiguous language in terms of what kind of measures or actions will be implemented, cannot meet any performance standards such as "no-net-increase" or "prevent an increase" because the impact analysis fails to include a description of the baseline conditions that were used to determine the impacts associated with altering drainage patterns and increasing the rate or amount of runoff, failed to provide details about what the studies or management plans should include, and as a whole defers any and all formulation of specific mitigation actions in specific locations and to specific harmed parties to some future date such as during construction itself. It is inappropriate and insufficient to assume that the details of mitigation to be fleshed out at a later date will be adequate to address the impacts. Further, Mitigation Measure SW-4 fails to account for and analyze impacts resulting from BDCP if the future studies and management plans are not completed before adverse impacts begin occurring or to identify the extent of these studies and management plans or their costs and how they will be paid for. Mitigation Measure SW-4 is therefore inadequate, incomplete, and not sufficiently specific and mandatory in order to be fully enforceable. *RECOMMENDATION: 1) If there are mitigation measures to address the additional impacts associated with Impact SW-4 of altering the existing drainage patterns and increasing the rate or amount of surface runoff that would result in flooding that we have mentioned above (repair/replace functioning drainage system; payment for flood damage to structures, crops,*	

			and/or ongoing loss of current beneficial use of land; increased reclamation and levee maintenance costs) then those measures should be listed under Mitigation Measure SW-4, including which specific impacts those other mitigation measures address; 2) If the aforementioned flooding impacts from insufficient drainage capability are not addressed by mitigation measures in other chapters, then the BDCP will need to develop.	
22	6-103	12	**Typo:** should read "Effects of *altering* existing drainage patterns"	
23	6-103	15	**IMPACT SW-5: ALTER DRAINAGE PATTERNS OR INCREASE SURFACE RUNOFF RESULTING IN FLOODING FROM HABITAT CONSTRUCTION** Instead of describing what the impacts of what is now the new Preferred Project, Impact SW-5 directs the reader to see the SW-5 CEQA Conclusion in Alternative 1A and doesn't even give a page number. Refer to our comments #24 on SW-5 in Alt 1 for our specific comments regarding the adequacy of this effects analysis. The text describing the impacts (vegetation roughness, modified channel geometries, floodplain expansion) doesn't match the title (altered drainage patterns, increased surface run-off) so impacts and proposed mitigations are potentially incorrect and insufficient. Fails to identify who and what will be specifically impacted by these increases or decreases in channel water surface elevations, flood flow changes from increased floodplain roughness, and decreased velocities. Impacts should be more specific such as: lowered water surface elevations may strand existing local water diversion intakes which could be detrimental to farmers and duck clubs, increased channel velocities could increase levee maintenance costs of reclamation districts, increased seepage to neighboring islands could increase crop damage to farmers/landowners and pumping costs for reclamation districts, disruption of existing drainage facilities could result in damage to structures/ag crops/soil suitability. *RECOMMENDATION: 1) Add a section that specifies all the significant effects on the environment mentioned above caused by altering drainage patterns or increasing runoff during construction of habitat restoration projects, instead of referring to another Alternative.*	

24	6-103 6-59	9-14 15-37	**IMPACT SW-5: ALTER DRAINAGE PATTERNS OR INCREASE SURFACE RUNOFF RESULTING IN FLOODING FROM HABITAT CONSTRUCTION** In order for a permitting agency to approve a project, the lead agency must provide feasible mitigation measures or alternatives that would avoid or substantially lessen the adverse impacts of the project. The effects described in lines 20-37 fail to mention anything related to the impacts identified in SW-5 of "altered drainage pattern," and instead only focus on surface water changes, including elevations and velocities. As a result the conclusion is both faulty and inadequate at it fails to include any identification of impacts associated with disconnecting existing drainage systems that will result in localized flooding and other adverse environmental impacts. Neither the Plan, this chapter, or Impact SW-5 contains a description of the baseline conditions that were used to determine the current drainage patterns on the islands where habitat restoration area facilities will be constructed, hydraulics, surface runoff characteristics or where direct and indirect impacts will in fact occur. Without an adequate baseline, neither we as a Cooperating Agency, the Lead Agencies or the Permitting Agencies can adequately identify a complete list of all of the potential significant impacts, the severity of the impacts, or the ability of the project alternatives and mitigation measures to avoid or lessen such impacts. This is a significant omission in light of the significant adverse drainage impacts identified in SW-4 including: • *"result in temporary and long-term changes to drainage patterns, drainage paths, and facilities that would in turn, cause changes in drainage flow rates, directions, and velocities."* The impact description for SW-5 is incomplete and inadequate as it fails to identify baseline existing conditions, an accurate description of how and where the project will cause the adverse impact, or to include the other impacts that would occur as a result of altering existing drainage facilities, runoff characteristics, or river hydraulics. Deficiencies in the nature and extent of actual impacts identified	

			in lines 20-37 due to inadequacy of providing baseline conditions on which to measure from include : • *"restored vegetation has the potential of increasing channel and/or floodplain roughness"* ***Page 6-59, lines 21-22.*** *Which is it? Will restored vegetation associated with BDCP habitat measures increase or decrease floodplain roughness?Where will this impact occur? How severe is the change compared to existing conditions?* • *"could result in increases in channel surface elevations"* ***Page 6-59, lines 22-23.*** *Increase by how much? Increase where? For how long? Will this increase cause additional erosion to levees? If so, where? How will levee erosion be mitigated?* • *"Modified channel geometries could increase or decrease channel velocities and/or channel water surface elevations"* ***Page 6-59, lines 24-25.*** *Which is it? Increase or decrease velocities? Where? Will this create levee erosion problems for neighboring RDs? Will people, terrestrial species, structures be flooded by increased water surface elevations? Will neighboring levees require additional freeboard to accommodate higher surface elevations?* • *"resulting in lower channel velocities and water surface elevations"* ***Page 6-59, lines 30-31.*** Where will these lower velocities and elevations occur? Will the lowered elevations strand existing water intakes, preventing them from accessing water supply? If so, where and how many intakes will be impacted? What mitigation will be provided to avoid or provide another water source? In addition, the analysis failed to: 1) study/review existing maps of the island drainage systems and determine where and for how long disconnections will occur and how they will affect the functionality of the rest of the drainage system to prevent localized flooding of entire island's population, structures, and farmland (drainage maps are readily available at DWR); 2) to provide a specific repair/reconstruction options to avoid/fix the disconnected drainage systems; 3) to provide assurance that the repairs will be paid for by BDCP;	

			4) to identify lands and land uses that will be adversely affected by localized flooding; 5) or disclose the nature and extent of any of these impacts. The drainage systems that currently exist on Delta islands, including where BDCP habitat restoration area facilities will be built, are critical features necessary to keep the land behind the levees reclaimed for agricultural production. The importance of a functioning drainage system to agricultural activities is pointed out on page 7-5 of the EIR/EIS Groundwater Chapter: • *Maintaining groundwater levels below crop rooting zones is critical for successful agriculture*, especially for islands that lie below sea level, and many *farmers rely on an intricate network of drainage ditches and pumps to maintain groundwater levels of about 3 to 6 feet below ground surface*. The accumulated agricultural drainage is pumped through or over the levees and discharged into adjoining streams and canal (U.S. Geological Survey 2000a). ***Without this drainage system, the islands would become flooded.*** [emphasis added] As stated in Chapter 7 of the EIR/EIS, the existing drainage facilities are "intricate networks," which means they have been carefully designed and located to work with the natural drainage patterns on the island and to function as a system. Therefore, any disconnection potentially renders the whole system inoperable. Since Chapter 7 further confirms that successful agriculture is dependent on the operation of this drainage system and clearly states the island will become flooded without the drainage system, the impacts identified in SW-4 also apply to SW-5, and are significant and adverse to the ongoing agricultural productivity of lands adjacent to the BDCP habitat restoration areas facilities. These impacts include: 1) localized flooding of homes/businesses and farmland that could result in loss of planted crops or prevent any crops from	

			being planted that is exacerbated by the increase in runoff associated with the discharge of water from dewatering activities into local drainages (Impact SW-6) which increases the flows and water surface elevations; 2) increased costs to local landowners and reclamation districts to re-design and re-construct a functioning drainage system; 3) increased pumping costs to local landowners and reclamation districts to build new pumps in new areas and to drain the additional water put into the drainage system by any dewatering activities associated with habitat restoration. A lead agency must identify all significant effects on the environment caused by a proposed project that cannot be avoided. However, the EIR/EIS must first perform a robust analysis to support the conclusion that impacts are significant and unavoidable. The EIR/EIS cannot defer the determination of the scope and nature of significant impacts until future studies and reports are prepared. Were any changes in surface elevations from tidal action created by BDCP habitat conservation measures factored in as an assumption in the modeling? If not, then the model should be run again with the changes in water elevations expected from the BDCP habitat CMs added in as assumptions. Also, an increased risk of flooding even from a small increase in peak flows could be problematic from a levee integrity and public safety perspective since some channels and reaches already exceed channel capacity under existing conditions such as the bottom (south end) of the Yolo Bypass which results in being a little over two feet above capacity during high flow events in 1986, 1997, and 2006. Therefore, there is no tolerance for even small increases of 1% in some areas without compromising public safety. Before more stress/increases in peak flows can be added, mitigation work to improve the current flood capacity in some channels and reaches will need to be done first (prior to construction or water ops implementation). The costs for structural or non-structural solutions and ongoing maintenance to reduce the risk level of flooding increased due to BDCP should be fully paid for by BDCP at no cost to the local levee maintaining agency (RD), landowners, or county governments. EIR/EIS environmental conclusions simply stating that future projects/actions/designs will comply	

			with applicable law does not constitute avoidance of all impacts and does not suffice as replacement of mitigation. In order to approve a project, the lead agencies must identify feasible mitigation measures or alternatives that would avoid or substantially lessen any significant adverse environmental effects of the project. The mitigation measures must be specific and mandatory, such that they are fully enforceable. It is insufficient to rely on existing laws or regulations, lines 25-26, to address all potential impacts that could result in flooding. Specific flood impacts can still occur for projects approved by the USACE, CVFPP, and DWR and therefore must identify, analyze, and mitigate the full nature and extent of those impacts. *RECOMMENDATION: 1) Expand the narrative in SW-5 to include description of how drainage patterns, facilities, and functionality will be altered by construction of habitat measures; 2) Delete line 15 and replace with a CEQA Conclusion that actually identifies the direct and indirect impacts that are specific to changes from altered drainage patterns and increased surface runoff associated with creating habitat restoration projects.*	
25	6-103	16-17	**MITIGATION MEASURE SW-5: (IMPLEMENT ALT 1A MM SW-4) REDUCE RUNOFF AND SEDIMENTATION** The mitigation needs to address ALL impacts to ALL parties that are specifically related to this activity and to the impacts included in the SW-5 title, not simply rely on mitigation measures for other activities that are unrelated to the impacts for SW-5 activities. Unmitigated impacts. Fails to identify impacts, give CEQA/NEPA level of significance ranknng, or mitigate for increased surface flooding risk to people and property or the soggy soils unsuitable for agriculatural activites that are caused by the disruption/disconnection of existing drainage systems (canals, pipes, ditches, pumping plants). Inadequate and missing mitigation. Runoff and sedimentation mitigations do not address the impacts of increased vegetation roughness, modified channel geometries, altered water surface elevations, seepage, alteration of flow pattern and velocity, and floodplain expansion. Mitigation Measure SW-4 (from Alt 1A) which focuses on reducing large amounts of runoff from	

			onsite paved and impervious surfaces, sediment prevention and removal, and onsite stormwater detention associated with construction of conveyance facilities is completely unrelated to the impacts from habitat construction described in lines 16-37. Therefore, the most significant impacts under SW-5 are NOT stormwater runoff from paved areas and sediment, but are long-term property and crop damage (loss of beneficial use of the land) from localized flooding caused by the disconnection of the intricate drainage system that keeps the lands adjacent to the CM1 facilities reclaimed (drained and usable for historical and existing beneficial uses). Based on historical instances of neighboring islands experiencing increased seepage and crop damage from inundation next to it (seepage damage/flooding on Ryer Island when Prospect Island was previously inundated for an extended period of time after a levee failure). Yet SW-5 is limited to flooding impacts from surface runoff and fails to identify the known impacts associated from seepage damage/flooding. In order for a permitting agency to approve a project, the lead agency must provide feasible mitigation measures or alternatives that are directly responsive and related to the impacts and must avoid or substantially lessen the adverse impacts of the specific activity. As previously stated, the narrative description of impacts in lines 16-37 does not accurately or fully describe ALL of the impacts associated with altering drainage patterns or increasing surface runoff from habitat creation. In addition, SW-5 does NOT describe in the narrative any impacts associated with "runoff or sedimentation." Therefore, Mitigation Measure SW-4 to "Implement measure to reduce runoff and sedimentation," line 16, is completely unrelated to the impacts from altering drainage patterns or those identified in lines 18-37. The mitigation offered for SW-5 fails to address the actual or specific impacts currently identified, or the nature and extent of other impacts that are omitted and not properly identified or analyzed. These mitigation measures need to be sufficiently specific and mandatory in order to be fully enforceable. Mitigation measures that defer the formulation of specific mitigation until some future	

			date, when vague and ambiguous "plans" will be prepared, without imposing any detailed performance standards as to what those plans must do or show is a woefully insufficient and inappropriate level of mitigation. Mitigation Measure SW-4 (from Alt 1A) fails to meet this standard according to the following language used: • *"will have to demonstrate"* ***Page 6-58, line 40.*** • *"no-net-increase in runoff"* ***Page 6-58, line 40.*** • *"will implement measures"* ***Page 6-58, line 41.*** • *"to prevent an increase in runoff volume and rate"* ***Page 6-58, lines 41-42.*** • *"to prevent an increase in sedimentation in the runoff"* ***Page 6-58, lines 42-43.*** • *"will design and implement"* ***Page 6-59, lines 2-3.*** • *"Drainage studies will be prepared"* ***Page 6-59, line 4.*** • *"to assess the need for, and to finalize, other drainage-related design measures"* ***Page 6-59, lines 4-5.*** • *"Based on study findings, if it is determined"* ***Page 6-59, line 6.*** • *"will design measures"* ***Page 6-59, line 9.*** • *"prevent a net increase"* ***Page 6-59, line 10.*** • *"transport study"* ***Page 6-59, line 12.*** • *"will be conducted"* ***Page 6-59, line 12.*** • *"management plan will be prepared and implemented during construction."* ***Page 6-59, line 13.*** • *"will include"* ***Page 6-59, line 14.*** • *"Measures to reduce flood potential could include"* ***Page 6-59, lines 26-27.*** The wording above is replete with vague and ambiguous language in terms of what kind of measures or actions will be implemented, cannot meet any performance standards such as "no-net-increase" or "prevent an increase" because the impact analysis fails to include a description of the baseline conditions that were used to determine the impacts associated with altering drainage patterns and increasing the rate or amount of runoff, failed to provide details about what the studies or management plans should include, and as a whole defers any and all formulation of specific mitigation actions in specific locations and to specific harmed parties to some future date such as during construction itself.	

			It is inappropriate and insufficient to assume that the details of mitigation to be fleshed out at a later date will be adequate to address the impacts. Further, Mitigation Measure SW-4 fails to account for and analyze impacts resulting from BDCP if the future studies and management plans are not completed before adverse impacts begin occurring or to identify the extent of these studies and management plans or their costs and how they will be paid for. Mitigation Measure SW-4 is therefore inadequate, incomplete, and not sufficiently specific to impacts associated with SW-5 or mandatory in order to be fully enforceable. *RECOMMENDATION: 1) Delete lines 16 and 17 and replace with specific and detailed mitigation measures that address the impacts described in lines 20-37 on page 6-59 as well as impacts such as seepage and flooding related to disrupting/disconnecting existing drainage systems; 2) Add a mitigation measure to address the seepage damage/flooding that is likely to occur on islands that are adjacent/near habitat restoration areas with prolonged amount of water inundating them.*	
26	6-103	18-31	**IMPACT SW-6: CREATE OR CONTRIBUTE TO RUNOFF WATER EXCEEDING EXISTING DRAINAGE CAPACITY OR ADDITIONAL SOURCES OF POLLUTED RUNOFF** Analysis - <u>A proper environmental analysis of a project of this size and long-term (10 year) construction timeline needs to provide an accurate, stable, and finite description of the project and the existing baseline conditions used to determine the significance of environmental impacts in order to allow a lead agency, trustee agency, cooperating agency, or an impacted party in the Plan Area to evaluate the severity of the impacts or the feasibility of the project alternatives and mitigation measures to avoid or lessen such impacts.</u> The project description and level of environmental analysis lacks sufficient details regarding the existing baseline conditions, locations, time periods, quantity of runoff and discharges from dewatering activities, and duration of these discharges to determine whether Impact SW-6 in fact properly captures and characterizes the full extent of drainage overflows and localized	

			surface flooding from runoff created by several square miles of construction and dewatering activities anticipated in CM1. Impact SW-6 contains almost no description of the baseline conditions that were used to determine impacts or where the direct and indirect impacts will occur or to account for changing conditions that are likely to occur prior to construction or during the 10-year construction time period. Therefore, Impact SW-6 lacks a sufficient baseline against which to compare the project in order to properly analyze the breadth of the environmental impacts. The impact analysis should describe the changing conditions, identified the conditions upon which the EIR/EIS relied for its baseline, and consider that range of circumstances as part of the analysis of impacts. Maps that are readily available at DWR and possibly the reclamation districts and other public agencies of the Delta island's existing irrigation and drainage system facilities and their capacity capabilities including size of pumping stations, seepage profile, groundwater levels, stormwater detention basins, where people and properties are located and vulnerable to damage from localized surface flooding, as well as FEMA floodplain maps. These are critical baseline materials to understand the existing conditions as well as determine locations where existing facilities will be disrupted/disconnected/overloaded by the project activities. The EIR/EIS is unclear about specific locations, timing, intensity, or duration of specific impacts or how and where these impacts need to be offset. The Impact SW-6 contains no discussion of whether such replacement/repairs of existing drainage facilities are feasible, the actions necessary to offset the expected exceedance of existing drainage facilities and resulting localized flooding from the project, locations where those repairs/enhancements to existing facilities would be needed, or the full extent of the environmental impacts of the project actions on local resources. Due to the lack of existing baseline conditions, Impact SW-6 fails to identify locations where modifications/repairs/replacement/enhancement need to be made to avoid or reduce impacts. Where, how frequently, and for how long will dewatering discharges result in increases in flows and water surface elevations? Where are the "receiving channels" for these dewatering discharges expected to occur, how often, and for	

			how long? What is the current capacity of these existing "receiving channels" and what's the % increase from the addition of the dewatering discharges? <u>A lead agency must identify all significant effects on the environment caused by a proposed project that cannot be avoided. However, the EIR/EIS must first perform a rigorous analysis that discloses the nature and extent of the impacts to support the conclusion that impacts are significant in order to provide the public and cooperating agencies with adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action.</u> There is no evidence identified in Impact SW-6 to support the adequacy of the conclusion that or provide the nature and extent of the impacts or their location, intensity, or duration. Wording such as: • "could result in adverse effects" • "if the runoff volume exceeds the capacities of local drainages." The EIR/EIS fails to provide the comparison of the amount of the additional discharges from dewatering activities to the ability and capacity of the local drainages to accommodate, identify where and when localized will occur if dewatering discharges exceed the local infrastructure capacities, or how the additional dewatering activities will prevent farmers from keeping their lands sufficiently drained in order to grow crops. If there are lands that farmers will not be able to drain due to the drainage canals being full from CM1 dewatering discharges, then the loss of agricultural production is a significant adverse impact that needs to be acknowledged, analyzed and mitigated. CEQA conclusion lacks credibility as is general and vague in making a blanket assumption without site-specific identification of where, for how long impacts will occur, or who will be impacted. Impacts are significant where? Significant for how long? Significant on whom? Will landowners adjacent and near construction areas experience flooding of their properties? Will reclamation district have increased pumping costs due to additional discharges by BDCP activities? Will there still be sufficient capacity for adjacent landowners to discharge their drainage? Will BDCP's use of local drainage facilities require approval or permitting by owner's/operators of the drainage system?	

			Impact fails to identify details on who and where will be impacted or how parties/properties adversely affected will be mitigated for additional costs associated with preventing or reducing the adverse impact from the CM1 dewatering discharges. Will landowners or reclamation districts be required to construct, modify or expand drainage ditches/canals or new pumping facilities to assure they can properly drain their lands for crop survival and to prevent or reduce the increased localized flooding? The drainage systems that currently exist on Delta islands, including the canals/channels where water from CM1 dewatering activities will be discharged, are critical features necessary to keep the land behind the levees reclaimed for agricultural production. The importance of a functioning drainage system to agricultural activities is pointed out in Chater 7 of the EIR/EIS on Groundwater: • *Maintaining groundwater levels below crop rooting zones is critical for successful agriculture*, especially for islands that lie below sea level, and many *farmers rely on an intricate network of drainage ditches and pumps to maintain groundwater levels of about 3 to 6 feet below ground surface*. The accumulated agricultural drainage is pumped through or over the levees and discharged into adjoining streams and canal (U.S. Geological Survey 2000a). ***Without this drainage system, the islands would become flooded.*** [emphasis added] ***EIR/EIS Chap 7, page 7-5.*** As stated in Chapter 7 of the EIR/EIS, the existing drainage facilities are "intricate networks," which means they have been carefully designed and located to work with the natural drainage patterns on the island and to function as a system. Therefore, any activity such as dewatering which overwhelms the current system's capacity and ability to allow farmers who built the systems to keep their fields/crops drained will result in flooding and adverse impacts to the current land uses. Since Chapter 7 further confirms that	

			successful agriculture is dependent on the operation of this drainage system and clearly states the island will become flooded without a properly functioning drainage system, the impacts identified on page 6-103 lines 28-31, are significant and adverse to the ongoing agricultural productivity of lands that are flooded due to increased runoff volumes from dewatering activities associated with the CM1 conveyance facilities. These impacts include: 1) localized flooding of homes/businesses and farmland that could result in loss of planted crops or prevent any crops from being planted that is exacerbated by substantially altering the existing drainage pattern identified Impact SW-5; 2) increased costs to local landowners and reclamation districts to re-design and re-construct a functioning drainage system including new pumps; 3) increased pumping costs to local landowners and reclamation districts to build new pumps in new areas and to drain the additional water put into the drainage system by CM1 dewatering activities. <u>Mitigation Measures that simply state that future projects/actions/designs will comply with applicable law does not constitute avoidance of all impacts and does not suffice as replacement of mitigation.</u> The following language not only makes such claims without being support by substantial evidence, but it doesn't even name all of the permitting agencies or what the actual permit requirements are in order to determine if they in fact address the impacts identified. Even more concerning, the claim includes an additional impact to "water quality" that wasn't even discussed in the preceding narrative, so not even sure what kind of adverse water quality impacts are anticipated to be caused by the dewatering activities, where the water quality would be degraded, how that would affect local land uses or water supplies, or what the permit design requirements are that would avoid this adverse impact. • *"Compliance with permit design requirements would avoid adverse on surface water quality and flows from dewatering activities."* ***Page 6-103, lines 29-30.*** <u>The conclusions in the EIR/EIS must be supported by substantial evidence – actual facts. They can be reasonable assumptions or expert opinions – but</u>	

			they must still be predicated and backed up by facts. Speculation does not constitute substantial evidence, and unsubstantiated narrative or expert opinion asserting nothing more than "it is reasonable to assume" that something "potentially may occur" is not analysis supported by factual evidence. The following language not only makes conclusions on effectiveness of mitigation action without being support by substantial evidence but it also fails to identify what a dispersion facility is or how many and where they will need to be located and mentions an adverse impact, "channel erosion," that is not discussed in the preceding narrative, so not even sure what kind of adverse erosion impacts are anticipated from the dewatering activities or who will be harmed. It should appear as Mitigation Measure SW-6. • *The use of dispersion facilities would reduce the potential for channel erosion.* ***Page 6-103, lines 30-31.***	
27	6-103 6-104	29-39 1-2	**IMPACT SW-6: CREATE OR CONTRIBUTE TO RUNOFF WATER EXCEEDING EXISTING DRAINAGE CAPACITY OR ADDITIONAL SOURCES OF POLLUTED RUNOFF** CEQA Conclusions - In order to approve a project, the lead agencies must identify feasible mitigation measure or alternatives that are specific to the actual impacts and would avoid or substantially lessen any significant adverse environmental effects of the project. The mitigation measures must be specific and mandatory, such that they are fully enforceable. The following statements/conclusions must have corresponding supporting evidence in the record of what exactly these requirements are and how they will perform in terms of avoiding or reducing the adverse impacts and be identified in a Mitigation Measure SW-6 to address the water quality and flows, and channel erosion impacts that may not be mitigated under MM SW-4. • *"Compliance with permit design requirements would avoid adverse on surface water quality and flows from dewatering activities."* ***Page 6-103, lines 29-30.*** • *The use of dispersion facilities would reduce the potential for channel erosion.* ***Page 6-103, lines 30-31.*** The formulation of mitigation measures cannot be deferred until a later time based on completion of	

			future studies or agreements being signed, although a lead agency is allowed to provide specific performance standards that specify the extent to which impacts will be mitigated. Mitigation Measure SW-4 inappropriately defers the formulation of specific mitigation until some future date, when vague and ambiguous "plans," "studies" will be prepared, without imposing any performance standards as to what those plans must do or show. It is inappropriate to assume that the details of mitigation will be fleshed out at an unknown future date. • *"Studies will be prepared"* ***Page 6-59, line 4.*** • *"Based on study findings, if it is determined"* ***Page 6-59, line 6.*** In order to approve a project, the lead agencies must identify feasible mitigation measure or alternatives that would avoid or substantially lessen any significant adverse environmental effects of the project. The mitigation measures must be specific and mandatory, such that they are fully enforceable. Please see Comment #25 above regarding deficiencies with the adequacy of Mitigation Measure SW-4 generally. Additionally, relying on following language from Mitigation Measure SW-4 does not meet this standard and is therefore inadequate to properly avoid or reduce significant impacts from dewatering activities: • *"will design and implement"* ***Page 6-59, lines 2-4.*** • *"to assess the need for, and to finalize, other drainage-related design measures, such as"* ***Page 6-59, lines 4-5.*** • *"if it is determined"* ***Page 6-59, line 6.*** The EIR/EIS assumes, without evidentiary support in the record, that all the mitigation measures will be fully implemented where the project activities may have a direct or indirect effect and that the measures will in fact work to avoid or substantially reduce the significance of the adverse impacts, which may in fact not occur. The EIR/EIS additionally fails to account for and analyze impacts resulting from Project activities if the mitigation measures are not implemented or not working in terms of reducing the level of adverse impacts. When will the studies be started? Completed? What is the scope of work of the studies and the conditions and locations they are trying to	

			maintain/protect? How much will these studies cost? How much are designing and reconstructing drainage systems for all lands on island? What are the number of acres and crops expected to be damaged? Will BDCP pay RD and landowner costs to reconstruct drainage facilities, install new pumps, or for increased monthly utility bills for additional pumping needed to handle BDCP runoff? What is protected total cost of studies, management, plans, design of repairs/reconstruction of disrupted facilities, building detention storage areas, etc.?	
28	6-104	7-14	**IMPACT SW-7: EXPOSE PEOPLE AND PROPERTY TO RISK OF LOSS, INJURY, OR DEATH FROM FLOODING DUE TO CONVEYANCE CONSTRUCTION** Analysis - <u>The conclusions in the EIR/EIS must be supported by substantial evidence – actual facts. They can be reasonable assumptions or expert opinions – but they must still be predicated and backed up by facts. Speculation does not constitute substantial evidence, and unsubstantiated narrative or expert opinion.</u> The additional flood risks to people and structures created by this project cannot simply be reduced through design and compliance with USACE, DWR, and CVFPB because there are significant risks that will exist during the ten year construction period. During ten years of construction local RDs, DWR, or USACE will unlikely be able to conduct levee inspections, conduct levee maintenance or construct their own repairs or improvements due to competition/blockage by BDCP construction activities, or be able to provide floodfighting due to inability to access the area or stage equipment. DWR/BDCP will likely need to assume all levee maintenance and floodfighting responsibilities for several reaches of levees and possibly the whole district in areas where land is consumed by the facilities and not enough remaining landowners to maintain RD functions of levee maintenance and island drainage. Therefore, Impact SW-7 cannot conclude that Alternative 4 will "not result in an increase to exposure of people or structures to flooding due to construction of the conveyance facilities" simply by complying with USACE, CVFPB, and DWR requirements. The impact findings must specify what physical design features, standards, requirements, and operating criteria that apply to	

			each element/feature of the conveyance facilities that will be constructed, including but not limited to: all pipelines/tunnels, modification of project levees, each intake facility, shafts, muck storage, forebays, emergency spillways, etc. The location of a 750-acre ring dam (Intermediate forebay) that holds 5,250 acre feet of water storage near Hood (population 271) and Courtland (population 355) which also has an elementary school with over 200 kids, a community pre-school, and a continuation high school does pose a new risk that currently does not exist to life and property, particularly in light of the BDCP Purpose and Need Statement citing seismic activity as risk in the Delta. Even under modern engineering designs and construction no dam or conveyance facility is immune to some kind of damage from mother nature or human-caused terrorism. It is disturbing and appalling that the EIR/EIS fails to acknowledge the new risk of flooding imposed on people and property in Hood and Courtland from a new dam build next to them holding 5,250 af of water. Therefore, the impacts of building the new conveyance facilities will be a significant adverse impact. <u>A lead agency must identify all significant effects on the environment caused by a proposed project that cannot be avoided. However, the EIR/EIS must first perform a rigorous analysis that discloses the nature and extent of the impacts to support the conclusion that impacts are significant and unavoidable in order to provide the public and cooperating agencies with adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action.</u> Chap 6, page 6-48, lines 22-23, states: "Overall, the peak flows simulated in CALSIM under the No Action Alternative show increases from 1% to 4% in certain locations. However, these changes are primarily due to the change in flow patterns due to sea level rise and climate change." What portion of the 1-4% is attributable to BDCP construction and water operations? Constructing levee improvements to keep up with sea level rise is primarily a responsibility of the locals and state/federal agencies that have cost-shares with the locals for these projects, however since BDCP relies on dual-conveyance even a portion of the sea level rise levee raise costs should also be shared proportionally by BDCP, otherwise BDCP is unfairly	

			benefitting. The BDCP portion of increased flood potential needs to be mitigated, particularly in channels, reaches, areas where the current system is already unable to perform to the flood flow design capacity, because there is absolutely no level of tolerance for even minor increases in flood risk/potential by BDCP actions. Impact SW-7 fails to identify any level of impacts, let alone any details on who and where will be impacted or how parties/properties adversely affected, which as stated above are significant adverse impacts, including but not limited to the following: 1) The amount of construction truck activity over 10-years discussed in Chapter 19 *Transportation* exceeds the weight and traffic volume that current levees upon which much of the construction trucks will travel over and will degrade them to a point of reducing their stability which could result in a levee failure from CM1 construction activities. 2) The maintenance, inspection, and improvement of the entire length of levees of the islands where CM1 facilities will be built is unlikely to be possible, so these levees have a greater chance of failure in the 10-year construction period than existing conditions. 3) The re-routing and blocking of roads during the 10-years of construction could complicate and slow down the evacuation and escape of people and animals if flooded out by damage to the Intermediate Forebay or failure of the levees from a high water event, earthquake, or terrorist act, which would increase the likelihood of death for people and listed species in the area of impact. 4) Installing up to 12 steel piles a day at EACH of the three north Delta intake locations, ***EIR/EIS, Appendix 3C, page 3C-5,*** (total: up to 36 per day) for a total of about 1,000 steel piles being installed will cause significant vibration. One of the primary reasons applicants of the BDCP state for building the new facilities in CM1	

			is due to concerns over levee stability and their performance during a seismic event. Despite this concern being so important that reducing seismic risk of SWP/CVP conveyance facilities is stated as one of the Purpose and Needs of the Project, this EIR/EIS chapter failed to provide any analysis of how 700 steel pile driver strikes for about 1,000 total steel piles (700,000 total steel pile drives) needed over several months and years for the three north Delta intakes, will affect the stability of the levees at the intake location site, adjacent, across the river, or even in the vicinity. This amount of intense local vibration could cause stress fractures and possibly levee failures to construction locations and neighboring islands which would damage people, property and wildlife costing millions of dollars to repair, replace, and rebuild. *RECOMMENDATIONS: 1) Acknowledge the increased flood risk posed to people, listed species and property from levees or new ring dam holding 5,250 af of water and other conveyance facilities if they are damaged my Mother Nature or human-related terrorist acts; 2) Identify these forebay water storage as potential flood impacts as significant adverse impacts; 3) Acknowledge the other flood risks that are created by the conveyance construction related to levee stability and failure; 4) Provide analysis of the additional flood risks created by stress on surrounding levees in vicinity of construction area, including either conducting studies on pile driving impacts on nearby levee stability or provide current literature or local project information regarding how levees performed under stress of about 700,000 steel pile driving strikes over months and possibly years; 5) Provide mitigations to avoid or reduce any significant impacts that are identified in the environmental analysis of these levee impacts; 6) identify the estimated annual BDCP cost for repairing, replacing, rebuilding of structures and levees due to levee damage caused by conveyance construction and property losses from resulting floods from levee failures caused by construction activities; 7) the CEQA conclusion, page 6-48, lines 32-36, should identify even the minimal impacts that increase flood potential, particularly in reaches that already exceed flood capacity design criteria.*	

29	6-104	15-18	**MITIGATION MEASURE SW-7: NONE PROVIDED.** EIR/EIS environmental conclusions simply stating that future projects/actions/designs will comply with applicable law does not constitute avoidance of all impacts and does not suffice as replacement of mitigation. In order to approve a project, the lead agencies must identify feasible mitigation measures or alternatives that would avoid or substantially lessen any significant adverse environmental effects of the project. The mitigation measures must be specific and mandatory, such that they are fully enforceable. There is new and increased risk of flooding posed by CM1 conveyance facilities that must be mitigated beyond design/permit requirements of USACE, CVFPB, or DWR, particularly in light of BDCP Project and Purpose which cites catastrophic earthquakes and the additional possibility of human-related terrorist acts against the facilities that the Plan and EIR/EIS did not acknowledge or analyze. Even properly designed and constructed facilities cannot guarantee they will not be damaged or collapse as seen in highway/bridge/building collapses in the Northridge and Loma Prieta earthquakes. No structure or design is foolproof to the power of mother nature's destructive forces or to poor construction due to political pressures (Bay Bridge) or in a hurry (Stockton sewer plant). Statement that compliance with USACE, CVFPB, and DWR requirements is sufficient to avoid increased flood risk is conjecture at best because it lacks any studies or analysis to substantiate the claim. *RECOMMENDATIONS: 1) Identify specific design criteria and permit requirement that will serve to avoid or reduce the impacts; 2) identify additional impacts needed to avoid or reduce impacts that are not covered under USACE, CVFPB, DWR permit requirements.*	
30	6-104 6-105 6-61 6-62	19-24 1-13 28-42 1-8	**IMPACT SW-8: EXPOSE PEOPLE AND PROPERTY TO RISK OF LOSS, INJURY, OR DEATH FROM FLOODING DUE TO HABITAT PROJECTS** Analysis - The conclusions in the EIR/EIS must be supported by substantial evidence – actual facts. They can be reasonable assumptions or expert opinions – but they must still be predicated and backed up by facts. Speculation does not constitute substantial evidence, and	

			unsubstantiated narrative or expert opinion. Therefore, Impact SW-8 cannot conclude that Alternative 4 will "not result in an increase to exposure of people or structures to flooding due to construction of the operations of habitat restoration facilities" simply by complying with USACE, CVFPB, and DWR requirements. The impact findings must specify what physical design features, standards, requirements, and operating criteria that are required under those permits that apply to each element/feature of each of the habitat measures that will be constructed. The conclusions in the EIR/EIS must be supported by substantial evidence – actual facts. Unsubstantiated narrative or expert opinion such as the following asserting is not analysis supported by factual evidence: • *"could increase flood potential"* ***Page 6-61, lines 30-31.*** • *"these potential increases"* ***Page 6-61, line 35.*** • *"action could also reach"* ***Page 6-61, line 36.*** What is the scientific background upon which these assumptions are made? Where are these assumptions anticipated to occur? Are these impacts anticipated to occur more frequently than existing conditions? If so, how much more often and when? A lead agency must identify all significant effects on the environment caused by a proposed project that cannot be avoided. However, the EIR/EIS must first perform a rigorous analysis that discloses the nature and extent of the impacts to support the conclusion that impacts are significant and unavoidable in order to provide the public and cooperating agencies with adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action. Wind fetch is not the only likely impact to be caused by habitat measures that propose to inundate areas permanently or more frequently, encourage more tidal excursion in some places, create unnatural unidirectional flows, or increased flow velocities in certain channels than occurs under existing conditions. Impact SW-8 fails to identify any level of impacts, let alone any details on who and where will be impacted or how parties/properties adversely	

			affected from wind fetch damage, which as stated above are significant adverse impacts. The analysis also fails to identify other potentially significant localized flood impacts beyond wind fetch including, but not limited to: 1) Prior history has shown than when Prospect Island was inundated due to a levee breach, the neighboring island, Ryer Island, experienced increased surface flooding from seepage and boils which reclamation district engineers attributed to the change in hydraulic pressure. This caused damage to crops and prevented planting on certain farm lands that could also be considered significant adverse impact in addition to wave fetch. Studies were done on the damage to neighboring islands caused by prior Prospect Island flooding, including information gathered from installation of seepage monitoring wells, then and more recently by DWR, yet this information is not discussed are analyzed in the EIR/EIS. 2) Changes in channel hydrodynamics and flows as well as water elevations and volumes could create additional costs to reclamation districts from erosion and seepage damage that may require additional rocking, large land-side berms, or other levee improvements to mitigate the impacts. At the very least seepage monitoring will need to be installed and addressed in locations surrounding habitat areas. In addition, BDCP will need to provide funding in perpetuity to affected reclamation districts/landowners for their additional pumping costs to maintain the land for current and future agricultural production . <u>A proper environmental analysis of a project of this size, even a programmatic analysis, needs to provide an accurate description of the project and the existing baseline conditions used to determine the significance of environmental impacts in order to allow a lead agency, trustee agency, cooperating agency, or an impacted party in the Plan Area to evaluate the severity of the impacts or the feasibility of the project alternatives and mitigation measures to avoid or lessen such impacts.</u> The project description and level of environmental	

			analysis lacks sufficient details regarding the existing baseline conditions, locations, time periods, quantity of expected wave fetch let alone other hydraulic and flood impacts like erosion and seepage from implementation of habitat measures that will create permanent and more frequent inundation of lands, changes in water flow direction and velocities, and increased hydraulic pressure or the duration of these actions to determine whether Impact SW-8 in fact properly captures and characterizes the full extent of damage could be caused by habitat measures. The EIR/EIS analysis should indicate what size the waves that are expected to be generated by the various habitat types identified in the Plan (this can be done by studying other Delta areas where islands were flooded and not repaired) and studies of what kind of erosion and overtopping damage the different sized waves can cause to levees. Provide information on how much annual damage BDCP expects to pay for erosion and seepage damage. *RECOMMENDATIONS: 1) Expand the analysis to include other likely causes of localized flooding to be caused by BDCP habitat projects such as seepage to agricultural production and increased drainage pumping costs; 2) Provide current and accurate baseline condition of levees and crop lands that could be affected by impacts associated with this activity; 3) Include documents, studies, and resulting environmental analysis conducted by BDCP consultants regarding this project on how/where/duration of these anticipated impacts that will show how local resources will be impacted by increased inundation, seepage, erosion, drainage pumping, levee overtopping or to change in natural flows such as reverse flows or unidirectional flows instead of tidal prior to release of Public Draft so that cooperating agency or an impacted party in the Plan Area can properly evaluate the severity of the impacts or the feasibility of the project alternatives and mitigation measures to avoid or lessen such impacts.*	
31	6-105 6-62	5-13 9-18	**MITIGATION MEASURE SW-8: (IMPLEMENT 1A SW-8 MEASURE) ADDRESS POTENTIAL WIND FETCH ISSUES.** <u>EIR/EIS environmental conclusions simply stating that future projects/actions/designs will comply with applicable law does not constitute avoidance of all impacts and does not suffice as replacement</u>	

			of mitigation. In order to approve a project, the lead agencies must identify feasible mitigation measures or alternatives that would avoid or substantially lessen any significant adverse environmental effects of the project. The mitigation measures must be specific and mandatory, such that they are fully enforceable. There is new and increased risk of flooding posed by habitat measure construction and operations that must be mitigated beyond design/permit requirements of USACE, CVFPB, or DWR, particularly in light of the likely impacts based on past incidences that the EIR/EIS failed to acknowledge or analyze. A specific mitigation should be provided that provides details on the specific design elements, operational requirements, or permit conditions that would be implemented by each agency such as raising existing levee heights or building a landside berm and how each of the elements would avoid or mitigate the impacts identified in EIR/EIS which include wind fetch damage as well as how these elements would avoid or mitigate the impacts *not* identified in EIR/EIS which include seepage, erosion, increased drainage pumping costs, lost crops damaged by localized flooding. In order to approve a project, the lead agencies must identify feasible mitigation measure or alternatives that would avoid or substantially lessen any significant adverse environmental effects of the project. The mitigation measures must be specific and mandatory, such that they are fully enforceable. Mitigation Measure SW-8 improperly defers the formulation of specific mitigation until some future date, when vague and ambiguous "plans," "studies," or "reports" will be prepared, without imposing any performance standards as to what those plans must do or show. It is inappropriate to assume that the details of mitigation will be fleshed out at an unknown future date. The formulation of mitigation measures cannot be deferred until a later time based on completion of future studies or agreements being signed, although a lead agency is allowed to provide specific performance standards that specify the extent to which impacts will be mitigated. Mitigation Measure SW-8 fails to provide specifics on either the extent or standards. • *"measures will be designed based upon wind fetch studies that will be completed prior to construction"* ***Page 6-62, lines 11-***	

			12. • *"strengthened and possibly raised"* ***Page 662, line 15.*** Having the actual implementation of measures based on feasibility rather than being applied directly once impacts are known is both an uncertain and unenforceable mitigation measure. Therefore, such limitations and conditions on the mitigation measures make them inadequate to avoid or reduce the significance of the adverse impacts. • *"Other mechanisms to reduce the effects of wind fetch will be considered to the extent feasible"* ***Page 6-62, lines 17-18.*** Mitigation Measure SW-8 is unenforceable because it fails to set any specific performance standards or criteria for surveying, relocation, repair, replacement, and/or compensating or restoring the impacted resource impacted by the project activity. The EIR/EIS assumes, without evidentiary support in the record, that all the mitigation measures will be fully implemented where the project activities may have a direct or indirect effect and that the measures will in fact work to avoid or substantially reduce the significance of the adverse impacts, which may in fact not occur. The EIR/EIS additionally fails to account for and analyze impacts resulting from Project activities if the mitigation measures are not implemented or not working in terms of reducing the level of adverse impacts.	
32	6-104 6-105 6-62	27-38 1-4 19-41	**IMPACT SW-9: PLACEMENT OF STRUCTURES IN 100-YEAR FLOOD HAZARD AREA THAT WOULD BE FLOODED OR IMPEDE OR REDIRECT FLOOD FLOWS** Analysis - The conclusions in the EIR/EIS must be supported by substantial evidence – actual facts. They can be reasonable assumptions or expert opinions – but they must still be predicated and backed up by facts. Speculation does not constitute substantial evidence, and unsubstantiated narrative or expert opinion. Environmental analysis failed to provide any current studies or BDCP specific data and information collected and then analyzed to reach the conclusions regarding impacts. The EIR/EIS consultants also failed to check with the reclamation districts in location or in adjacent areas near facilities to see if there are any other	

			flood risk impacts expected from construction. There have been recent examples where new structures such as the City of Stockton sewer treatment plant ended up being shut down due to land movements that threatened to cause the facilities to fail despite following the permit requirements of USACE, CVFPB, and DWR. Where is the data, studies, or factual history regarding how building of structures on elevated pads has redirected flows, resulted in additional runoff, or other impacts? Even if the consultants had provided an Appendix noting the various other previous similar construction projects and impacts seen or not seen after construction completed, then that would provide some sort of basis for this conclusion. Without providing such evidence – these conclusions are nothing more than conjecture: • *"could lead to mudflows"* ***Page 6-62, line 23.*** • *"issues associated with alterations to"* ***Page 6-62, line 27.*** • *"potential for increased surface water elevations"* ***Page 6-62, lines 27-28.*** • *"Potential adverse effects could occur due to"* ***Page 6-105, line 1.*** • *"could increase flows in local drainages; and changes in sediment accumulation near the intakes."* ***Page 6-105, line 2.*** <u>EIR/EIS environmental conclusions simply stating that future projects/actions/designs will comply with applicable law does not constitute avoidance of all impacts and does not suffice as replacement of mitigation. In order to approve a project, the lead agencies must identify feasible mitigation measures or alternatives that would avoid or substantially lessen any significant adverse environmental effects of the project. The mitigation measures must be specific and mandatory, such that they are fully enforceable.</u> • *"because BDCP proponents would be required to comply with the requirements of USACE, CVFPB, and DWR to avoid"* ***Page 6-105, lines 7-9.*** Raised pads for conveyance facilities, all will result in creating a barrier to surface drainage with potential to create localized flooding. All of the new structures including earthen structures must be evaluated in the EIR/EIS for how and where they	

			re-direct flows/drainage/run-off and provide appropriate mitigations at each and every location at the full cost of BDCP and no cost to the locals. There is new and increased risk of flooding posed by constructing two-story elevated building pads in the interior of Delta islands and adjacent to levees must be mitigated beyond design/permit requirements of USACE, CVFPB, or DWR, particularly in light of the likely impacts based on past incidences that the EIR/EIS failed to acknowledge or analyze. A specific mitigation should be provided that provides details on the specific design elements, operational requirements, or permit conditions that would be implemented by each agency such as paying for additional drainage canals/pipelines, pumps, and electricity costs, raising other non-BDCP structures on the island to 100-year level to prevent their flooding from re-directed flows from surface water runoff when it hits the two-story wall of dirt (elevated pad CM1 structures will be built on) and how each of the permit design or operation requirements would avoid or mitigate the impacts identified in EIR/EIS which include re-directed flood flows from elevated building pads, increased surface water runoff from paved areas, alteration of existing drainage facilities and patterns, changes to stream courses and natural flow directions, and sediment accumulation near the intakes that reduces Sacramento River flood flow capacity as well as how these elements would avoid or mitigate the impacts *not* identified in EIR/EIS which include seepage, erosion, increased drainage pumping costs, lost crops damaged by localized flooding, flood damaged buildings, loss of life, etc. <u>A proper project-level environmental analysis of a project of this size needs to provide an accurate description of the project and the existing baseline conditions used to determine the significance of environmental impacts in order to allow a lead agency, trustee agency, cooperating agency, or an impacted party in the Plan Area to evaluate the severity of the impacts or the feasibility of the project alternatives and mitigation measures to avoid or lessen such impacts.</u> The project description and level of environmental analysis lacks sufficient details regarding the existing baseline conditions, locations, time periods, and quantity of surface water runoff currently experienced in the construction areas, both the current Sacramento River width and channel capacity at the intake locations and the design	

			identified for SPFC functionality, and the current annual drainage pumping amounts (per month) and costs. Where are the DWR maps of seepage areas on these islands where CM1 facilities to be built? Where are the maps of the island's existing drainage systems, including pumping stations and system capacities? Where is the modeling and other studies regarding flood capacity that is readily available in other plans such as Central Valley Flood Protection Plan? Where are studies from Sacramento County regarding how building structures could impede or re-direct flows and how they recommend these impacts are mitigated? Where are studies from FEMA regarding how building very large elevated dirt pads re-directs flood impacts to other structures? The EIR/EIS analysis should use existing data and baselines to compare against the increases and alterations of existing facilities/capacities to properly identify all of the possible hydraulic and flood impacts like erosion and seepage, changes in river and surface water flow direction and velocities, and increased hydraulic pressure or the duration of these actions to determine whether Impact SW-9 in fact properly captures and characterizes the full extent of damage could be caused by building large elevated structures in flood hazard areas with known seepage and drainage issues. <u>A lead agency must identify all significant effects on the environment caused by a proposed project that cannot be avoided. However, the EIR/EIS must first perform a rigorous analysis that discloses the nature and extent of the impacts to support the conclusion that impacts are significant and unavoidable in order to provide the public and cooperating agencies with adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action.</u> Where are the current studies or data and modeling collected by BDCP that supports the conclusion that will not create increased flood potential on the five rivers and Yolo Bypass facility of the SPFC? If the Plan Chapter 5 Effects Analysis modeling provides evidence that supports this conclusion, then it should be mentioned what the analysis says and where that info can be found. Where are the current studies or new BDCP data and analysis of how, where, and for how long and frequently the BDCP expects increases in surface water or re-directed surface waters to occur or which local drainages will be impacted and whether they have capacity for increased flows?	

			Where will the surface runoff be re-directed when it hits the two-story wall of dirt that the CM1 facilities are built up on? What percentage of the land surface do the new elevated building pads for CM1 facilities on each of the Delta islands? Will the weight and location of these large building pads create additional pressure on known seepage areas and cause water to be forced out onto surrounding lands? How many acres and what crops will be damaged by the seepage and surface runoff flooding? Where are the current studies or new BDCP analysis regarding how much annual sediment is supposed to build up at the intakes and how this affects the current flood flow capacity in the intake vicinity as well and both up-river and down-river? The EIR/EIS analysis should indicate what quantities of and where increased surface flows to be created, how and where re-directed flows will occur, how and where drainage systems will be disconnected due to CM1 footprint, how much annual sedimentation will accumulate in the river, etc. Provide information on how much annual damage BDCP expects to pay for erosion and seepage damage to non-BDCP structures and current and future crops, cost of replacing and repairing disrupted drainage system so that it is functioning again, increased drainage pumping costs to be paid to RDs, cost of annual sediment removal is, cost to widen Sacramento River channel to replace flood flow capacity lost by in-river diversion intake construction and sediment, etc. The EIR/EIS's failure to recognize that levees are underneath the road surface of many roads/hwys identified for use during the 10-year construction period means that no analysis was done or mitigation offered regarding the need to inspect the levee integrity and perform routine maintenance. The local Reclamation District (RD) is responsible for daily inspection of levee conditions for issues such as cracks, slippage, encroachments, seepage, burrowing animals, etc. In addition, DWR conducts levee inspections twice a year and the USACE conducts more extensive Periodic Inspections every 5 years. The local RD is responsible for performing annual maintenance activities on and around the levees in order to meet USACE and FEMA levee standards which will be hindered by any blockage or access issues caused by construction activities. DHCCP consultants need to begin immediate consultation with local RDs, the CVFPB, DWR's levee inspection branch, and USACE to discuss drafting a specific	

			mitigation measure to deal with how staging of construction equipment, construction traffic, and/or road re-routing will affect the ability for levee inspections and annual levee maintenance to be performed. Any interference with levee inspections or maintenance exposes SWP and CVP to liability if as a result the levee loses its current levee rating by USACE or FEMA will expose the BDCP to liability associated with the change in status and any resulting flood damage to private property that is protected by that levee. Construction impacts that impede access of levees to RD's, DWR levee inspectors, or USACE for inspection and maintenance needs to identified and mitigated and compensation to landowners for any flood damage to their property and crops. Additionally, the EIR/EIS fails to identify the construction impacts on ability of the local RD, county OES, DWR's Emergency Response personnel, CalEMA, or USACE to access the levees in the construction zone/area if need to do floodfighting activities. The degradation/damage to a levee from the extensive number of heavy BDCP construction trucks on a daily basis or from flood, earthquake, or daily intensive vibration from the multiple steel pile driving for the new intakes for several months could result in failure of levee in the general vicinity of construction which would require quick response to floodflight. But the EIR/EIS neither discusses this potential, analyzes its impacts, nor provides any mitigation measures or evacuation plan for workers and residents on the island. The inability to quickly floodfight and repair a damaged levee will result in loss of life and property in the area protected by that levee and could have a domino effect of causing neighboring levee failures if CM1 construction activities/equipment block access to the levee break or floodfighting personnel and supplies. Construction impacts that impede fast access to levees that require floodfighting needs to be identified and mitigated.	
33	6-105 6-59	14-15 1-14	**MITIGATION MEASURE SW-9: (USE MITIGATION SW-4 IN ALT. 1A: REDUCE RUNOFF AND SEDIMENTATION)** <u>EIR/EIS environmental conclusions simply stating that future projects/actions/designs will comply with applicable law does not constitute avoidance of all impacts and does not suffice as replacement</u>	

			of mitigation. In order to approve a project, the lead agencies must identify feasible mitigation measures or alternatives that would avoid or substantially lessen any significant adverse environmental effects of the project. The mitigation measures must be specific and mandatory, such that they are fully enforceable. • *"because BDCP proponents would be required to comply with requirements of USACE, CVFPB, and DWR to avoid increased flood potential"* ***Page 6-105, lines 7-9.*** There is new and increased risk of flooding posed by increased surface water flooding, reduced drainage capabilities due to exceedance or alteration of existing facilities, re-directing surface water flows around elevated structures to areas currently not experiencing surface flooding, weight of elevated pads/structures causing seepage to surrounding lands, and to reduced capacity in Sacramento River to handle SPFC flood flow design. These impacts must be mitigated beyond design/permit requirements of USACE, CVFPB, or DWR. A specific mitigation should be provided that provides details on the specific design elements, operational requirements, or permit conditions that would be implemented by each agency such as paying for increased drainage pipes and pumping costs, elevating non-BDCP structures to 100-year, widening and/or dredging Sacramento River to assure can handle design flood flows, etc. and how each of these permit requirements would avoid or mitigate the impacts identified in EIR/EIS which include surface flooding, re-directed flood flows and reduced flood flow capacities as well as how these elements would avoid or mitigate the impacts *not* identified in EIR/EIS which include seepage, erosion, increased drainage pumping costs, lost crops damaged by localized flooding, etc. In order to approve a project, the lead agencies must identify feasible mitigation measure or alternatives that would avoid or substantially lessen any significant adverse environmental effects of the project. The mitigation measures must be specific and mandatory, such that they are fully enforceable. Mitigation Measure SW-9 (Alt 1A MM SW-4) improperly defers the formulation of specific mitigation until some future date, when vague and ambiguous "plans," "studies," or "reports" will be prepared, without imposing any	

			performance standards as to what those plans/studies must do or show. It is inappropriate to assume that the details of mitigation will be fleshed out at an unknown future date. The formulation of mitigation measures cannot be deferred until a later time based on completion of future studies or agreements being signed, although a lead agency is allowed to provide specific performance standards that specify the extent to which impacts will be mitigated. Mitigation Measure SW-9 fails to provide specifics on either the extent or standards. • *"Drainage studies will be prepared"* ***MM SW-4 of Alt 1A, page 6-59, line 4.*** • *"to assess the need for, and to finalize, other drainage-related design measures"* ***Page 6-59, lines 4-5.*** • *"Based on study findings"* ***Page 6-59, line 6.*** • *"if it is determined that onsite stormwater detention storage is required"* ***Page 6-59, lines 6-7.*** • *"detailed sediment transport study" "will be conducted"* ***Page 6-59, line 12.*** • *"a sediment management plan will be prepared"* ***Page 6-59, lines 12-13.*** A menu of specific mitigations should be provided that provides details on the specific design elements, operational requirements, or permit conditions that would be implemented by each permitting agency and how each of the elements would avoid or mitigate the impacts identified in EIR/EIS as well as how these elements would avoid or mitigate the impacts *not* identified in EIR/EIS which include seepage, erosion, increased drainage pumping costs, lost crops damaged by localized flooding, etc. Will the studies only analyze the impacts to the BDCP new facilities at only the BDCP construction sites, or will it include an analysis of how the existing drainage system functions to drain the whole island? Will the studies analyze how, where, and duration of drainage disruptions and localized flooding? Will BDCP utilize other current studies done in CVFPP to identify current SPFC design deficiencies and hydraulics for determining how and where Sacramento River needs to be widened or dredged to replace flood flow capacity due to footprint of in-water intake facilities? What are the specific performance standards that specify the extent to which impacts will be mitigated for each of the studies and plans to be developed pursuant to this mitigation	

			measure? What is the condition the studies or plans will be trying to maintain? What is the scope of work direction for these studies/plans and their cost to prepare? To implement? Mitigation Measure SW-9 (Alt 1A MM SW-4) is unenforceable because it fails to set any specific performance standards or criteria for surveying, relocation, repair, replacement, and/or compensating or restoring the impacted resource impacted by the project activity. The EIR/EIS assumes, without evidentiary support in the record, that all the mitigation measures will be fully implemented where the project activities may have a direct or indirect effect and that the measures will in fact work to avoid or substantially reduce the significance of the adverse impacts, which may in fact not occur. The EIR/EIS additionally fails to account for and analyze impacts resulting from Project activities if the mitigation measures are not implemented or not working in terms of reducing the level of adverse impacts. What are the total anticipated costs for surveying island drainage patterns and systems, reviewing current flood flow capacities and designs and for implementation of mitigation measures such as widening river, dredging river, designing and reconstructing existing or new drainage systems anywhere on the island that are disconnected from rest of the system by facility footprint, and implementing annual sediment management plan?	
34	6-105	18	**TYPO:** "five" should be "three" to properly identify number of intake locations designed for Alt 4.	
35	GEN All inclusive	GEN All inclusive	**GENERAL EIR/EIS COMMENTS** **Comment Limitations** Overall, the EIR/EIS as currently drafted is still insufficient for NDWA as a Cooperating Agency or an agency with a water supply contract with DWR for the assurance of a dependable supply of suitable quality water to evaluate or provide meaningful comments for the following reasons: 1) **Inadequate Analysis** - The EIR/EIS does not provide sufficient or adequate documentation to support assumptions and conclusions in the individual Impact Statements or Mitigation Measures and	

				defers the significant portion of this work until some future date, preventing NDWA as a cooperating agency to evaluate the true nature and extent of the impacts associated with construction or implementation of any of the CMs, let alone the adequacy of the proposed mitigation. If there are reports, studies, maps, or other evidence then they should be referenced, included as Appendices, and the results of studies described so there is a clear nexus on how the impact assumptions/conclusions were reached. Otherwise the document is only based on conjecture and speculation rather than an actual environmental review that compares the individual and combined elements/activities of the Plan with existing baseline conditions. In many chapters the EIR/EIS fails to provide an accurate assessment of location, size, duration, or level of severity of the anticipated and foreseeable impacts for each individual Conservation Measure (CM) or the cumulative impacts if they are all implemented during the 50-year life of the Plan. Since the adverse impacts of CM1 significantly outweigh and rely on implementation of the limited ecological benefits of CM2-22 which even cancel each other out over the long term in some cases (reduced tidal action in Cache Slough Complex will eliminate benefits of any tidal restoration over time), each Conservation Measure needs to be analyzed to a level of detail to at least indicate the total amount of cumulative effects of how each CM impacts the other and to justify the implementation of CM1 which has significant adverse effects on aquatic and terrestrial species during construction and implementation. The EIR/EIS fails to quantify the duration and severity of impacts associated with the "temporary" construction activities for each of the CMs which is important context due to the long time period that magnifies the cumulative effects over time. The number of years associated with each Impact should be clearly stated, even if an estimation. (See additional comments below).	
				2) **Modeling/Effects Analysis Problems** –	

			The NDWA has submitted a joint letter with other agencies concerned with the performance of the BDCP modeling. Due to the concerns raised in the letter and with conversations with the BDCP modeling consultants, NDWA is unable to assess the accuracy of the assumptions and conclusions reached in the Impact Statements for the EIR/EIS as a whole, but particularly for Chapters 5 *Water Supply*, 6 *Surface Water*, 7 *Groundwater*, and *8 Water Quality* which are the most important chapters to us a cooperating agency as they most directly affect the ability of BDCP to comply with the NDWA Contract criteria. BDCP needs to run effects analysis modeling runs for all four scenarios in Alt. 4 using the current SWRCB D-1641 salinity compliance point at Emmaton since the BDCP permits will not include changing this location and therefore will have to operate all four scenarios to meet Emmaton salinity criteria. In addition, these four chapters which are all tied directly together failed to include all of the physical impacts that are clearly identified in the Plan Chapter 5 *Effects Analysis* that will directly impact the NDWA Contract provisions regarding: 1) water availability (access) in ***all*** channels of the North Delta (300,000 acres); 2) changes in natural flows (reversals at Georgiana Slough, tidal exchange to unidirectional in Steamboat and Sutter); 2) alteration of surface water elevations to the detriment of North Delta channels or water users (Georgiana, Steamboat, Sutter, and -3 feet in Sac River); and 3) the locations and duration of seepage and erosion damage caused by altered hydraulics, including changes in flow directions and velocities. 3) **Optimization Changes** – The DHCCP staff has been recently proactive in finally investigating the feasibility of the design, size, and location of CM1 water conveyance facilities proposed to be built in the North Delta in order to identify what they call an "Optimization Alignment." The NDWA would like to commend the DHCCP consultants for recognizing that outreach and direct communication with residents and	

			agencies in the CM1 construction area is the most productive and effective way to design a more feasible project as well as reduce project costs and adverse impacts. While the NDWA is pleased to hear BDCP is considering announcing significant design changes in terms of size and location in August that will change the footprint and associated impacts, this also negates any reason for NDWA to evaluate or provide any input on any EIR/EIS chapters beyond 5, 6, and 7 since the Project is due to be significantly modified once again. The NDWA would request the BDCP lead agencies run new models, specifically analyze new project description instead of relying and referring to Alt. 1A for impacts and mitigation, and release a 3rd Admin Draft for cooperating, responsible, and trustee agencies to comment on prior to releasing a Final Draft for public comment. **Recommendation:** 1) Add more description and documentation (Appendices/maps/tables/results descriptions that provide context and nexus) in each Impact Statement that supports the assumptions and conclusions made in all alternatives; 2) the EIR/EIS, both project and program level analysis, should at least provide an in depth and accurate cumulative effects analysis as if all CMs 1-22 were implemented over the 50-year life of the Plan to give Delta communities and landowners an idea of the worst case scenario; 3) Make each alternative impact in each chapter clarify how long each impact will occur and quantify the severity in terms of risk to life, loss of property, and harm to Delta economy and ecosystem; 4) Each chapter should include a new table, a matrix grid, that identifies the various impacts associated under each analyzed Alternative, and their proposed mitigation, for that chapter, so can compare side-by-side how each of them fare in terms of individual impacts for that chapter; 5) modify the BDCP models to address issues raised in joint letter and re-run with newer updated information and current and BDCP permit conditions of operating SWP/CVP water conveyance to meet salinity criteria at Emmaton for all four scenarios in Alt. 4.	

			Inadequate Analysis **Baseline Conditions and Comparison** - A proper environmental analysis of a project of this size and long-term (10 year) construction timeline needs to provide an accurate, stable, and finite description of the project and the existing baseline conditions used to determine the significance of environmental impacts in order to allow the public or a cooperating agency to determine the true nature and extent of the actual impacts likely to be caused by the Project. Generally most of the Impact statements contain little to no description of the existing baseline conditions that were used to determine impacts; or where the direct and indirect impacts will occur; or to account for changing conditions that are likely to occur prior to or during the 10-year construction time period. Therefore, the EIR/EIS lacks a sufficient baseline against which to compare the project to allow NDWA as a cooperating agency to properly analyze the severity of the environmental impacts, the project changes necessary to avoid impacts, or the mitigations to reduce the impacts to a level of insignificance. The impact analysis should describe the changing conditions, identify the conditions upon which the EIR/EIS relied for its baseline, and consider that range of circumstances as part of the analysis of impacts. **Supporting Evidence and Findings** - In proposing environmentally detrimental projects, a lead agency must justify their decisions based on counterbalancing social, economic or other benefits, and to point to substantial evidence in support. Written findings must be made for each significant environmental impact identified in the EIR/EIS and each finding must be accompanied by a brief explanation of the rationale for the findings supported by substantial evidence and some explanation to supply the logical step between each finding and the conclusion in the record. Instead the Impact statements and Mitigation Measures in each chapter were replete with nothing more than speculation and conjecture without reference to any evidence supporting the foundation and basis for assumption and conclusions made. This too prevented NDWA from providing as specific or comprehensive comments and suggestions for improving as we would like. The conclusions in the EIR/EIS must be supported by substantial evidence – actual facts. They can be reasonable assumptions or expert opinions – but	

			they must still be predicated and backed up by facts. Speculation does not constitute substantial evidence, and unsubstantiated narrative or expert opinion asserting nothing more than "it is anticipated" that something "potentially could result" is not analysis supported by factual evidence. Not having a sufficiently detailed project has resulted in significant and serious adverse impacts being overlooked and omitted. Ignorance is NOT bliss and can result in costly and potentially deadly consequences. The Plan and EIR/EIS should be more concerned with quality and completeness of content instead of meeting unrealistic deadlines and budget limitations. **Overriding Benefits** - A lead agency cannot acknowledge and impose a project for which an EIR/EIS identifies a significant environmental impact unless the impact has been mitigated or avoided by changes in the project, or unless the agency specifically finds that overriding benefits outweigh the significant effects on the environment, particularly when the EIR/EIS analysis grossly underestimates the project's actual impacts and fails to disclose to decision-makers and the public the true nature, extent, and costs of those impacts. The EIR/EIS contains a total of 46 significant and unavoidable adverse impacts which is UNACCEPTABLE. The NDWA disagrees that these impacts are unavoidable. In order to approve a project, the lead agencies must identify feasible mitigation measure or alternatives that would avoid or substantially lessen any significant adverse environmental effects of the project on Delta resources and economy. The mitigation measures must be specific and mandatory, such that they are fully enforceable. To the extent that a lead agency rejects potential mitigation, the lead agency must also provide information in the record to justify rejecting mitigation measures as infeasible based on economic, social, or housing reasons. The EIR/EIS fails to meet these objective in any of the chapters for either impacts associated with CM1 construction and operation or any of the CM2-22. **Defers Environmental Analysis to Future Studies** - A lead agency must identify all significant effects on the environment caused by a proposed project, including those that cannot be avoided. However, the EIR/EIS must first perform a rigorous analysis that discloses the nature and extent of the impacts to support the conclusion that impacts are significant and/or unavoidable in order to provide	

			the public and cooperating agencies with adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action. Instead the EIR/EIS relies extensively on deflecting the responsibility for the formulation of specific mitigation until some future date, when vague and ambiguous "plans," "studies," or "reports" will be prepared, without imposing any performance standards as to what those plans must do or show. It is inappropriate to assume that the details of mitigation will be fleshed out at an unknown future date. This is an impermissible deferral of environmental analysis which prevents NDWA as a cooperating agency from determining the scope, severity, or duration of the impacts from this project activity or the extent to which our 1981 Contract with DWR regarding the operation of the SWP will be violated. **Permit Conditions Are Not Mitigation** - Mitigation Measures that simply state that future projects/actions/designs will comply with applicable law and required permits does not constitute avoidance of all impacts and does not suffice as replacement of mitigation. Those are things the Project is already required to do and may not in fact address the impacts. There are numerous examples of projects that followed modern design/engineering standards, regulatory and statutory requirements, and government agency permit conditions and still resulted with significant problems. A local Delta example is the City of Stockton's Delta Water Supply Project, the city's most expensive undertaking that started pumping water from the San Joaquin River in the summer of 2012 to Stockton homes and was soon shut down for repairs because a pump station built atop a Delta levee had already sunk (moving 13 ½ in some places, causing the metal pipes and bolts to stretch to their breaking limit), putting the levee in "catastrophic danger." Now the city is being sued by one of the contractors who completed repairs for failing to either address the shifting ground/soils stability problem or provide them accurate and complete plans. Another is nearby – the Bay Bridge, which has yet to open due to construction defects and flaws that render it unsafe for vehicles. Both of these projects had extensive political pressure put on them to ignore and refuse to alter the project to address the safety and environmental review concerns raised and to expedite the construction. The BDCP suffers	

			from even more intense political pressure and desire to rush through shoddy, insufficient planning and expedite construction – damned the consequences. Unfortunately these consequences can be not only serious and costly, but possibly deadly due to possibility of loss of life due to flood. **Mitigation Oversight and Effectiveness** - The EIR/EIS assumes, without evidentiary support in the record, that all the mitigation measures will be fully implemented where the project activities may have a direct or indirect effect and that the measures will in fact work to avoid or substantially reduce the significance of the adverse impacts, which may in fact not occur. The EIR/EIS additionally fails to account for and analyze impacts resulting from Project activities if the mitigation measures are not implemented or not working in terms of reducing the level of adverse impacts. The EIR/EIS fails to break out the costs of proposed mitigation measures or for any of the studies that need to be done before specific mitigation measures are offered and lumps the mitigation costs into the cost of the each conservation measure, so there is no way for NDWA as a cooperating agency to determine if there is enough money identified to cover the costs to conduct future studies or develop management plans, to implement the mitigation measures for the ten-year construction period of the 50-year duration of the Plan, to compensate harmed parties if mitigation isn't working, to ensure the mitigation is done properly and is effective in reducing the adverse impacts, to enforce, or to modify and offer an alternative mitigation if the proposed mitigation isn't working to reduce adverse impacts.	
36	GEN All inclusive	GEN All inclusive	**CM 1 Covered Action, Not a Conservation Measure:** Fundamental flaw of the BDCP and EIR/EIS is having half the Plan proposing project level environmental analysis of water conveyance facilities/operations (CM1) and programmatic level analysis of habitat projects. This is particularly troubling since the Plan intends for the new water conveyance facilities (CM1) to be ready for construction once the HCP/NCCP permits are approved despite the *Effects Analysis* showing CM1 is not only detrimental to fish and wildlife species including the possibility of causing jeopardy, but may even cause the extinction of one fish species if implemented as currently proposed. Each of the Conservation Measures must be able to show how	

			it is contributing to recovery of each species identified in the plan. If implementation of a CM results in additional take or harm to species or their habitat conditions – then it is a Covered Action. If a CM requires implementation of one or more of the other CMs in order to mitigate its adverse effects on species or their habitat – then it is a Covered Action. If a CM benefits some species in the Plan, but is detrimental to others – then it is a Covered Action. If a CM must rely on another CM or combination of other CMs to mitigate its adverse impacts to species or habitat – then it is a Covered Action. If the cumulative adverse impacts of the CMs and Covered Actions is greater than the benefits to each and every species identified in the Plan – then it is ***not*** an HCP/NCCP. If phasing of implementation of Covered Actions or CMs cause adverse impacts to species or habitat prior to any benefits that contribute to recovery – then it is ***not*** an HCP/NCCP. The intent of the BDCP is to provide a project-level environmental analysis of a Covered Action (new North Delta water conveyance facilities construction and operations that results in take/harm to species or habitat) in order to fast-track its implementation before the Conservation Measures which are knowingly and purposely being put on a slower track by only intending to analyze them to a programmatic-level of environmental analysis that will require significant planning, design, analysis, outreach, and document preparation before being able to be permitted, implemented, or achieve any meaningful benefits to species. Thus, the BDCP focuses on implementing the goals of water supply over the ecosystem. If CMs 2-22 are not implemented, then CM1 as a Covered Action that requires mitigation will have significant adverse impacts on species, including possible extinction of one fish species. This inequitable and uneven treatment of water supply versus ecosystem restoration is systemic and foundational in the BDCP due to the Notice of Intent project purpose which provides clear and measurable objectives for water supply to deliver up to full contract amounts, but only contains vague direction on ecosystem. Consequently, the BDCP ends up only being a take permit for water conveyance operations and a long list of potential ecosystem management tactics with no clear over-arching or cohesive strategy to improve the species. **Recommendation:** Remove CM1 as a Conservation Measure and instead have it properly identified as a Covered Activity to be mitigated.	

37	GEN	GEN	**MITIGATION MEASURES** In order to approve a project, the lead agencies must identify feasible mitigation measure or alternatives that would avoid or substantially lessen any significant adverse environmental effects of the project. The mitigation measures must be specific and mandatory, such that they are fully enforceable. To the extent that a lead agency rejects potential mitigation, the lead agency must also provide information in the record to justify rejecting mitigation measures as infeasible based on economic, social, or housing reasons. The formulation of mitigation measures cannot be deferred until a later time based on completion of future studies or agreements being signed, although a lead agency is allowed to provide specific performance standards that specify the extent to which impacts will be mitigated. Allowing the BDCP Proponents to decide whether seepage is "caused by" BDCP habitat implementation and what level of mitigation will be provided is a serious conflict of interest that obfuscates the liability of BDCP to remediate, repair, or avoid the damage caused by their Project, which is why these details must be clearly identified in the EIR/EIS so the permitting agencies can decide if it is sufficient and appropriate mitigation or not prior to approving permits. If BDCP is allowed to be the prosecutor presenting evidence, the judge, and jury in deciding whether their project caused damage and how much mitigation should be provided to who, then it will be too easy for them to declare their Project innocent of causing any damages every single time. Unless the impacts and mitigation are specific and measurable, and written into the HCP/NCCP as permit conditions to be approved by the permitting agencies, then there is too much risk that BDCP Proponents will arbitrarily and capriciously reject and deny legitimate adverse impacts that are their obligation to mitigate. The EIR/EIS assumes, without evidentiary support in the record, that all the mitigation measures will be fully implemented where the project activities may have a direct or indirect effect and that the measures will in fact work to avoid or substantially reduce the significance of the adverse impacts, which may in fact not occur. The EIR/EIS additionally fails to account for and analyze impacts resulting from Project activities if the mitigation measures are not implemented or not	

			working in terms of reducing the level of adverse impacts. What happens if implementation of mitigation measures is not reducing the adverse impacts as anticipated? Under what criteria will the permitting agencies even determine if the mitigation measures are working or whether they are reducing adverse impacts enough? Without this information the public and cooperating agencies do not have adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action or to evaluate the severity of the impacts or the feasibility of the project alternatives and mitigation measures to avoid or lessen such impacts.	
38	GEN	GEN	**Cumulative Impacts:** The EIR/EIS is lacking a comprehensive discussion of how each CM relates to the other. Cumulative Impacts Analysis does not provide any sort of analysis of how impacts associated with each CM1-22 relate to each other. For instance, do more than one CM have the same adverse impacts and therefore when combined have an even greater detrimental effect on environmental resources? Every action, or in this case Covered Actions and Conservation Measures, causes a reaction. Yet, the EIR/EIS fails to analyze how the activities and effects in each CM1-22 react to each other, conflict with other, or complement each other. The EIR/EIS's Impact Statements are simply a list of effects that are disconnected and poorly integrated. The following excerpt from the DRERIP emphasizes this point: "Collectively, the synthesis team concluded that a number of the conservation measures have the potential for additional synergistic effects that can raise or lower the value of some individual conservation measures when implemented concurrently with other actions. The complexity of the various trade-offs between expected positive and negative effects make it difficult to predict the biological responses to concurrent multiple measures." The BDCP and therefore the EIR/EIS still suffers from this problem and needs to provide this synthesis to support why the collection of CMs in Alternative 4 are in fact the right mix and won't in fact result in making the Existing Conditions worse if they are implemented. **Recommendation:** Add a Chapter to the EIR/EIS that shows what action and reaction each of the	

			CMs Impacts have to each other and cumulatively if and when all are implemented over the life of the Plan. .	
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BDCP EIR/EIS Review Document Comment Form

Document: 2nd *Administrative Draft—Chapter No. 7 Groundwater – Part II*

Comment Source: North Delta Water Agency
Submittal Date: July 31, 2013

No.	Page	Line #	Comment	ICF Response
1	7-1 thru 7-52 inclusive		**CHAPTER 7 GROUNDWATER - OMMISSIONS** Loss of availability/access - Chapter 7, *Groundwater*, fails to identify or discuss water supply impacts to in-Delta water users despite EIR/EIS chapters 6 (Surface Water) and 7 (Groundwater) making it clear that de-watering during construction of CM1 will result in lowering groundwater elevations by up to 10 feet and possibly depleting both ag and domestic water well supplies. In addition, many of the adverse impacts identified in Chapter 5 of the Plan (*Effects Analysis*) identifies adverse changes to natural flows and velocities, surface water elevations, and tidal flux, all of which will impact the groundwater levels, particularly in the North Delta where CM1, CM2, and CM3 will be located, yet none of this information is directly acknowledged in the EIR/EIS chapters 5, 6, and 7. According to the Chapter 5 *Effects Analysis*, CM2's diversion of 6,000 af into the Yolo Bypass results in lowering the Sacramento River by more than 3 feet which could cause additional lowering of groundwater table since the Delta is a large floodplain with shallow groundwater that is hydraulically connected to the surface water, and changes in river stages affect groundwater levels and vice versa, ***page 7-5, lines 14-16.*** Adding CM1 which would divert another 3,000-9,000 cfs into the new North Delta intakes will reduce the surface water elevations in the Sacramento River below the new intakes even more as well as sloughs and channels downriver such as Steamboat, Sutter, and Georgiana. ***Plan Chap 5, page 5.3-10.*** Despite the hydraulic connection of surface and groundwater in the Delta mentioned above, Chapter 7 of the EIR/EIS fails to report the findings regarding changed hydraulics, flows, and water elevations from the new water diversions from the Sacramento River proposed in CM1 and CM2 that are explained in the Plan *Effects Analysis* and instead only acknowledges the groundwater impacts from dewatering, discharges, and seepage from forebay. The tidal action's influence on this hydraulic	

			connection is also pointed out on ***page 7-5, lines 17-18:*** *"This hydraulic connection is also evident when the tide is high and surface water flows from the ocean into the Delta, thereby increasing groundwater levels nearby."* The EIR/EIS is supposed to analyze the environmental impacts of the Plan, which should include all of the findings regarding hydrologic and hydraulic water changes identified in the Plan's *Effects Analysis*, such as altered flow patterns (including unnatural reverse and unidirectional flows instead of twice daily tidal action) and velocities, tidal muting from implementation of habitat measures, changes to surface water elevations in rivers and channels, and water quality. This is particularly concerning since the homes and businesses in the Delta communities of Clarksburg, Courtland, Freeport, Hood, Isleton, Rio Vista, Ryde, and Walnut Grove receive their water supply from individual water wells (groundwater), ***Page 7-1, lines 25-28,*** (municipal and irrigation well are typically deeper in the aquifer, 200-400 feet below ground surface, than domestic wells that are about 100-250 feet below ground surface), ***page 7-8, lines 33-35,*** and maintaining groundwater levels below crop rooting zones is critical for successful agriculture, ***Page 7-5, lines 20-21,*** and groundwater is used throughout the Delta through pumping and plant uptake in the root zone, ***page 7-11, lines 26-27,*** with an average annual groundwater pumping in upland peripheral Delta areas estimated to range from 100,000 and 150,000 acre-feet of water for both domestic and agricultural uses, ***page 7-11, lines 28-29.***	
2	7-39	15-21	**7.3.3. EFFECTS AND MITIGATION APPROACHES – Omissions And Deficiencies** <u>A lead agency must identify all significant effects on the environment caused by a proposed project that cannot be avoided. However, the EIR/EIS must first perform a rigorous analysis that discloses the nature and extent of the impacts to support the conclusion that impacts are significant and unavoidable in order to provide the public and cooperating agencies with adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action. A lead agency must identify all significant effects on the environment caused by a proposed project that cannot be avoided. However, the EIR/EIS must first perform a robust analysis to</u>	

			support the conclusion that impacts are significant and unavoidable. The EIR/EIS cannot defer the determination of the scope and nature of significant impacts until future studies and reports are prepared. The EIR/EIS admits the analysis does not include details regarding the number, location, depth, or annual production of existing water wells in the vicinity of the CM1 project facilities "at this time." Therefore the model predictions in changes in groundwater levels or flow directions cannot be correlated to particular wells or lands to be affected. Until the BDCP collects the data on these individual wells, CM1 will fail to meet a project-level, permit-ready, level of analysis of CM1 Conveyance Construction. The EIR/EIS should be supported by accurate baseline condition descriptions, substantial evidence or scientific research, rather than relying on future studies and reports that have yet to even identify the actual severity of the impact, let alone an analysis that compares the project to the existing conditions. The studies and reports mentioned don't even provide any details regarding what data will be collected and analyzed. Such future studies do not constitute substantial evidence and result in the EIR/EIS not being able to provide full disclosure on the significance of the impacts from this project. Without this information the public and cooperating agencies do not have adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action or to evaluate the severity of the impacts or the feasibility of the project alternatives and mitigation measures to avoid or lessen such impacts.	
3	7-46	3-10	**7.3.3.2 ALT 1A – DUAL CONVEYANCE WITH TUNNEL/PIPELINE** Alt 4 refers reader to Alt 1A for complete description of groundwater impacts and associated mitigations, therefore we provide the following observation regarding the opening introductory paragraph of Alt 1A. The construction of CM1 facilities is described as having "temporary" effects on lands and communities in the vicinity, which makes the impacts sound more benign than they really are. While some of the activities described in this paragraph are not permanent, some of them are in fact permanent such as some of the power poles,	

			muck and spoils disposal areas, and access roads. In addition, having several square miles torn up from excavation and open-trenching, roads re-routed, particulate matter and dust from excavation, concrete plants and borrow pits blanketing the air, constant and intense vibrations and ear-piercing noise from up to 36 steel piles being driven into the ground every day, and thousands of trucks blocking roads and creating dust and noise impacts just to name the more obvious adverse local conditions occurring daily for up to TEN YEARS is not considered "temporary" effects by the local residents and businesses. In order to be more transparent with the public and local government agencies and residents about the VERY long-term timeframe that local residents and businesses must suffer through these destructive and disruptive impacts, the EIR/EIS should replace the term temporary with more accurate timeline of "up to ten years." When EIR/EIS is being general in terms of construction then should mention the 9-10 year timeline and provide estimates on timelines for each activity's specific impacts.	
4	7-82	13-24	**IMPACT GW-1: Deplete groundwater supplies or reduce production capacity of preexisting wells during construction** <u>A proper project-level environmental analysis of a project of this size needs to provide an accurate description of the project and the existing baseline conditions used to determine the significance of environmental impacts in order to allow a lead agency, trustee agency, cooperating agency, or an impacted party in the Plan Area to evaluate the severity of the impacts or the feasibility of the project alternatives and mitigation measures to avoid or lessen such impacts.</u> The project description and level of environmental analysis lacks sufficient details regarding the existing baseline conditions, locations, depths, annual water supply production or pumping costs of residential and business water wells. These are typically permitted by the County so the EIR/EIS should be able to collect this information in order to provide sufficient details to determine the level of impact and the type, duration, and locations of mitigation measures. DWR, Dept. of Food & Agriculture, SWRCB, or County Agriculture Commissioners may also have reports or data that can be used in the analysis of this impact.	

			The EIR/EIS analysis should use existing data and baselines to compare against the anticipated lowering of surface and groundwater during dewatering in order to determine which domestic and ag water supply wells will be impacted, to what extent, and for how long to determine whether Impact GW-1 in fact properly captures and characterizes the full extent of water delivery disruption that could be caused by construction of CM1 facilities. The assumptions and conclusions in the EIR/EIS must be supported by substantial evidence – actual facts. They can be reasonable assumptions or expert opinions – but they must still be predicated and backed up by facts. Speculation does not constitute substantial evidence, and unsubstantiated narrative or expert opinion. Environmental analysis failed to provide any current data, modeling, reports, or studies or BDCP specific data and information collected and then analyzed to reach the conclusions regarding groundwater impacts during construction of CM1. Therefore, the assumptions and conclusions in GW-1 are conjecture and speculation that warrant additional info upon which to evaluate the environmental impact on groundwater resources and existing beneficial uses. A lead agency must identify all significant effects on the environment caused by a proposed project that cannot be avoided. However, the EIR/EIS must first perform a rigorous analysis that discloses the nature and extent of the impacts to support the conclusion whether impacts will occur or not and if they are significant and unavoidable in order to provide the public and cooperating agencies with adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action. Where is the current studies or data and modeling collected by BDCP that supports the assumptions and conclusions made in this impact statement? What was actually analyzed to determine these assumptions are in fact the correct ones to use? Appendix 7A Groundwater Model Determination describes how the model was built to analyze groundwater impacts, but it doesn't explain what the findings from the model runs are or what activities the model was simulating and analyzing. Did it analyze just the groundwater impacts	

			associated with construction of CM1, or does it include other CM1 activities and from CM2-22 as well? Without providing such evidence – the following assumptions and conclusions regarding groundwater impacts generally, and Impact GW-1 specifically, are nothing more than unsubstantiated opinion and conjecture which do not meet a project-level analysis of environmental impacts and raise several questions: <u>Dewatering wells</u> ***Page 7-46, Line 19****, "the dewatering well would be generally 75 to 300 feet deep, placed every 50 to 75 feet apart along the construction parameter as needed and each would pump 30-100 gpm."* How many total dewatering wells will be installed? Couldn't find a map or appendix analysis that shows locations and total number of wells to be installed, so used the legend on Figures M3-1 sheet 1 and 2 to calculate there are at least 300 dewatering wells (26 per 2,000 feet if 75-feet apart) located just around the perimeter of the three intakes, so doesn't include the hundreds more that could also be installed around the perimeter of the forebay, open-trenching, borrow pits, or any other construction area that needs to be dried up. If you use pumping 50 gallons per minute as an average, then just the 300 dewatering wells around the intakes would pump 15,000 gpm, for a total of pumping 21.6 million gallons per day (24-hours), every day for years. Is this calculation accurate in how many gallons of water the project intends to extract and discharge every day? Whatever the correct amount of daily discharge is should be disclosed and analyzed in terms of impacts on the environmental resources. How much of the 21.6 million gallons will be discharged into local drainages and how much directly into the river? What are the specific river and local drainage locations for these discharges? What is the capacity of the local drainage ditches/canals the project plans to use? Will land uses and property in the areas of discharge be affected by seepage or surface flooding? For how long will they be flooded and not able to grow crops? Will the drainage interfere or damage crops? If so, where and how many acres and lost crop values are expected? How much water will be discharged/drained in a month? How much in a year? The EIR/EIS needs to be more specific with how many dewatering wells will be installed so can see all open trenching areas, forebays and shaft locations to be dewatered, identify their	

			approximate locations on a map so that can see exactly which construction areas will have the perimeter dewatered, how many gallons will be extracted daily/monthly/annually, how long the dewatering in each location is expected to occur, the locations where the water will be discharged, how much will be discharged daily at these locations, and identify if BDCP will need to improve/expand the capacity of existing drainage facilities at these locations and on island's system in order to accommodate the dewatering amounts and to pay for the additional pumping costs to the local reclamation districts and farmers for use of their drainage pumps for the entire dewatering period. ***Page 7-46, Lines 22-23,*** *"no dewatering is required along the tunnel alignment,"* however the beginning of this sentence says that *"Dewatering for the tunnel shaft constitutes the deeper dewatering (300 feet deep)"* and ***Appendix 3C, page 3C-19*** states that *"Extensive dewatering (via dewatering wells at tunnel shaft sites) and groundwater control along the alignment may be required"* and ***lines 25-26*** again mentions wells around the "perimeter of tunnel shafts" and other CM1 facilities. The EIR/EIS map shows 15 venting and retrieval shafts along the tunnel alignment, so this conflict needs to be resolved and the EIR/EIS should identify the number of and locations of all of the dewatering wells that will be around the perimeter of every facility. The EIR/EIS should at the very least identify the total length in feet of the perimeter areas that will have dewatering wells installed so cooperating agencies and the public can figure out how many wells there will be based on the 50-75-foot spacing in between each, but also show the perimeters on Chapter 7 maps so is clear which facilities will be surrounded by how many wells. ***Page 7-46, Lines 26-28,*** *"Dewatering would occur 24 hours per day and 7 days per week and would be initiated 1 to 4 weeks prior to excavation. Dewatering would continue until excavation is completed and the construction site is protected from higher groundwater levels"* This fails to specify how long the time period is from pre-excavation to completion will be. How many continuous days, months, and years will this constant dewatering occur? Is it continuous dewatering for six days, six months, six years, or longer? It is important to know how long this	

			activity will continue in order to understand how long the lowered groundwater conditions, residential water well depletions, and discharges will be occurring. If the length of time differs at the various facilities, then that should be stated. If the Groundwater Model discussed in Appendix 7A analyzed any of the above, then the results of these model runs needs to be disclosed as evidence to support the assumptions and conclusions . ***Page 7-46, Lines 28-30,*** *"Dewatering requirements of features along this alignment are assumed to range from approximately 240 to 10,500 gpm (California Department of Water Resources 2010b)."* Not sure what the DWR 2010 reference is – is it a report? If so, what is the document's title? Is it an engineering study of dewatering impacts on North Delta lands? Relying on assumptions is not sufficient for such a long term activity associated with a development project of this size, scope and potential impacts on people, species, land uses, and flood protection. ***Page 7-46, Lines 31-32,*** *"Groundwater removed with the dewatering system would be treated as necessary and discharged to surface waters under an NPDES permit."* This statement has significant regulatory meaning and consequences, but is not explained, which raised many questions. Where will the locations of these new "point source" discharges be located? How much water will they each be discharging daily? What kind of treatments to the groundwater is contemplated? Where will this treatment occur? How will these new "point source" discharges affect the drainage by the local landowners/RDs? Will this new NPDES permit create any new regulatory burdens on local landowners/RD since their discharges don't currently require NPDES permits? All of the context and implications of this activity and permit needs to be explained, particularly how it will impact local drainages in terms of exceeding capacity and seepage/surface flooding. ***Page 7-46, Lines 32-33,*** *"Velocity dissipation features, such as rock or grouted riprap, would be used to reduce velocity and energy and prevent scour."* This statement alludes to the expectation that significant enough erosion of levees and other flood management infrastructure such as interior drainage canals/ditches are expected to need prevention and repairs such as riprap or rock.	

			However, there is no detail, description or context given regarding the types of velocities to be expected because fails to identify exactly how much gpm will be discharged or where. There is no way for a Reclamation District or drainage facility owner can determine anything from this statement in terms of the nature and extent of the impacts from this activity or the severity, duration, or types of mitigation that would be necessary to avoid or reduce the level of impact. ***Page 7-46, Line 35,*** *"Dewatering would temporarily lower groundwater levels in the vicinity of the dewatering sites. Two areas could be subject to substantial lowering of groundwater levels: (1) In the vicinity of the intake pump stations along the Sacramento River; and (2) in the vicinity of the Byron Tract Forebay."* What is the definition of "temporarily" for this activity? Does it mean dewatering continuously for six hours, six days, six months, six years, or longer? If length of time is different at each location, this should be specified so the local impacts can be properly determined. What is the definition of "in the vicinity of"? Does it mean the 2,600 foot "radius of influence" referenced at bottom of page or does vicinity mean something else? Again, need this to be specific so as a cooperating agency we can determine whether the EIR/EIS properly identifies the potential impacts and mitigation needed in terms of their nature and extent. ***Page 7-46, Lines 38-39,*** *"Groundwater-level lowering from construction dewatering is forecasted to be less than 10 feet in the vicinity of the intakes and less than 20 feet in the vicinity of the forebay."* What is this forecast based on? Did model runs as described in Appendix 7A produce results that developed this forecasted impact or is it based merely on unsubstantiated speculation and assumption? Make clear whether is speculative assumptions or is based on evidence and then cite and explain the results of the evidence used to reach this conclusion. What was the baseline of the current groundwater levels during different months of the year and different locations in the plan area used to reach these conclusions? Having the forecast be off by several feet would have dire consequences to availability for residential drinking water and farming. ***Page 7-46, Lines 39-41,*** *"The horizontal distance from the boundary of the excavation to locations*	

			where forecasted groundwater levels are 5 feet below the static groundwater level is defined as the "radius of influence" herein. The radius of influence is forecasted to extend approximately 2,600 feet from the Byron Tract Forebay excavation and from the intake excavations (Figure 7-7)." What is the data, studies, modeling or other evidence used to develop how the "radius of influence" is defined or how wide of an area it includes? Is the 2,600 feet radius based on actual engineering studies conducted on the land in the area where these radius of influence will occur or is it an arbitrary number based on experience on lands outside of the Delta which may not have a high, inter-connected and multiple layered groundwater aquifer which is similar to a sponge underneath? Justification and evidence needs to be provided for this assumption/definition. The definition of radius is a straight line from the center to the periphery of a circle. For purposes of this EIR/EIS where does the center start? Is the center of the radius the location of each dewatering well? If so, a map should be provided that shows each dewatering well around the entire perimeters of facilities that shows the boundary of the 2,600 foot radius. Will this radius only apply to Byron Tract Forebay and intakes as stated or will the radius also apply to any of the other facilities such as the Intermediate Forebay in North Delta, borrow pits, concrete batch plants, shafts, tunnel alignment, pipelines, widened levees, pumping plants etc as well? Again, this ambiguity is why the number, location, and radius of influence needs to be not only explained and justified by scientific/engineering studies in the narrative in this impact, but also shown on maps for this chapter. ***Page 7-47, Lines 1-3,*** *"Groundwater would return to pre-pumping levels over the course of several months. Simulation results suggest that 2 months after pumping ceases, water levels would recover to within 5 feet of pre-pumping water levels."* This conclusion needs to be supported by inclusion of a Table showing the model simulation results or by referencing where in Appendix 7A modeling or the *Effects Analysis* of the Plan this evidence is shown and explained. ***Page 7-47, Lines 3-5,*** *"The sustainable yield of some wells might temporarily be affected by the lowering of water levels such that they are not able to support existing land uses."* Again, this conclusion which is a significant adverse impact	

			needs to be supported by the evidence used to make this determination. Vague terms such as "some" and "might" and "temporarily" are insufficient to allow a cooperating agency or the public to evaluate the nature and extent of the impacts of this activity. Which wells will be affected? How many wells? How many are residential, municipal, or agriculture? How will they be affected? What kind of existing land uses will not be able to be supported as a result? How many acres total will not be able to support existing land uses and where? Will the taps and toilets in the houses not work? Will there be costs to home and landowners to drill their well deeper which would also include higher monthly electricity pumping? If so, none of these impacts are identified or analyzed, but are glossed over without any mention. ***Page 7-47, Lines 1-13,*** *"Groundwater levels within 2,600 feet of the areas to be dewatered are anticipated to experience groundwater level reductions of up to 20 feet for the duration of the dewatering activities and up to 2 months after dewatering activities are completed."* As mentioned in the previous comments, this conclusion lacks sufficient detail to allow the public or cooperating agency to evaluate whether the baseline existing conditions or if the nature, extent and magnitude of the impact has been properly characterized, which means we cannot verify that the mitigation is appropriate either. This vague language fails to meet any level of project-level analysis necessary to comply with environmental disclosure laws. Evidence and context needs to be provided to answer many questions. What are ALL of the specific areas to be dewatered? Where are these areas located? Where is the center of the 2,600 feet placed? What is the level of impacts to areas outside of the 2,600 foot radius? Will any of the impacts in those areas be mitigated too? Will any areas experience a permanent state of lowered groundwater? If so, how much lower than existing baseline conditions? What is the actual duration of the dewatering activities? The total continuous length of time this activity will occur for different CM1 activities and locations is not identified. All of these details regarding this activity need to be provided in the EIR/EIS in order for us to evaluate and provide you feedback on appropriate mitigation as a cooperating agency. ***Page 7-47, lines 17-18,*** *"Mitigation Measure GW-1*	

			identifies a monitoring procedure and options for maintaining an adequate water supply for land owners that experience a reduction in groundwater production" conflicts with ***lines 21-22*** *which clearly state "replacement water supplies may not meet the preexisting demands or planned land use demands of the affected party."* The statement regarding the mitigation measure should be modified to clarify that it will only partially reduce the level of impact, may apply to only some landowners, and delete wording that indicate will maintain "adequate water supply for land owners" as this is clearly not the case as does not intent to meet preexisting demands or land uses. The impacted landowners will more than likely have a different definition of what constitutes "an adequate water supply for landowners" than the BDCP proponents. Allowing BDCP Proponents to decide what is an "adequate water supply for land owners" in the Delta is a serious conflict of interest that obfuscates the liability of BDCP to remediate, repair, or avoid the damage to local water supplies caused by their project. Unless the impacts and mitigation are specific and measurable, and written into the HCP/NCCP as permit conditions to be approved by the permitting agencies, then there is too much risk that BDCP Proponents will arbitrarily and capriciously reject and deny legitimate adverse impacts that are their obligation to mitigate. ***Page 7-47, Lines 22-24,*** this wording regarding level of significant impact is too vague, lacking any context regarding the nature, extent, severity or duration of the impact. If temporary means six years or more, then this should be stated. And it fails to even mention the significant impacts associated with drainage like the erosion and NPDES permits, or localized flooding from seepage or exceeding existing drainage system capacity. <u>Written findings must be made for each significant environmental impact identified in the EIR/EIS and each finding must be accompanied by a brief explanation of the rationale for the findings supported by substantial evidence and some explanation to supply the logical step between each finding and the conclusion in the record.</u> <u>*Impact Omissions*</u> – Impact GW-1 fails to mention the risk of land subsidence and sink holes occurring from lowering the groundwater levels by up to 20 feet on a sustained basis, 24/7 for several years. Will subsidence create any additional flood risks to	

			people, property, species, or the new conveyance facilities? What, if any, engineering analysis did BDCP conduct on the soils in the area dewatering will occur to determine risk of subsidence and sink holes and did it also analyze the subsidence effects associated with such a long period of continuous dewatering? Did the EIR/EIS analyze whether subsidence from sustained constant lowering of the groundwater would create problems for building multi-acre, 30-foot tall and extremely heavy building pads on those soils? What were the findings? Because the City of Stockton experienced significant ground shifting of up to 13 ½ feet of movement on their brand new water supply facilities, Delta Water Supply Project, which caused the shutdown of the facility as strength of metal pipes and bolts were stretched to their limit and on the verge of breaking. How does the likelihood of subsidence, land shifting, and sink holes vary in all areas where dewatering will occur over a prolonged, multi-year sustained daily draining? Provide information on how much annual erosion and seepage damage caused by dewatering activities expected to impact non-BDCP structures and current and future crops, cost of replacing and repairing disrupted drainage systems so that it is functioning again if overwhelmed by amount of water discharged from dewatering, increased drainage pumping costs to be paid to RDs, and cost of not having sufficient water to meet current land uses. If land will need to be fallowed because of lack of sufficient water, then this needs to be disclosed, including the number of acres and types of crops to be impacted so can be mitigated in this chapter or the agriculture chapter.	
5	7-47 7-48	27-44 1-8	**MITIGATION MEASURE GW-1: Maintain water supplies in areas affected by construction dewatering** <u>A lead agency must identify all significant effects on the environment caused by a proposed project that cannot be avoided. However, the EIR/EIS must first perform a robust analysis to support the conclusion that impacts are significant and unavoidable. The EIR/EIS cannot defer the determination of the scope and nature of significant impacts until future monitoring is done or studies and reports are prepared. Impact GW-1 improperly deflects the responsibility for analyzing those impacts to some future date. This is an impermissible deferral of pre-project</u>	

			environmental analysis which prevents us as a cooperating agency from determining the scope, severity, or duration of the impacts from this project activity. The assumptions and conclusions are made on pure speculation, conjecture and pre-decisional ambiguous radius of influence limits that may not in fact represent the true nature, extent, severity, and duration of the impacts likely to occur as a result of this project activity. Erosion damage resulting from increased flow velocities created by dewatering discharges must be repaired or alleviated under Article 6 of the 1981 NDWA Water Availability and Quality Agreement with DWR, so where and what these fixes will be need to be should be included as a required mitigation. In order to approve a project, the lead agencies must identify feasible mitigation measure or alternatives that would avoid or substantially lessen any significant adverse environmental effects of the project. The mitigation measures must be specific and mandatory, such that they are fully enforceable. How and from where will offsite water be transported to supply domestic water supply needs if a temporary connection to a nearby unaffected well cannot be made? How often will potable water be delivered to homes and in what quantities? Will the amount delivered to homes be based on existing usage or will there be some arbitrary limit be placed on each home based on a daily per capita usage determined by BDCP proponents? Will BDCP pay for the cost of drilling deeper domestic wells and their increased monthly electricity pumping costs? What kind of criteria is required for a "substantial evidence" standard to be met that indicates wells are adversely affected and who decides if the evidence standard is met? What is landowners option if BDCP disagrees that sufficient evidence to allow them to be provided mitigation? Allowing BDCP Proponents to decide what criteria is required for a "substantial evidence" standard to be met that indicates wells are adversely affected or not is a serious conflict of interest that obfuscates the liability of BDCP to remediate, repair, or avoid the damage to local domestic water supply caused by their project. Unless the impacts and mitigation are specific and measurable, and written into the HCP/NCCP as permit conditions to be approved by the permitting agencies, then there is too much risk that BDCP Proponents will arbitrarily and capriciously reject and deny legitimate adverse impacts that are their obligation to mitigate.	

			How many agricultural acres would experience water supply losses from dewatering? How many acres will be fallowed and for how long if sheet piles or deepening of wells is not "feasible?" What kind of crops will be affected? What will be the long term impacts on the future productivity of these soils for agriculture crops if go without planting for long period of time? An analysis of these issues need to be included with a corresponding Mitigation Measure.	
6	7-48	12-26	**IMPACT GW-2: Deplete groundwater supplies, interfere with groundwater recharge, alter local groundwater levels, or reduce the production capacity of preexisting nearby wells during operation of water conveyance (CM1)** <u>A lead agency must identify all significant effects on the environment caused by a proposed project. However, the EIR/EIS must first perform a rigorous analysis that discloses the nature and extent of the impacts to support the conclusion whether impacts will occur or not and if they are significant and unavoidable in order to provide the public and cooperating agencies with adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action.</u> Where is the current studies or data and modeling used by BDCP that supports the assumptions and conclusions made in this impact statement? What was actually analyzed to determine these assumptions are in fact the correct ones to use? Why is the information and details regarding the changes in Delta hydraulics that were modeled and explained in the Plan's *Effects Analysis* not included in the EIR/EIS analysis of environmental impacts on groundwater? Where did the elevation increase of 10 feet or more number come from? What data or studies is it based on? If from recent modeling or studies, then that information and results needs to be cited and explained. What is the definition of "in the vicinity of?" How many acres near the forebays will experience increased water elevations of 10 feet or more? Is this a year-round state or do the elevations change month-to-month based on Alt 4 water ops? **<u>Significant Impacts Not Identified</u>** – The Impact Analysis didn't even bother to discuss all of the potential impacts identified in the title of GW-2 and is silent as to what evidence exists to support a	

			conclusion that no other impacts other than an increase in forebay "vicinity." The purpose of an EIR/EIS is to provide an environmental analysis of the impacts caused by implementing a project, in the case of the BDCP, the Covered Actions and CMs. Unfortunately, the preparers of the EIR/EIS failed to transfer the acknowledgement of the significant and widespread changes in Delta hydraulics and hydrodynamics resulting from implementation of CM1 that are reported in the Plan Chapter 5 *Effects Analysis*. The relevance of all of the changes in surface flow patterns (including unnatural flows: reverse and unidirectional instead of tidal), altered water surface elevations, and water quality to the interference of groundwater supplies is pointed out on ***page 7-5, lines 14-17,*** *"Because the Delta is a large floodplain and the shallow groundwater is hydraulically connected to the surface water, changes in river stages affect groundwater levels and vice versa."* Despite this hydraulic connection of surface and groundwater in the Delta, Chapter 7 of the EIR/EIS fails to report the findings regarding changed hydraulics, flows, and water elevations from the new water diversions from the Sacramento River proposed in CM1 and CM2 that are explained in the Plan Effects Analysis and instead only acknowledges the groundwater impacts from dewatering, discharges, and seepage from forebay. The tidal action's influence on this hydraulic connection is also pointed out on ***page 7-5, lines 17-18:*** *"This hydraulic connection is also evident when the tide is high and surface water flows from the ocean into the Delta, thereby increasing groundwater levels nearby."* According to the *Effects Analysis*, CM2's diversion of 6,000 af into the Yolo Bypass results in lowering the Sacramento River by more than 3 feet which could cause additional lowering of groundwater table since the Delta groundwater is hydraulically connected to the surface water and changes in river stages affect groundwater levels and vice versa, ***page 7-5, lines 14-16.*** Adding CM1 which would divert another 3,000-9,000 cfs into the new North Delta intakes will reduce the surface water elevations in the Sacramento River below the new intakes as well as sloughs and channels downriver such as Steamboat, Sutter, and Georgiana. ***Plan Chap 5, page 5.3-10.*** The EIR/EIS is supposed to analyze the environmental impacts of the Plan, which should include all of the findings regarding hydrologic and hydraulic water changes identified	

			in the Plan's *Effects Analysis*, such as altered flow patterns (including unnatural reverse and unidirectional flows instead of twice daily tidal action) and velocities, tidal muting from implementation of habitat measures, changes to surface water elevations in rivers and channels, and water quality. This is particularly concerning since the homes and businesses in the Delta communities of Clarksburg, Courtland, Freeport, Hood, Isleton, Rio Vista, Ryde, and Walnut Grove receive their water supply from individual water wells (groundwater), ***Page 7-1, lines 25-28,*** (municipal and irrigation well are typically deeper in the aquifer, 200-400 feet below ground surface, than domestic wells that are about 100-250 feet below ground surface), ***page 7-8, lines 33-35,*** and maintaining groundwater levels below crop rooting zones is critical for successful agriculture, ***Page 7-5, lines 20-21,*** and groundwater is used throughout the Delta through pumping and plant uptake in the root zone, ***page 7-11, lines 26-27,*** with an average annual groundwater pumping in upland peripheral Delta areas estimated to range from 100,000 and 150,000 acre-feet of water for both domestic and agricultural uses, ***page 7-11, lines 28-29.*** <u>The assumptions and conclusions in the EIR/EIS Impacts Analysis must be supported by substantial evidence – actual facts. They can be reasonable assumptions or expert opinions – but they must still be predicated and backed up by facts. Speculation does not constitute substantial evidence, and unsubstantiated narrative or expert opinion do not qualify either.</u> Environmental analysis failed to provide any current studies or BDCP specific data and information collected and then analyzed to reach the conclusions that a groundwater level rise of 10 feet or more in the vicinity of the two new forebays during operation of new conveyance facilities would not affect the yields of nearby wells. Without any evidence to back up the assumption and conclusion that groundwater level increases from the forebays won't impact yields of nearby wells and therefore there's no adverse effect under GW-2 is only conjecture and speculation. The no adverse impact conclusion is also incorrect because the EIR/EIS failed to even acknowledge water operation effects (all four Alt 4 scenarios) on Delta hydraulics which includes a direct connection	

			between surface and groundwater, ***page 7-5, lines 14-17,*** *"Because the Delta is a large floodplain and the shallow groundwater is hydraulically connected to the surface water, changes in river stages affect groundwater levels and vice versa."* Despite this hydraulic connection of surface and groundwater in the Delta, Chapter 7 of the EIR/EIS fails to report the findings regarding changed hydraulics, flows, and reduced water elevations from the new water diversions from the Sacramento River proposed in CM1 and CM2 that are explained in the Plan's *Effects Analysis* and instead only acknowledges the higher groundwater impacts near forebays. The tidal action's influence on this hydraulic connection is also pointed out on ***page 7-5, lines 17-18:*** *"This hydraulic connection is also evident when the tide is high and surface water flows from the ocean into the Delta, thereby increasing groundwater levels nearby."* As mentioned above, according to the Plan's *Effects Analysis*, the water operations proposed under all four Alt. 4 scenarios will in fact have impacts on groundwater supplies. According to the *Effects Analysis*, CM2's diversion of 6,000 af into the Yolo Bypass results in lowering the Sacramento River by more than 3 feet which could cause additional lowering of groundwater table since the Delta groundwater is hydraulically connected to the surface water and changes in river stages affect groundwater levels and vice versa, ***page 7-5, lines 14-16.*** Adding CM1 which would divert another 3,000-9,000 cfs into the new North Delta intakes will reduce the surface water elevations in the Sacramento River below the intakes as well as sloughs and channels downriver such as Steamboat, Sutter, and Georgiana. ***Plan Chap 5, page 5.3-10.*** This lowered river and channel elevations most certainly could result in a sustained and possibly permanent lowering or depletion of water wells in a very wide area of the North Delta, well beyond the actually facility location and must be acknowledged, analyzed, and mitigated.	
7	7-48	35-36	**MITIGATION MEASURE GW-2:** ***Needs to be added.*** <u>A lead agency must identify all significant effects on the environment caused by a proposed project, particularly those that cannot be avoided. However, the EIR/EIS must first perform a rigorous analysis that discloses the nature and extent of the impacts to support the conclusion of whether</u>	

			impacts exist or not, as well as their level of significance and whether they are unavoidable in order to provide the public and cooperating agencies with adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action. **Incorrect CEQA Conclusion** – For the reasons stated above, the CEQA Conclusion is incorrect and should be expanded to include conclusions from an analysis of the impacts on groundwater in all areas where the Plan Chap 5 Effects Analysis indicates surface water elevations will be lowered and tidal exchanges muted under all four scenarios of Alt 4 water ops and changed to: Significant Adverse. **Requires Mitigation** – Changing the CEQA Conclusion to Significant Adverse Impact will also require the EIR/EIS to identify appropriate mitigation measures to address the impacts of lowered river and channel elevations and tidal muting caused by Alt 4 water ops as analyzed in the Plan Effects Analysis.	
8	7-48 7-49	37-43 1-7	**IMPACT GW-3: Degrade water quality during construction and operation of conveyance facilities (CM1)** A lead agency must identify all significant effects on the environment caused by a proposed project. However, the EIR/EIS must first perform a rigorous analysis that discloses the nature and extent of the impacts to support the conclusion whether impacts will occur or not and if they are significant and unavoidable in order to provide the public and cooperating agencies with adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action. Where is the current studies or data and modeling used by BDCP that supports the assumption and conclusion that only dewatering would cause temporary changes to groundwater levels near intakes and forebays, that the levels would return to within 5 feet of the static condition 2 months after dewatering ceases, or that no significant regional changes in groundwater flow directions are forecasted? Apparently the consultants who prepared this Impact Analysis failed to read the BDCP Plan on which the EIR/EIS is supposed to base its environmental analysis, specifically the Plan Chapter 5 *Effects Analysis'* reporting of extensive, significant and permanent changes in Delta hydraulics and surface water	

			elevations, flow patterns, and velocities. **<u>Ditto Impact GW-2 Comments on Need to Include Effects Analysis Impacts on Groundwater Quality</u>** - Refer to comments above for Impact GW-2 for the citations to the reasons why the Plan's *Effects Analysis* modeling of Alt 4 water ops and the reported changes to Delta hydraulics including flow patterns and velocities, water elevations that according to ***Page 7-5*** will have significant and permanent impacts on groundwater in widespread areas of in North Delta, particular along the Sacramento River, and Sutter, Steamboat, and Georgiana Sloughs and must therefore be acknowledged, analyzed, and level of impacts recognized in Impact GW-3. Why is the information and details regarding the changes in Delta hydraulics that were modeled and explained in the Plan's *Effects Analysis* not included in the EIR/EIS analysis of environmental impacts on groundwater quality Impact GW-3? **<u>Significant Impacts Not Identified</u>** – The purpose of an EIR/EIS is to provide an environmental analysis of the impacts caused by implementing a project, in the case of the BDCP, the Covered Actions and CMs. Unfortunately, the preparers of the EIR/EIS failed to transfer the acknowledgement of the significant and widespread changes in Delta hydraulics and hydrodynamics resulting from implementation of CM1 water operations and CM2 for Alt. 4 (all four scenarios) that are reported in the Plan Chapter 5 *Effects Analysis*. The relevance of all of the changes in surface flow patterns (including unnatural flows: reverse and unidirectional instead of tidal), altered water surface elevations, and water quality to the interference of groundwater supplies is pointed out on ***page 7-5, lines 14-17,*** *"Because the Delta is a large floodplain and the shallow groundwater is hydraulically connected to the surface water, changes in river stages affect groundwater levels and vice versa."* Despite this hydraulic connection of surface and groundwater in the Delta, Chapter 7 of the EIR/EIS fails to report the findings regarding changed hydraulics, flows, and water elevations from the new water diversions from the Sacramento River proposed in CM1 and CM2 that are explained in the Plan Effects Analysis and instead only acknowledges the groundwater impacts from dewatering, discharges, and seepage from forebay. The tidal action's influence on this	

			hydraulic connection is also pointed out on ***page 7-5, lines 17-18:*** *"This hydraulic connection is also evident when the tide is high and surface water flows from the ocean into the Delta, thereby increasing groundwater levels nearby."* According to the Effects Analysis, CM2's diversion of 6,000 af into the Yolo Bypass results in lowering the Sacramento River by more than 3 feet which could cause additional lowering of groundwater table since the Delta groundwater is hydraulically connected to the surface water and changes in river stages affect groundwater levels and vice versa, ***page 7-5, lines 14-16.*** Addin CM1 which would divert another 3,000-9,000 cfs into the new North Delta intakes will reduce the surface water elevations in the Sacramento River below the new intakes as well as sloughs and channels downriver such as Steamboat, Sutter, and Georgiana. ***Plan Chap 5, page 5.3-10.*** How will the changed Delta hydraulics and water quality identified in the Plan Effects Analysis impact water quality in wells? **<u>CEQA Conclusion Conflicts with EIR/EIS and Plan Effects Analysis</u>** – In addition to the reasons stated above regarding significant *Effects Analysis* water ops changes that could significantly affect groundwater quality, the increase in groundwater elevation of up to 10 feet "in the vicinity of" the forebays could most definitely contaminate the water quality of wells since Chapter 8 *Water Quality* identifies significant and unavoidable water quality impacts (WQ-5, 6, 11, 14, 18, 22) in the Delta for seven different constituents (salinity, bromide, chloride, mercury, organic carbon, and pesticides). Why is there no cross-walking of impacts identified in EIR/EIS Chapter 8 or Plan Chapter 5? This is particularly concerning since the homes and businesses in the Delta communities of Clarksburg, Courtland, Freeport, Hood, Isleton, Rio Vista, Ryde, and Walnut Grove receive their water supply from individual water wells (groundwater), ***Page 7-1, lines 25-28.*** <u>A proper environmental analysis of a project of this size and long-term (10 year) construction timeline needs to provide an accurate, stable, and finite description of the project and the existing baseline conditions used to determine the significance of</u>	

			environmental impacts in order to allow a lead agency, trustee agency, cooperating agency, or an impacted party in the Plan Area to evaluate the severity of the impacts or the feasibility of the project alternatives and mitigation measures to avoid or lessen such impacts. What was actually analyzed to determine these assumptions are in fact the correct ones to use? ***Line 39,*** what is the definition of "small changes?" Without Impact GW-3 providing baseline conditions or projected water ops changes to flow patterns, how can NDWA or the public confirm whether these changes are small, medium, or significant and adverse? What is the definition of "temporary?" Lower by how much? What locations? How many acres? The assumptions and conclusions in the EIR/EIS Impacts Analysis must be supported by substantial evidence – actual facts. They can be reasonable assumptions or expert opinions – but they must still be predicated and backed up by facts. Speculation does not constitute substantial evidence, and unsubstantiated narrative or expert opinion do not qualify either. Environmental analysis failed to provide any current studies or BDCP specific data and information collected and then analyzed to reach the conclusions that a groundwater level rise of 10 feet or more in the vicinity of the two new forebays during operation of new conveyance facilities would not affect the yields of nearby wells. Without any evidence to back up the assumption and conclusion that groundwater level increases from the forebays won't impact yields of nearby wells and therefore there's no adverse effect under GW-2 is only conjecture and speculation. The no adverse impact conclusion is also incorrect because the EIR/EIS failed to even acknowledge water operation effects (all four Alt 4 scenarios) on Delta hydraulics which includes a direct connection between surface and groundwater. This lowered river and channel elevations most certainly could result in a sustained and possibly permanent depletion of water wells in a very wide area of the North Delta, well beyond the actually facility location and must be acknowledged, analyzed, and mitigated	
9	7-49	7-17	**MITIGATION MEASURE GW-3:** ***Needs to be added.*** A lead agency must identify all significant effects	

			on the environment caused by a proposed project, particularly those that cannot be avoided. However, the EIR/EIS must first perform a rigorous analysis that discloses the nature and extent of the impacts to support the conclusion of whether impacts exist or not, as well as their level of significance and whether they are unavoidable in order to provide the public and cooperating agencies with adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action. **Incorrect CEQA Conclusion** – For the reasons stated above, the CEQA Conclusion is incorrect and should be expanded to include conclusions from an analysis of the impacts on groundwater quality based on the findings of how Delta hydraulics will modifier under Alt. 4 water ops according to the Plan Chap 5 *Effects Analysis*. After this review and analysis is completed, the CEQA Conclusion may need to be changed to: Significant Adverse. **Requires Mitigation** – Changing the CEQA Conclusion to Significant Adverse Impact will also require the EIR/EIS to identify appropriate mitigation measures, Mitigation Measure GW-3, to address the water quality and hydraulic impacts caused by Alt 4 water ops as analyzed and reported in the Plan Effects Analysis.	
10	7-49	18-35	**IMPACT GW-4: Conveyance construction groundwater lowering interference with agricultural drainage in the Delta** A lead agency must identify all significant effects on the environment caused by a proposed project. However, the EIR/EIS must first perform a rigorous analysis that discloses the nature and extent of the impacts to support the conclusion whether impacts will occur or not and if they are significant and unavoidable in order to provide the public and cooperating agencies with adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action. Once again, as with GW-1, 2, and 3, the preparers of Impact GW-4 apparently didn't include analysis of other chapters in EIR/EIS or Plan that clearly indicate construction activities are in fact expected to interfere with agricultural drainage. The EIR/EIS should cross-walk between the chapters and acknowledge how impacts identified in other chapters are directly related to each other.	

			The less than significant impact and possibly beneficial conclusion may be incorrect because the EIR/EIS failed to even acknowledge water operation effects (all four Alt 4 scenarios) on Delta hydraulics which includes a direct connection between surface and groundwater. **Relevant Excerpts** – The following should be acknowledged, discussed, and analyzed in GW-4 Impact Analysis: • ***Agriculture Resources page 14-120, lines 36-38,*** "Construction and operation of water conveyance facilities would indirectly affect agriculture by causing seepage or changes in the elevation of groundwater within the study area as discussed in Chapter 7, Groundwater Impacts GW-1, GW-4, and GW-5." • ***Groundwater page 7-5, lines 14-17,*** *"Because the Delta is a large floodplain and the shallow groundwater is hydraulically connected to the surface water, changes in river stages affect groundwater levels and vice versa."* • ***Groundwater page 7-5, lines 17-18:*** *"This hydraulic connection is also evident when the tide is high and surface water flows from the ocean into the Delta, thereby increasing groundwater levels nearby."* The assumptions and conclusions in the EIR/EIS Impacts Analysis must be supported by substantial evidence – actual facts. They can be reasonable assumptions or expert opinions – but they must still be predicated and backed up by facts. Speculation does not constitute substantial evidence, and unsubstantiated narrative or expert opinion do not qualify either. Environmental analysis failed to provide any baseline conditions information, current studies or BDCP specific data and information used to reach the conclusions that impact would less than significant or possibly beneficial. Without any evidence to back up the assumptions, conclusions, CEQA level of significance and failure to acknowledge and analyze information from other chapters results in GW-4 being based on only conjecture and speculation. Where are the studies, maps, or modeling that shows only a portion of the groundwater would temporarily flow toward the dewatering sites or changes in groundwater flow	

			directions is only minor near the intakes?	
11	7-49	35	**MITIGATION MEASURE GW-4:** ***Needs to be added.*** A lead agency must identify all significant effects on the environment caused by a proposed project, particularly those that cannot be avoided. However, the EIR/EIS must first perform a rigorous analysis that discloses the nature and extent of the impacts to support the conclusion of whether impacts exist or not, as well as their level of significance and whether they are unavoidable in order to provide the public and cooperating agencies with adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action. **Incorrect CEQA Conclusion** – For the reasons stated above, the CEQA Conclusion is likely incorrect and should be expanded to include conclusions from an analysis of the impacts on groundwater quality based on the findings of how Delta hydraulics will modifier under Alt. 4 water ops according to the Plan Chap 5 *Effects Analysis*. This should include how many ag acres will be impacted, where, how often and long, and the crops impacted. After this review and analysis is completed, the CEQA Conclusion may need to be changed to: Significant Adverse. **Requires Mitigation** – Changing the CEQA Conclusion to Significant Adverse Impact will also require the EIR/EIS to identify appropriate mitigation measures, Mitigation Measure GW-4, to hydraulic impacts caused by Alt 4 water ops as analyzed and reported in the Plan *Effects Analysis* on seepage and ag drainage.	
12	7-49 7-50	36-42 22	**IMPACT GW-5: Interfere with agricultural drainage in the Delta** **Incorrect CEQA Conclusion** The conclusion that water operations under Alt. 1A and Alt 4 are not expected to result in changes in groundwater flow patterns and therefore results in less than significant impact and no mitigation requirement appears to be incorrect according to the water operation and CM2 effects (all four Alt 4 scenarios) on Delta hydraulics which includes a direct connection between surface and groundwater clearly identified in the Plan Chapter 5 *Effects Analysis* and the EIR/EIS. • *Because the Delta is a large floodplain and the shallow groundwater is hydraulically*	

			connected to the surface water, changes in river stages affect groundwater levels and vice versa. This hydraulic connection is also evident when the tide is high and surface water flows from the ocean into the Delta, thereby increasing groundwater levels nearby. ***Page 7-5, lines14-18.*** • *BDCP will fundamentally change the hydrodynamics of the Delta.* ***Chap 5, page 5.3-2.*** • *The Sacramento River diversions into the proposed north Delta intakes along the Sacramento River between Freeport and Hood are the primary cause of BDCP changes in Delta flows.* ***Chap 5, page 5.3-7.*** • *Overall, there would be minimal upstream changes but some substantial shifts in how water moves through the Delta.* ***Chap 5, page 5C.0-1.*** • *In the North Delta, flow patterns will be altered by the increased diversions to the Yolo Bypass (CM2) and operations of the new north Delta intake facilities (CM1).* ***Chap 5, page, 5.3-2.*** • *A decrease of 6,000 cfs in the Sacramento River could result in as much as a 3-foot reduction in river stage.* ***Chap 5, page 5C.5.4-6.*** • *The median diversion into Sutter and Steamboat Sloughs are lower under the evaluated starting ops because of the Fremont Weir notch increases the diversions to the Yolo Bypass and because North Delta intakes reduce the Sacramento River flow at these two sloughs. In addition, tidal restoration in the Cache Slough Complex was simulated to shift the tidal elevations and reduce the Sutter/Steamboat diversion fractions.* ***Chap 5, page 5.3-10.*** • *The general effect of each new North Delta intake is the reduction of the downstream flow by about 3,000 cfs for a total of 9,000 cfs reduced outflow in Sacramento River,* ***Chap 5, page 5.3-6*** *(when operated at capacity, which is anticipated in modeling to be at least 10% of years for months of Jan-June),* ***Chap 5, page 5.3-7.*** • *In the North Delta, flow patterns will be altered by the increased diversions to the*	

			Yolo Bypass (CM2) and operations of the new North Delta intake facilities (CM1). ***Chap 5, page 5.3-6.*** • *Proposed tidal restoration will add substantial increment to the existing Delta surface area at high tide (+f feet) and low tide (-2 feet). The Suisun tidal restoration also causes tidal muting (reduced tidal amplitude and reduced tidal flows) throughout the Delta.* ***Chap 5, page 5.3-37.*** The same comments made above on GW-4 also apply to GW-5 and the aforementioned needs to be analyzed in terms of ag drainage interference and adverse impacts. <u>EIR/EIS environmental conclusions simply stating that future projects/actions/designs will comply with applicable law does not constitute avoidance of all impacts and does not suffice as replacement of mitigation. In order to approve a project, the lead agencies must identify feasible mitigation measures or alternatives that would avoid or substantially lessen any significant adverse environmental effects of the project. The mitigation measures must be specific and mandatory, such that they are fully enforceable.</u> Relying on design requirements of Division of Safety of Dams or other agency permit requirements avoids any kind of actual analysis of impacts and does not guarantee avoidance or reduction of significant adverse impacts. The EIR/EIS obviously anticipates some level of potential seepage from the operation of the forebays according to the language on ***lines 1-7, page 7-50***, which mentions seepage monitoring and potential repairs/remediation after seepage occurs. A proper environmental analysis needs to be conducted to describe in detail the difference of expected seepage occurrences between a lined and unlined forebay, the soil conditions in the forebay locations including the shallow groundwater levels and interconnection with surface water levels, and provide a comparison of reasons why the proposed forebays should be lined or not in these locations and how each will perform when compared for seepage avoidance. <u>The EIR/EIS should be supported by accurate baseline condition descriptions, substantial evidence or scientific research, rather than relying on future studies and reports that have yet to even identify the actual severity of the impact, let alone an</u>	

			analysis that compares the project to the existing conditions.	
13	7-50	23-24	**MITIGATION MEASURE GW-5: Agricultural lands seepage minimization (use MM GW-6)** The EIR/EIS should be supported by accurate baseline condition descriptions, substantial evidence or scientific research, rather than relying on future studies and reports that have yet to even identify the actual severity of the impact, let alone an analysis that compares the project to the existing conditions. The purpose of the EIR/EIS is to allow affected parties and the public to evaluate the nature and extent of the project on environmental resources. This cannot be accomplished if the site-specific evaluation of baseline conditions is deferred to a future date after the EIR/EIS has been permitted, thus preventing inclusion of required mitigation that is specific and enforceable as part of the permit conditions so they can be enforced or changed if necessary. The formulation of mitigation measures cannot be deferred until a later time based on completion of future studies. A lead agency must identify all significant effects on the environment caused by a proposed project that cannot be avoided. However, the EIR/EIS must first perform a robust analysis to support the conclusion that impacts are significant and unavoidable. The EIR/EIS cannot defer the determination of the scope and nature of significant impacts until future studies and reports are prepared. This is an impermissible deferral of environmental analysis which prevents us as a cooperating agency from determining the scope, severity, or duration of the impacts from this project activity. Delaying the formulation of mitigation measures per ***lines 26-27,*** "potentially feasible additional mitigation measures will be developed in consultation with affected landowners," is inappropriate as the seepage damage will have already occurred instead of specific measures to avoid the impact in the first place being evaluated and provided in the EIR/EIS permit conditions.	
14	7-50 7-51	25-41 1-16	**IMPACT GW-6: Deplete or interfere with groundwater supplies (recharge, elevations, well production, seepage) as a result of CM 2-22** A proper environmental analysis of a project of this size and long-term (10 year) construction timeline	

			needs to provide an accurate, stable, and finite description of the project and the existing baseline conditions used to determine the significance of environmental impacts in order to allow a lead agency, trustee agency, cooperating agency, or an impacted party in the Plan Area to evaluate the severity of the impacts or the feasibility of the project alternatives and mitigation measures to avoid or lessen such impacts. The assumptions and conclusions in the EIR/EIS Impacts Analysis must be supported by substantial evidence – actual facts. They can be reasonable assumptions or expert opinions – but they must still be predicated and backed up by facts. Speculation does not constitute substantial evidence, and unsubstantiated narrative or expert opinion do not qualify either. The language referenced below is too vague and ambiguous to allow us to evaluate the nature and extent or adequacy of the mitigation. • *"Increased frequency of inundation of areas associated with the proposed tidal habitat, channel margin habitat, and seasonally inundated floodplain restoration actions would result in increased groundwater recharge."* ***Page 7-50, lines 28-30.*** • *"Such increased recharge could result in groundwater level rises in some area."* ***Page 7-50, lines 30-31.*** • *"Depending on the local geology, flooding of one area could also increase seepage to adjacent islands."* ***Page 7-50, lines 31-32.*** • *"would be expected to result in a substantially increased rate of recharge and related groundwater-level increases."* ***Page 7-50, lines 33-34.*** What is the definition of "substantially increased rate of recharge" and what studies or other evidence of baseline or project conditions indicates this may occur? How much groundwater recharge is expected and where? How many feet is the groundwater level expected to rise under each conservation measure 2-22? Does the level of groundwater level rising vary depending on the type of habitat (ie: inundated floodplain v. tidal habitat) proposed in each conservation measure and by the location as well? The purpose of the EIR/EIS is to allow affected parties and the public to evaluate the nature and	

			extent of the project on environmental resources. This cannot be accomplished if the site-specific evaluation of baseline conditions is deferred to a future date after the EIR/EIS has been permitted, thus preventing inclusion of required mitigation that is specific and enforceable as part of the permit conditions. The EIR/EIS should describe the geology of each area where habitat is proposed to be created under CM 2-22 instead of saying "Depending on the local geology," ***line 31.*** The EIR/EIS should provide the information on baseline conditions and project elements and the analysis comparing how the conditions will be changed by the project and by how much and whether adverse impacts or not instead of stating, "effects could be beneficial or deleterious depending on existing groundwater levels and land uses." Such non-conclusions regarding actual impacts and their locations, duration, and severity provides no help what-so-ever to agencies or landowners regarding the actual impacts of the proposed project. This is especially true for a project that proposes to convert 100,000 acres or more to habitat and due to the historical evidence of seepage damage occurring on Ryer Island when Prospect Island was flooded and by the farmers who are suing for damages caused by implementation of San Joaquin Restoration Program are in fact likely to occur if CM2-22 are implemented. EIR/EIS failed to provide any baseline conditions information, current studies or BDCP specific data and information collected in locations of potential projects and then analyzed to reach the conclusions t that effects could be beneficial or deleterious. Without any evidence to back up the assumptions, conclusions, CEQA level of significance and failure to acknowledge and analyze information from other chapters in EIR/EIS and Plan results in GW-6 being based on only conjecture and speculation. Where are the studies, maps, or modeling that show how much of a groundwater recharge areas where CM 2-22 are anticipated to be implemented this Impact Statement concludes will be occurring as a result of increased inundation? <u>A lead agency must identify all significant effects on the environment caused by a proposed project, particularly those that cannot be avoided. However, the EIR/EIS must first perform a rigorous analysis that discloses the nature and extent of the impacts to support the conclusion of whether</u>	

			impacts exist or not, as well as their level of significance and whether they are unavoidable in order to provide the public and cooperating agencies with adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action. • *"These effects could be beneficial or deleterious depending on existing groundwater levels and lands uses."* ***Page 7-50, lines 34-35.*** • *"The effects on groundwater resources caused by the implementation of restoration actions could be adverse."* ***Page 7-50, lines 40-41.*** Which is it? Beneficial or adverse? Where are the effects anticipated to be beneficial and what evidence is that conclusion based on? Where are the effects anticipated to be deleterious and what evidence is that conclusion based on? **Unidentified Effects/Impacts** – GW-6 only assumes groundwater recharge will be caused by increased frequency of inundation is the only impact and ignores any mention of other possible impacts that are included in the GW-6 title: deplete groundwater supplies, alter local groundwater levels, reduce the production capacity of preexisting nearby wells, or interfere with agricultural drainage. As mentioned in previous comments these are all significant impacts and therefore the omission of any discussion or analysis of these effects is a serious and substantial oversight. The EIR/EIS failed to cross-walk the following information contained in other chapters and in the *Effects Analysis* done for the Plan to determine the nature and extent of any impacts beyond frequent inundation caused by activities implemented pursuant to CM 2-22: • *Because the Delta is a large floodplain and the shallow groundwater is hydraulically connected to the surface water, changes in river stages affect groundwater levels and vice versa. This hydraulic connection is also evident when the tide is high and surface water flows from the ocean into the Delta, thereby increasing groundwater levels nearby.* ***Page 7-5, lines14-18.*** • *Restoration of 65,000 acres of tidal marsh (CM4) could result in changes in turbity and tidal excursion in specific Delta locations and subregions.* ***Chap 5, page 5C.0-2.***	

			• *In the North Delta, flow patterns will be altered by the increased diversions to the Yolo Bypass (CM2) and operations of the new north Delta intake facilities (CM1).* ***Chap 5, page, 5.3-2.*** • *In addition to flows from new north Delta intakes, BDCP habitat restoration may modify hydrodynamics in the Delta. These hydrodynamic changes in turn can change salinities, DO, turbidity, and flows.* ***Chap 5, page 5C.1-1.*** • *A decrease of 6,000 cfs in the Sacramento River could result in as much as a 3-foot reduction in river stage.* ***Chap 5, page 5C.5.4-6.*** Will tidal excursions result in seepage? Will flow pattern changes in the Sacramento River and north Delta channels affect groundwater levels? Will a reduction by several feet in the Sacramento River and channels affect groundwater and well water levels? The reader of the EIR/EIS has no idea because none of these effects were discussed or analyzed in Impact GW-6. Due to the interconnection of surface water and groundwater in the Delta, the EIR/EIS needs to evaluate the changes in hydraulics, hydrodynamics, surface water elevations, tidal muting, and other effects identified in the Plan's Chapter 5 *Effects Analysis* and explain how they will impact the production of preexisting water wells or increase costs to drill deeper and higher monthly electricity bills for pumping. If any of CM2-22 require any dewatering activities or will disconnect/disrupt the drainage system on the island then these effects also need to be acknowledged, analyzed and mitigated. <u>The mitigation measures must be specific and mandatory, such that they are fully enforceable. Requiring a project to minimize "to the greatest extent feasible" the loss of agricultural land, or having mitigation measures be based on feasibility, cost, or the signing of an agreement with local agencies rather than being applied directly, are uncertain and unenforceable. Therefore, such limitations and conditions on the mitigation measures make them inadequate to avoid or reduce the significance of the adverse impacts.</u> Therefore the following conclusion is too vague, arbitrary, and left to the biased discretion of BDCP proponents to decide instead of the permitting agencies responsible for approving HCP/NCCP:	

			• *"anticipated to reduce the impact to less-than-significant level in most instances"* ***Page 7-51, lines 9-10.*** • *"mitigation may be infeasible due to factors such as costs."* ***Page 7-51, lines 10-11.*** In proposing environmentally detrimental projects, a lead agency must justify their decisions based on counterbalancing social, economic or other benefits, and to point to substantial evidence in support. Written finding must be made for each significant environmental impact identified in the EIR/EIS and each finding must be accompanied by a brief explanation of the rationale for the findings supported by substantial evidence and some explanation to supply the logical step between each finding and the conclusion in the record. Therefore the following conclusion is insufficient: • "though in some instances mitigation may be infeasible due to factors such as costs. The impact is therefore significant and unavoidable as applied to such latter properties." ***Page 7-51, lines 11-12.*** Where are these "latter properties" located? How many acres fall under this category? What is the impact on the local agricultural economy if these effects are left unmitigated? What are the cost factors BDCP will use to determine if feasible?	
15	7-51	17-32	**MITIGATION MEASURE GW-6: Agricultural lands seepage minimization** The EIR/EIS should be supported by accurate baseline condition descriptions, substantial evidence or scientific research, rather than relying on future studies and reports that have yet to even identify the actual severity of the impact, let alone an analysis that compares the project to the existing conditions. ***Lines 18-32,*** defer a lot of data collection and determinations to some unknown future date and unidentified entities which raises many questions regarding how impacts will be measured and determined, and therefore eligibility for mitigation measures to remedy harm caused by the Project. Who determines whether the seepage is caused by implementation of one of the habitat CMs? What criteria must whoever gets to decide use in determining whether seepage caused by implementation of one of CMs2-22? What independent third-party will confirm whether the	

			baseline conditions are accurate or not? Who gets to decide what sites "could result in seepage"? What criteria must the entity use in deciding these sites? Who decides where the monitoring devices will be placed and how long they will monitor? Who conducts the field checks of the monitoring, how often, and for how long? Who do they report the results to and how often? Who decides what the potential "associated impacts on agricultural field conditions" are and what criteria must they use in making this decision? Who gets to decide what constitutes what "potentially feasible additional mitigation measures" will be? Do the permitting agencies of the BDCP HCP/NCCP decide what is all of the above? If so, then this should be explained, as well all of the criteria to be used by future decision-makers. What happens if landowner disagrees with the adequacy of the mitigation measure the BDCP must consult with them on? The EIR/EIS assumes, without evidentiary support in the record, that all the mitigation measures will be fully implemented where the project activities may have a direct or indirect effect and that the measures will in fact work to avoid or substantially reduce the significance of the adverse impacts, which may in fact not occur. The EIR/EIS additionally fails to account for and analyze impacts resulting from Project activities if the mitigation measures are not implemented or not working in terms of reducing the level of adverse impacts. What happens if implementation of mitigation measures is not reducing the adverse impacts as anticipated? Under what criteria will the permitting agencies even determine if the mitigation measures are working or whether they are reducing adverse impacts enough? Without this information the public and cooperating agencies do not have adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action or to evaluate the severity of the impacts or the feasibility of the project alternatives and mitigation measures to avoid or lessen such impacts. In order to approve a project, the lead agencies must identify feasible mitigation measure or alternatives that would avoid or substantially lessen any significant adverse environmental effects of the project. The mitigation measures	

			must be specific and mandatory, such that they are fully enforceable. To the extent that a lead agency rejects potential mitigation, the lead agency must also provide information in the record to justify rejecting mitigation measures as infeasible based on economic, social, or housing reasons. The formulation of mitigation measures cannot be deferred until a later time based on completion of future studies or agreements being signed, although a lead agency is allowed to provide specific performance standards that specify the extent to which impacts will be mitigated. Allowing the BDCP Proponents to decide whether seepage is "caused by" BDCP habitat implementation and what level of mitigation will be provided is a serious conflict of interest that obfuscates the liability of BDCP to remediate, repair, or avoid the damage caused by their Project, which is why these details must be clearly identified in the EIR/EIS so the permitting agencies can decide if it is sufficient and appropriate mitigation or not prior to approving permits. If BDCP is allowed to be the prosecutor presenting evidence, the judge, and jury in deciding whether their project caused damage and how much mitigation should be provided to who, then it will be too easy for them to declare their Project innocent of causing any damages every single time. Unless the impacts and mitigation are specific and measurable, and written into the HCP/NCCP as permit conditions to be approved by the permitting agencies, then there is too much risk that BDCP Proponents will arbitrarily and capriciously reject and deny legitimate adverse impacts that are their obligation to mitigate.	
16	7-51 7-52	33-42 1-4	**IMPACT GW-7: Degrade groundwater quality as a result of implementing CM2-22** The assumptions and conclusions in the EIR/EIS Impacts Analysis must be supported by substantial evidence – actual facts. They can be reasonable assumptions or expert opinions – but they must still be predicated and backed up by facts. Speculation does not constitute substantial evidence, and unsubstantiated narrative or expert opinion do not qualify either. What analysis did the EIR/EIS do that resulted in the assumption that neither Alt. 1A or Alt. 4 will alter regional patterns of groundwater flow or quality, ***lines 34-35***? Did the EIR/EIS include assumptions from other chapters to reach this conclusion such as: • *There may be changes in salinity in some*	

			Delta locations caused by tidal flow missing effect from restoration actions and sea level rise. ***Chap 5, page 5.3-3.*** • *Increased tidal mixing associated with the addition of tidal marsh restoration areas under the BDCP may allow more salt into the western Delta.* ***EIR/EIS Chap 6, page 6-40. Chap 5, page 5C.0-2.*** • *Restoration of 65,000 acres of tidal marsh (CM4) could result in changes in turbity and tidal excursion in specific Delta locations and subregions.* ***Chap 5, page 5C.0-2.*** • *Proposed tidal restoration will add substantial increment to the existing Delta surface area at high tide (+4 feet) and low tide (-2 feet).* ***Chap 5, page 5.3-37.*** • *Tidal flows in the lower Sac River (West Delta ROA) were reduced by the downstream restoration in Suisun Marsh and were increased by the upstream restoration in Cache-Slough ROA. The net effect on tidal flows was an increase of about 3% in the lower Sac River flows. Tidal flows in the lower SJR (West Delta ROA) were reduced by about 10%. Simulated tidal elevations will be muted and tidal flows will be reduced in the Sac River.* ***Chap 5, page 5.3-37.*** • *A decrease of 6,000 cfs in the Sacramento River could result in as much as a 3-foot reduction in river stage, although understanding of how notch flows would affect river stage is incomplete.* ***Chap 5, page 5C.5.4-6.*** Clearly the BDCP *Effects Analysis* modeling has shown that habitat CMs will in fact alter regional patterns of surface water flow and quality, and ***page 7-5*** of this chapter clearly identifies the interconnection and action/reaction of changes in surface water affecting groundwater and vice versa. Therefore, Impact GW-7 needs to expand the analysis to include descriptions of how these changes in the *Effects Analysis* will impact groundwater quality. <u>A lead agency must identify all significant effects on the environment caused by a proposed project, particularly those that cannot be avoided. However, the EIR/EIS must first perform a rigorous analysis that discloses the nature and extent of the impacts to support the conclusion of whether</u>	

			impacts exist or not, as well as their level of significance and whether they are unavoidable in order to provide the public and cooperating agencies with adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action. EIR/EIS Chapter 8 *Water Quality* identifies "significant and unavoidable" adverse water quality impacts associated with CM2-22 for: 1) mercury (WQ-14); 2) organic carbon (WQ-18); pesticides (WQ-22). However, these water quality impacts are not mentioned in Impact GW-7. How or if the contamination of surface water quality from these constituents can filter into the groundwater due to the shallow levels and interconnection between surface and groundwater should be explained and mitigated. Failure to acknowledge, discuss, analyze, or mitigate these is a significant omission and oversight that prevents the public and cooperating agencies from evaluating the full nature and extent of possible impacts on the environmental resources where CMs2-22 will be implemented. A lead agency cannot acknowledge and impose a project for which an EIR/EIS identifies a significant environmental impact unless the impact has been mitigated or avoided by changes in the project, or unless the agency specifically finds that overriding benefits outweigh the significant effects on the environment, particularly when the EIR/EIS analysis grossly underestimates the project's actual impacts and fails to disclose to decision-makers and the public the true nature, extent, and costs of those impacts. Therefore, the EIR/EIS cannot defer the determination of the scope and nature of significant impacts until future studies and reports are prepared. The purpose of the EIR/EIS is to allow affected parties and the public to evaluate the nature and extent of the project on environmental resources by providing accurate baseline condition descriptions, substantial evidence or scientific research, rather than relying on future studies and reports that have yet to even identify the actual severity of the impact, let alone an analysis that compares the project to the existing conditions. Written findings must be made for each significant environmental impact identified in the EIR/EIS and each finding must be accompanied by a brief explanation of the rationale for the findings supported by substantial evidence and some explanation to supply the logical step between each finding and the conclusion in the record. This cannot be	

			accomplished if the site-specific evaluation of baseline conditions is deferred to a future date after the EIR/EIS has been permitted, thus preventing inclusion of required mitigation that is specific and enforceable as part of the permit conditions. The CEQA Conclusion's statement that, "At this point, a definitive conclusion regarding the potential for groundwater quality degradation beneath restoration areas cannot be reached" is particularly concerning in light of the significant adverse impacts groundwater quality degradation will have on land uses, particularly agricultural production, if the EIR/EIS properly evaluates impacts in terms of the importance of groundwater to the Delta's economy and public health: • *The homes and businesses in the Delta communities of Clarksburg, Courtland, Freeport, Hood, Isleton, Rio Vista, Ryde, and Walnut Grove receive their water supply from individual water wells (groundwater),* ***Page 7-1, lines 25-28*** • *Maintaining groundwater levels below crop rooting zones is critical for successful agriculture,* ***Page 7-5, lines 20-21*** • *Groundwater is used throughout the Delta through pumping and plant uptake in the root zone,* ***page 7-11, lines 26-27*** • *An average annual groundwater pumping in upland peripheral Delta areas estimated to range from 100,000 and 150,000 acre-feet of water for both domestic and agricultural uses,* ***page 7-11, lines 28-29.***	
17	7-52	6-16	**MITIGATION MEASURE GW-7: Provide an alternate source of water** <u>The EIR/EIS should be supported by accurate baseline condition descriptions, substantial evidence or scientific research, rather than relying on future studies and reports that have yet to even identify the actual severity of the impact, let alone an analysis that compares the project to the existing conditions.</u> ***Lines 6-16,*** defer a lot of data collection and determinations to some unknown future date and unidentified entities which raises many questions regarding how impacts will be measured and determined, and therefore eligibility for mitigation measures to remedy harm caused by the Project. What is the definition of "unacceptable degradation of groundwater quality"? Who gets to decide what will be accepted as "unacceptable degradation" and therefore eligible for mitigation? When, how and	

			who will determine what the "previously established beneficial uses" are? "Established" by who/what entity? "Established" when? Who decides what constitutes "quality comparable to pre-project conditions"? The MM fails to mention the amounts of water to be provided or how often and for how long the water will be provided. Without this information the public and cooperating agencies do not have adequate information to fully assess the direct, reasonably foreseeable indirect, and cumulative impacts of a proposed action or to evaluate the severity of the impacts or the feasibility of the project alternatives and mitigation measures to avoid or lessen such impacts. In order to approve a project, the lead agencies must identify feasible mitigation measure or alternatives that would avoid or substantially lessen any significant adverse environmental effects of the project. The mitigation measures must be specific and mandatory, such that they are fully enforceable. To the extent that a lead agency rejects potential mitigation, the lead agency must also provide information in the record to justify rejecting mitigation measures as infeasible based on economic, social, or housing reasons. The formulation of mitigation measures cannot be deferred until a later time based on completion of future studies or agreements being signed, although a lead agency is allowed to provide specific performance standards that specify the extent to which impacts will be mitigated. If left to the BDCP Proponents to decide whether degradation is "unacceptable" or whether the degradation is caused by the activities in the implementation of BDCP CMs is a serious conflict of interest that obfuscates the liability of BDCP to remediate, repair, or avoid the damage. Unless the impacts and mitigation are specific and measurable, and written into the HCP/NCCP as permit conditions to be approved by the permitting agencies, then there is too much risk that BDCP Proponents will arbitrarily and capriciously reject and deny legitimate adverse impacts that are their obligation to mitigate.	
18	7-52	17-23	**IMPACT GW-8: Groundwater changes in export service areas** There is absolutely no description given regarding whether implementation of BDCP will deplete, interfere, alter, or reduce any groundwater	

			production or not. Will the average annual deliveries to these service areas result in improving or worsening those groundwater basins?	
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