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Via email to: modifiedrulemakingprocess.comment@deltacouncil.ca.gov

Comments on modified regulations

1. Sufficiency of the regulations ensure consistency with the Delta Reform Act and other state laws

There is a fundamental issue with the structure of the Delta Reform Act, in that it delegates to an administrative process, primarily overseen by the Delta Stewardship Council, acts that would normally be reserved for the legislature, most notably, review and approval for public funding of a plan by the Department of Water Resources to create a multi-billion dollar extension of the State Water Project, to fundamentally change operations of the State Water Project and Central Valley Project, and to fundamentally change land uses in the legal Delta.

To provide bounds on this process, the Delta Reform Act created the Delta Stewardship Council, and delegated the act of creating a legally enforceable Delta Plan to the Council. The Delta Reform Act specified statutory requirements for the Delta Plan, and for the Bay Delta Conservation Plan, in order to be incorporated into the Delta Plan.

But the Delta Reform Act did not fully specify administrative processes for ensuring consistency of the results of the DSC's administrative process with the authorizing statute, or with other applicable laws. It also exempted the Delta Stewardship Council's administrative procedures for review of appeals of determinations of consistency with the Delta Plan from the California Government Code. The California Government Code would ordinarily provide for administrative review of the appeal procedure by the Office of Administrative Law, ensuring conformance of the appeals process with state laws and the state constitution.

The courts have held that

> So long as the scope of an agency's powers are properly defined and limited by the Legislature and the exercise of those powers is subject to appropriate judicial review, the exercise of limited legislative and judicial powers by an administrative agency does not offend the Constitution. (Ray v. Parker, supra, 15 Cal.2d at pp. 291-292, 101 P.2d 665.)
>
> (California Radioactive Materials Management Forum, v. Department Of Health Services, 15 Cal.App. 4th 841, May 7, 1993.)

It is not clear that the Delta Reform Act has sufficient specificity to properly define and delineate the administrative process overseen by the Delta Stewardship Council. This places a burden on the Delta Stewardship Council to demonstrate that regulations adopted as part of the Delta Plan are sufficient to ensure that future actions by the Council with respect to the Delta Plan will be in full accordance with the authorizing statute and with all applicable state laws.

Many problems have been noted with the vagueness and lack of specification in the Delta Plan, and its lack of adequacy with respect to provisions in the Delta Reform Act.[1] This lack of adequacy can allow the actions of the Council to deviate in many ways, large and small, from the language and intent of the Delta Reform Act, and to act in ways that are inconsistent with other state laws.

2. The requirements of the Delta Reform Act, with respect to the Delta Plan, are not adequately addressed in the draft regulations.

The Delta Reform Act contained clear and explicit directions about the contents of the Delta Plan, which were not followed by the Delta Stewardship Council. As a result, the Delta Plan deviates significantly from the intent of the legislature.

A. Ecosystem Restoration Measures

With respect to ecosystem restoration, section 85302(c) of the Delta Reform Act states that:

The Delta Plan shall include measures that promote all of the following characteristics of a healthy Delta ecosystem:

(1) Viable populations of native resident and migratory species.
(2) Functional corridors for migratory species.
(3) Diverse and biologically appropriate habitats and ecosystem processes.
(4) Reduced threats and stresses on the Delta ecosystem.
(5) Conditions conducive to meeting or exceeding the goals in existing species recovery plans and state and federal goals with respect to doubling

1 See comments of attorneys Stephan C. Volker and Michael Jackson on the Fifth Staff Draft Delta Plan.

salmon populations.

Article 3 is silent on many of these measures. As such, the regulations severely restrict the applicability of this section to the Delta Plan and to future actions of the Council with respect to the Delta Plan.

These measures inherently specify many aspects of these public trust duties of the Delta Stewardship Council with respect to the Delta. The measures are also essential to any future determinations of consistency with the Delta Plan. Therefore the OAL should require that the Delta Stewardship Council expand Article 3 to include substantive language on each of these required measures.

B. Performance Measurements

The Delta Plan is also required to include performance measurements in meeting goals and objectives:

85211. The Delta Plan shall include performance measurements that will enable the council to track progress in meeting the objectives of the Delta Plan. The performance measurements shall include, but need not be limited to, quantitative or otherwise measurable assessments of the status of

> (a) The health of the Delta's estuary and wetland ecosystem for supporting viable populations of aquatic and terrestrial species, habitats, and processes, including viable populations of Delta fisheries and other aquatic organisms.
>
> (b) The reliability of California water supply imported from the Sacramento River or the San Joaquin River watershed.

While there are some measures for the reliability of the water supply in the draft regulations, there are no quantitative measures to track the health of the Delta's estuary and wetland ecosystem for supporting viable populations of aquatic and terrestrial species. It seems clear that the legislature intended that the Delta Plan not only include goals for viable populations of aquatic and terrestrial species in the Delta, but that the Delta Stewardship Council should track progress towards achieving these goals.

In addition, the draft regulations do not address the need to assess the status of the Sacramento River and San Joaquin River watershed with respect to water supply reliability. Since climate change could greatly impact runoff in these watersheds, this requirement is essential.

The Office of Administrative Law should require that the draft regulations be expanded to ensure that the Delta Plan, and future actions of the Delta Stewardship Council, comply fully with this section of the Delta Reform Act.

C. Water Quality

Section 85032(d) of the Delta Reform Act requires the following:

(d) The Delta Plan shall include measures to promote a more reliable water supply that address all of the following:

(1) Meeting the needs for reasonable and beneficial uses of water.
(2) Sustaining the economic vitality of the state.
(3) Improving water quality to protect human health and the environment.

The draft regulations do not have policies which sufficiently address item (d)(3). While the State Water Resource Control Board's Bay Delta Water Quality Control Plan addresses the need to protect waters in the Delta from certain kinds of degradation, they do not address the need to improve water quality in the Delta to protect human health and the environment.[2]

The Office of Administrative Law should require that the draft regulations, and future actions of the Delta Stewardship Council, including review for consistency with the Delta Plan, comply fully with this section of the Delta Reform Act.

3. Consistency of covered actions with the Delta Plan

In addition to the vagueness of the Delta Plan, Policy GP1 -- Detailed findings to establish consistency with the Delta Plan – fails to adequately specify substantive standards for consistency of covered actions with the Delta Reform Act. The proposed regulations, and GP 1, through omission, severely narrow the applicability of the Delta Reform Act to covered actions. The omission is particularly egregious with respect to the Bay-Delta Conservation Plan, and section 85320 of the Delta Reform Act.

The original proposed rule for GP 1 had the following provision:

> (5) If the agency that files the certification of consistency will carry out the covered action, the certification of consistency must also include a certification from that agency that the covered action complies with all applicable laws pertaining to water resources, biological resources, flood risk, and land use and planning. If the agency that files the certification of consistency will not carry out the covered action (but will approve or fund the action), the certification of consistency must include a certification from that agency that the covered action complies with all applicable laws of the type listed above over which that agency has enforcement authority or with which that agency can require compliance.

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2 The Environmental Water Caucus made extensive recommendations to the Delta Stewardship Council on measures to improve water quality in the Delta, including a recommendation that the Delta Stewardship Council condition approval of covered actions on inclusion of enforceable implementation plans in TMDLS. See EWC comments.

It had been narrowed from the 5th Draft Delta Plan, which had the following provision:

> All covered action proponents shall certify that the covered action shall comply at all times with existing applicable law.[3]

The entire rule has now been stricken from GP 1.

The vagueness of the Delta Plan, and the two revisions to GP1, severely restrict review by the Delta Stewardship Council of conformance of covered actions with the Delta Reform Act and with other state laws. In doing so, the draft regulations create an administrative process that can spiral out of control.

It seems clear that the legislature cannot create a new agency of the state and delegate to it an administrative process that could result, over time, in violations of the authorizing statute and other state laws. Thus either the Delta Stewardship Council's interpretation of the Delta Reform Act is unconstitutional, or the Act itself is unconstitutional.

The Office of Administrative Law, as part of the review of the draft regulations, should require that the regulations have sufficient breadth and specificity to ensure that the Delta Plan and actions certified as consistent with the Delta Plan fully comply with the Delta Reform Act and all applicable state laws, both now and in the future.

4. Requirements in Delta Reform Act for oversight of science, monitoring, and assessment programs that support adaptive management by the Independent Science Board

The Delta Reform Act also explicitly mandated the role of the Independent Science Board in oversight of scientific research, monitoring, and assessment programs that support adaptive management of the Delta (Section 803504(a)):

> (3) The Delta Independent Science Board shall provide oversight of the scientific research, monitoring, and assessment programs that support adaptive management of the Delta through periodic reviews of each of those programs that shall be scheduled to ensure that all Delta scientific research, monitoring, and assessment programs are reviewed at least once every four years.
>
> (4) The Delta Independent Science Board shall submit to the council a report on the results of each review, including recommendations for any changes in the programs reviewed by the board.

Through omission, the proposed regulations fail to implement these essential oversight duties of the Independent Science Board. The Office of Administrative law should require specific regulations to implement these requirements. The OAL should also require the Delta

3 Fifth Staff Draft Delta Plan, p. 61.

Stewardship Council to revise the requirements for adaptive management in the certifications of consistency with the Delta Plan in section 5002 to ensure that they are consistent with the statutory requirements for oversight by the Independent Science Board.

5. Delegation and section 85320(2)(b) of the Delta Reform Act

The Delta Reform Act delegates the determination of consistency with the Delta Reform Act sections 85320 to the California Department of Fish and Game (now the Department of Fish and Wildlife), as does the appeals procedure of the Delta Stewardship Council.

> 16. If the Department of Fish and Game (department) determines that the Bay Delta Conservation Plan (BDCP) referred to in Water Code section 85053 meets all of the requirements of Water Code section 85320 for inclusion in the Delta Plan, it shall file the BDCP and its determination with the council. [4]

However, this delegation should not be interpreted as altering the essential agency duties of the Delta Stewardship Council in assuring compliance of the Delta Plan with the provisions of the Delta Reform Act, including section 85320 (b) (2).

Section 85320 states that

> (b) The BDCP shall not be incorporated into the Delta Plan and the public benefits associated with the BDCP shall not be eligible for state funding, unless the BDCP does all of the following:
>
> > (2) Complies with Division 13 (commencing with Section 21000) of the Public Resources Code, including a comprehensive review and analysis of all of the following:
> >
> > > (A) A reasonable range of flow criteria, rates of diversion, and other operational criteria required to satisfy the criteria for approval of a natural community conservation plan as provided in subdivision (a) of Section 2820 of the Fish and Game Code, and other operational requirements and flows necessary for recovering the Delta ecosystem and restoring fisheries under a reasonable range of hydrologic conditions, which will identify the remaining water available for export and other beneficial uses.
> > >
> > > (B) A reasonable range of Delta conveyance alternatives, including through-Delta, dual conveyance, and isolated conveyance alternatives and including further capacity and design options of a lined canal, an unlined canal, and pipelines.
> > >
> > > (C) The potential effects of climate change, possible sea level rise up to 55 inches, and possible changes in total precipitation and runoff patterns

4 Final Staff Draft Delta Plan, Appendix B.

on the conveyance alternatives and habitat restoration activities considered in the environmental impact report.

(D) The potential effects on migratory fish and aquatic resources.

(E) The potential effects on Sacramento River and San Joaquin River flood management.

(F) The resilience and recovery of Delta conveyance alternatives in the event of catastrophic loss caused by earthquake or flood or other natural disaster.

(G) The potential effects of each Delta conveyance alternative on Delta water quality.

The Office of Administrative Law, as part of its review of the proposed regulations, should require that GP1 be revised to substantively ensure compliance of the Bay Delta Conservation Act with section 85320(b)(2).

6. Importance of adequate review of the Bay Delta Conservation Plan with respect to 85320(b)(2)(A)

In regard to this provision of section 85320(b)(2)(A) , many environmental groups have argued that the requirement for a water availability analysis is fundamental to the public trust and must be done formally and with reference to the Public Trust review conducted by the State Water Resources Control Board according to section 85086 of the Delta Reform Act.

> "(c) (1) For the purpose of informing planning decisions for the Delta Plan and the Bay Delta Conservation Plan, the board shall, pursuant to its public trust obligations, develop new flow criteria for the Delta ecosystem necessary to protect public trust resources."

The SWRCB flow criteria proceedings have been completed and submitted to the Delta Stewardship Council, yet there are no plans to use them in any formal assessment of whether the Bay Delta Conservation Plan meets the criteria in section 85302 (A) for a comprehensive review and analysis of "flows necessary for recovering the Delta ecosystem and restoring fisheries under a reasonable range of hydrologic conditions."

The need for a formal assessment is clear from the actions of US Fish and Wildlife Service and the National Marine Fisheries Services in attempting to review the Bay Delta Conservation Plan for conformance with the requirements of the Endangered Species Act. The agencies had to request their own modeling runs to develop operating criteria necessary for the protection of fish in the Delta. The resulting operating models were not part of the BDCP review and analysis, but they should be. The agencies have recently requested to convene a five agency team that will

develop operating criteria for upstream reservoirs to protect migrating winter and spring run Chinook salmon.[5]

For this reason, the lack of specification of any substantive criteria with respect to section 85302(A) and (D) is a serious omission in policy GP1 and Article 3 of the proposed regulations. The Office of Administrative Law should require the Delta Stewardship Council to include such criteria.

7. BDCP and review with respect to climate change and water quality

With regard to subsections (C) and (G) of section 85302(b)(2) on climate change and water quality, the Delta Reform Act has attempted to delegate responsibility for review of conformance of the Bay-Delta Conservation Plan with these subsections to DFW, but it is not clear that DFW has sufficient statutory authority and resources in these other areas for adequate review. Thus this section of the Delta Reform Act may be fundamentally flawed and unconstitutional.

It is critically important that the Bay Delta Conservation Plan be adequately reviewed for consistency with 85320(b)(2) (C), which requires a comprehensive review and analysis of 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."

since the drier climate change scenarios could greatly reduce runoff in the Sacramento and San Joaquin River watersheds.[6]

To ensure full conformance of the Delta Plan with section 85302(b)(2)(C) , the Office of Administrative Law should require the Delta Stewardship Council to include specific, substantive criteria in Article 3 with respect to BDCP and climate change.

The Bay Delta Conservation Plan also does not currently include a comprehensive review of the impacts of the proposed conveyance plans on water quality in the Delta, instead focusing only on the impacts of the conveyance on covered species. It seems clear that the intent of the legislature, in requiring a comprehensive review and analysis of

> (G) The potential effects of each Delta conveyance alternative on Delta water quality.

in order for BDCP to be incorporated in the Delta Plan, did not intend that such review be restricted only to impacts on endangered aquatic species.

The lack of specification of any standards for water quality in the current regulations may thus

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5 NMFS and USFWS, red flag comments on March BDCP administrative draft.

6 California Water Research, Incorporation of Drought Risk from Climate Change into California Water Planning

have the effect of restricting the applicability of this statute. The Office of Administrative Law should require the Delta Stewardship Council to include specific, substantive criteria for determination of consistency of BDCP with respect to subsection (G).

8. Adaptive Management and BDCP

In the section of the draft regulations on adaptive management, there is no mention of the requirement in Section 85321 of the Delta Reform Act, which requires the Bay Delta Conservation Plan to include fishery agencies in real-time decisionmaking about water system operations.

> 85321. The BDCP shall include a transparent, real-time operational decisionmaking process in which fishery agencies ensure that applicable biological performance measures are achieved in a timely manner with respect to water system operations.

This omission could restrict application of this section of the statute to the Bay-Delta Conservation Plan. Again, the OAL should require language in the draft regulations to adequately incorporate this language.

9. Summary

There is a significant pattern in these omissions, in that each involves statutory language which provides checks and balances on the Delta Plan and the Bay Delta Conservation Plan to ensure protections for the Delta ecosystem, water quality, and migratory fish and aquatic species.

The sum of these omissions is to allow incorporation of the Bay Delta Conservation Plan and other projects into the Delta Plan, without meeting any of the basic statutory requirements for protection of the Delta. This is clearly contrary to the intent of the legislature in the Delta Reform Act.

There have been extensive prior comments on the Delta Plan, and on the need to meet the requirements of the Delta Reform Act. However, the Delta Stewardship Council has chosen not to act on these comments. It is now up to the Office of Administrative Law to ensure that the draft regulations include these essential checks and balances.

Sincerely,

Deirdre Des Jardins
California Water Research
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Santa Cruz, CA 95060

Attachments

Comments of attorney Stephan C. Volker on the 5th Staff Draft Delta Plan

Comments of attorney Michael Jackson on the 5th Staff Draft Delta Plan

Environmental Water Caucus Comments on the 5th Staff Draft Delta Plan

Final Staff Draft Delta Plan, Appendix B

NMFS, red flag comments on March BDCP administrative draft

USFWS, red flag comments on March BDCP administrative draft

California Water Research, Incorporation of Drought Risk from Climate Change into California Water Planning

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February 2, 2012

VIA EMAIL AND U.S. MAIL

Delta Stewardship Council
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Re: Comments of PCFFA, FOR, NCRA, CalSPA, IFR, and Winnemem Wintu Tribe on the Fifth Staff Draft Delta Plan and its Program Environmental Impact Report

Delta Stewardship Council Members:

The Pacific Coast Federation of Fishermen's Associations ("PCFFA"), Friends of the River ("FOR"), North Coast Rivers Alliance ("NCRA"), California Sportfishing Protection Alliance ("CalSPA"), Institute for Fisheries Resources ("IFR"), and the Winnemem Wintu Tribe (collectively, "Conservation Groups") appreciate the opportunity to comment on the Delta Stewardship Council's ("Council's") Fifth Staff Draft Delta Plan ("Draft Plan") and its Draft Program Environmental Impact Report ("DPEIR"). We respectfully request that you revise both the Draft Plan and the DPEIR to bring them into compliance with the Delta Reform Act and CEQA, as discussed below.

I. INTRODUCTION

The largest and most productive estuarine system on the west coast of North and South America – the Sacramento-San Joaquin River Delta – is collapsing for two principal reasons. First, the Central Valley Project ("CVP") and the State Water Project ("SWP") have diverted too much of the Delta's fresh water flows. Second, agricultural diverters have discharged too much contaminated agricultural run-off and return flows into the Delta. These dual threats to the Delta's health have grown steadily over the past five decades. The resulting environmental devastation has pushed the Delta's imperiled fisheries to the brink of extinction. Seventeen species of fish endemic to the Delta have already gone extinct; just twelve indigenous species remain. Habitat for the Sacramento River winter and spring run Chinook salmon, Central Valley steelhead, the Delta smelt, and the Sacramento River Northern American green sturgeon have suffered progressively worsening degradation from excessive Delta exports by the CVP and the

SWP.[1] Their unsustainable levels of diversions from the Delta not only greatly decrease fresh water flows, but also increase salinity and the concentration of herbicides, pesticides, and toxic agricultural run-off in the Delta.

The Delta's imminent ecologic collapse due to excessive freshwater diversions and contaminated agricultural run-off is indisputable. For this reason, in 2009 the California Legislature declared in the Delta Reform Act that "[t]he Sacramento-San Joaquin Delta watershed and California's water infrastructure are in crisis and existing Delta policies are *not sustainable*." Water Code § 85001(a), emphasis added. The Legislature found that "[r]esolving the crisis requires *fundamental reorganization* of the state's management of Delta watershed resources." *Id.,* emphasis added. The Legislature declared that "'the Delta' . . . is a critically important natural resource for California and the nation. It serves Californians concurrently as both the hub of the California water system and the most valuable estuary and wetland ecosystem on the west coast of North and South America." Water Code § 85002. The Legislature therefore resolved "to provide for the sustainable management of the Sacramento-San Joaquin Delta ecosystem, to provide for a more reliable water supply for the state, to protect and enhance the quality of water supply from the Delta, and to establish a governance structure that will direct efforts *across state agencies* to develop a *legally enforceable* Delta Plan." Water Code § 85001(c), emphasis added.

The Legislature adopted two principal overarching policies to protect and restore the Delta. The first comprises eight "policy objectives" designed to restore and enhance the Delta's ecological health while maintaining sustainable water usage:

(a) Manage the Delta's water and environmental resources and the water resources of the state over the long term.

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[1]Sacramento River winter run Chinook salmon were declared threatened under the federal Endangered Species Act ("ESA") in 1990 (55 Fed.Reg 46515), and then due to continuing population declines, declared endangered in 2005 (70 Fed.Reg 37160). Their critical habitat in the Sacramento River and its tributaries was designated in 1993. 58 Fed.Reg. 33212. Sacramento River spring run Chinook salmon were declared threatened, and their critical habitat designated, in 2005. 70 Fed.Reg. 37160, 52488. Central Valley steelhead were declared threatened in 2000 (65 Fed.Reg. 52084) and their critical habitat was designated in 2005 (70 Fed.Reg 52488). The Sacramento River North American green sturgeon were declared threatened in 2006 (71 Fed.Reg 17757) and its critical habitat was designated in 2008 (73 Fed.Red 52084). Delta smelt were declared endangered in 1993 (58 Fed.Reg. 12854) and their critical habitat was designated in 1994 (59 Fed.Reg. 65256).

(b) Protect and enhance the unique cultural, recreational, and agricultural values of the California Delta as an evolving place.

(c) Restore the Delta ecosystem, including its fisheries and wildlife, as the heart of a healthy estuary and wetland ecosystem.

(d) Promote statewide water conservation, water use efficiency, and sustainable water use.

(e) Improve water quality to protect human health and the environment consistent with achieving water quality objectives in the Delta.

(f) Improve the water conveyance system and expand statewide water storage.

(g) Reduce risks to people, property, and state interests in the Delta by effective emergency preparedness, appropriate land uses, and investments in flood protection.

(h) Establish a new governance structure with the authority, responsibility, accountability, scientific support, and adequate and secure funding to achieve these objectives.

Water Code § 85020(a)-(h).

Second, the Legislature announced a new State policy to *reduce* diversions of water from the Delta because it recognized that the existing level of diversions was incompatible with restoration and enhancement of the Delta's ecosystem, and thus not a "sustainable" management scheme for the Delta's imperiled resources:

> The policy of the State of California is to *reduce reliance on the Delta in meeting California's future water supply needs* through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. Each region that depends on water from the Delta watershed shall improve its regional self-reliance for water through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts.

Water Code § 85021, emphasis added.

The Legislature also announced that

> [t]he longstanding constitutional principle of reasonable use and the public trust doctrine *shall be the foundation of state water management policy* and are particularly important and applicable to the Delta.

Water Code § 85023, emphasis added.

Because "[t]he Delta is a distinct and valuable natural resource of vital and enduring interest to all the people and exists as a delicately balanced estuary and wetland ecosystem of hemispheric importance," the Legislature mandated its restoration. Water Code § 85022(c)(1). It declared that "[t]o promote the public safety, health, and welfare, and to protect public and private property, wildlife, fisheries, and the natural environment, it is necessary to protect and enhance the ecosystem of the Delta and prevent its further deterioration and destruction." *Id.* at (c)(3).

The Legislature did not merely adopt lofty goals. It understood that strong and specific measures were necessary to break the management impasse that had pushed the Delta into a calamitous downward spiral. As the Attorney General pointed out in his September 14, 2010, Memorandum to the Council elucidating its CEQA duties, the Delta Reform Act "requires that the Delta Plan include *specific implementation measures* and calls for a plan that is '*legally enforceable*.' (Water Code §§ 85001, subd. (C), 85302, subd. (D) and (e).) To that end, [the Delta Reform Act] requires that the Delta Plan include a 'compliance mechanism.' (*Id.* § 85300, subd. (d) (1) (A).)" *Id.*, emphasis added. The Act thus commands that the Delta Plan include "*performance measurements* that will enable the [C]ouncil to track progress in meeting the objectives of the Delta Plan." Water Code § 85211, emphasis added. These measurements "shall include . . . *quantitative or otherwise measurable assessments* of the status and trends . . . of . . . [t]he health of the Delta's estuary and wetland ecosystem for supporting viable populations of Delta fisheries and other aquatic organisms." Water Code § 85211, emphasis added.

The Act demands *specific* steps to restore Delta species and their habitat. For example, the Plan must include "measures that promote . . . [v]iable populations of native resident and migratory species," "[f]unctional corridors for migratory species," and "[d]iverse and biologically appropriate habitats and ecosystem processes." Water Code § 85302(c). Similarly, the Plan must promote measurable "conditions conducive to *meeting or exceeding* the goals in *existing species recovery plans* and state and federal goals with respect to *doubling salmon populations*." *Id.*, emphasis added.

To assist the Council's adoption of Delta flow criteria essential for salmon recovery, the Department of Fish and Game is directed, in consultation with federal fisheries agencies and "based on the best available science," to "recommend to the [State Water Resources Control

B]oard Delta flow criteria and quantifiable biological objectives for aquatic and terrestrial species of concern dependent on the Delta" by February 3, 2011. Water Code § 85084.5. The State Water Board is required, in turn, to "develop new flow criteria for the Delta ecosystem necessary to protect public trust resources" using "the best available scientific information" by November 2, 2010. Water Code § 85086(c)(1). These "flow criteria for the Delta ecosystem shall include the *volume, quality and timing of water necessary for the Delta ecosystem*" and must be submitted to the Council by December 3, 2010. Water Code § 85086(c)(1) and (e), emphasis added.

In short, the Delta Reform Act calls for a science-based, comprehensive, and specifically enforceable Delta Plan that will sweep aside the feeble, ineffectual and conflicting policies of the past and impose a unified, detailed and forceful regulatory regime that "will direct efforts across state agencies" to achieve consistent, "legally enforceable" and effective standards to restore the Delta to health. Water Code § 85001(c).

The Draft Delta Plan does not comply with these statutory mandates. It fails to provide "specific implementation measures" that are "legally enforceable." It lacks a "compliance mechanism." It proposes *no measures that would significantly alter the status quo. Id.* Instead, it defers and sidesteps the adoption of specific, enforceable measures at every turn. It is a blueprint for yielding to the status quo, thus sealing the Delta's doom. Because it is far too vague and abstract, the Plan will do little to prevent the further degradation of the Delta ecosystem, which, as the DPEIR acknowledges, is "in serious decline." DPEIR at 1-5. The Plan skirts the very question that the Delta Reform Act requires it to answer: how should Delta flows be *altered* to *halt* the Delta's precipitous decline and thereby protect, enhance, and restore its ecosystem while at the same time providing a sustainable level of reliability for the Delta's water diverters?

The immediate and decisive action required by the Delta Reform Act is the only means by which the Delta's imperiled species can be saved from extinction. As the Act emphatically and repeatedly directs, the Delta Plan must include *specific*, *measurable*, and *enforceable* goals, and quantified targets to measure the success of the Plan.

Above all else, the Plan must include detailed Delta flow criteria whose centerpiece is *curtailed diversions* to restore Delta health and "reduce reliance on the Delta in meeting California's future water supply needs." Water Code §§ 85086, 85021. All available science confirms that significant reductions in water exports from the Delta must occur to restore its ecologic health. These curtailments are not only required by the Act's clear mandates, but also by the Public Trust Doctrine, which commands the Council to "avoid or minimize any harm" to public trust resources including the Delta's declining fish and wildlife "so far as feasible." *National Audubon Society v. Superior Court* (1983) 33 Cal.2d 419, 435-36. These necessary reductions would not conflict with the Act's parallel goal of establishing "reliability" in water deliveries. In fact, just the opposite would occur. A long-term, durable commitment to reduced

water exports sends a clear message to water users that the years of boom-and-bust water allocations are over. It resets expectations at sustainable export amounts. But the Council's Draft Plan delays and evades these essential tasks, in direct defiance of the Delta Reform Act's clear mandate that the Council achieve a "fundamental reorganization of the state's management of Delta watershed resources." Water Code § 85001(a).

The Council will – if it proceeds with its current Draft Plan – miss a critical opportunity to address and resolve the twin threats of excessive diversions and contaminated return flows that have pushed the Delta to the brink of ecologic collapse. The Council must heed the Legislature's unmistakable command that it adopt specific, measurable, and enforceable programs to restore the Delta's health. If the Council fails to create a Plan with measurable standards and detailed implementation steps that would have specific and concrete results, it will defy the Legislature's direction and the public's expectation that the Council do its job. Absent a firm and informed Plan, the Delta will die. Accordingly, Conservation Groups urge the Council to revise the Plan to address their concerns, as detailed below.

Conservation Groups likewise urge the Council to revamp the DPEIR to remedy its fatal lack of focus, detail, and direction. The Plan's lack of specificity necessarily resulted in a deficient DPEIR in violation of the California Environmental Quality Act ("CEQA"), Public Resources Code section 21000 et seq. As discussed in the third part of this Comment Letter, the DPEIR lacks an adequate and definite project description, fails to provide a detailed discussion of the project's specific impacts, neglects to provide sufficient information regarding alternatives to enable the public to make an informed comparison of the proposed project with a reasonable range of management options, understates the environmental advantages of the Environmental Water Caucus' Alternative 2, and fails to assess the Plan's impacts on public trust resources.

For each of these reasons as detailed below, the Council must revise and recirculate the Draft Plan and DPEIR to comply with its statutory duties.

II. THE DRAFT DELTA PLAN FAILS TO: ACKNOWLEDGE PAST MISMANAGEMENT, RECOGNIZE THE NEED TO REDUCE DELTA EXPORTS, AND PROVIDE SPECIFICALLY ENFORCEABLE OBJECTIVES AND IMPLEMENTATION MEASURES.

The Delta Reform Act directs this Council to adopt a Delta Plan that includes the following five principal features: First, it must recognize that the Delta crisis is the product of past mismanagement. Only by acknowledging the management mistakes – most prominently, excessive diversions – that have caused the Delta's ecologic collapse can the Council rectify those errors. Second, the Plan must posit as its primary goals restoration of the Delta's ecosystem and reduction of Delta exports as necessary to restore sustainability to the Delta's water supply function. Third, the Plan must adopt and implement the eight specific policy

objectives mandated by the Legislature in Water Resources Code section 85020. Fourth, the Plan must include specific implementation measures that will promote recovery of a healthy Delta ecosystem while providing a reliable water supply, improved water conservation, and better water use efficiency, as required by Water Code sections 85302 and 85303. Fifth, the Plan shall be "based on the best available scientific information," include "quantified or otherwise measurable targets" to achieve its objectives, and provide for continuing monitoring and data collection to assure that its management measures do in fact achieve ecosystem restoration, as required by Water Code sections 85211 and 85308.

The Draft Delta Plan fails to satisfy any of these five criteria, as shown below.

A. The Plan Fails to Acknowledge Past Mismanagement.

Those who ignore history are doomed to repeat the mistakes it exposes. The Draft Delta Plan is no exception. Despite the Delta Reform Act's express condemnation of "existing Delta policies" as "not sustainable" because they have pushed "[t]he Sacramento-San Joaquin watershed" into an ecologic "crisis" "requir[ing] fundamental reorganization of the state's management of Delta watershed resources" (Water Code § 85001(a)), the Delta Plan overlooks the management mistakes that caused the crisis. The Plan ignores the history lesson that the Legislature wrote into the Delta Reform Act. The Legislature recognized that (1) "the species that comprise the Delta ecosystem had evolved and adapted to [its] unique, dynamic system," (2) "[a]s *a result of the operations of state and federal water projects*, the natural salinity variations in the Delta have been altered," and (3) "[*r*]*estoring a healthy estuarine ecosystem* in the Delta may require *developing a more natural salinity regime* in parts of the Delta." Water Code § 85003(a) and (c), emphasis added.

Despite the Legislature's finding and declaration that "existing Delta policies are not sustainable" because the CVP and the SWP have exported so much fresh water as to fundamentally alter the Delta's "unique, dynamic" salinity regime, the Draft Plan steps circumspectly around the very mismanagement practices that precipitated the Delta crisis of today. The Plan's passing reference to this "legacy of Delta ecosystem deterioration" ascribes its cause to amorphous "failed natural resource policy, complicated by inconclusive scientific information, land-use patterns, and intense competition over water supplies." Plan at 15. But it is the Plan's primary function to specifically *identify* and *correct* the mismanagement practices that caused the Delta's ecologic collapse. Pointing the finger in all directions effectively masks the root cause of the problem: excessive diversions. By sweeping the excessive diversion elephant under the rug of "inconclusive scientific information," the Plan ignores the source of the problem, and thereby perpetuates its pernicious effects.

Instead of identifying the dramatic increases in water diversions and their obvious adverse ecologic effects – including most notably, reverse flows in the Delta, entrainment of Delta

species such as the Delta smelt, and increased salinity levels as fresh water flows have been pumped south – the Plan blames "hydraulic mining practices over a century ago," levees and swamp reclamation likewise dating from "the late 1800's," and California's "volatile climatic patterns caus[ing] periods of peak flows and prolonged drought." Plan at 16-20. But despite these historic conditions, the Delta remained healthy and hosted salmon runs in the millions *until the CVP and the SWP began pumping* enormous quantities of fresh water south in the 1960's.

The Draft Plan's failure to acknowledge this causal relationship between excessive diversions and ecologic disaster skews the Plan away from the basic Delta problem and its solution. It betrays the Legislature's clear command that the Council acknowledge that "existing Delta policies are not sustainable" and that "[r]esolving the crisis requires fundamental reorganization of the state's management of Delta watershed resources." Water Code § 85001(a). Unless and until the Plan forthrightly acknowledges the management mistakes of the past – including most notably, excessive water diversions – it is doomed to repeat rather than rectify those mistakes.

B. The Draft Plan Fails to Posit as Its Primary Goals Restoration of the Delta's Ecosystem and Reduction of Delta Exports.

The Delta Reform Act sets forth the Legislature's Delta management "policies" in three key provisions. First, in Water Code section 85020, the Act states that "[t]he policy of the State of California is to achieve" eight objectives that will "[r]estore the Delta ecosystem, including its fisheries and wildlife, as the heart of a healthy and wetland ecosystem," "[p]romote statewide water conservation, water use efficiency, and sustainable water use," and "[i]mprove water quality to protect human health and the environment consistent with achieving water quality objectives in the Delta."" *Id.* at (c), (d), and (e). Additional policy objectives include managing the Delta and the state's water resources "over the long term," "[p]rotect[ing] and enhanc[ing]" the Delta's unique cultural, recreational, and agricultural values," "[i]mprov[ing] the water conveyance system and expand[ing] statewide water storage," "[r]educ[ing] risks . . . by effective emergency preparedness . . . and . . . flood protection," and "[e]stablish[ing] a new governance structure . . . to achieve these objectives." *Id.* at (a), (b), (f), (g), and (h).

Second, Water Code section 85021 forcefully directs that "[t]he policy of the State of California is to *reduce reliance on the Delta* in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency." *Id.*, emphasis added. The Legislature's express adoption of this policy is pivotal. It reflects the Legislature's decision to shift the burden of supplying California's future water needs *away from* the overworked and imperiled Delta watershed, and instead *toward* "regional self-reliance for water through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts." *Id.*

Third, the Legislature directed in Water Code section 85023 that "[t]he longstanding constitutional principle of reasonable use and the public trust doctrine shall be the foundation of state water management policy and are particularly important and applicable to the Delta." *Id.* The Legislature thus recognized that protection of public trust resources – which include fish, wildlife, boating, swimming and fishing – *trumps non-public trust uses that would harm them*, such as excessive Delta exports.

Contrary to these pronouncements of the Legislature's fundamental policies that reshape California's water management policies for the Delta, the Draft Plan doggedly adheres to "business as usual." At no point does it acknowledge that the Legislature has decided "to reduce reliance on the Delta in meeting California's future water supply needs." Water Code § 85021. Nor does the Draft Plan ever acknowledge that the Legislature has mandated that the "constitutional principle of reasonable use and the public trust doctrine shall be the foundation of state water management policy," nor that these principles are "particularly . . . applicable to the Delta." Water Code § 85023.

The Draft Plan's failure to acknowledge and implement the Legislature's fundamental paradigm shift from decades of increasing – and unsustainable – exports from the Delta to "reduc[ing] reliance on the Delta" and increasing reliance on surface and ground water supplies elsewhere defies the Legislature's deliberate and explicit rejection of the failed Delta management policies of the past. By hijacking the Water Reform Act's primary thrust toward "reduc[ing] reliance on the Delta" as necessary to "restore the Delta ecosystem," the Draft Plan has usurped the Legislature's authority to adopt the State's Delta management policy. The Draft Plan has inserted a dramatically contrary policy of subordinating restoration of public trust resources to maintaining the existing unsustainable level of current water exports, ostensibly to provide a "reliable water supply" for the state.

The Draft Plan's redirection of the Delta Reform Act's new management policies is directly contrary to the Legislature's decision to reduce Delta exports and its recognition that "[p]roviding a more reliable water supply for the state involves implementation of water use efficiency and conservation projects, wastewater reclamation projects, desalination, and new and improved infrastructure, including water storage and Delta conveyance facilities." Water Code § 85004(b). At no point does the Delta Reform Act imply – let alone expressly allow – the existing excessive level of Delta exports to continue. On the contrary, the Legislature specifically rejected perpetuation of the failed Delta policies of the past by announcing that "[t]he policy of the State of California is to reduce reliance on the Delta in meeting California's future water supply needs . . . ." Water Code § 85021. The Draft Plan ignores this fundamental change in management direction. Accordingly, it must be revised to conform to the Legislature's unmistakable mandate that Delta exports be reduced.

C. The Draft Plan Must Expressly Adopt and Implement the Legislature's Eight Specific Policy Objectives Set Forth in Section 85020.

The Legislature adopted eight specific objectives that it declared to be "inherent in the co-equal goals for management of the Delta." As noted above, those objectives required restoration of the Delta ecosystem, "including its fisheries and wildlife, as the heart of a healthy estuary and wetland ecosystem," protection of the "unique cultural, recreational, and agricultural values of the California Delta," and improved "statewide water conservation, water use efficiency, and sustainable water use" as necessary to "reduce reliance on the Delta in meeting California's future water supply needs." Water Code §§ 85020(b), (c), (d), 85021. Additional specific policy objectives included managing the Delta and the state's water resources "over the long term," achieving water quality objectives in the Delta, improving the water conveyance system and expanding statewide water storage, reducing risks by increasing emergency preparedness and flood protection, and establishing a new governance structure to achieve these objectives. *Id.* at (a), (e), (f), (g), and (h).

The Plan gives no more than lip service to these clear expressions of the Legislature's new policies for Delta management. Notwithstanding its passing reference to these "core objectives" as "the foundation of the Delta Plan's policies and recommendations" (Plan at 13), the Plan fails to adopt strategies and specific, enforceable measures to achieve these objectives. Despite the fact that restoration of the Delta ecosystem and reduced reliance on Delta exports in favor of improved water storage and water use efficiency elsewhere are the overriding purposes of the Delta Reform Act, the Draft Plan adopts no specific water quality, water flow, or habitat enhancement standards as necessary to assure actual restoration of the imperiled Delta ecosystem and achievement of the Legislature's water quality objectives for the Delta.

Rather than developing specific management steps and enforceable standards to achieve the Legislature's seven substantive objectives set forth in section 85020, the Draft Plan presents only generalized discussions of these topics, sidestepping its primary responsibility to translate the Legislature's clear policy objectives into specific and enforceable management measures and performance standards, as discussed in the following analysis.

D. The Plan Fails to Include Specific Implementation Measures and Performance Standards Essential for Enforcement of the Delta Reform Act's Objectives.

Although the Delta Reform Act clearly and repeatedly directs the Council to include specific implementation measures and performance standards because they are essential to enforcement of the Act's substantive water quality improvement, habitat restoration, and water conservation and efficiency objectives, the Draft Plan fails to provide them.

Chapter 4, which ostensibly identifies measures to achieve "a more reliable water supply for California," never in fact does so. Each of the "policies" it enumerates merely repeats existing requirements of State law (for example, requiring the preparation and implementation of urban water management plans and agricultural water management plans), or proposes mere "recommendations" bereft of any specific enforceability. Plan at 79-84. Instead of adopting updated Delta fresh water flow criteria as a necessary restraint on the quantity and timing of Delta exports, the Plan defers to the State Water Board's ongoing "phased process to review and amend" flow requirements for the Delta and its tributaries. Plan at 84-86. But the State Water Board has already adopted and submitted to the Council the Delta flow criteria required by Water Code section 85086(e), removing any impediment to the Council's immediate inclusion of those criteria in the Draft Plan.

Worse, in response to the Act's direction that the Council develop measures to promote expanded water storage and improved conveyance facilities, the Plan concedes that it provides "[n]o policies with regulatory effect" to achieve these primary statutory imperatives. Plan at 89. Although Chapter 4 seeks a 10 percent reduction in statewide urban per capita water usage by 2015 and 20 percent by 2020, and posits overall goals for increased use of recycled water and storm water run-off, it identifies no specific performance measures by which to achieve, let alone enforce, these objectives. The "performance measures" identified for all of the other water conservation, water efficiency, and water supply improvement projects state only that there be "progress toward" achieving these vague objectives, rendering the entire planning effort illusory. Plan at 98.

In Chapter 5, which is incongruously entitled "Restore the Delta Ecosystem," the Plan actually proposes no specifically enforceable programs to improve Delta habitat. Plan at 107-128. Instead of providing specific fresh water flow criteria and related standards for habitat improvement (such as increased seasonal flows, reduced turbidity, increased dissolved oxygen, and reduced water temperature), this Chapter defers adoption of flow objectives until June 2, 2014 for the Delta and June 2, 2018 for its principal tributaries, and proposes no specific habitat improvements or standards by which their achievement can be measured. Plan at 113-121. Rather than providing the detailed "performance measures" specifically mandated by the Act, the Draft Plan merely repeats the language of the Act and engages in a useless semantic exercise of dividing the types of performance measures into "three general classes." Plan at 125-126. No specific performance measures are articulated. *Id.* Instead, this Chapter merely provides that "progress toward" achievement of various broad categories of habitat improvements is desired. Plan at 127-128. In short, the Draft Plan provides no specific ecosystem restoration measures, let alone standards by which their achievement can be determined. Consequently, the Draft Plan fails utterly to fulfill the principal purpose of the Delta Reform Act – restoration of the Delta's imperiled ecosystem.

Chapter 6, concerning water quality improvements, does identify in broad strokes many of the principal pollutants that currently harm Delta water quality. Plan at 133-138. However, this Chapter, like Chapter 4, defers to the State Water Board responsibility for adopting and implementing updated fresh water flow objectives for the Delta and its tributaries. Plan at 139. As noted, the Legislature clearly intended that the Council itself adopt and implement such objectives in the Delta Plan, utilizing flow criteria the State Water Board has already approved. The Plan likewise sidesteps the Council's clear statutory duty to adopt water quality standards and implementation measures by deferring to actions by the Central Valley Regional Water Quality Control Board, the Department of Water Resources, the State Water Board, and the Department of Public Health. Plan at 141. The Chapter likewise evades any responsibility for adopting water quality standards to protect the environment, again deferring to other agencies including the State Water Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards. Plan at 148-150. Consequently, the Draft Plan adopts no programs, implementation measures, or performance standards by which to gage achievement of the Legislature's command that the Council improve and protect water quality for human health and the environment.

Chapter 7, which ostensibly responds to the Legislature's direction that the Plan identify programs, implementation measures, and performance standards to reduce risks, increase preparedness, and provide flood protection, fails to perform any of these functions. Plan at 161-186. Rather than identify, adopt, and implement specific programs, measures, and standards in response to this statutory command, Chapter 7 merely recounts general measures underway by other agencies such as the Department of Water Resources, the U.S. Army Corps of Engineers, and the Federal Emergency Management Agency ("FEMA"). Although several broad policies for avoiding encroachment in certain floodways are stated (Plan at 165), no specific measures to implement or enforce these policies are identified, let alone adopted. The Chapter admits that it identifies "[n]o policies with regulatory effect" regarding Emergency Preparedness and Response, nor concerning Reoperation of Upstream Reservoirs and Peak Flow Attenuation. Plan at 180 and 185. Consequently, the Plan fails to provide any specific, quantifiable, and enforceable programs, measures and performance standards to achieve the Legislature's mandate that the Council "[r]educe risks to people, property, and state interests in the Delta by effective emergency preparedness, appropriate land uses, and investments in flood protection." Water Code § 85020(g).

In summary, the Plan completely fails to include any specific implementation measures and performance standards essential for enforcement of the Delta Reform Act's explicit objectives.

III. THE DRAFT DELTA PLAN PROGRAM ENVIRONMENTAL IMPACT REPORT IS INADEQUATE.

The "heart of CEQA" is the environmental impact report. *Citizens for Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564. "The EIR, with all its specificity and complexity, is the mechanism prescribed by CEQA to force informed decision making and to expose the decision making process to public scrutiny." *California Native Plant Soc. v. City of Santa Cruz* (2009) 177 Cal.App.4th 957, 978, *quoting Planning & Conservation League v. Department of Water Resources* (2000) 83 Cal.App.4th 892, 910.

The DPEIR's analysis of the Plan fails to foster informed decisionmaking or to expose the Council's decisionmaking process to the public. *Id.* Instead, it suffers from the same high level of abstraction and lack of specificity that plague the Plan itself. The DPEIR does not contain a clearly defined and accessible project description. Nor does it address impacts of the Plan's implementation with specific information about the consequences of approving any of the Plan's features. Comparison of alternatives is likewise impossible because the Plan's substance – and that of its alternatives – is exceedingly hard to grasp. In sum, the DPEIR's analysis is too vague to be useful and therefore violates CEQA, as discussed below.

A. The DPEIR Is Deficient as a Program EIR.

While Conservation Groups recognize that the DPEIR is a "program EIR," its failure to provide the information required by CEQA undermines CEQA's fundamental goal of fostering informed decisionmaking.

A program EIR is prepared for "a series of actions that can be characterized as one large project and are related either: (1) Geographically, (2) As logical parts in the chain of contemplated actions, [or] (3) In connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program." Cal. Code Regs., tit. 14 ("CEQA Guidelines"), § 15168 (a). Program EIRs allow agencies to (1) provide "for a more exhaustive consideration of effects and alternatives than would be practical in an EIR on an individual action;" (2) ensure full consideration of cumulative impacts; (3) avoid "duplicative reconsideration of basic policy considerations;" and (4) allow for consideration of "broad policy alternatives and program wide mitigation measures at an early time when the agency has greater flexibility to deal with basic problems or cumulative impacts." *Id.*, § 15168 (b).

That said, program EIRs, like all EIRs, "must meet the content requirements discussed in Article 9" of the CEQA Guidelines. These requirements include an adequate project description (§ 15124) and discussion of alternatives (§ 15126.6), a complete description of the environmental

setting (§ 15125), a robust analysis and discussion of impacts (§ 15126.2) and mitigation measures (§ 15126.6), as well as other CEQA-required topics. The DPEIR fails to meet these requirements and thus must be substantially revised.

B. The DPEIR's Project Description Is Inadequate.

"[A]n accurate, stable and finite project description is the *sine qua non* of an informative and legally sufficient EIR." *County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 199. However, "[a] curtailed, enigmatic or unstable project description draws a red herring across the path of public input." *Id.* at 197-198. "[O]nly through an accurate view of the project may the public and interested parties and public agencies balance the proposed project's benefits against its environmental cost, consider appropriate mitigation measures, assess the advantages of terminating the proposal and properly weigh other alternatives." *City of Santee v. County of San Diego* (1989) 214 Cal.App.3d 1438, 1454.

As described above, the Plan lacks concrete details about how it will achieve the Delta Reform Act's goals. It consists instead of abstract policies and recommendations devoid of specific objectives, implementation measures, and performance standards. Consequently, the DPEIR's project description section contains the very type of "enigmatic" descriptions that were condemned in *County of Inyo*, 71 Cal.App.3d at 199.

Further, the DPEIR lacks a concise and meaningful summary of the key aspects of the Proposed Plan. The Executive Summary's description of the Proposed Plan lacks substance and therefore fails to provide the reader with any useful information about the Plan's policies and their implementation. DPEIR, at ES-2. Although Section 2A's Proposed Project description is approximately 53 pages long, it contains no summary of key aspects of the Plan. DPEIR at 2A-4 to 2A-57. Appendix C's dense table of the Proposed Project's actual policies and recommendation is approximately 21 pages long and likewise contains no concise, accessible summary of the Plan. App. C-1 to C-21. A narrative discussion of the Proposed Project would greatly assist the reader's understanding of the Plan and shed light on the core differences between it and its alternatives.

Conservation Groups therefore request that the Council revise the DPEIR to include in its Executive Summary specific descriptions of the most significant elements of the Proposed Plan, including, at a minimum, a description, in plain English, of the twelve regulatory policies (ES-2) that make up the foundation of the Plan.

C. The DPEIR's Discussion of the Plan's Purpose and Objectives Is Far Too Vague.

According to the CEQA Guidelines, "[t]he description of the project shall contain . . . [a] statement of the objectives sought by the proposed project. A clearly written statement of objectives will help the lead agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings or a statement of overriding considerations, if necessary. The statement of objectives should include the underlying purpose of the project." § 15124 (b).

The DPEIR contains a section entitled "Delta Plan Purpose and Project Objectives" which fails to explain either. DPEIR at 1-1 to 1-4. Although that section recites many of the Delta Reform Act's mandates, it does not provide any further definition of the key terms and management implications of those mandates. For example, the DPEIR does not adequately define the objective of providing a "more reliable water supply." This "goal" without more detail evades informed evaluation and therefore proves unhelpful in the evaluation of alternatives that are intended to achieve the Plan's goals.

D. The DPEIR's Discussion of Alternatives Is Too Narrow and Inadequately Detailed.

"CEQA requires that an EIR, in addition to analyzing the environmental effects of a proposed project, also consider and analyze project alternatives that would reduce adverse environmental impacts." *In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings* (2008) 43 Cal.4th 1143, 1162-1163, *citing* Pub. Res. Code §§ 21061, 21001(g), 21002, 21002.1(a), 21003(c). Further, the CEQA Guidelines state that an EIR must "describe a range of reasonable alternatives to the project . . . which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project . . . ." § 15126.6 (a). "There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason." CEQA Guidelines § 15126.6(a). The rule of reason "requires the EIR to set forth only those alternatives necessary to permit a reasoned choice" and to "examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project." *Id.*, § 15126.6(f).

As with the Proposed Project description, the DPEIR's alternatives lack specificity and thereby evade meaningful review. Comparison of the five alternatives to the Proposed Project, which all consist of broad brush policies and recommendations, reveals very little about the consequences of the Council's selection among the alternatives. Furthermore, as discussed above, the Council has failed to provide adequately detailed project objectives that would guide selection of alternatives. Without more precise objectives, the five alternatives lack comparative definition.

Further, the DPEIR's characterization of the Environmental Water Caucus's proposed Alternative 2 understates this alternative's tangible environmental benefits, erroneously deeming this alternative environmentally inferior to the Council's Proposed Project. Contrary to the DPEIR's mischaracterization, Alternative 2 is environmentally superior with respect to all relevant measures, including Delta restoration, water supply reliability, flood risks, water quality, greenhouse gas emissions, and climate change impacts. Moreover, the ecological restoration that Alternative 2 will achieve will yield substantial economic dividends ignored by the DPEIR. The DPEIR's misinterpretation of Alternative 2 as proposing additional ocean desalination and expansion of the Friant/Millerton reservoir is in error, and must be corrected. Because Alternative 2 supports aggressive use and improvement of existing diversion facilities south of the Delta, it has substantially fewer impacts on the Delta ecosystem than any of the alternatives proposing continued or expanded diversion of water from the Delta or its northern tributaries. Alternative 2 is fully consistent with improved Delta levee construction and maintenance, and thus would not pose flood risks greater than the Proposed Project. Finally, Alternative 2's elimination of the use of Delta water to irrigate drainage-impaired farmlands would reduce contamination of the Delta and thereby avoid its substantial economic as well as environmental costs. For each of these reasons, the Council should select Alternative 2 as the environmentally superior alternative that best achieves the Delta Reform Act's objectives.

E. The DPEIR's Discussion of the Project's Impacts Is Incomplete.

"The fundamental purpose of an EIR is 'to provide public agencies and the public in general with detailed information about the effect which a proposed project is likely to have on the environment.' (§ 21061)." *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 428. Accordingly, an EIR must adequately identify and analyze the significant environmental effects of the proposed project. Pub. Res. Code § 21100(b); CEQA Guidelines § 15126.2(a). "In assessing the impact of a proposed project on the environment, the lead agency normally examines the 'changes' in existing environmental conditions in the affected area that would occur if the proposed activity is implemented." *San Joaquin Raptor Rescue Center v. County of Merced* (2007) 149 Cal.App.4th 645, 659-660, citing CEQA Guidelines § 15126.2(a) and *Wal–Mart Stores, Inc. v. City of Turlock* (2006) 138 Cal.App.4th 273, 289. "Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects." CEQA Guidelines § 15126.2(a). "An EIR should be prepared with a sufficient degree of analysis to provide decisionmakers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible . . . . The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure." CEQA Guidelines § 15151.

The DPEIR's impacts analyses fall short of this standard in two significant ways. First, as discussed above, the Plan's unacceptably high level of abstraction impedes the DPEIR's analysis. For example, the Plan's comparison of the Proposed Project's and alternatives' greenhouse gas (GHG) emissions opines:

> The Proposed Project would have approximately the same GHG impacts as all the alternatives (except Alternative 3), but for differing reasons. Alternatives 1A and 1B would involve fewer GHG emissions from construction but more GHG emissions from pumping and moving water, particularly over mountain ranges in southern California. Alternative 2 would involve more GHG emissions from operation of local water projects such as desalination plants and treatment plants but fewer GHG emissions from pumping/moving water. Alternative 3 would involve overall less construction and operation of local water projects and about the same amount of water movement/pumping, so fewer GHG emissions overall.

DPEIR at 25-10. This analysis does not provide the reader with any useful information about the GHG emissions of the Project except that Alternative 3 would likely have fewer GHG emissions. The very generality of the analysis precludes evaluation of the detailed information required by CEQA.

Second, throughout its analysis, the DPEIR defers any specific analysis until project-level environmental reviews of projects implementing the Plan. Much of the information about the impacts of the Plan are thus not revealed. Continuing with the GHG emission example, the chapter addressing GHG emissions repeatedly states that "[a]s individual projects are proposed, these individual projects will need to be evaluated in site-specific environmental documents prepared by the lead agencies." *See, e.g.,* DPEIR at 21-9, 21-11, 21-12, 21-13, 21-17. Conservation Groups are aware that the Draft Plan represents a broad-scale program. Nonetheless, lead agencies cannot defer analysis, even in upper tier environmental analyses, if that analysis can – as here – feasibly be undertaken for the program in question. *EPIC v. California Dept. of Forestry and Fire Protection* (2008) 44 Cal.4th 459, 502-03. The DPEIR must be revised to rectify its omission of essential, fact-based analysis.

F. The DPEIR Fails to Address the Council's Public Trust Responsibilities.

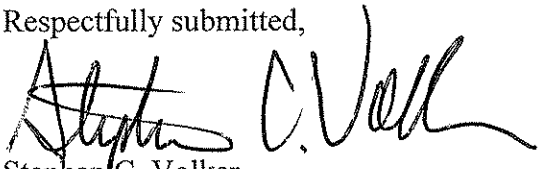
The Legislature directed in the Delta Reform Act that "[t]he longstanding constitutional principle of reasonable use and the public trust doctrine shall be the foundation of state water management policy and are particularly important and applicable to the Delta." Water Code § 85023. Despite this specific admonition to the Council to recognize and incorporate these foundational principles into the Delta Plan, the Plan fails to do so. Nothing in the Council's DPEIR remedies this omission. Neither the Plan nor the DPEIR ever acknowledges, let alone implements, the Council's paramount duty under the Public Trust Doctrine to "attempt, so far as

feasible, to avoid or minimize any harm to . . . interests [protected by the public trust]." *National Audubon Society*, *supra*, 33 Cal.3d at 435-36. As noted, the Public Trust Doctrine protects public uses of public waters including fishing, boating, swimming, scientific study, wildlife habitat, and aesthetic enjoyment. *Marks v. Whitney* (1971) 6 Cal.3d 251, 259-260; *Carstens v. California Coastal Commission* (1986) 182 Cal.App.3d 277, 294. By specifically incorporating the Public Trust Doctrine into the Council's Delta planning process, the Legislature made crystal clear its intent that the Delta's public trust resources be protected "so far as feasible." But neither the Plan nor the DPEIR provides any discussion of this "foundation of state water management policy" let alone assure its full integration into the Plan and the DPEIR's analysis of its impacts. Because the Council has failed to recognize and implement the Public Trust Doctrine despite the Legislature's clear command that it do so, both the Draft Plan and its DPEIR must be revised to conform to this statutory and constitutional mandate.

IV. CONCLUSION

For each of the foregoing reasons, the Draft Plan and the DPEIR fail to comply with the Delta Reform Act and CEQA. Accordingly, the Council must withdraw these documents and prepare an adequate Plan and EIR that comport fully with the Delta Reform Act and CEQA.

Respectfully submitted,



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February 2, 2012

VIA E-MAIL and CERTIFIED MAIL RETURN RECEIPT REQUESTED

Delta Stewardship Council
Attn: Terry Macaulay
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E-mail: eircomments@deltacouncil.ca.gov

Re: *California Sportfishing Protection Alliance (CSPA), California Water Impact Network (CWIN), AquAlliance, and the Pacific Coast Federation of Fisherman's Association's (PCFFA) Comments to the Draft Delta Plan Program Environmental Impact Report*

Dear Ms. Macaulay,

Thank you for this opportunity to provide comments on the Draft Delta Plan Program Environmental Impact Statement ("DPEIR") regarding the Delta Plan ("Plan") issued in November 2011. These comments represent the comments of the California Sportfishing Protection Alliance (CSPA), the California Water Impact Network (CWIN), AquAlliance, and Pacific Coast Federation of Fisherman's Association (PCFFA) (hereinafter, collectively referred to as ("the Groups"). The groups urge the Delta Stewardship Council ("DSC" or "Council") to reject the DPEIR as proposed because the DPEIR fails to consider many potentially significant environmental impacts of the Plan and alternatives to the Plan, and otherwise fails to meet the requirements of the National Environmental Policy Act and the regulations of the Council on Environmental Quality implementing it ("NEPA")[1], the California Environmental Quality Protection Act pursuant to California Public Resources Code sections 21000 *et seq*. ("CEQA"), the Clean Air Act ("CAA") the Federal Reclamation Act of 1902, the Clean Water Act ("CWA"), the Coastal Zone Management Act, the Omnibus Appropriations Bill, the Central Valley Project Improvement Act of 1992 and numerous other statutory and common law provisions described in greater detail below.

The Role of the Delta Stewardship Council in Shaping the Delta Plan

The Sacramento-San Joaquin Delta Reform Act of 2009 ("Delta Reform Act") established a suite of requirements for the Delta Plan ("Plan" or "project"). These requirements

[1] 40 USC §4321, *et seq.* and 40 C.F.R. Parts 1500-1508 Council on Environmental Quality Guidance

are framed by the Water Code's "basic goals" for the Delta; first among these is to "[a]chieve the two coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem," which closely tracks the second "basic goal" to "[p]rotect, maintain, and, where possible, enhance and restore the overall quality of the Delta environment, including, but not limited to, agriculture, wildlife habitat, and recreational activities." (Wat. Code § 29702; *see also* Wat. Code § 85054.) The pursuit of these goals must conform with the Legislature's determination that "[t]he permanent protection of the Delta's natural and scenic resources is the paramount concern to present and future residents of the state and nation." (Wat. Code § 85022(c)(2).) The Delta Plan created and directed the Delta Stewardship Council (DSC) (an independent agency of the state created by SBX7 1) to develop a legally enforceable Delta Plan to achieve the coequal goals of "providing a more reliable water supply for California" while "protecting, restoring, and enhancing the Delta ecosystem" in a manner that "protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place." (Water Code Section 85054). The Act also established a state policy of promoting regional self-reliance and reduced reliance on the Delta in meeting California's future water supply needs. The objective of the DSC is to "...develop, adopt, and commence implementation of the Delta Plan by January 1, 2012." (Water Code Section 85300).

The groups are particularly concerned that the DPEIR contains inadequate description of the overall program, discussion and analysis of the "Project" overall, fails to address many baseline environmental conditions, and inadequately evaluates feasible alternatives and the "no project" alternative. At a minimum, the DPEIR must set forth basic costs and clearly defined baseline conditions so that the Proposed Program can be measured against the various Alternatives, which it does not do. The DSC further fails to define and quantify the following terms: 1) a "more reliable water supply," 2) "protecting, restoring, and enhancing the Delta ecosystem," 3) "enhancement of the Delta as an evolving place" and 4) "regional self-reliance" and "reduced dependence on the Delta." By failing to define what is meant by the foregoing terms, the DSC is incapable of quantifying, analyzing and balancing the goals and policies outlined in the Delta Reform Act. These failures undermine and sabotage efforts to resolve California's water crisis.

For example, the failure of the DSC to define and quantify what a "reduced dependence on the Delta" would look like makes it impossible to determine the extent to which the Delta is currently over appropriated. As it is, consumptive water rights issued by the State Water Resources Control Board (State Board) exceed unimpaired flow into the Delta; state and federal water project contracted water deliveries are greater than available supplies and the delivery capacity of the systems; increased pollutant mass loading to the estuary has exhausted assimilative capacity and exacerbated water quality degradation; and excessive diversions have led to the collapse of estuary's biological tapestry. Two recent state agency reports, [2] which were developed through extensive public processes, conclusively establish that an increase in Delta outflow is necessary to protect and restore the estuary's aquatic ecosystem. In other words, California's water system is seriously oversubscribed, operating in deficit, and is thus incapable of meeting competing demands on the system. The DSC's charge is to resolve this imbalance. In the near term, it's largely a zero sum game, as more water to protect public trust values

[2] State Water Resource Control Board. August 2010. *Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem*; California Department of Fish and Game. November 2010. *Quantifiable Biological Objectives and Flow Criteria for Aquatic and Terrestrial Species of Concern Dependent on the Delta.*

translates to less water for consumption values. Over the longer term however, through improved efficiencies, conservation, reclamation, reuse and improved storage and diversion methods, water shortages would be largely alleviated. The DSC cannot avoid having to make difficult decisions regarding the distribution of limited water resources. Sadly, the Fifth Draft of the Delta Plan fails to provide the structure and information critically necessary to make intelligent but painful decisions, with the DSC resorting to gamesmanship to maintain an over appropriated status quo.

The DSC Plan and the DPEIR Fail to Analyze The Delta Plan In Light of The Public Trust Doctrine.

"The longstanding constitutional principle of reasonable use and the *public trust doctrine* shall be the foundation of state water management policy and are particularly important and applicable to the Delta." Water Code Section 85023. As an agency of the state of California, the DSC is creating a 100 year plan that must conform with CEQA statutes, regulations, guidelines and California case law to analyze the plan.

The California Supreme Court last visited public trust law in the seminal case of National Audubon Society v. Superior Court of Alpine County, 33 Cal.3d 419 (1983) in which the court held that the state has "an affirmative duty to take the public trust into account in the planning and allocation of water resources, and to protect public trust whenever feasible." The Supreme Court further quoted, with favor, now Justice of the 3rd Appellate District Ron Robie, that "the requirements of the California Environmental Quality Act (Public Resources Code 21000 et. seq.) impose a similar obligation." In keeping with the Supreme Court ruling, the state must take the public trust into account in the Delta Plan. The Delta Plan functions as a strategic document which provides guidance and recommendations to cities and counties, as well as state, federal, and local agencies on how to restore the Delta ecosystem and provide a more reliable water supply for California. The plan contains regulatory policies and establishes a certification process for proposed projects to ensure that they comply with the Delta Plan. The plan further envisions the incorporation of other "completed" plans into the Delta Plan, thereby "certifying" that proposed plans, projects, and covered actions are consistent with the Delta Plan.

The planning and allocation of limited and oversubscribed resources implies that there has been an analysis and balancing of the competing demands on these resources. Inexplicably, the Fifth Draft of the Delta Plan makes no effort to balance the public trust and resolve these competing demands for limited resources. The Fifth Draft of the Plan contains no water availability analysis that would show, at a minimum, what water will be available to meet the Reform Act's goals. Such an analysis would have to include an evaluation of the existing seniority-based water rights system, an assessment of real vs "paper" water and area of origin statutory restrictions, and a discussion of the public trust doctrine. The Plan and its DEIR do none of these things. The DSC plan will guide the Bay/Delta activities for 100 years. It is time to use CEQA in a real analysis of the plan before finalizing what could be a mistake that would haunt California water policy for decades. These deficiencies alone fall short of the statutory requirements of the Delta Reform Act and do not comport with the state's requirements to consider the public trust doctrine as held in Mono Lake.

The DSC denies that it has any affirmative duty to analyze whether the plan protects the public trust in the Bay/Delta. However, the DSC, as an agency of the sovereign state of California, has an affirmative duty, inherent in the public trust doctrine, and made a specific duty

by the California Supreme Court in Audubon, to evaluate and compare the proposed alternatives to see if, and how completely, each of the alternatives satisfy the public trust in the Delta. The Legislature has expressly declared that "*permanent protection* of the Delta's natural and scenic resources is the *paramount* concern to present and future residents of the state and nation." (Wat. Code, § 85022(c)(3) (emphasis added).) Thus the Legislature, like the Supreme Court in the *Bay-Delta Programmatic EIR* case, has expressed a *preference* for public trust values, using the word paramount. The plain meaning of "paramount" is the "highest in rank or jurisdiction, chief; pre-eminent; supreme." (Webster's Dictionary). Because that legislative determination cannot be characterized as unreasonable, and is supported by other policies of the Delta Reform Act, the Legislature's implementation of the public trust by the preference expressed in section 85022, subdivision (c)(3) must be honored by the DSC. (*California Trout v. State Water Res. Control Bd.* (1989) 207 Cal. App. 3d 585, 624-625, 629-631.) Here, however, the DSC and the DPEIR do no public trust analysis, because the DSC incorrectly insists that the duty to evaluate the effects of the Delta Plan on public trust resources is not within their purview, even though the Delta Reform Act mandates that the public trust and the doctrine of reasonable use are "particularly important and applicable to the Delta." The groups dispute the DSC's position that an analysis of the public trust doctrine is unwarranted, and request an analysis of whether it is feasible to protect the trust under each of the proposed alternatives. The groups further incorporate the DPEIR comments of the firm of Rossman and Moore, as if set forth herein in full, on the issue of whether or not, and how, to legally evaluate the public trust at the planning stage of the DSC process.

Deficiencies in the Plan's "Area of Origin" Water Rights Analysis

The California Legislature has created a variety of Water Code provisions to protect the area of origin water rights of Californians living in the state's wet areas. These area of origin rules include the Watershed Protection Act, Water Code sections 11460 through 11463; the County of Origin protection, Water Code section 10500; the Delta Protection Act, Water Code sections 1220 through 12204; and the protected area provisions, Water Code sections 1215 through 1222. Generally speaking, these statutes mandate that large-scale water transport systems, like the CVP and the State Water Project, not deprive an area where water originates of the prior right to all water reasonably required to adequately meet the beneficial needs of the area and its inhabitants.

During the Central Valley Project Act's legislative process, area of origin residents insisted the Act contain provisions guaranteeing they have first access to water originating in their area. Residents argued that excess water should only be exported to drier areas of the state once area of origin residents received their water. The legislature addressed these concerns in several key provisions of the Act, now codified as California Water Code sections 11460-11463. These provisions, known as the "Watershed Protection Act" ostensibly gave inhabitants of the watersheds of origin priority over out of area users:

> In the construction and operation by the [Department of Water Resources] of any project under the provisions of this part, a watershed or area wherein water originates, or an area immediately adjacent thereto which can conveniently be supplied with water therefrom, *shall not be deprived by the department directly or indirectly of the prior right to all of the water reasonably required to adequately supply the beneficial*

> *needs of the watershed, area, or any of the inhabitants or property owners therein.*

Water Code Section 11460 (emphasis added).

These state watershed protections apply to the federally operated CVP pursuant to 43 U.S.C. § 383 (2006); *California v. United States*, 438 U.S. 645, 678 (1978) (federal Reclamation projects must comply with state water law.) The Delta Protection Act of 1959 further requires that the coordinated operations of the CVP and SWP maintain water quality standards and, in doing so, prohibits any person, corporation or government agency from diverting water to which local users of Delta water are entitled from the channels of the Sacramento-San Joaquin Delta. "Protected areas" are also statutorily safeguarded from plundering by out of area demands through a series of statutes commonly known as the "protected areas" statutes of 1984, which expressly prohibit water exporters from depriving designated protected areas of the prior right to water reasonably required to adequately supply the beneficial needs of the protected area. These numerous protections enacted since 1927 evidence the California Legislature's commitment to protecting area of origin residents' access to local water prior to the exportation of that water to drier areas of the state.

The DSC failed to take into account the water needs of water rights holders within the Delta watershed, and failed to consider the water needs sufficient to sustain beneficial uses, including environmental needs, in the watersheds that are protected by the "area of origin." Water users upstream from the Delta are understandably concerned that their long-standing water rights will be hijacked to subsidize increased inflow in the Delta in order to maintain maximum water exports to junior water rights users that are served by the state and federal project pumps in the Delta. Such a result would directly conflict with the Delta Reform Act, which admonishes against interference with area of origin laws and the system of water rights seniority. The looming BDCP process, and the umbrella authority for BDCP built into the Delta plan, needs to be disclosed and analyzed within the DPEIR, with alternatives compared and watershed needs mitigated. The omission of these important discussions in the present draft of the DPEIR will result in a skewed and incomplete understating of potential environmental effects on the Delta, which at a minimum will serve to exacerbate water rights litigation throughout the state.

Deficiencies in the Plan's Water Availability Analysis Renders Meaningful Environmental Conclusions Impossible

A state lead agency is required to prepare an EIR for each discretionary project that *may* have a significant effect on the environment. (Pub. Resources Code, §§ 21080, subd. (d),21100, subd. (a).) "The word 'may' connotes a 'reasonable possibility'" that a project will have a significant environmental impact. (*Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296, 309, quoting *No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.3d 68, 83 n.16.)

The CEQA Guidelines define a "significant effect on the environment" as a "substantial, *or potentially substantial*, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance." (Cal. Code Regs., tit. 14, § 15382, emphasis added; see also Pub. Resources Code, § 21068.) A lead agency's determination of the significance of environmental effects is governed by the criteria in CEQA Guidelines sections 15064 and 15065 and Public Resources Code section 21083, subdivision (b). The Sacramento-San Joaquin Delta is a natural resource of statewide, national, and international significance, containing irreplaceable

resources, and it is the policy of the state to recognize, preserve, and protect those resources of the delta for the use and enjoyment of current and future generations. (Public Resources Code Section 29701)

Water Code section 85300, subdivision (a) therefore requires the DSC to "develop, adopt and implement" the Delta Plan. The Delta Plan itself qualifies as "an activity directly undertaken by a public agency." Thus, the Plan must be analyzed to determine whether it "may cause either a direct physical change… or a reasonably foreseeable indirect physical change[,] in the environment" – thereby qualifying as a "project" subject to CEQA. (Pub. Resources Code, § 21065; see also Cal. Code Regs., tit. 14, § 15060, subd.(c).) The Delta Plan must include "quantified or otherwise measurable targets associated with achieving the objectives of the Delta Plan," and describe "the methods by which the Council shall measure progress toward achieving the co-equal goals." (*Id*., § 85308, subds. (b) and (d); see also *id*., § 85211.) The mere fact that the DSC prepared the DPEIR for the Fifth Draft of the Delta Plan demonstrates the DSC's belief that the plan has potential to cause direct or foreseeably indirect physical changes in the Delta environment. However, the present DPEIR fails to include quantifications or measurable targets to achieve the objectives of the authorizing law. On this issue alone, the present draft of the Delta Plan completely fails as a programmatic document under CEQA.

Water Code section 85302, subdivision (a) further requires that the Delta Plan actually to be implemented to achieve the co-equal goals required under Water Code Section 85054. Once implemented, these goals of the Delta Plan clearly will have physical environmental effects. SB 1 requires that the Delta Plan include specific implementation measures and calls for a plan that is "legally enforceable." (Water Code §§ 85001, subd. (c), 85302, subds. (d) and (e).) The only enforceable components of the Plan, according to the DPEIR, are the "policies." A number of critical elements of the Plan have no policies associated with them, as shown below (without limitation). Hence, those components are unenforceable. The Plan must include enforceable strategies and subgoals as required by the Reform Act, and it is within this area that the Plan falls fundamentally short. The Plan contains little more than a description of the status quo, including recommendations for other government agencies to take action to improve the existing situation in the Bay/Delta. These recommendations are made without any real regulatory muscle to support or enforce them. Ultimately, the people of California cannot rely on the Plan's weak "policies" and unenforceable "recommendations" to meaningfully confront the challenges facing the Delta. As explained below, however, the EIR assumes that the project (*i.e.*, the Delta Plan) will succeed in its grand ambitions and neglects to consider the potential, even likely, result that the Plan will fail to deliver the full range of benefits presupposed but not necessarily realizable.

The DSC's failure to conduct a water availability analysis to determine whether water exists now, or in the future, to sustain present south-of-Delta exports or whether water presently exists to accomplish the State Board's recommended flows is fundamental to the DPEIR's flawed decisions on alternatives: the possible range of alternatives, a realistic "no project" alternative, analysis of those alternatives, and the mitigation of impacts caused by competing water needs. Without a water availability analysis, the DPEIR is complete guesswork and provides no information from which the public can understand whether the Delta Plan will meet the mandatory state requirements under the Delta Reform Act.

Deficiencies in the Plan's Water Availability Analysis Renders Meaningful Economic Conclusions Impossible

One of the significant flaws of previous unsuccessful Bay-Delta proceedings was the absence of a comprehensive economic analysis of the benefits of protecting in-Delta beneficial uses against the benefits of diverting and exporting water from the estuary. The DPEIS continues a flawed tradition of approving projects without economic analysis of the Plan, or alternatives. The lack of economic evaluation deprives decision makers and the public of the critical information necessary to reach informed decisions that reflect an appropriate balance of competing demands.

To properly address ecosystem restoration and water supply reliability requires a comprehensive cost/benefit analysis that describes the economic consequences of various projects and their alternatives, including changes in economic impacts and the distributional outcomes for each alternative. A reasonable economic assessment should describe current and baseline conditions for each alternative; measure the economic effects on physical, human, social and natural capital; and apply a "with" vs. "without" approach that can isolate the economic effects (values, impacts, equity) caused by the alternatives from changes unrelated to the alternatives. A proper economic assessment must include:

1. The changes in the values of goods and services available to Californians that result from the market and non-market activities associated with alternatives. These include changes in economic benefits, costs and changes in the quality of life.
2. The economic impacts that occur to jobs and incomes for workers, costs or revenues for private firms, and expenditures or tax revenues for governments, including multipliers.
3. The effects and economic impacts across brackets of households, ethnicities and geographic areas and identification of how groups that enjoy the benefits differ from those who bear the costs.
4. Measurement of the economic effects of policies on ecosystem services that have value to humans using non-market valuation techniques.

Comprehensive economic analyses are routinely employed by state and federal agencies throughout the nation. The historic failure to apply them in evaluating competing beneficial uses in the Bay-Delta is at the core of the current water crisis in California.

In 1983, the U.S. Water Resources Council published, *The Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (P&G). The *P&G* helps federal agencies, including the Corps of Engineers and Bureau of Reclamation, to plan water-related projects. The 2007 Water Resources Development Act requires that the *P&G* ensure the best available economic principles and analytical techniques. Unfortunately, the *P&G* has not been updated since it was published. Recently, the National Research Council (NRC) of the National Academies reviewed proposed changes to the *P&G*.[3]

[3] National Research Council of the National Academies. 2010. *A Review of the Proposed Revisions to the Federal Principles and Guidelines Water Resources Planning Document*. Committee on Improving Principles and Guidelines for Federal Water Resources Project Planning, Water Science and Technology Board, Division on Earth and Life Studies.

While the NRC ultimately concluded that the proposed changes did not adequately address the many deficiencies in the outdated *P&G*, and thus were not representative of current best economic practices, the NRC review contains valuable insight into current best practices for economic principles and analytical techniques. As a result of the review, the California Department of Water Resources (DWR) developed the *Economic Analysis Guidebook (Guidebook)* in 2008 to address deficiencies in the *P&G*, in order to help DWR economists conduct economic analyses using up-to-date methods and describe economic concepts and analyses to non-economist staff.[4] The *Guidebook* describes economics as "critical" to describing the environmental consequences, social effects, and costs and benefits of water-management alternatives. This is significant because for every environmental issue, a tradeoff inherently exists between "natural" and "human" demands on water resources. Because of this tradeoff, the examination of environmental issues should always take into account the economic effects of water uses that benefit the natural environment, even if this use adversely impacts agricultural and urban water users. Economics can also help describe effects on social equity or environmental justice, because economic costs and benefits include both monetary and non-monetary effects.[5]

In 2005, DWR produced a four-part study that describes the importance of considering the full range of economic costs and benefits of public policies that affect aquatic resources. DWR refers to this as a "multi-object approach" to floodplain management because it takes into account objectives besides flood mitigation (a single objective) to consider consequences on habitats, water quality, society, etc. This multi-objective approach includes:

1. A report titled *Ecosystem Valuation Methods* (*Methods*), describing a number of up-do-date methods of valuing aquatic-based ecosystem services. The analytical methods discussed have relevance to, and can help inform, assessments of the economic significance of ecological uses of Bay-Delta flows.[6]
2. A second report, *Natural Floodplain Functions and Societal Values* (*Functions*), describing biophysical aspects of floodplain habitats and examples of economic values of the ecosystem services that floodplains provide.[7]
3. A third report, *Middle Creek Flood Ecosystem Restoration Project Case Study: Benefit and Cost Analysis* (*Case Study*), describes the results of a case study of applying analytical methods and data described in the *Methods* and *Functions* reports to a floodplain restoration project.[8]

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[4] California Department of Water Resources (CDWR). 2008. *Economic Analysis Guidebook*. The State of California. January.

[5] CDWR (2008), p.viii.

[6] California Department of Water. 2005A. *Ecosystem Valuation Methods. Revised Draft*. Multi-Objective Approaches to Floodplain Management on a Watershed Basis. May.

[7] California Department of Water Resources. 2005B. *Natural Floodplain Functions and Societal Values Revised Draft*. Multi-Objective Approaches to Floodplain Management on a Watershed Basis. May.

[8] California Department of Water Resources. 2005C. *Middle Creek Flood Ecosystem Restoration Project Case Study: Benefit and Cost Analysis*. Multi-Objective Approaches to Floodplain Management on a Watershed Basis. May.

4. A fourth report, *Floodplain Management Benefit and Cost Analysis Framework* (*Framework*), describes a framework for analyses of ecological, social and economic consequences of policy decisions that affect aquatic resources. It emphasizes the importance of including information on ecological consequences in decision-making. It stresses the importance of incorporating environmental and social consequences into management decisions, measuring the economic effects of policies on ecosystem services having value to humans using non-market valuation techniques, selecting appropriate discount rates for economic effects that will occur in the future, accounting for analytical uncertainty and risk and considering ecological, social, and economic effects of policy decision on a broad watershed scale.[9]

The U.S. Environmental Protection Agency (EPA) recently released two guidelines for preparing economic analyses and valuing ecological services. The first, entitled *Valuing the Protection of Ecological Systems and Services*, was released by the EPA's Science Advisory Board (SAB) in May of 2009.[10] The report describes methods of identifying and describing the economic significance of natural resources and associated ecosystem services affected by policies or projects. The SAB noted the importance of valuing ecosystem services using up-to-date economic methods, while promoting collaboration among social scientists and biophysical scientists. Many of the recommendations have relevance to assessing the economic effects of water allocations in the Delta. These include:

1. Identifying and describing the critical relationships between biophysical aspects of natural resources and ecosystem services, and analyses of the economic effects of policies that impacts resources and services.
2. Choosing appropriate valuation methods.
3. Identifying and describing sources of uncertainty in analyses of the economic significance of ecosystem services. [11]

The most widely used tool for evaluating alternative approaches and balancing public trust uses with other beneficial uses is the Benefit Cost Analysis (BCA). BCA requires the identification and clarification of the elements of each alternative.[12] Care must be taken to avoid errors of omission, as these errors would affect the outcome of the analysis. The scope of analysis (i.e., which benefits and costs matter, to whom, over what geography and over what period of time), along with what should be included in the analysis and who and what should be excluded must be identified.[13] Risk and uncertainty must be identified and accounted for. For

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[9] California Department of Water Resources. 2005D. *Floodplain Management Benefits and Cost Analysis Framework. Revised Draft*. Multi-Objective Approaches to Floodplain Management on a Watershed Basis. June.

[10] Environmental Protection Agency (EPA) Science Advisory Board. 2009. Valuing the Protection of Ecological Systems and Services. EPA-SAB-09-012. May.

[11] EPA, 2009, p.1-7.

[12] Field, B.C. 1997. *Environmental Economics*, 2nd Edition. San Francisco: McGraw-Hill Company, Inc. p.116-117; U.S. Environmental Protection Agency (EPA). 2010. *Guidelines for Preparing Economic Analyses.* Report No. EPA-240-R-10-001. December. p.A-8.

[13] U.S. Environmental Protection Agency (EPA). 1993. *Guide for Cost-Effectiveness and Cost-Benefit Analysis of State and Local Ground Water Protection Programs*. U.S. Environmental Protection Agency, Office of Water, and

example, the analysis should not assume that all Californians would perceive numerically equal upside and downside risks in a neutral way because, when it comes to environmental matters, people tend to be risk averse. [14] Non-quantified factors must therefore be assessed and explained.[15] If important benefits and costs cannot be expressed in monetary units, BCA can be misleading because the calculation of net benefits does not demonstrate a full evaluation of benefits and costs.

Best practices for BCA would therefore include, but are not be limited to:

1. Comparing conditions with the alternative to conditions without the alternative: a good BCA avoids comparing conditions before the alternative to conditions after the alternative.[16]
2. Reporting and documenting methods, information and assumptions. A good BCA should rely on transparent assumptions and allow for straightforward replication by a third-party analyst.[17]
3. Applying methods and assumptions consistently throughout the analysis.[18] For example, uncertainty should not be accounted for in one aspect of the BCA and ignored in another.
4. Recognizing that economic impacts and economic equity are complements to BCA and not substitutes for it. Consider EPA's guidance, "[c]ounting the number of jobs lost (or gained) as a result of a regulation generally has no meaning in the context of benefit-cost analysis."[19] Each of the categories of economic effects (i.e., economic values, economic impacts and economic equity) plays a distinct role in a comprehensive economic description and evaluation of alternatives for improving Bay-Delta flows and should remain distinct.
5. Addressing externalities explicitly; i.e., accounting for the effects of a transaction on those who did not agree to experience the costs or benefits. The expected undesirable side-effects and ancillary benefits of a proposed action or alternative should be added to the direct benefits and costs as appropriate.[20]

Office of Ground Water and Drinking Water. April. p.11.

[14] Lesser, J.A., D.E. Dodds, and R.O. Zerbe, Jr.. 1997. *Environmental Economics and Policy*. p.406. Goodstein, 1999. E.S. *Economics and the Environment*. p.150. Field, B.C. 1994. *Environmental Economics*. p.129.

[15] Office of Management and Budget (OMB). 2003. *Informing Regulatory Decisions: 2003 Report to Congress on the Costs and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities*. Office of Information and Regulatory Affairs. February. p. 127.

[16] Office of Management and Budget (OMB). 1992. *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*. Circular A-94. October. p.6.

[17] OMB, *Informing Regulatory Decisions*, 2003, p.134.

[18] Rossi, P. and H. Freeman. 1982. *Economics*, 13th Edition. New York: McGraw-Hill Book Company. p.275.

[19] EPA, 2010, p.8-8. See also, OMB, 1994, p.6-7.

[20] OMB, *Regulatory Analysis*, 2003, p.3.

Evaluation of economics and alternatives must not become trapped in a simplified in-stream or habitat use vs. an agricultural or municipal use (jobs vs. fish) argument. As the Public Policy Institute of California (PPIC) describe in their recent report, *Myths of California Water – Implications and Reality,* the competition for Bay-Delta water resources is much more complex:

> Healthy ecosystems provide significant value to California's economy, partially and sometimes fully offsetting their costs to traditional economic sectors. Direct benefits include improvements in recreation, commercial fishing, and drinking and agricultural water quality, and indirect benefits include improvement in the quality of life in California. [21]

In its December, 2010 publication entitled *Guidelines for Preparing Economic Analyses (Guidelines)* the EPA updated best practices for the third time since the guideline's initial publication in 1983. [22] This most recent update includes detailed recommendations on identifying and describing baseline conditions that would exist with and without a proposed policy revision or regulation, along with an expanded description of the methods used to define and quantify the ecological benefits of projects and policies that protect natural resources.

In analyzing conditions in the Bay-Delta at present, it is clear that insufficient resources exist to satisfy all the demands on Bay-Delta water resources for goods and services. When water is used to produce one set of goods and services, demands for other must go unmet. Understanding this demand competition and balancing opposing needs is an essential task of the DSC. These demands include:

1. Competition for agricultural, municipal, industrial and hydroelectric supply that are economically important to public and private enterprises and households. There is potential for these demands to adversely impact other commercial uses like commercial and guided sport fishing.
2. Quality-of-life demands like aesthetic and recreational values that can increase economic well-being by enabling individuals to live in a place that offers recreational opportunities, pleasant scenery, wildlife viewing and other amenities considered important. These quality-of-life issues can raise property values and demand for commercial products.[23] In fact, differences in quality of life explain about half the interstate variation in job growth during periods of economic growth.[24]
3. Environmental demands associated with economic values that do not necessarily entail a conscious, explicit use of ecosystem goods and services. Environmental

[21] Hanak, Ellen et al. 2010 (PPIC 2010). "Myths of California Water—Implications and Reality." *West- Northwest*, Vol. 16, No. 1, Winter. p 20-22.

[22] National Center for Environmental Economics. 2010. *Guidelines for Preparing Economic Analyses. U.S. Environmental Protection Agency*. EPA 240-R-10-001. December.

[23] Roback, J. 1982. "Wages, Rents, and the Quality of Life." *Journal of Political Economy* 90: 1257-1278; 1988. "Wages, Rents, and Amenities: Differences among Workers and Regions." *Economic Inquiry* 26: 23-41.

[24] Partridge, M. and D. Rickman. 2003. "The Waxing and Waning of Regional Economies: The Chicken-Egg Question of Jobs Versus People." *Journal of Urban Economics* 53: 76-97.

values increase as people learn more about the environment, the services it provides, and environmental degradation.[25] These include:

a. Non-use values and values of goods and services that generally go unrecognized. Non-use values arise whenever people place a value on maintaining some aspect of the environment, even though they do not use it. For example, studies have shown that regardless of direct interaction with salmon populations, many Californians hold a positive willingness to pay to ensure the long-term survival of salmon.[26]
b. Ecosystem services that provided benefits that people generally consume without being aware of them. Some of these maintain the web of life. Others, such as the ability of wetlands to purify water and mitigate flood damage or water that dilutes wastes and maintains water quality have a more direct link to the well-being of California residents. Scientists and economists believe these services have great economic value, even though people are generally unaware of their importance.[27]

While quality of life and environmental values are typically harder to measure than commercial values, this does not diminish their value or impact on jobs and incomes. Rather, the difficulty in measuring environmental values merely reflects the lack of tools for measuring them. One of the challenges the DSC faces is identifying, describing, evaluating and balancing the full range of benefits and costs of the competing demands for Bay-Delta water resources. It is in this area where the lack of a quality water availability analysis renders a BAC infeasible.

The DSC's Failure to Analyze Changing Hydrology Invalidates its Analysis of Effects on the Bay-Delta

The DPEIR fails to use the latest information on changing hydrology in the Delta watershed, thereby invalidating its "no project" assessment. The California Legislature recognized in 2006 legislation (AB 32) that "[g]lobal warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California," including a "reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems." (Health & Saf. Code, § 38501(a).) The Legislature went on to list multiple uses of water it expects to be reduced or threatened by global warming, including the quality and supply of water from Sierra snowpack, hydropower generation, the protection of recreational uses, fisheries, marine life, and public health. Health & Saf. Code, § 38501(b). The "harms associated with climate change are serious and well recognized," (*Massachusetts v. Environmental Protection Agency* (2007) 127 S. Ct. 1438, 1455) and yet climate change goes virtually unmentioned in the PDEIR's discussion of the program, its potential facilities, and the existing environmental setting. The no-project

[25] Blomquist, G.C. and D.R. Johnson. 1998. "Resource Quality Information and Validity of Willingness to Pay in Contingent Valuation." *Resource and Energy Economics* 20:179-196.

[26] Loomis, J., T. Brown, and J. Bergstrom. 2007. "Defining, Valuing, and Providing Ecosystem Goods and Services," *Natural Resources Journal* 47: 329-376.

[27] Daily, G.C. (ed). 1997. *Nature's Services: Societal Dependence on Natural Ecosystems*. Washington, D.C.: Island Press.

assessment never calculates the foreseeable consequences of climate change on program operations. These effects must be properly recognized and analyzed by the DPEIR.

Failure to analyze the foreseeable consequences of climate change violates the requirements of CEQA. In *Communities for a Better Environment v. City of Richmond* [*City of Richmond*] (2010) 184 Cal.App.4th 70, 85), the court set aside the EIR for a refinery project partly because it lacked "any objective quantification" of factors to the project that directly impacted GHG emissions, which the court found made some of the conclusions "meaningless." The "difficulties caused by evolving technologies and scientific protocols do not justify a lead agency's failure to meet its responsibilities under CEQA by not even attempting to formulate a legally adequate mitigation plan." (*Id*. at p. 96.)

The CEQA deficiency in the present matter is even clearer than the deficiencies found by the court in *City of Richmond.* The deficiencies in the DPEIR do not simply involve the project's GHG contribution, but rather a question of whether foreseeable changes in climate must be studied to determine effects on the program's ability to provide water to multiple uses during its proposed one hundred year term. While not expected to foresee the unforeseeable, an agency must use its "best efforts to find out and disclose all that it reasonably can." (CEQA Guidelines § 15144; see also *City of Richmond*, 184 Cal.App.4th at p. 96; *Vineyard*, 40 Cal.4th at p. 428.) As in *Vineyard*, failure to provide the analysis omitted from the DPEIR would leave uncertain the program's long-term ability to furnish water to its referenced uses. (*Id.)* In this instance, the agency must first conduct a "thorough investigation" of climate change and support its proposed hydrology "by scientific or objective data." (*Berkeley Keep Jets Over the Bay Committee v. Board of Port Commissioners* [*Berkeley Keep Jets*] (2001) 91 Cal.App.4th 1344, 1370-71 (rejecting non-analysis of air quality problem even where no universally-accepted protocol yet existed).) The DSC DPEIR should include climate data available to its sister agencies, such as DWR's *California Water Plan Update, 2005*. This report finds that "evaluating impacts of global climate change on the management of the SWP can be done with existing resources" and that "state government must help predict and prepare for the effects of global climate change on our water resources and water management systems." (Maurice Roos, *Accounting for Climate Change*, in DWR, *Water Plan 2005*, appendix 4.) This DWR report surveys the "large number of potential effects on California water resources infrastructure due to global warming." (*Id.* at p. 4-616.) While the EIR notes its reference to some uncertainty, that uncertainty is "primarily on the degree of change to be expected," and that the report found that "[r]esponsible planning requires that the California planning community work with climate scientists and others to reduce these uncertainties and to begin to prepare for those impacts that are well understood, already appearing as trends, or likely to appear." (Roos, *op cit.*, at 4-612.)

Clearly, data exists regarding the potential impacts of global climate change on the Bay-Delta. The 2005 Roos report helps illuminate just how climate change is likely to affect DSC program facilities operation. It refers to "new and updated temperature modeling" being developed for Oroville relicensing, and states that "a logical extension would be to apply the new temperature models to evaluate the affect [*sic*] of a changed climate and runoff scenario, *beginning with Lake Oroville and the Feather River*." (*Id.* at p. 4-616 (emphasis added).) Roos also finds that "[i]t is time to try to *quantify the effects of projected climate change on California's water resources*." (*Id.* at p. 4-625 (emphasis added).[28]

[28] *See also Progress on Incorporating Climate Change into Management of California's Water Resources* (*Progress 2006*,) for examples of "incorporating climate change into existing water resources planning management

In *Progress on Incorporating Climate Change into Management of California's Water Resources (Progress 2006)*, the authors describe how the loss of the State's snowpack will affect the operation of most major multipurpose reservoirs at low and mid-elevations in the Sierra. *Progress 2006,* at 2-31; *see also id.* at 6-31 to 6-33 (discussing changing flood risks in the Feather River Basin). The report warns that climate change will increase water temperatures, which in turn will "pose a threat to aquatic species that are sensitive to temperature, including anadromous fish. Increased water temperatures will also cause decreased dissolved oxygen concentrations in water and other water quality changes, and will likely increase production of algae and some aquatic weeds." *Id.* at 2-60. For example, the expected consequences of the first impact, "reduction of the State's average annual snowpack," are "[p]otential loss of *5 million acre-feet or more* of annual average water storage in the State's snowpack," and "*increased challenges for reservoir management* and balancing the competing concerns of flood protection and water supply." *Id.* (emphasis added).

The failure of the DPEIR to disclose and analyze potential climate change effects on the hydrology upon which the Delta Plan relies is stunningly incompetent. This omission makes it impossible for the public and the decision-makers to evaluate the alternatives, the mitigations, and the true nature of the environmental impacts of the proposed DSC program, all of which are violations of CEQA's fair disclosure requirements. This shortcoming manifests itself throughout the portions of the document that describe the Plan's "policies" and "recommendations." Of these two categories, only "policies" create binding obligations; "recommendations" merely suggest ideas to other actors for their contemplation. (Delta Plan at pp. 53-54.) Hence, the likelihood of the Plan's success as a "legally enforceable" document for the "comprehensive, long-term management [of] the Delta" (Wat. Code §§ 85000(c), 85059) must be judged by analyzing its policies alone since there is no certainty whatsoever that any of the "recommendations" will be heeded.

Within the Plan's twelve policies, there is scant substance that advances the Legislature's goals beyond preexisting laws and strategies. Most of the policies repeat existing requirements, demand the drafting of studies or plans that will inform further actions, or allow for unfettered wiggle room by setting standards based not on numeric targets, but solely on "feasibility" or "appropriateness." This lack of substance is far from sufficient to ensure the provision of a more reliable water supply for California and the protection, restoration, and enhancement of the Delta. In adopting such policies, the Plan also ignores the Legislature's direction that the Plan should "[i]nclude quantified or otherwise measurable targets associated with achieving the [Plan's] objectives" and "[b]e based on the best available scientific information." (Wat. Code § 85308.)

CEQA Standards Are Not Met in The DPEIR

As discussed above, a state lead agency is required to prepare an EIR for each discretionary project that *may* have a significant effect on the environment. (Pub. Resources Code, §§ 21080, subd. (d),21100, subd. (a).) The CEQA Guidelines describe a number of advantages to preparation of a program EIR, such as: (1) providing "for a more exhaustive

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tools and methodologies." (In this respect, compare *PCL v. DWR*, 89 Cal.App.4th at p. 919 (EIR violated CEQA's information disclosure requirements by refusing to forecast based on simulation models DWR used elsewhere).

consideration of effects and alternatives than would be practical in an EIR on an individual action;" (2) ensuring full consideration of cumulative impacts; (3) avoiding "duplicative reconsideration of basic policy considerations;" and (4) allowing for consideration of "broad policy alternatives and program wide mitigation measures at an early time when the agency has greater flexibility to deal with basic problems or cumulative impacts." (*Id*., § 15168, subd. (b).) Therefore, prior to an approval of the Delta Plan, the DSC must ensure that the significant environmental effects of the plan are avoided or mitigated to a level of insignificance whenever feasible. (Pub. Resources Code, §§ 21002, 21002.1, subd. (b).) CEQA provides that the DSC should not approve the Delta Plan "if there are feasible alternatives or feasible mitigation measures which would substantially lessen the significant environmental effects of" the plan. (*Id.*, § 21002; see also Cal. Code Regs., tit. 14, §§ 15021, subd. (a)(2), 15092, subd. (b)(2)(A).)

Prior to approving the Delta Plan, the DSC must consider the final EIR and make one or more of the following three findings with respect to *each* significant effect identified in the EIR:

1. Changes or alterations have been required in, or incorporated into, the project which mitigate or avoid the significant effects on the environment;
2. Changes or alterations that are within another agency's responsibility or jurisdiction have been, or can and should be, adopted by that other agency; or 3) Specific economic, legal, social, technological or other considerations make infeasible the mitigation measures or alternatives identified in the EIR and specific overriding economic, legal, social or technological benefits of the project outweigh its significant environmental effects. (Pub. Resources Code, § 21081, subds. (a)(1)-(3) and (b); Cal. Code Regs., tit. 14, §§ 15004. subd. (a), 15043, 15091, subd. (a), 15093, subd. (a).) These findings must be supported by substantial evidence in the record. (Pub. Resources Code, § 21081.5; Cal. Code Regs., tit. 14, §15091, subd. (b), 15093, subd. (b).) Finally, if the Council has required implementation of mitigation measures in its findings, it also must adopt a mitigation reporting or monitoring program pursuant to Public Resources Code section 21081.6 and Guidelines section 15097. (See Cal. Code Regs., tit. 14, § 15091, subd. (d).)

None of these requirements are met in the DPEIR.

Ambiguities and Lack of Crucial Data in the DPEIR Prevent An Objective Assessment of Whether the Project and its Alternatives Can Accomplish the Asserted Objectives

A. The EIR Fails to Meet the Purposes of a Program EIR.

Using a program EIR affords a lead agency no cover for a CEQA document that "does not provide decision-makers, and the public, with the information about the project required by CEQA." (*Planning and Conservation League v. Department of Water Resources* (2000) 83 Cal.App.4th 892, 916.) A program EIR cannot rationalize vague or evasive analysis. The CEQA guidelines' list of "advantages" to preparing a program EIR include a "more exhaustive" examination of effects and alternatives, "full consideration" of cumulative impacts, and allowance for analysis of "broad policy alternatives and program wide mitigation measures" at a time when the lead agency has the best opportunity to address them properly. (Cal. Code Regs., tit. 14, § 15168(b).)

The DPEIR utterly fails to meet these standards. The groups incorporate by this reference the comments filed by the firm of Rossmann & Moore on this point. As they point out, the DSC cannot assert that the Delta Plan does not "analyze the operation of present or foreseeable future operations of the export projects in the Delta so how can the DSC determine "consistency" with the proposed Delta Plan.

B. The EIR Evades a Genuine Comparison Between the Project and Alternatives

"[An] EIR may not define a purpose for a project and then remove from consideration those matters necessary to the assessment whether the purpose can be achieved." (*County of Inyo v. City of Los Angeles* (1981) 124 Cal.App.3d 1, 9.) But that is precisely what occurs in the Draft EIR.

The Draft EIR identifies the Delta Plan as a "legally enforceable, comprehensive management plan for the Sacramento–San Joaquin Delta and the Suisun Marsh (Delta) that *achieves the coequal goals and all of the inherent subgoals and objectives, as described in Section 1*." (DPEIR at p. 2A-1.) The Plan and EIR are the source of information for "cities, counties, and State, federal, and local agencies to restore the Delta ecosystem and provide a more reliable water supply for California." (*Id.*) However, the DPEIR fails entirely to serve as the basis for a genuine comparison between the project and its alternatives, making the reader unable to determine even whether the plan, much less its alternatives, can feasibly accomplish these objectives.

First, the EIR's definition of the "project" itself is fraught with ambiguities. For example, it leaves uncertain whether, and under what circumstances, the "applicant-driven" BDCP will become part of the Plan and therefore be incorporated into consistency determinations. Additionally, key words that are essential to understanding the contours of the project remain undefined, most notably the "reliability" of water supplies.

Second, through a combination of euphemisms and evasive statements, the DPEIR avoids confronting critical water supply difficulties that are likely to undermine the DPEIR's assumption that the "coequal goals" can be simultaneously achieved. The lengthy analysis of water supply, for instance, barely addresses the State Board's Delta flow recommendations. These recommendations underscore the imperative to reduce water exports to sustain the Delta's ecosystem, as well as beneficial uses and public trust values. The State Board recommended flow criteria to protect these values in August 2010: "Recent Delta flows are insufficient to support native Delta fishes for today's habitats…." In order to preserve the attributes of a natural variable system to which native fish species are adapted, many of the criteria developed by the State Board are crafted as percentages of natural or unimpaired flows. These criteria include:

- 75% of unimpaired Delta outflow from January through June;
- 75% of unimpaired Sacramento River inflow from November through June; and
- 60% of unimpaired San Joaquin River inflow from February through June."[29]

Moreover, testimony from environmentalists and water suppliers in the flow proceedings reveal a depth of conflict barely addressed in the DPEIR, and the still-unresolved history of

[29] Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem, State Water Resources Control Board, Aug. 3, 2010, p. 5, *available at* http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow.

controversy over the Monterey Amendments and the Kern Water Bank is not even discussed in the DPEIR's water analysis.

Third, as persuasively detailed in the comment letters of the California Environmental Water Caucus and this document, the DPEIR undermines any fair comparison between the project and Alternative 2. It does so by (1) misattributing key project elements to Alternative 2; (2) assigning to the proposed project an illusory advantage based upon retirement of drainage-impaired land; and (3) failing to ascribe to Alternative 2 significant environmental advantages likely to stem from the retirement of that land.

Finally, having recognized that global climate change is likely to have an enormous impact on future water supply (including a 4.5 to 6 million acre-foot reduction in snowpack), the EIR inconsistently applies that insight. Incredibly, the EIR cites climate change in its discussion of the disadvantages of Alternative 2 (due to its additional "facilities") but fails to apply climate change concerns to the Delta Plan's core issue: whether sufficient water supply will exist to serve the "reliability" component without severely compromising the Plan's ability to protect the "paramount concern" of enabling "permanent protection" of the Delta's resources. (Wat. Code § 85022(c)(2).) This failure also makes it impossible for the DPEIR to evaluate alternatives, potential mitigations, or to provide the disclosure necessary to allow the public and the DSC decision-makers to evaluate the effectiveness of the proposed Delta Plan.

Environmental Setting as Established in the Delta Reform Act

The 2009 legislation described the current environmental setting in the Delta as follows:

> The Delta is a critically important natural resource for California and the nation. It serves Californians concurrently as both the hub of the California water system and the most valuable estuary and wetland ecosystem on the west coast of North and South America. (Water Code Section 85002)
>
> The Delta is a distinct and valuable natural resource of vital and enduring interest to all the people and exists as a delicately balanced estuary and wetland ecosystem of hemispheric importance. (Water Code Section 85022(c) (1))…
>
> (a) The Sacramento-San Joaquin Delta watershed and California's water infrastructure are in crisis and existing Delta policies are not sustainable. Resolving the crisis requires fundamental reorganization of the state's management of Delta watershed resources.
>
> (b) In response to the Delta crisis, the Legislature and the Governor required development of a new long-term strategic vision for managing the Delta. The Governor appointed a Blue Ribbon Task Force to recommend a new "Delta Vision Strategic Plan" to his cabinet committee, which, in turn, made recommendations for a Delta Vision to the Governor and the Legislature on January 3, 2009.

(c) By enacting this division, it is the intent of the Legislature to provide for the
sustainable management of the Sacramento-San Joaquin Delta ecosystem, to provide for a more reliable water supply for the state, to protect and enhance the quality of water supply from the Delta, and to establish a governance structure that will direct efforts across state agencies to develop a legally enforceable Delta Plan.

85001.

For the reasons stated below, the DSC plan has not adequately disclosed existing data in the possession of the DSC and other state and federal agencies, nor has the DPEIR addressed the policies that the Legislature enacted in the Delta Reform Act to govern the DSC plan.

Legal Standards of the Delta Reform Act

A. The 12 policies, along with the 61 recommendations that make up the Delta Plan, utterly fail to comply with the Delta Reform Act.

Rather than repeat comments on this subject that you will receive from others, the groups incorporate by this reference the discussion contained in the comment letter by the office of Rossmann & Moore, Section 1, pointing out the inadequacy of the 12 Policies in the Plan and DPEIR in meeting the standards, listed below, that were established by the Legislature for the DSC to actually use in developing its mandatory Delta Plan. Water Code § 85302 states that "[t]he Delta Plan shall include measures that promote all of the following characteristics of a healthy Delta ecosystem":

(1) Viable populations of native resident and migratory species.
(2) Functional corridors for migratory species.
(3) Diverse and biologically appropriate habitats and ecosystem processes.
(4) Reduced threats and stresses on the Delta ecosystem.
(5) Conditions conducive to meeting or exceeding the goals in existing species recovery plans and state and federal goals with respect to doubling salmon populations.

(d) The Delta Plan shall include measures to promote a more reliable water supply that address all of the following:
(1) Meeting the needs for reasonable and beneficial uses of water.
(2) Sustaining the economic vitality of the state.
(3) Improving water quality to protect human health and the environment.

(e) The following subgoals and strategies for restoring a healthy ecosystem shall be included in the Delta Plan:
(1) Restore large areas of interconnected habitats within the Delta and its watershed by 2100.
(2) Establish migratory corridors for fish, birds, and other animals along selected Delta river channels.
(3) Promote self-sustaining, diverse populations of native and valued species by reducing the risk of take and harm from invasive species.
(4) Restore Delta flows and channels to support a healthy estuary and other ecosystems.

(5) Improve water quality to meet drinking water, agriculture, and ecosystem long-term goals.
(6) Restore habitat necessary to avoid a net loss of migratory bird habitat and, where feasible, increase migratory bird habitat to promote viable populations of migratory birds.

Water Code § 85302 (c) – (e)

Unless the Plan's unenforceable recommendations are converted into enforceable policies, the Plan will fail to uphold its statutory purpose. In its current state, the Plan will likely fail, and yet this the DPEIR does not factor this failure into its analysis. For example, forty plus years after the enactment of the federal Clean Water Act and Porter Cologne, virtually every significant water body in the Central Valley, including the entire Delta, is identified as "impaired" and incapable of supporting identified beneficial uses because of multiple pollutants. With the exception of several legacy pollutants, these impairments exist because the chronically understaffed agencies charged with implementing water quality statutes have been unwilling or unable to carry out their mandated responsibilities. Despite the serious and broadly recognized impacts that deteriorating water quality poses to the viability of the Bay-Delta, the plan and the DPEIR call for no new, meaningful actions to address this threat. Rather, the plan and the DPEIR simply reiterate existing efforts and already-planned initiatives that, to succeed, would require understaffed agencies to accomplish measures they have been unable or unwilling to do over the last 30 years. In analyzing the Plan, the DPEIR simply acknowledges the impairment problem and then blithely ignores it.

The DPEIR is similarly superficial in its discussion on water supply reliability. The Proposed Project does not require specific water reliability projects - rather it contains broad requirements and recommendations. Given both the general nature of the Proposed Project policies and recommendations and the uncertainty concerning the extent to which the Proposed Project will result in any particular action, it is unclear what types of projects will actually be implemented as a result of the Proposed Project policies and recommendations. Yet despite this uncertainty, this DPEIR asserts that the Proposed Project will lead to an increase in local and regional water reliability projects. (DPEIR at p. 2A-6.) The logic of this assertion is untenable, because DSC has no authority over many of the projects that would lead to increased storage facilities, and therefore cannot contend that Proposed Project recommendations regarding storage will lead to an increase in water storage projects. These are just two examples of the utter legal failure of the Draft Plan and the DPEIR to disclose, analyze, and mitigate the existing problems in past governance, enforcement, and management by state and federal agencies that lead to the passage of the Delta Reform Act. We list and comment upon many more such failures in this letter in the Specific Comments Section, below.

B. <u>The Ecological Crisis In The Delta Is Not Adequately Analyzed In The DPEIR</u>

The text of Water Code section 85001 holds that:

a) The Sacramento-San Joaquin Delta watershed and California's water infrastructure are in crisis and existing Delta policies are not sustainable. Resolving the crisis requires fundamental reorganization of the state's management of Delta watershed resources.
b) In response to the Delta crisis, the Legislature and the Governor required development of a new long-term strategic vision for managing the Delta. The Governor appointed a Blue

Ribbon Task Force to recommend a new "Delta Vision Strategic Plan" to his cabinet committee, which, in turn, made recommendations for a Delta Vision to the Governor and the Legislature on January 3, 2009.

c) By enacting this division, it is the intent of the Legislature to provide for the sustainable management of the Sacramento-San Joaquin Delta ecosystem, to provide for a more reliable water supply for the state, to protect and enhance the quality of water supply from the Delta, and to establish a governance structure that will direct efforts across state agencies to develop a legally enforceable Delta Plan.

The objectives of the Delta Plan are defined by the coequal goals, and policy objectives presented in Water Code sections 85054, 85020, 85021, 85022(c), and 85023. “Coequal goals” means the two goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place. (Water Code section 85054.) The policy of the State of California is to achieve the following objectives that the Legislature declares are inherent in the coequal goals for management of the Delta:

a) Manage the Delta's water and environmental resources and the water resources of the state over the long term.
b) Protect and enhance the unique cultural, recreational, and agricultural values of the California Delta as an evolving place.
c) Restore the Delta ecosystem, including its fisheries and wildlife, as the heart of a healthy estuary and wetland ecosystem.
d) Promote statewide water conservation, water use efficiency, and sustainable water use.
e) Improve water quality to protect human health and the environment consistent with achieving water quality objectives in the Delta.
f) Improve the water conveyance system and expand statewide water storage.
g) Reduce risks to people, property, and state interests in the Delta by effective emergency preparedness, appropriate land uses, and investments in flood protection.
h) Establish a new governance structure with the authority, responsibility, accountability, scientific support, and adequate and secure funding to achieve these objectives.

Water Code section 85020.

Populations of Sacramento River and Delta native pelagic and salmonid fisheries and their associated food webs are collapsing. This is not surprising when the estuary has systematically been deprived of half of its water flow, its critical habitat has been reduced, variability has been eliminated, and the hydrograph turned on its head. The destruction of native pelagic and salmonid fisheries in the Delta are especially vulnerable to such dramatic degradation due to their slow pace of evolution over several millennia.

The historical collapse of fisheries in the Central Valley is amply documented. In 1978, following a long formal evidentiary hearing and in a moment of remarkable candor, the State Water Board found that “full mitigation of project impacts on all fishery species now would

require the virtual shutting down of the project export pumps."[30] In 1988, following another extensive evidentiary hearing, the State Water Board acknowledged, "a safe level of exports is not known."[31] Indeed, the Board's 1988 draft order found that "optimal water quality objectives" for shad and striped bass larvae and salmon smolt survival in the Delta would require the prohibition of all exports between April 1 through November 30, in all types of water years.[32] By 1991:

1. Adult fall-run Sacramento River salmon escapement had been halved from its numbers in the late 1960s
2. Spring-run Sacramento river salmon abundance was about 0.5% of historic runs
3. The San Joaquin River fall-run salmon escapement dropped from 70,000 in 1985 to 430 in 1991
4. The 1985 level of Delta smelt abundance was 80% lower than the 1967-1982 average population
5. Adult striped bass declined from about 3 million (early 1960s) to 1.7 million (late 1960s) to approximately 590,000 (1990)
6. Abundances of shrimp and rotifers declined between 67% and 90% in the 1970s and 1980s
7. White catfish populations severely declined since the mid-1970s and overall fish abundance in Suisun Marsh has been reduced by 90% since 1980.[33]

Fisheries collapse over the last decade has accelerated. The Department of Fish and Game's (DFG) Fall Midwater Trawl indices for 2009 reveal that young striped bass, Delta smelt, splittail and threadfin shad are at record historical lows and that longfin smelt and American shad are at the second and third lowest level of record, respectively.[34] Salmonids have fared as poorly as pelagic species. Sacramento River fall-run Chinook salmon, numbering some 750,000 in 2002, dropped to 90,000 in 2007 to 66,264 in 2008 and to a dismal new low of 39,530 in 2009. In response, the Pacific Fisheries Management Council and the Fish and Game Commission closed the ocean and coastal fishery to commercial and recreational fishing for the 2008 fishing season and the Commission banned salmon fishing in all Central Valley Rivers, with the exception of limited fishing on a stretch of the Sacramento River. The ban on all salmon fishing was extended through the 2009 season but eased somewhat for 2010.[35]

While the causes of fishery declines are numerous, including contaminants and invasive species, the major factors in their decline are the significant reductions in Delta inflow and outflow. These reductions have caused extensive changes in the historic hydrograph of the Delta, resulting in loss and degradation of habitat that is so significant that the habitat is on the point of collapse. Central Valley Project and State Water Project pumps seasonally export up to 65% of inflow. In 10 of the last 20 years, more than 50% of total freshwater inflow has been diverted from tributary rivers or from the Delta. Sacramento Basin inflow has been reduced and the Delta's annual freshwater outflow has been reduced, especially in the critical fall and spring periods. Both exports and reverse Old and Middle River flows have increased over the last

[30] SWRCB. 1978. D-1485. Page 13.
[31] SWRCB. 1988. Draft 1988 Water Quality Control Plan for Salinity, 7.3.2.5. Pages 7-32.
[32] Ibid. Table 5-4-1. Page 5-110.
[33] SWRCB. 1992. Draft Water Right Decision 1630. Page 29.
[34] DFG. 2010. Fall Midwater Trawl. 3 pages.
[35] SWRCB. 2010. Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem. 3 August 2010. Page 39.

decade.[36]

The California Legislature, in the Delta Reform Act, (as specified above) tasked the SWRCB to gather the best available science and develop flow criteria for the Delta ecosystem necessary to protect public trust resources, including the volume, quality, and timing of water needed under different conditions. The SWRCB conducted a proceeding in the matter. An astonishing assemblage of biologists and scientists from resource and water agencies, academia and the NGO community testified and presented evidence in the hearing. A final report was issued on August 3, 2010. The report observes that "[t]he combined effects of water exports and upstream diversions reduced average annual net outflow from the Delta from unimpaired conditions by 33% and 48% during the 1948 – 1968 and 1986 – 2005 periods, respectively and that Sacramento River inflows over the last 18 to 22 years have been about 50% on average between April through June compared to unimpaired conditions. [37] The report determined that "[r]ecent Delta flows are insufficient to support native Delta fishes for today's habitats." The report's criteria for flows include, among many other measures, "75% of unimpaired Delta outflow from January through June and 75% of unimpaired Sacramento River inflow from November through June."[38] Existing water criteria fails to address many issues that must be considered in considering impacts on aquatic life. For example, during the SWRCB's Delta flow hearing, Dr. G. Fred Lee pointed out that:

> The current US EPA criteria development approach only considers some and in some cases a small part of the impacts of chemical contaminates on aquatic life. For example, the approach currently used to develop water quality criteria does not include additive/synergistic properties of regulated chemicals that occur in concentration below the water quality criteria allowing unanticipated adverse impacts to aquatic life. Adverse impacts of chemicals to aquatic life that occur for especially sensitive species, such as zooplankton which serve as fish food organism were not included in the development of the water quality criteria. These criteria are only applicable to protecting about 90% of the species. Therefore there could readily be fish species in the Delta and its tributaries that are more sensitive to a chemical than those used to establish the water quality criterion value. There is also very limited information on chronic exposure to sub-lethal impacts of a chemical and mixtures of chemicals to fish populations. Another issue is that other stressor such as low DO, ammonia etc. that can impact the lethal and especially sub-lethal impacts of chemicals. It has been well known for over 40 years through biomarker studies that fish and other organisms show organism biochemical responses to chemical exposures at concentrations well below the water quality criterion. The significance of these biomarker responses to an organism or group of organisms is largely unknown. Chemicals can adversely impact the health of the fish and other aquatic life that weaken their ability to resist adverse impact of stressors such as low DO, elevated

[36] Swanson, C. 2010. Presentation to NRC Committee of Sustainable Water and Environmental Management in the California Bay-Delta. 26 January 2010. 18 slides.

[37] SWRCB. 2010. Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem. 3 August 2010. 3.3.2, page 28.

[38] Ibid. 1.2 Summary Determinations, Flow Criteria and Conclusions, page 5.

> temperature and predation as well to disease. It's been known for over 40 years that very low levels of copper affect the "breathing" rate of some fish.[39]

Dr. Lee went on to point out, "many thousands of unregulated chemicals, including pharmaceuticals and personal care products, industrial chemicals, and other potentially hazardous chemicals, are discharged to waterways, including the Delta and its tributaries, in domestic wastewaters, agricultural runoff and waste waters."[40]

This data, and other volumes of relevant evidence are largely ignored or downplayed by the Delta Plan and the DPEIR. Relevant evidence necessary to determine whether or not the proposed Delta Plan and the alternative examined would arrest this dire situation, and whether mitigations could bring these impacts below a state of significance are not included. This is a CEQA failure of huge magnitude.

<u>The DPEIR Fails to Adequately Address State Policy to Reduce Reliance on the Delta</u>

The policy of the State of California is to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. (Water Code section 85021.) Each region that depends on water from the Delta watershed shall improve its regional self-reliance for water through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts. (Id.) The Legislature finds and declares all of the following:

> (1) The Delta is a distinct and valuable natural resource of vital and enduring interest to all the people and exists as a delicately balanced estuary and wetland ecosystem of hemispheric importance.
> (2) The permanent protection of the Delta's natural and scenic resources is the *paramount* concern to present and future residents of the state and nation.
> (3) To promote the public safety, health, and welfare, and to protect public and private property, wildlife, fisheries, and the natural environment, it is necessary to protect and enhance the ecosystem of the Delta and prevent its further deterioration and destruction.
> (4) Existing developed uses, and future developments that are carefully planned and developed consistent with the policies of this division, are essential to the economic and social well-being of the people of this state and especially to persons living and working in the Delta.

Water Code section 85022 (c) (emphasis added).

The groups hereby incorporate, in so far as they are consistent with the views expressed in this document, the comments of the South Delta Water Agency prepared by John Herrick for this DPEIR process. As Mr. Herrick says: "What is needed is for the DPEIR to determine whether the DSC Plan has satisfied these laws is a detailed analysis of what water is produced in the relevant watersheds, what is necessary for environmental needs as described in the State

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[39] Ibid. Page 4.
[40] Ibid. Page 4.

Board's Flow Recommendations, what is needed by superior right holders and what is left over for export." As does the BDCP, the Delta Plan ignores the necessary first step of preparing a water availability analysis and so ends up simply encouraging others to find new supply projects without addressing the real problem. Such encouragement does not move us closer to a reliable water supply for present Delta users, it simply tells those who do not have enough water that they do not have enough water. Water users south of the Delta all know their supply is dependent at present on available yearly precipitation. The DSC needs to compare the State Board's flow recommendations, required by the Delta Reform Act, to the alternatives to determine whether any water is available to export. Alternative 2 was suggested by the Environmental Water Caucus because modeling showed that only 3,000,000 ac. ft. is available in wet years for export after the outflow required to restore the Delta estuary is reestablished. The other alternatives rely on "paper water" unavailable without unlawfully continuing the over-appropriation of the Delta estuary.

The Delta Plan ignores the paper water issue completely, thereby allowing the DPEIR to assume water for its alternatives. What is also needed before approving a Delta Plan is a resolution of the issue of whether the state and federal projects are able to export any water from the Delta when area of origin, in-Delta and environmental needs do not get their full supply. By not examining and addressing this issue, the DSC offers no reason (for example through the cost- benefit analysis process described above) that justifies the choice of any alternative other than Alternative 2. The other alternatives cannot meet the State Board's flow recommendations and the DPEIR does not provide any analysis that says they can meet the Plan requirements of the Delta Reform Act. This too violates CEQA.

There Has Been An Impermissible Deferral Of Analysis Of Legally Required Elements Of The Delta Plan

The Delta Reform Act includes references to two specific long-term milestones. The first reference is to *"Restore large areas of interconnected habitats within the Delta and its watershed by 2100."* (Water Code Section 85302(e)(1)) The second reference is to the incorporation of the Bay Delta Conservation Plan (BDCP) if the BDCP meets the requirements of Water Code sections 85320 and 85321. The BDCP's associated Natural Community Conservation Plan and Habitat Conservation Plan permits are anticipated to be for a 50-year period. If the Council finds that the BDCP meets the standards outlined in statute, the BDCP shall be included in the Delta Plan. If the Council determines that the BDCP fails to meet the statutory criteria listed in Water Code Sections 85320 and 85321, *"the BDCP shall not be incorporated into the Delta Plan and the public benefits associated with the BDCP shall not be eligible for state funding."* (Water Code Section 85320(b))

The DPEIR does not attempt to analyze the BDCP for consistency with the proposed Delta Plan; it instead attempts to develop a Plan without comparing the policies established by the Delta Reform Act and the extensive information already available about the BDCP and its proposed alternatives, including the 15,000 cubic feet per second canal or tunnel. Deferring evaluation of whether the DSC plan, including the BDCP, will be consistent with the Delta Reform Act will in large measure never happen if such a procedure is followed.

Specific Comments on the Delta Plan DPEIR

The following at the specific comments of the groups on the Delta Plan DPEIR:

Executive Summary (ES)-
The ES talks about ecosystem restoration, but nothing about actual restoration goals for the various species affected (ES-2). Delta as place enhancement talks nothing about Delta agriculture (ES-3). The document does not appear to compare the Proposed Project to Existing conditions or adequately describe existing conditions per CEQA Guidelines Sec 15126.6(e)(2)) (ES-4).

The EWC Alternative 2 seems to have been perverted to include agricultural drainage treatment facilities (ES 6- "It involves more facilities to treat and recycle wastewater and agricultural runoff.") like the ones being proposed for the Grasslands Bypass Project and Westlands. It includes less levee maintenance and upgrades and does not include return of the urban water preference in SWP contracts or return of the Kern Water Bank to state ownership (ES 6). The DPEIR notes that Alternative 2 would reduce toxic drainage in the Tulare Basin by retiring the 380,000 acres in the San Luis Unit, but fails to mention the San Joaquin basin and the Delta itself as benefitting from a reduction in selenium, salt, boron and other polluted discharges into the San Joaquin River from the Grasslands Bypass Project and other sources of pollution in that area (ES 8).

Introduction (Chapter 1)
The document says it is NEPA-compliant, even though it doesn't need to be. If it were, then there would be an economic component, which there is not (1-14). Section 1.3.1 (Current Conditions) is not identified as the actual description of the Existing Conditions from which all alternatives are to be compared. However Section 1.3.1 is referenced as Existing Conditions later in Chapter 2 (2A-85). Since the Existing Conditions alternative does not provide quantification of water supplies, water quality performance, percentage of fish or wildlife restoration goals met to date, or other resource areas normally evaluated in a Draft EIR, therefore there is a complete inability to actually compare the other alternatives to Existing Conditions. Dozens of environmental documents have been completed in recent years that clearly describe and quantify Existing Conditions and the No Project alternatives. There is no reason this DPEIR could not do so, but it does not.

Figure 1-1, Project Area (1-15) shows the Trinity River as part of the Project Area, but all of the subsequent analyses completely leave out impacts to the Trinity River, as if it is not plumbed to the CVP and the Delta and a source of water for environmental needs in the Delta or water exports. This is particularly important because Reclamation's Trinity River water permits from the SWRCB are inconsistent with the Trinity River Record of Decision (Trinity ROD) by 474,000 AF and Reclamation has stated that State Water Quality Objectives for the Trinity River approved by USEPA as Clean Water Act 303 standards are not permit requirements that they must comply with.[41] Impacts to the Trinity ROD are not mentioned anywhere in the analysis, nor is the fact that Trinity River Coho salmon (Southern Oregon/Northern California Coho) are listed as Threatened under both the federal ESA and CESA . See more about this subject below.

[41] See 2/23/11 letter from Acting CVP Operations Chief to Brian Person, Trinity Management Council at http://www.c-win.org/webfm_send/141.

Chapter 2 Project and Alternatives

(2A-18 lines 22-30) There are many recommendations and admonitions of activities that "should" occur in the 2003 Bulletin 118, but where are the facts of the success or failure of this DWR planning document?

- "[a]dditional local groundwater management plans should be developed to address groundwater storage and water quality, monitoring programs should be implemented, and local water supply agencies should work with local land use agencies to minimize future impacts on groundwater recharge capabilities."
- "[r]ecommended that DWR should identify groundwater basins or subbasins that have management plans, all agencies should improve data collection and analysis for all groundwater basins, and agencies that replace water sold for water transfers manage the groundwater in accordance with groundwater management plans.

How are the lofty goals highlighted above monitored not only for completion, but also for effectiveness? In an attempt to answer this question, it is essential to point out that there are many problems with local monitoring programs in the Sacramento Valley counties that truly leave management as merely a goal not a reality. Examples include:

- *Monitoring protocols of impacts to the region have not been developed.* Ken Loy, Hydrogeologist with *West Yost* Associates, explained during a December 16, 2011 groundwater workshop that impacts (such as subsidence and stream leakage) to the region will not occur in "real time" as the water is extracted from deep aquifers. He emphasized that impacts will occur over time, will be delayed, and persistent. Loy also explained that impacts will result from cumulative demands on the aquifer system. Since groundwater substitution transfers constitute a potentially large and new demand on the aquifer system, agencies that participate in such transfers have an increased responsibility to anticipate, monitor and mitigate injury that may result over time.

- Long term Impacts associated with regional use of the Tuscan aquifer formation will occur in the up-gradient recharge portion of the system. County ordinances and Basin Management Objectives (BMO) are being put forth by these Guidelines and by state/federal agencies as the primary, if not the only, mechanisms of monitoring and mitigating impacts associated with GW substitution exports. As BMO noncompliance levels are exceeded year after year in Butte and Glenn counties with no action in place to resume compliance with the basin objectives it is clear that BMOs and ordinances are not backed up by the political will or scientific specificity to manage aquifer resources. This local challenge is dwarfed by the inability of county efforts to manage a regional resource. Butte County staff clearly communicated this deficiency in the 2007 Needs Assessment for the Tuscan Aquifer Monitoring, Recharge, and Data Management Project as follows:

> "Each of the four counties that overlie the Lower Tuscan aquifer system has their own and separate regulatory structure relating to groundwater management. Tehama County, Colusa, and Butte Counties each have their own version of an export ordinance to protect the citizens from transfer-related third party impacts. Glenn County does not have an export ordinance because it relies on Basin Management Objectives (BMOs) to manage the groundwater resource, and

subsequently to protect third parties from transfer related impacts. Recently, Butte County also adopted a BMO type of groundwater management ordinance. Butte County, Tehama County and several irrigation districts in each of the four counties have adopted AB3030 groundwater management plans. All of these groundwater management activities were initiated prior to recognizing that a regional aquifer system exists that extends over more than one county and that certain activities in one county could adversely impact another. ***Clearly the current ordinances, AB3030 plans, and local BMO activities, which were intended for localized groundwater management, are not well suited for management of a regional groundwater resource like that theorized of the Lower Tuscan aquifer system."*** [emphasis added]

- Butte County's 2011 Basin Management Objectives report compares the quantity of groundwater to previous years, but does not assess the status of the streams or of the groundwater dependent vegetation. This is and has been a failure to comply with SB 1938, but the BMO report does not explicitly disclose this important fact. SB 1938 states, "The local agency shall adopt monitoring protocols that are designed to detect changes in... flow and quality of surface water caused by groundwater pumping in the basin."

We note in the DPEIR that it "also was recommended that Bulletin 118 be updated every 5 years; however, this has not occurred." DWR's failure to follow its own recommendation does not inspire confidence.

Chapter 2A Proposed Project and Alternatives

Section 2.1.2.1 states that regulatory actions of state agencies are exempt from being a "covered action" in the Delta Plan. It states that CESA permits by DFG are exempt. If that is the case, then the BDCP is an exempt action because it includes an NCCP that is a CESA permit. It's a rigged outcome, as there will be no opportunity to fight incorporation of BDCP into the Delta Plan, regardless of how bad it is (2A3). It goes on later to say "However, the underlying action requiring the take permit could be a covered action and, if it is, it must be consistent with the Delta Plan's policies. Therefore, even when a covered action is regulated by another agency (or agencies), the action still must be consistent with the Delta Plan." (2A4) Nonetheless, if that action is the BDCP and that's part of the Delta Plan, then it won't be a covered action and is not subject to review because the Delta Stewardship Council is required to adopt the BDCP if it meets certain statutory requirements. If and when the Peripheral Canal/Tunnel goes for permits, since the BDCP will be a part of the Delta Plan, it will be considered consistent, regardless of whether it actually is.

The Proposed Project is not much different from the No Action Alternative. It's generally a regurgitation of existing and in-process programs and plans. For instance, it includes a lot of the same projects that are ongoing anyway such as the Grasslands Bypass Project (GBP), CVRWQCB's new Drinking water policy, major water storage investigations, habitat restoration, CV-SALTS, etc. However, it's pretty vague on specifics. For instance it says less water will be exported from the Delta but doesn't say how much, nor does it say what the "existing condition" of such exports is, which is a matter of great debate since 2011 Delta exports set records. The Proposed Project does not state that BDCP's purpose and need is to deliver "full contract deliveries" to CVP and SWP contractors, which is a contradiction to the

Proposed Action that would reduce Delta deliveries to those same contractors. USEPA[42] and a coalition of EWC members[43] including C-WIN, CSPA and AquAlliance wrote to David Hayes stating concern with "full contract deliveries" and requesting that language be eliminated from the BDCP Purpose and Need. The response from David Hayes to the Coalition denied the request[44].

The Proposed Action really isn't a legitimate CEQA alternative and can't be defined in a number of areas, such as regulatory, other than to encourage the SWRCB to implement some sort of enforceable but undefined Bay –Delta Outflow Proceeding. It says nonsensical things for the TMDL section like "Selenium for the San Joaquin River, Grasslands, and Salt Slough is adopted" (2A-43) but fails to mention that Basin Plan water quality objectives for selenium are not enforced in Mud Slough and portions of the San Joaquin River and won't be until 2020, and then it will probably be extended again. It just assumes projects such as the GBP will ultimately be successful, which is very questionable for most if not all of the regulatory programs that it lists as under or similar to the Proposed Action (2A42-43). It goes on further to say that funding may limit any progress on improving water quality (2A43), thereby reducing expectations of any progress in water quality.

Despite statements like that, the Delta as Place portion of the Proposed Project talks optimistically about more state parks and recreational facilities at a time when many California State parks are scheduled for closure due to budget constraints. Basically the fluff is puffed up with positive expectations that can't be met (Delta parks and recreational facilities) and the substantial issues (enforcement of water quality laws) are watered down with reduced expectations due to lack of funding.

The document tries to avoid talking about a peripheral canal (PC) or tunnel and instead talks generally about new "conveyance" and uses the example of the North Bay Alternative Aqueduct Project, claiming that "Conveyance facilities also could be used to develop a new intake/diversion location in an area that has higher water quality or reduces adverse impact to the aquatic habitat compared to existing intake/diversion facilities. This type of conveyance project is being considered…" (2A-43). But what if the project improves water quality for exporters but harms in delta users and the aquatic habitat like a PC that increases diversions? There is no discussion of the PC's potential impact of further impairing water quality due to increased residence time and concentration of pollutants in Delta because most of the fresh water will be removed from the Sacramento River. Similar to BDCP it tries to portray the PC as a good thing for the environment by not disclosing negative impacts, or in this case, not even describing what "conveyance" actually is. Since the BDCP is required to be incorporated into the Delta Plan (if it meets certain requirements), this DPEIR should disclose what it is likely to be, even if it's not finalized. Restatement of the BDCP Purpose and Need to meet "full contract deliveries" would be a big first step toward disclosure.

Section 2.2.3.1.7- Agricultural Treatment Facilities (2A-45) contains erroneous information. It says land was retired to reduce pollution when actually land was retired because it was too

[42] EPA June 10, 2010 Letter from Alexis Strauss and Enrique Manzanilla to D. Glaser, R McInnis and R. Lohoefener. RE Purpose Statement for Bay Delta Conservation Plan (BDCP) see: http://www.epa.gov/region9/water/watershed/pdf/EpaR9Comments-BdcpPurpose-ExportPolicy.pdf
[43] http://www.c-win.org/webfm_send/163
[44] Letter from David Hayes to Tom Stokely, C-WIN, August 5, 2011. See: http://www.c-win.org/webfm_send/201

salted up with high groundwater (boron too), making it impossible to farm. As far as selenium goes, it does not limit agricultural production, but salt and boron do. The DPEIR talks about land fallowing but fails to mention the CVPIA land retirement program and its status (which is basically dead except for the 100,000 acres that have already been retired through various programs). The DPEIR fails to mention the $2.7 billion San Luis Drainage Feature Re-evaluation EIS and ROD from 2007 (SLDFR) and basically says that "It is not known at this time what types of actions would be implemented to reduce water quality effects of agricultural practices." The document completely skirts making any commitments or description of alternatives to resolve the selenium problems and even fails to mention the latest wish/hope technology- reverse osmosis and bio-treatment. It even suggests groundwater injection of treated saline pollution, which was taken off the table as a viable alternative through SLDFR years ago. It just says that some alternatives may be implemented in the future (or may not). The DPEIR is not even current on what is going on with drainage from toxic lands.

Section 2.2.4.1 to 2.2.4.4- Overview of Flood Risk Reduction (2A-46) The DPEIR talks extensively about existing and proposed Delta Levee and Floodplain improvement projects but really doesn't provide any quantitative or qualitative discussion of the differences between No Action and the Proposed Project, let alone the differences between Existing Conditions and No Action. The Proposed Project is supposed to be compared to Existing Conditions (CEQA Guidelines Section 15126.6(e)(2) but there is no quantitative analysis anywhere in the document on acres of floodplain protected by levees under the various alternatives. A basic discussion of how many miles of levees to be replaced or upgraded would suffice.

Financing (Section 2.2.6 (2A-55)- The DPEIR cites several funding mechanisms recommended by the Delta Plan, but fails to mention any funding for recreational facilities/Delta as Place. It then summarily dismisses all of the potential environmental impacts of potential fees/bonds, etc. by saying they won't cause any environmental impacts because they are just recommendations for other agencies to implement. What about impacts of reduced General Fund revenues (because of paying off bonds $2 for every $1 spent) on other programs such as Fish and Game wardens, water quality enforcement, etc.? The lack of General Fund money due to bond indebtedness could cause significant adverse environmental impacts that should be disclosed and are not. Clearly this "project" relies on Bond money and it should therefore have a basic discussion of how Bond money robs the General Fund of money for basic services.

Scoping- It seems that many of the scoping comments were dismissed, such as quantifiable performance measures to identify success and definitions of reliable water supply and Delta ecosystem restoration. There is no explanation of why these comments were rejected.

Alternatives- The Proposed Action is vague and really not very distinguishable from No Project except it assumes slightly less Delta exports (without disclosing specifically what are Delta exports under No Project, under Proposed Project and under Existing Conditions), new conveyance, new storage and a new recreational facilities that can't possibly be funded or maintained, as well as undefined habitat restoration.

Existing Conditions is not clearly defined. Chapter 2 (2A-85) indicates that Section 1.3 in Chapter 1 is the description of Existing Conditions. However, there is no quantification of Delta exports or modeling of an environmental baseline of any sort that is normally used in this type of environmental document. Nor is there quantifiable information on any other resource area from which to compare the various alternatives to Existing Conditions.

Alternatives 1A and 1B- There is no discernable difference between these two alternatives. They differ from the proposed action in that they don't reduce Delta exports or implement a SWRCB Delta outflow proceeding. The reader can't really tell the difference between the two other than all policies would be recommendations under Alternative 1B. Under 1A, only one policy regarding reliable water supply is changed to a recommendation. In either case since the DSC doesn't really have control other than to disapprove "covered actions." There are some minor and unquantifiable differences between the 2 alternatives such as the degree of levee maintenance, invasive species reductions and habitat restoration. It is all so vague that it's very difficult to see significant differences between the two alternatives and as is the case with all alternatives, there is no effort in the DPEIR to quantify differences or impacts.

Alternative 2- (2A-69) The DPEIR seems to have missed several key points of the EWC alternative as also pointed out by the Environmental Water Caucus in previous comment letters on the DSC Plan incorporated by reference herein. Those points include, but are not limited to, deleting the fish passage program recommended by NMFS at upstream Bay/Delta watershed dams, re-instating the urban preference for municipal and industrial users in low water years, returning the Kern Fan to state ownership, and improving existing levees and the South Delta export facilities to stop killing endangered fish.

In addition, **Agricultural Drainage Treatment** is incorrectly characterized in Alternative 2. The DEIS includes statements that there would be more agricultural drainage treatment facilities than the Proposed Action and possibly Existing Conditions. This is incorrect. If the 380,000 acres toxic lands within the San Luis Unit are not irrigated per the EWC's Alternative 2, there won't be a need for more drainage treatment plants like the one proposed for the Panoche Drainage District/Grasslands Bypass Project and ultimately for all of Westlands drainage impaired lands. The U.S. Geological Survey (USGS), in Open File Report No. 2008-1210 states that "*Land retirement is a key strategy to reduce drainage because it can effectively reduce drainage to zero if all drainage-impaired lands are retired*."[45] The Bureau of Reclamation's own analyses for the San Luis Drainage Feature Re-evaluation (SLDFR) shows land retirement as the most cost effective way to reduce drainage. The National Economic Development Act Summary for SLDFR[46] showed that the alternative with the most land retirement was the only alternative that had a positive cost/benefit. According to the Environmental Working Group, if the cost of crop subsidies to these impaired lands is considered, the annual losses under the Preferred Alternative for SLDFR doubles from $10 million/year to $20 million/year.[47] The Bureau admits in its Feasibility Report for SLDFR that such treatment facilities are not cost effective, require additional public subsidies for the affected districts and have not yet been able to work on the scale envisioned for the western San Joaquin/Tulare basins, yet they continue down that path.[48]

Other inconsistencies between Alternative 2 and the EWC recommendations are as follows:

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[45] http://pubs.usgs.gov/of/2008/1210/; accessed 4/18/2010

[46] http://www.c-win.org/webfm_send/202

[47] Environmental Working Group, "Throwing Good Money at Bad Land", 2007, see http://ewg.org/Throwing-Good-Money-at-Bad-Land

[48] See San Luis Drainage Feasibility Report, U.S. Bureau of Reclamation, March 2008. See http://www.usbr.gov/mp/sccao/sld/docs/sldfr_report/index.html

Alternative 2, Page 2A-69.
Improper characterization of the EWC Alternative 2 as advocating more ocean desalination. The EWC Alternative does not advocate ocean desalination.

Table 24, Page 2A-71, Alternative 2, Storage. The EWC Alternative 2 did not recommend expansion of Friant/Millerton reservoir; there was no comment related to Friant/Millerton.

Table 24, Page 2A-72, Alternative 2, Conveyance. The reference to the EWC agreement with the recommendation to complete BDCP was in the described context of consistency with the provisions of the Delta Reform Act; the EWC also stated that it is unlikely to lead to BDCP meeting either the statutorily mandated flow requirements or the water quality standards envisioned in the Delta Plan, and as such, would likely not meet the recovery objectives. The EWC's qualification is important to include since it expresses doubts that BDCP can actually achieve the reliability, ecosystem goals, and water quality goals of the Delta Plan. (CEQA Guideline 15146, Degree of Specificity).

Table 24, Page 2A-72, Alternative 2, Conveyance. The EWC Alternative 2 made no recommendation regarding abandonment of South Delta intakes as indicated in Table 24; this error must be corrected. The EWC Alternative 2 also includes the screening of existing South Delta pumps.

Table 24, Page 2A-74, Alternative 2, Ecosystem Restoration. The EWC Alternative 2 is incorrectly characterized as "Less emphasis than Proposed Project on ecosystem restoration throughout the Delta…" In the EWC's comments on the Fifth Draft of the Delta Plan, we indicated the following: "We agree with the Council's reliance on the *Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions* (DFG 2011). The EWC also supports most of the Ecosystem Restoration Program features of the CALFED program. The finding in the Table that Alternative 2 places less emphasis than the Proposed Project on ecosystem restoration throughout the Delta is in error and it should indicate that Alternative 2's emphasis on Ecosystem Restoration is the same as or similar to the Proposed Project.

Table 24, Page 2A-79, Alternative 2, Flood Risk Reduction, Levee Design Standards. The characterization of the EWC Alternative 2 as "Less emphasis than Proposed Project on reducing flood risk for all lands in the Delta areas…" does not consider the EWC recommendation to immediately initiate planning to upgrade core levees above the
PL88-99 standard, in accordance with the recommendations of the Delta Planning Commission. This action, if reinforced by the Delta Stewardship Council, would significantly reduce Delta earthquake and sea level rise vulnerabilities. (CEQA Guideline 15126.5, Discussion of Alternatives).

Table 24, Page 2A-80, Alternative 2, Flood Risk Reduction, Prioritization for Levee Construction. Same comment as immediately above, Page 2A-79.

Summary of Section 2A. With the above corrections or modifications applied to Section 2A, there is little or no basis for selecting the Proposed Project as the Environmentally Preferred Alternative instead of Alternative 2." The only stated reason Alternative 2 isn't a better alternative than the Proposed Project is due to the large amount of land retirement, including 380,000 acres in the San Luis Unit and 320,000 acres in the Tulare Basin for Tulare Lake Basin

Reservoir, as well as potentially more land fallowing due to the limitation in Delta exports at 3 million AF (again, not quantified). However, it is clear that no solution is in place for the 380,000 acres of San Luis Unit drainage impaired lands either financially, technically or otherwise authorized by Congress at necessary funding levels. Ultimately, like the 100,000 acres already retired due to soil salinization, the full 380,000 acres (that includes the existing 100,000 acres) will go out of production anyway unless they are allowed to reopen the San Luis Drain and dump all of the San Luis Unit's pollution into the San Joaquin River (which definitely won't help the Delta and even BDCP doesn't propose this drastic measure). Efforts to maintain arability in the root zone of those lands through drainage treatment will require substantial increased public subsidies. According to Reclamation's 2008 Feasibility Report for San Luis Drainage Feature Re-evaluation:

> *To provide drainage service to the San Luis Unit, neither of the action alternatives is economically justified by the Federal government. For the Federal government to provide drainage service to the San Luis Unit, neither of the action alternatives is financially feasible, within existing authorities.* [49]

The Feasibility Report also found that substantial increased subsidies and Congressional funding authorization would be necessary to implement the Preferred Alternative: [50]

- Increase the funding authorization for the San Luis Act by $2.69 Billion (2006 indexing)
- Waive the required collection of full Operation and Maintenance funding (and interest), including payments to the CVPIA Restoration Fund per Section 5 of the Reclamation Act for providing drainage service to Panoche, Pacheco and San Luis Water Districts.
- Authorize indefinitely waiving repayment of San Luis Unit contractors' contractual obligation for repayment of reimbursable capital and/or reimbursable Operation and Maintenance costs incurred to implement the Preferred Alternative AND the remaining reimbursable capital costs incurred to construct pre-existing CVP facilities until the contractors can "afford to pay" their bills.

The Feasibility Report also found that if the Preferred Alternative were implemented, the CVPIA Restoration Fund would be adversely affected because the San Luis Unit contractors will be unable to pay into the CVPIA Restoration Fund and there is a pre-existing prohibition on reassigning drainage costs to CVP power customers.

The proposed Panoche Demonstration Selenium Treatment Facility will cost an estimated $37 million just to remove selenium from drainage, not salt or boron. At a treatment rate of 200 gallons per minute 24/7 for 18 months (470 AF), the cost of treating agricultural drainage only for selenium is $78,723/AF, not counting transportation and disposal of the processed solid waste to a hazardous waste facility. Even at that cost, the potential for success is low. Previous attempts to use reverse osmosis have failed. A 2010 Report by CH2MHill for the North American Metals Council[51] determined the following:

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[49] See page 97 http://www.usbr.gov/mp/sccao/sld/docs/sldfr_report/index.html

[50] Ibid. p xxvi

[51] Review of Available Technologies for the Removal of Selenium from Water, CH2MHill, June 2010. See http://www.namc.org/docs/00062756.PDF, page 8-2.

"While these physical, chemical and biological treatment technologies have the potential to remove selenium, there are very few technologies that have successfully and/or consistently removed selenium in water to less than 5 μg/L at any scale. There are still fewer technologies that have been demonstrated at full-scale to remove selenium to less than 5 μg/L, or have been in full-scale operation for sufficient time to determine the long-term feasibility of the selenium removal technology. There are no technologies that have been demonstrated at full-scale to cost-effectively remove selenium to less than 5 μg/L for waters associated with every one of the industry sectors."

Continued irrigation of the 380,000 acres of drainage impaired lands in the San Luis Unit will result in continued decline of soil productivity and will ultimately cause retirement of the land because it cannot support agriculture. Irrigation of these lands can only continue with huge subsidies and/or discharge of the toxins to the San Joaquin River and Delta. Therefore, continued irrigation of these lands does not meet the Delta Plan Financing Framework's key tenets (2A-55) for cost effectiveness and stressors as follows:

- Beneficiaries (those who benefit from the water resources of the Delta and its watershed) should pay for the benefits they receive
- Stressors (those whose actions adversely affect the Delta ecosystem) should pay for the harm they cause the ecosystem.

Taking into account the fact that Alternative 2's ultimate impact on agriculture by retirement of those 380,000 acres is really no different than Existing Conditions, No Action or the Proposed Action, it removes one reason that Alternative 2 cannot be environmentally preferred to the Proposed Action.

Mitigation for Alternative 2 impacts on fugitive dust: The Alternative 2 significant negative impact of fugitive dust from fallowed or retired lands could be fully mitigated by not disking and/or growing dry land crops and/or re-establishing native vegetation.

Chapter 3- Water Resources

Overall, this chapter is completely lacking in any kind of quantitative analysis of water resources affected by the Delta Plan in upstream and downstream areas as well as the Bay-Delta itself. For instance, the Trinity River Record of Decision is completely left out of the analysis as a guiding force for Trinity River Division operations. There is a complete lack of disclosure let alone analysis of temperature and flow standards for the Delta and all of its tributaries, artificial or natural, reservoir carryover storage, operations or anything that could possibly provide the reader with a method to compare the different alternatives with each other and Existing Conditions.

(3-1) Study Area
The Trinity River must be mentioned in the text that reflects the map on Figure 3-1. We also believe that the Pit and McCloud rivers should also be included in the text and in Figure 3-1.

(3-3)- Environmental Setting/Major Sources of information- This section should include the Trinity River Mainstem Fishery Restoration EIS/EIR (USFWS/BOR/HVT/Trinity County, 1999) and the Trinity River ROD (Interior 2000). It is a major omission regarding water operations for this important "Delta Tributary Watershed" (Water Code Section 78647.4 (b).

The 2006 Sacramento Valley Integrated Regional Water Management Plan does not represent the interests, needs, and values of the region. It was crafted by water districts that intentionally excluded the public and NGOs from visioning, describing the environmental setting, plan creation, and governance. It is inappropriate to use the SVIRWMP as a source document to describe the environmental setting for the watershed that is so vital for California.

(3-5) Figure 3.2- This map doesn't even show that the Trinity River exists downstream of Lewiston Dams. This is a serious omission considering that the Trinity River Division of the CVP (TRD) is operated in part to regulate flows on the Trinity River in order to meet the tribal trust obligation that Interior has to the Hoopa Valley and Yurok Tribes.

(3-6) It is unclear what evidence and analysis is in the DPEIR to reach the following conclusion:

> "With the growing limitations on available surface water exported through the Delta, and the potential impacts of climate change, reliance on groundwater through conjunctive management would become increasingly more important in meeting the state's future water uses." Conjunctive management, the way it is proposed in the Sacramento Valley, has the potential to replicate the destructive practices that left the Owens and San Joaquin valleys bereft of water, vegetation, and species that depend on healthy hydrology.

We appreciate the DPEIR's acknowledgement that, "A comprehensive assessment of overdraft in the state's groundwater basins has not been conducted since Bulletin 118-80 in 1980, but overdraft is estimated at between 1 to 2 MAF annually (DWR 2003, p. 2)." In light of the deficit of analysis since 1980 and the use of only an estimate of overdraft, albeit one that is massive with tremendous range, what data and analysis have been used to justify the expansion of past practices like conjunctive use, conjunctive management, and water transfers with groundwater substitution? The immense failures of water management in California have already caused extensive overdraft (see DPEIR Figure 3-4 for critically overdrafted basins; pp 3-12 to 3-13) and the collapse of fisheries and ecosystems.

(3-9) The DPEIR must include historic data that covers centuries, not simply "decade time scales." Major climate change has occurred at millennial, decadal, and annual scales in the history of the Sierra Nevada. The regional climate developed from warm, wet, tropical conditions about 65 million years ago through a cycle of at least eight major glacial and interglacial periods of the last million years to the winter-wet, summer-dry pattern of the last 10,000 years. These climatic periods have greatly influenced vegetation, animals, and human populations; their effects are observable today and influence how people manage resources. For instance, two extensive droughts, each lasting 100 to 200 years, occurred within the last 1,200 years. During the cold phase of the Little Ice Age (about a.d. 1650-1850), glaciers in the Sierra Nevada advanced to positions they had not occupied since the end of the last major ice age more than 10,000 years ago. The period of modern settlement in the Sierra Nevada (about the last 150 years), by contrast, has been relatively warm and wet, containing one of the wettest half-century intervals of the past 1,000 years. (http://ceres.ca.gov/snep/pubs/web/v1/ch01/v1_ch01_02.html)

The following statement, "… where supplemental water supplies are needed…" should be changed to read "… where supplemental water supplies are wanted…" since "need" has been

and still is currently based on speculative urban and agricultural expansion. The word "needed" in the following sentence should also be changed to "wanted." "Over time, the natural pattern of water flows continued to change as the result of upper watershed diversions and the construction of facilities to divert and export water through the Delta to areas where supplemental water supplies are needed, including densely populated areas such as San Francisco and Southern California and agricultural regions such as the San Joaquin Valley and Tulare Lake." The DPEIR fails to focus on the demand side of water in California and the ability to control demand in more ways than increasing supply with very costly infrastructure.

(3-10, lines 18-19)- It is important to note that largemouth bass showed a clear increase in Se concentrations 1999-2007 in Appendix E, Table E-1. Selenium contamination is not going away.

(3-11, lines 11-15)- We agree-the authors correctly identified that the major source of selenium to the Delta is agriculture from the San Joaquin Valley.

(3-12, lines 1-2)- Appendix D, Table D-2 only identifies the draft EIS for San Luis Drainage Feature Re-evaluation, not the final ROD of 2007 which identified a preferred alternative to treat drainage from 180,000 acres and retire 200,000 acres (which also includes the existing 54,000-100,000 acres already retired).

(3-13, lines 41-42)- The document incorrectly states that Delta water users are the largest users of Delta water (up to 1.3 MAF), but then says "After local users, the major users of Delta surface water are the CVP and SWP", making it appear that the state and federal pumps export less water from the Delta. This is untrue.

(3-14, lines 34-41)- The document should identify that while the Jones Pumping Plant has a capacity of 4,600 cfs, it is limited to a little over 4,200 cfs due to subsidence, although the State-federal intertie might allow increased deliveries to CVP contractors normally served by the Delta Mendota Canal.

(3-15, lines 1-2)- The document states that CVP/SWP Delta pumping has been significantly reduced since 2007, but fails to mention that 2011 was a record year with exports exceeding any prior year. This is very misleading.

Lines 26-13- This section mentions the CVPIA (Section 3406 b2) water but fails to mention CVPIA Refuge Water Supplies (3406 d) and Trinity water (3406 b23). All three sections of CVPIA redirected a significant amount of CVP water to environmental purposes but the document is not clear on the fact that CVPIA accomplished those actions. The DPEIR also fails to mention that most of the water released for fishery purposes under CVPIA Section 3406 b2 is pumped into the canals in the Delta before it reaches the Golden Gate.

(3-16, lines 32-39) As noted above, the McCloud, Pit, and Trinity rivers must at least be mentioned when describing the Sacramento River watershed.

(3-17, lines 10-11)- The DPEIR mentions a volume of water diverted from Whiskeytown Lake to Keswick Reservoir, but does not give a specific average Trinity River export volume, nor does it even cite the 1999 Trinity EIS/EIR and the 2000 Trinity ROD. This is another significant omission. There is no mention of Trinity River Basin Plan temperature objectives, the 2000

NMFS Trinity Biological Opinion, problems with transmission of cold Trinity water through Whiskeytown, the temperature curtains, the temperature control device at Shasta Dam or temperature issues and water quality objectives in the Sacramento River. It also fails to mention the significance of the Trinity River Division in diluting acid mine drainage discharges from Iron Mountain Mine.

(3-18/19 lines 1-40 and 1-5) This section has very limited data, and requires more evidence and supporting facts.

(3-19 lines17-21) The DPEIR asserts that Sacramento Valley "groundwater levels are generally in balance valley-wide with pumping matched by recharge…" What is the basis for that conclusion? The following examples contradict the statement above:

- "It has been long recognized that the Colusa Basin faces significant flooding, drainage, and groundwater recharge problems." (Northern Sacramento Valley Four County Group 2009.)
- Declining groundwater elevations have been observed specifically in Butte County. A 2007 Butte Basin Groundwater Status Report describes the "historical trend" in the Esquon Ranch area as showing "seasonal fluctuation (spring to fall) in groundwater levels of about 10 to 15 feet during years of normal precipitation and less than 5 feet during years of drought." The report further notes: "Long-term comparison of spring-to-spring groundwater levels shows a decline of approximately 15 feet associated with the 1976-77 and 1986-94 droughts (Butte Basin Water Users Association, 2007). The 2008 report indicates that, "The spring 2008 groundwater level measurement was approximately three feet higher than the 2007 measurement, however it was still four feet lower than the average of the previous ten spring measurements. Fall groundwater levels are approximately nine feet lower than the averages of those measured during either of the previous drought periods on the hydrograph. At this time it appears that there may be a downward trend in groundwater levels in this well," (Butte Basin Water Users Association 2008.)
- Professor Karin Hoover, Assistant Professor of hydrology, hydrogeology, and surficial processes from CSU Chico, found in 2008 that, "Although regional measured groundwater levels are purported to 'recover' during the winter months (Technical Memorandum 3), data from Spangler (2002) indicate that recovery levels are somewhat less than levels of drawdown, suggesting that, in general, water levels are declining." According to Toccoy Dudley, "Test results indicate that the 'age' of the groundwater samples ranges from less than 100 years to tens of thousands of years. In general, the more shallow wells in the Lower Tuscan Formation along the eastern margin of the valley have the 'youngest' water and the deeper wells in the western and southern portions of the valley have the 'oldest' water," adding that "the youngest groundwater in the Lower Tuscan Formation is probably nearest to recharge areas." (Dudley 2005.) "This implies that there is currently no active recharge to the Lower Tuscan aquifer system (M.D. Sullivan, personal communication, 2004)," explains Dr. Hoover. "If this is the case, then water in the Lower Tuscan system may constitute fossil water with no known modern recharge mechanism, and, once it is extracted, it is gone as a resource," (Hoover 2008.)

- "Overdraft of groundwater in Sacramento County over the last 6 decades has significantly impacted the magnitude and duration of fall flows on the Cosumnes River." (Fleckenstein, et al. 2004).

Additionally, how and where recharge occurs in the northern Sacramento Valley is unknown. An attempt to develop greater understanding is in its infancy: "Most recently, Butte County received funding through Prop 50 under the DWR Watershed Program to develop a groundwater model to determine run-off and recharge within the watershed areas." (Northern Sacramento Valley Four County Group 2009.)

(lines 22-40) The Sierra Nevada [mountain range] and "Coast ranges" are identified, but there is no mention of the southern Cascade Range that is a prominent geologic feature of the northern Sacramento Valley and a significant contributor to the hydrology of the Sacramento River watershed.

It is also noteworthy that the planning area for the possible Sites reservoir is not mentioned in this section. The Sites project is a proposed offstream storage reservoir located about 10 miles west of the small town of Maxwell in the Sacramento Valley. The water quality problems of Maxwell are mentioned in this paragraph with the "hills to the west" listed as the source,: exactly where a reservoir would be located. These existing water quality problems and the source minerals should be disclosed with any mention of a possible reservoir near Sites and these issues analyzed here. CEQA guidelines' list of "advantages" to preparing a programmatic EIR include a "more exhaustive" examination of effects and alternatives, "full consideration" of cumulative impacts, and allowance for analysis of "broad policy alternatives and program wide mitigation measures" at a time when the lead agency has the best chance to address them and present them to the public. (Cal. Code Regs., tit. 14, § 15168(b).)

(3-19/20) There is brief discussion of general groundwater quality in the Sacramento Valley and some specific mention of TDS, chloride, sodium, sulfate, and nitrates, but there is a noticeable absence of data and discussion regarding hazardous waste plumes and the potential for well contamination. There are significant public health and safety issues associated with large groundwater extractions associated with water transfers and groundwater storage projects as proposed in the DPEIR (pp 20, 3-77, 80, 81), For example, in 1994, following seven years of low annual precipitation, Western Canal Water District and other irrigation districts in Butte, Glenn and Colusa counties exported 105,000 af of water extracted from the Tuscan aquifers to buyers outside of the area. This early experiment in the *conjunctive use* of the groundwater resources caused a significant and immediate adverse impact on the environment (Msangi 2006). Until the time of the water transfers, groundwater levels had dropped but the aquifers had sustained the normal demands of domestic and agricultural users. The water districts' extractions, however, lowered groundwater levels throughout the Durham and Cherokee areas of eastern Butte County (Msangi 2006). The water level fell and the water quality deteriorated in the wells serving the City of Durham (Scalmanini 1995). Irrigation wells failed on several orchards in the Durham area. One farm never recovered from the loss of its crop and later entered into bankruptcy. Although the districts' groundwater substitution was in the deep levels of the aquifer, residential wells dried up in the shallow zone of the aquifer as far north as Durham (Barris 1995).

There is a lack of disclosure regarding the potential impacts from large groundwater extractions associated with conjunctive use, water transfers, and groundwater storage projects that are part of

the Delta Plan and DPEIR (p 3-78/79). As noted above there is the likelihood that water levels may collapse in domestic wells that can lead to serious contamination from heavy metals and non-aqueous fluids. Additionally, there are numerous hazardous waste plumes in most counties in the Sacramento Valley. One example, Butte County, has many hazardous waste plumes that could easily migrate when hydrostatic pressure is altered in the groundwater basin from increased groundwater pumping proposed for the Project. (Todenhagen 2010) All of this must be disclosed and analyzed cumulatively at the programmatic CEQA level.

(3-20/21)- This section should describe the hydrologic contributions and plumbing of the McCloud, Pit, and Trinity rivers in the Sacramento River watershed.. It is a significant omission.

The DPEIR asserts that, "[w]ater diverted for irrigation, but not actually consumed by crops or other vegetation becomes recharge to the groundwater aquifer or flows back to surface waterways and contributes to surface supplies either within or downstream of the Sacramento Valley." It should be noted that if recharge does occur, it would be to the shallow alluvial aquifer, not the source aquifer for most agricultural uses, which is deeper. There also is not mention of evaporation in the irrigation water budget.

(3-22, lines 32-35)- The discussion of water transfers fails to mention that DWR's Drought Water Bank water transfer program was shut down by litigation (after the fact) and that a joint EIS/EIR is being prepared by Reclamation and SLDMWA (a year overdue so far). Please provide citations for the water transfers.

(3-26, lines 26-29)- The document discusses the Basin Plan amendment for the Grasslands Bypass Project to "address selenium control" but fails to mention it was really an amendment to waive implementation of Basin Plan selenium water quality objectives for another decade because they can't meet them now and there is no technology other than land retirement that has been proven to work.

(3-27, lines 28-35)- The DPEIR leaves a great deal out of the discussion regarding the Cosumnes River groundwater basin. Examples include:

- "Overdraft of groundwater in Sacramento County over the last 6 decades has significantly impacted the magnitude and duration of fall flows on the Cosumnes River. The decline in fall flows is a primary stressor of spawning success of fall-run Chinook salmon." (Fleckenstein, et al. 2004).
- "Annual groundwater deficits are on the order of several hundred million cubic meters." *Id*

When "groundwater storage capacity" is provided here and in other sections, what does the estimated amount bring to the discussion or analysis? Does it play a role in the Project description or the alternatives? For example, is it viewed as a source of export water, as necessary for local hydrology, or, in this case, as essential for local hydrology and species as noted above? If the Consumnes River basin and other groundwater basins are part of the Project and alternatives, they must be analyzed and presented to the public.

(3-29, lines 9-10)- The statement below Table 3-2 describes "many" groundwater basins as removing more water than is recharged, but actually it is "most" (5 out of 6). Only the Chowchilla basin appears to not be removing more water than is recharged. The text is misleading as it relates to the data in the table.

(3-32)- Surface Water Use- This section is an appropriate place to identify the large amount of paper water in the San Joaquin Basin. If such information were disclosed, it would point out that the San Joaquin and its tributaries are completely over-allocated and therefore the various water permits should be licensed to eliminate paper water. The South SJID, Turlock ID and Merced ID descriptions in the DPEIR should include a description of the acres served by the districts.

(3-33, lines 1-2)- The document notes that the CVP provides "surplus" CVP water to contractors in San Felipe and San Joaquin areas. It should further note how much of that water is paper water and the fact that there hasn't been 100% delivery of contract water for many years and it is unlikely to do so in the future. Again, disclosure of that information would lead to a conclusion that there is a significant amount of paper water within the CVP, and licensing of BOR's CVP permits to eliminate paper water is necessary (along with reduction in contract amounts to correspond with actual availability of water).

(3-34, lines 6-7)- There should be a discussion of how the VAMP has failed here and what factors led to that failure. See Hankin 2010.[52]

(3-40, lines 1-3)- The document fails to mention that selenium and boron can also be pollutants in local groundwater making it unfit for use. Even 1 ppb of boron can adversely affect crops.

(lines 29-34)- This section fails to mention the 2007 San Luis Feature Re-evaluation Record of Decision (SLDFR ROD) that selected a different alternative than the one cited in this DPEIR. The "In-Valley Water Needs Land Retirement" alternative that includes 194,000 acres of land retirement was selected, not the "In Valley/Drainage Impaired Land Retirement" Alternative, which would have actually retired 298,000 acres. Both alternatives include an existing 54,000 acres of retired land.[53] The DPEIR incorrectly portrays the final decision, but it is notable that in the SLDFR DEIS, the environmentally preferred alternative was the In Valley/Drainage Impaired Land Retirement Alternative because it had the most land retirement and a positive National Economic Development (NED)Act cost/benefit analysis. Nonetheless, Reclamation requested and received a waiver from the NED requirement to otherwise adopt the most cost effective alternative and instead chose a financial loser- the "In-Valley Water Needs Land Retirement" alternative. Existing efforts to "solve" the drainage problem through cost effective large scale technologies have failed.[54] The U.S. Geological Survey (USGS), in Open File Report No. 2008-1210 states that "*Land retirement is a key strategy to reduce drainage because it can effectively reduce drainage to zero if all drainage-impaired lands are retired*."

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[52] http://www.sjrg.org/peerreview/review_vamp_panel_report_final_051110.pdf

[53] SLDFRE ROD, Bureau of Reclamation, March 2007.
See http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=2598 page 13.

[54] CH2MHill, "Removal of Available Technologies for the Removal of Selenium from Water," for the North American Metals Council, June 2010. Conclusion, Pages 8-1 and 8-2.

(3-44) Conjunctive Use- This section should mention that C-WIN, CSPA, South Delta Water Agency, Central Delta Water Agency and the Center for Biological Diversity have filed two lawsuits to return the Kern Water Bank to state control, and that it is part of Alternative 2.

(3-48, lines 9-10)- This section states that environmental water use is 58% of the Bay Area's water use, but provides no clarification if this is "developed" water or just flows through the Golden Gate Bridge. It creates an impression that most of Bay Area's developed water is used for the environment, which is untrue.

(3-50/51)- Environmental Water Use- This section still doesn't explain or quantify the 58% figure given for environmental water use. It implies that dam releases for fish are bigger than they are, or that they don't get pumped out before they reach salt water. The document needs clarification in this regard.

(3-74, lines 12-15)- The DPEIR mentions an agricultural drainage reclamation project in the San Joaquin Valley but provides no citation or source for this information or its status. Is it already happening, in planning stages, waiting government subsidies, etc.? What is the source water? To date, no project has been able to successfully treat San Joaquin Valley agricultural drainage water on a large scale and cost effectively other than land retirement (USGS Open File Report No. 2008-1210).

(3-77) Thresholds of Significance- In addition to a threshold for impacts to water supplies outside of the Delta that use Delta water, it should also include the following:

- Substantially change water supply availability to water users located upstream of the Delta (area of origin/senior water rights holders, Sacramento River and tributary rivers and streams' fisheries, etc.).
- Substantially change water supply availability and quality to in-Delta water users.

The violation of water quality objectives and standards should include specifics such as temperature, salinity, etc., but the document does not disclose the myriad water quality standards that are being violated regularly today and how frequently the various alternatives would be expected to violate those standards and WDR's in the future. The analysis is therefore incomplete.

The second bullet regarding substantial depletion of groundwater must also include:

- Substantially depleted surface waters due to depleted groundwater supplies.
- Substantially higher stream temperatures that will result in aquatic and terrestrial species mortality and threaten reproductive success.

3.4.3 Proposed Project- None of the analyses for the Proposed Project compare it to Existing Conditions per CEQA requirements even though the other alternatives are compared, at least qualitatively to Existing Conditions. There is no quantitative analysis of any of the alternatives compared to Existing Conditions or each other.

(3-79)- Effects of Project Operations- The document does not but should disclose how well different alternatives meet reservoir cold water carryover storage requirements for Shasta and

Trinity and other reservoirs which have cold water carryover requirements in Biological Opinions or other permit requirements.

(lines 2-19) Sites reservoir, the potential North-of-the-Delta Offstream Storage project, has considerable potential to violate water quality as noted above (p 3-19 comments). The DPEIR's findings - that potentially significant impacts will be avoided by future mitigation - violates CEQA, in that CEQA does not allow such deferral where substantial questions remain regarding whether such mitigation can feasibly accomplish the stated objective.

(lines 13-19) Because the Los Vaqueros expansion project EIR found that "the project would not result in significant adverse changes in Delta water quality that could cause the violation of a water quality standard," it does not follow that *all* other storage projects will be able to make that finding nor that the statement is actually accurate in fact or in practice. It also does not remove responsibility from the lead agency to analyze direct, indirect, and cumulative impacts at the programmatic level. We find no disclosure, analysis, or proposed mitigation for all impacts at the programmatic level.

(lines 32-37) The DPEIR's conclusion that, "The number and location of all potential projects that would be implemented is not known at this time," may be accurate enough for the lead agency, but it indicates that the DPEIR was not ready for prime time. Programmatic CEQA review requires more detail than complete deferral into the future. The DPEIR is preparing to potentially approve, at a programmatic level, reservoirs, groundwater banking, conjunctive use, water transfers, a peripheral canal or tunnels, ocean desalination, and other infrastructure to enable the other projects. The project area is defined on page 1-14. The lead agency may not know the *exact* number and *exact* location of all potential projects, but it is disingenuous to exclude the geographic locations and actions that are planned in the document that led to this environmental review: the 5th Staff Draft Delta Plan.

(3-80/81)- The DPEIR rightly concludes that, "Long-term operation of a groundwater storage facility encouraged by the Delta Plan would by definition result in significant fluctuations in local groundwater levels." The impacts could be devastating, but the DPEIR defers to local management as the mechanism to protect the groundwater basins. "Rising groundwater levels would occur as artificial recharge is induced into the aquifer system, followed by groundwater level declines during subsequent removal of groundwater from storage. There is currently no statewide groundwater management legislation that would regulate this type of facility. However, any operating groundwater storage facility would be subject to local groundwater management regulations (basin adjudications, county ordinances, or local groundwater management plans), as described in Appendix D." Provided above are many examples of the inadequate nature of local ordinances and plans above (2A-18 lines 22-30), which also apply here.

(3-80/81) - Effects of Project Operations- Groundwater transfers, Impact 3-2a: Substantially Deplete Groundwater Supplies or Interfere Substantially with Groundwater Recharge

The DPEIR rightly concludes that, "Long-term operation of a groundwater storage facility encouraged by the Delta Plan would by definition result in significant fluctuations in local groundwater levels." The impacts could be devastating, but the DPEIR defers to local management as the mechanism to protect the groundwater basins. "Rising groundwater levels would occur as artificial recharge is induced into the aquifer system, followed by groundwater

level declines during subsequent removal of groundwater from storage. There is currently no statewide groundwater management legislation that would regulate this type of facility. However, any operating groundwater storage facility would be subject to local groundwater management regulations (basin adjudications, county ordinances, or local groundwater management plans), as described in Appendix D." Provided above are many examples of the inadequate nature of local ordinances and plans above (2A-18 lines 22-30), which also apply here.

(3-81 lines 15-38) This section denies impacts from water transfers involving groundwater by citing a Yuba Basin groundwater transfer EIR and project. The DPEIR fails to describe how this single EIR and project varies greatly from plans and projects completed and proposed in the Sacramento Valley, the location where, "These types of activities and related impacts are most likely to occur…" Please consider:

- During the 1994 Drought Water Bank, the amount of surface water transfers that involved groundwater pumping was not "within historic ranges" in Butte County as the DPEIR asserts transpires with the Yuba County transfers. As described above, many wells went dry in Butte County as a result of DWR's 1994 Drought Water Bank groundwater transfers (see comments for 3-19/20).
- The DPEIR does not disclose existing conditions (see comments for p 3-19 for examples) and the impacts that are well known from 1994.
- Recently past and current proposals for water transfers that involve groundwater propose vastly more that "historic levels." For example:
    - Drought Water Bank 2009 (340,000 af)
    - North-to-South, Ten Year Water Transfer Program, Bureau of Reclamation (600,000 af) http://www.usbr.gov/mp/cvp/ltwt/docs/FederalRegisterNoticeTenYearTransfers.pdf
    - *Groundwater/Conjunctive Management* presentation to the State Water Commission where the author presents "Aquifers are emptied" from the "Full aquifers in the Sacramento Valley," (Hauge 2011) http://cwc.ca.gov/cwc/docs/Hauge%20Groundwaterfinal%20sep11.pdf

A finding of no significance from the proposed project is unjustified.

(3-82)- 3.4.3.1.3 Impact 3-3a: Substantially Change Water Supply Availability to Water Users That Use Delta Water- If the Proposed Action would actually reduce Delta exports, there would be an impact here, but it does not analyze that quantitatively, it cannot make a finding of no impact.

(3-84) 3.4.3.2.2 Impact 3-2b: Substantially Deplete Groundwater Supplies or Interfere Substantially with Groundwater Recharge- This section erroneously makes a finding of no impact from the Proposed Action that will increase water transfers using groundwater. The erroneous assumption is that "sustainable groundwater management plans" for areas outside of the Delta will ensure that no groundwater overdraft occurs from groundwater substitution transfers. This very chapter of the DPEIR shows several areas of California with groundwater management plans that still have groundwater overdraft. It cannot be assumed that these plans

will prevent groundwater overdraft and we have provided detailed information above regarding the inadequacy of groundwater management plans in the Sacramento Valley (see 2A-18 lines 22-30). Certainly, the provisions of SB X7 6 do not require groundwater management, only monitoring of groundwater.

3.4.3.2.3 Impact 3-3b: Substantially Change Water Supply Availability to Water Users That Use Delta Water- This section also fails to justify a finding of no significant impact. There is no actual analysis of how much Delta exports would be reduced or a calculation of how much "new" water would be created by new projects such as recycling or desalinization. Since it's clear that BDCP will actually INCREASE Delta exports through meeting "full contract deliveries" for CVP and SWP contractors, the finding may belie what the real impact of the Proposed Action will be once BDCP is incorporated into the Delta Plan.

In addition, the unsupported claim that, "The increase in groundwater levels could result in higher yields in nearby shallow wells and therefore be a benefit to shallow wells in some areas," leaves so much unsaid and unresolved, such as:

- How would this benefit shallow well owners that currently have healthy groundwater levels? Where would this potentially occur? Would a drop in levels by water transfers that use groundwater first harm other well owners before a potential, but highly unlikely, benefit may accrue?
- How would recharging the shallow aquifer assist wells that are in deeper levels of a confined or unconfined aquifer? Where is this likely to occur? Where is the acknowledgment of potential harm to these well owners?

The conclusion that the impacts would be less than significant is unfounded.

(3-91) 3.4.3.6 Mitigation Measures- There should be a mitigation measure to maintain adequate cold water carryover storage in CVP and SWP reservoirs to ensure providing cold water for fish to meet downstream temperature objectives and otherwise keep fish in good condition below dams in order to meet DFG Code Section 5937.

(3-94, lines 14-17) 3.4.4 No Project Alternative- The document fails to justify the finding that the Proposed Project will overall have less impacts than the No Action Alternative. The DPEIR fails to describe what the Proposed Project is and how it will affect various water resources issue areas such as groundwater, water quality and water supply. It assumes success without even describing in any detail what the Proposed Project is, let alone a quantitative analysis. How can a Peripheral Canal that takes water out of the Sacramento River before it gets to the Delta improve Delta water quality? How can meeting "full contract deliveries" for CVP and SWP customers not create impacts to Trinity River and Sacramento River salmon? Increased residence time and concentration of pollutants from the San Joaquin River into the Delta will clearly be a significant impact from the Proposed Action but the document does not disclose those impacts.

(3-98, lines 23-24)- The DPEIR makes an unsubstantiated finding that Alternative 2 has more water quality impacts than Existing Conditions, even though it states that under Existing Conditions there are many landowners who currently violate water quality standards and WDR's for drainage problem lands. The finding is based on an erroneous assumption that Alternative 2

includes more agricultural treatment facilities and is therefore a risk to water quality. As explained in other chapters, Alternative 2 would eliminate agricultural drainage polluted discharges because of land retirement and therefore agricultural drainage treatment plants are not necessary. Since Alternative 2 is actually superior to Existing Conditions or the Proposed Project, it is the environmentally preferred alternative for water quality.

(3-99, lines 8-9) 3.4.7.1.2 Impact 3-2: Substantially Deplete Groundwater Supplies or Interfere Substantially with Groundwater Recharge- Again the document incorrectly identifies that Alternative 2 has greater impacts than Existing Conditions (but less than the Proposed Project) because the DPEIR incorrectly assumes that Alternative 2 includes more emphasis on water transfers. Since Delta exports would be limited to 3 MAF/year, water transfers would unquestionably be less than Existing Conditions and therefore less impacts. Again, Alternative 2 is the environmentally preferred alternative.

3.4.7.1.3 Impact 3-3: Substantially Change Water Supply Availability to Water Users Located Outside of the Delta That Use Delta Water- It is probably correct that Alternative 2 has greater impacts to water users outside of the Delta (exporters) because it limits exports to 3 MAF, but it doesn't acknowledge that in-delta water users would benefit from increased freshwater flows through the Delta. However, the large number of projects under Alternative 2 to improve water supply reliability would fully mitigate for any water supply impacts, except for the elimination of water to 380,000 acres of drainage-impaired lands in the San Luis Unit. However, since those lands require substantial water, crop and drainage subsidies and will ultimately go out of production anyway due to salt buildup, it is actually a benefit to water quality, economics and the environment to eliminate water deliveries to poison lands.

Chapter 4, Biological Resources- (4-1). The Study Area does not include the Trinity River, even though it says it includes the watershed of Delta, including the Sacramento and San Joaquin basins. Since the Trinity is one of the sources of water for the Delta, it is inappropriate to leave it out, especially since some of the alternatives would retain existing Delta pumping or even increase Delta pumping- with resultant impacts to the areas of origin such as the Trinity. Trinity River Coho salmon are listed as a threatened species under federal and state law, but they aren't mentioned anywhere in the document. This is a significant omission. Even the South Delta Improvement Project DPEIR/DEIS did a temperature analysis on Trinity River salmon, albeit flawed.

Evaluation of impacts to Trinity River salmon and steelhead from the alternatives with high Delta exports such as Alternatives 1A and 1B could have been performed through evaluation of the frequency of violation of Trinity River Temperature Objectives Contained in the Water Quality Control Plan for the North Coast Region[55]. Such an evaluation is a standard procedure for evaluation of impacts to the Trinity River and has been used in several environmental documents such as the South Delta Improvement Project DEIS/EIR and the Trinity River Mainstem Fishery Restoration EIS/EIR. Additionally, the availability of water during extended drought to meet Trinity River Record of Decision flows while also meeting Basin Plan Temperature Objectives is a reasonable analysis that also was not completed.

There is no evaluation of impacts to the four races of Sacramento River Chinook salmon through

[55] See http://www.waterboards.ca.gov/northcoast/water_issues/programs/basin_plan/083105-bp/04_water_quality_objectives.pdf page 3-8.00, footnote 5.

analysis of Sacramento River temperature objectives contained in the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins[56]. Again, evaluation of the frequency of meeting the 56 degree F temperature objective and minimum carryover storage requirements for Shasta Reservoir contained in the NMFS Biological Opinion are common methods of quantitative analysis which were left out of this DPEIR.

4.3.2.2.4 (4-25)- Importance of the Delta to Water-birds- This section completely omits any references to Refuge Water Supplies contained in CVPIA. The DPEIR should indicate how the Delta Plan and BDCP will impact refuge water supplies and targets for restoration. It mentions that there are goals for wetland habitat in the Delta, but fails to mention what they are. How well each of the alternatives would meet those goals is an appropriate quantitative analysis that does not exist in this document.

Rice (4-38)- This section again fails to identify the CVPIA provision allowing for flooding of rice fields for winter migratory waterfowl habitat. It is as if this DPEIR does not acknowledge that CVPIA exists.

Shasta Dam to Red Bluff Diversion Dam (4-40)- This section mentions the Trinity River diversions to Clear Creek and the Sacramento River, but completely fails to mention that the Trinity River Record of Decision is supposed to limit those diversions. It also fails to mention that the Interior Department has a statutory and Tribal Trust obligation to the Hoopa Valley and Yurok Tribes[57] and their federally reserved fishing rights and an obligation to restore the Trinity River's fishery resources.

4.4.1 Assessment Methods (4-58)- The DPEIR states that:

> The Proposed Project (Delta Plan) and alternatives would not directly result in construction or operation of projects or facilities and therefore would result in no direct impacts on biological resources. The Proposed Project and alternatives could ultimately result in or encourage implementation of actions or development of projects, such as facilities or infrastructure, as described in Section 2A, Proposed Project and Alternatives.

It is a cop out to fail to describe potential impacts of approval of the Delta Plan and the BDCP that will be incorporated into the Delta Plan if certain statutory requirements that are rigged (such as DFG approval). Since the BDCP purpose, among other things, is to provide "full contract deliveries" to CVP and SWP contractors, the Delta Plan needs to do an analysis based on the impacts of full contract deliveries. That would include increased delivery of water and production of toxic agricultural drainage from the San Luis Unit and other lands in the western San Joaquin Valley, increased reservoir depletion for all CVP and SWP reservoirs, impacts to Trinity River fishery flows and temperatures, impacts to Sacramento River fishery flows and temperature objectives, impacts to American River temperatures and fishery flows, impacts to meeting Level 4 wildlife refuge water supplies, growth inducing impacts in urban areas, etc.

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[56] See http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr.pdf, Table III-4, page III-8.00.
[57] See October 4, 1993 Interior Solicitor Opinion on Fishing Rights of Hoopa Valley and Yurok Tribes, located at http://www.schlosserlawfiles.com/~hoopa/SolOp_93.pdf

4.4.1 Assessment Methods (4-58)- The document uses the excuse that it's only a plan and therefore has no direct impact on biological resources is disingenuous. The policies and recommendations of the plan will result in changes in the physical environment, particularly when the BDCP is incorporated into the Delta Plan. At a minimum, the Delta Plan DPEIR should develop a range or impacts for BDCP based on the work done to date, such as the purpose and need to meet "full contract deliveries" for CVP and SWP contractors. The lack of specific analysis is unacceptable and does not meet the legal requirements of CEQA.

4.4.2 Thresholds of Significance (4-59)- Since there is no quantitative analysis of impacts to listed species or other listed, sensitive or otherwise protected species or habitats, it is impossible to determine if an impact is significant. One very clear threshold of significance that is not in the document is violation of water quality or air quality standards. For instance, if a particular alternative were to increase the number of violations of temperature objectives for the Trinity River or Sacramento River, it should be considered a significant impact. There are numerous water quality and air quality standards that should be considered but are not included.

Another example of a violation of specific plans and policies would be conflicts with the requirements of the Trinity River Record of Decision (2000). However, since the Trinity ROD is not mentioned or described in the DPEIR analysis, it is impossible to determine or describe conflicts. There are likely many other programs, Records of Decision, etc. that could be significantly impacted by the Delta Plan but are not mentioned. Again, the lack of specificity and quantitative analysis makes this document fatally flawed.

The Trinity River is protected from harm by diversions to the Sacramento River and Delta in numerous legal opinions, court decisions and administrative actions reflecting state and federal recognition of the Trinity's special legal status.[58] This special status creates a priority for the use of Trinity River water for Trinity River fisheries and other in-basin uses that is superior to any other use of CVP water outside of the Trinity River basin. Data in recent studies indicate that a small portion of flows originating from the Sacramento River reach interior South Delta compliance points, playing a role in salinity conditions there. Thus, Bureau of Reclamation water right permits for the Trinity River provide a portion of the water used to meet salinity objectives in the Delta as well export pumping supplies . However, current Bureau of Reclamation policies regarding the Trinity River Division operations make it clear that the Bureau does not recognize the Trinity River's special legal status. Reclamation's interpretation of the Trinity's legal status places salmon and steelhead fisheries and the overall health of the river's ecosystem and

58 See US Department of the Interior Memorandum by Solicitor Leo Krulitz to the Assistant Secretary, Land and Water Resources, Proposed Contract with Grasslands Water District, December 7, 1979, accessible online at http://www.c-win.org/webfm_send/156. Key federal authorities for doing no harm to the Trinity River include: The Trinity River Act of 1955 (PL 84-386); the Trinity River Basin Fish and Wildlife Restoration Act of 1984 (PL 98-541); Tribal Trust Doctrine, applied to the Hoopa Valley and Yurok Tribes; The Central Valley Project Improvement Act, PL 102-575 (CVPIA); Federal Reclamation Act (Section 8); Federal Clean Water Act Section 303; The 2000 Trinity River Record of Decision (page 17); and the 2000 Trinity River Biological Opinion by the National Marine Fisheries Service. State laws and policies on doing no harm to the Trinity River include: the Public Trust Doctrine; area of origin and watershed protection statutes in the California Water Code; California Department of Fish and Game recognition in environmental review comments concerning the Trinity River Mainstem Fishery Restoration Program; State Water Resources Control Board Order WR 90-05; North Coast Regional Water Quality Control Board and State Water Resources Control Board-approved temperature objectives for Trinity River, approved by US Environmental Protection Agency as Clean Water Act Section 303 standards.

economy at great risk.[59] The groups request that the Delta Plan include a policy statement in the Project Description that recognizes and extends protection, through amendment of the Bureau's water rights permits to the Trinity River, addressing salinity and flow objectives in the Delta as well as a limitation on the use of Trinity River water for Delta exports.

Proposed Mitigation Measure- SWRCB licensing of all rim dam reservoir to eliminate paper water and provide minimum instream fishery flows and requirements for temperature objectives through retention of cold water storage. The state and federal water contractors have previously made an argument against additional Delta outflows because of the need for more cold water upstream storage (to attempt to defeat additional Delta outflow) in the legislatively required flow hearings at the State Board. We agree this analysis should be done and the DSC CEQA document seems like the right place to do it.

Proposed Trinity River Mitigation Measure: - The following mitigation measure would ensure that no harm is done to Trinity River fisheries through implementation of the Delta Plan and BDCP:

The SWRCB shall convene a Trinity specific water right hearing, as directed in SWRCB Water Quality Order 89-18.[60] The water right hearing shall license Reclamation's eight Trinity River water permits as follows:

1. Conformance of Reclamation's eight Trinity River water permits with the minimum instream flows contained in the Trinity River Record of Decision.
2. Inclusion of permit terms and conditions to require Reclamation to comply with the Trinity River temperature objectives contained in the Water Quality Control Plan for the North Coast Region (NCRWQCB).
3. A requirement to maintain an adequate supply of cold water in Trinity Reservoir adequate to preserve and propagate all runs of salmon and steelhead in the Trinity River below Lewiston Dam.
4. Eliminate paper water in Reclamation's Trinity River water rights.

(4-62, lines 25-27)- This statement tries to make it sound like increased water transfers through the Delta would be good for the biological environment by repelling salt water. However, it fails to state that increased water transfers also means increased Delta pumping, South Delta water quality impacts, and mortality to fisheries from the Delta pumps, either directly or indirectly through take at the pumps and modification of flows and habitat.

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[59] Letter of Paul Fujitani, Acting Operations Manager, US Bureau of Reclamation, to Brian Person, Chair, Trinity Management Council, Operating the Trinity River Division in Accordance with Water Rights Order 90-05 and Other Operational and Regulatory Objectives, February 23, 2011, accessible online at http://www.c-win.org/webfm_send/141. While USEPA maintains that Reclamation is required to comply with Trinity River Basin Plan Temperature Objectives for all project purposes, Reclamation does not agree. A February 23, 2011 letter by acting Central Valley Project Operations Manager Paul Fujitani to the Trinity Management Council stated, "We consider the Basin Plan to be objectives that we strive to meet, but do not consider the objectives as permit conditions."

[60]See: http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/1989/wq1989_18.pdf, page 18.

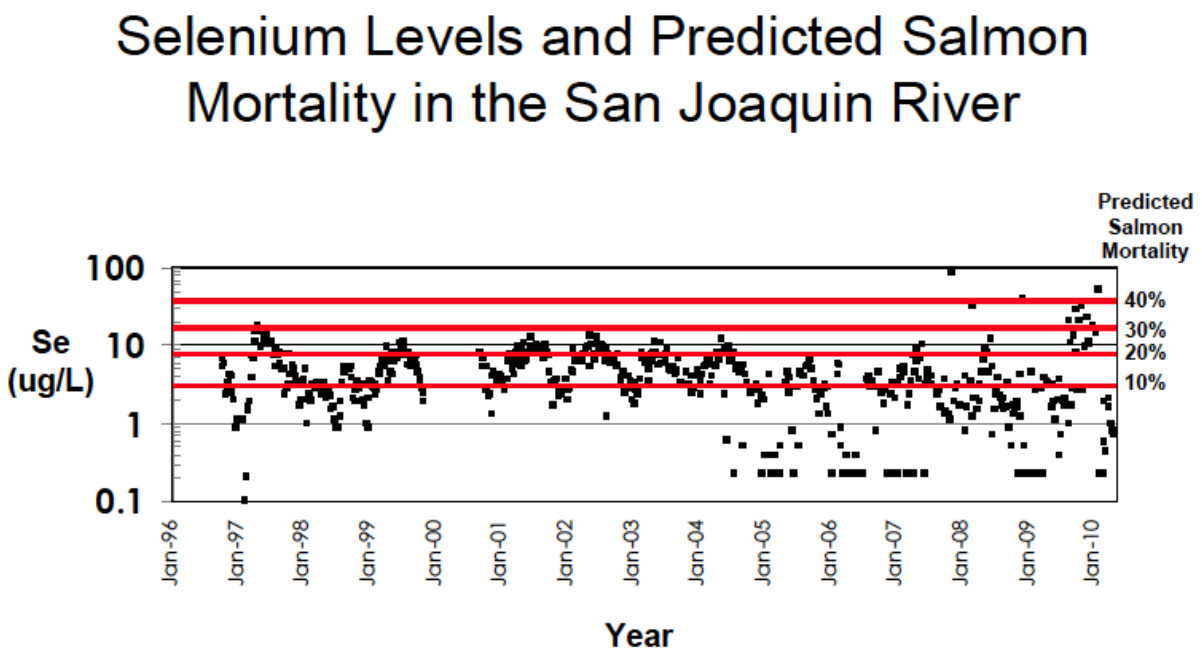
4-64/65 (end of page/top of second page)- Again, this tries to make water transfers look good by talking about increased flows in rivers going to the Delta, but it fails to identify adverse impacts to fish and water quality from increased Delta pumping associated with water transfers through the Delta.

Biological Project Impacts as a Whole- The DPEIR takes a conservative approach to most biological impacts by stating that project impacts are significant. However, most of these statements begin with something to the effect of: "Review of environmental analyses of similar projects suggests that these potentially significant impacts would be less than significant or mitigated to a less-than-significant level." Since the DPEIR does no quantitative analysis of each of the biological resource areas, the preceding statement is unsubstantiated, even if the final determination is a significant impact. Disclosure of the impact of the present CVP-SWP diversion system on the Bay/Delta ecosystem and public trust assets would make it impossible for this draft EIR to make the finding that "these potentially significant impacts would be less than significant or mitigated to a less than significant level."

4.4.3.3.2 Impact 4-2c: Substantial Adverse Effects on Special-status Species (4-74, lines 1-6)- The DPEIR makes the following statement in regard to impacts from treatment facilities such as ones proposed for treatment of selenium-contaminated agricultural drainage:

> The operation of facilities intended to improve water quality, such as discharges from wastewater treatment plants or the discharge of brine waste could adversely influence aquatic species if the discharges contained compounds or materials that produce direct toxicity or influence the aquatic food web. However, the discharges associated with any new facilities would be regulated by the SWRCB and RWQCBs to ensure compliance with existing water quality standards. Therefore, operation of these facilities would not be expected to produce significant impacts.

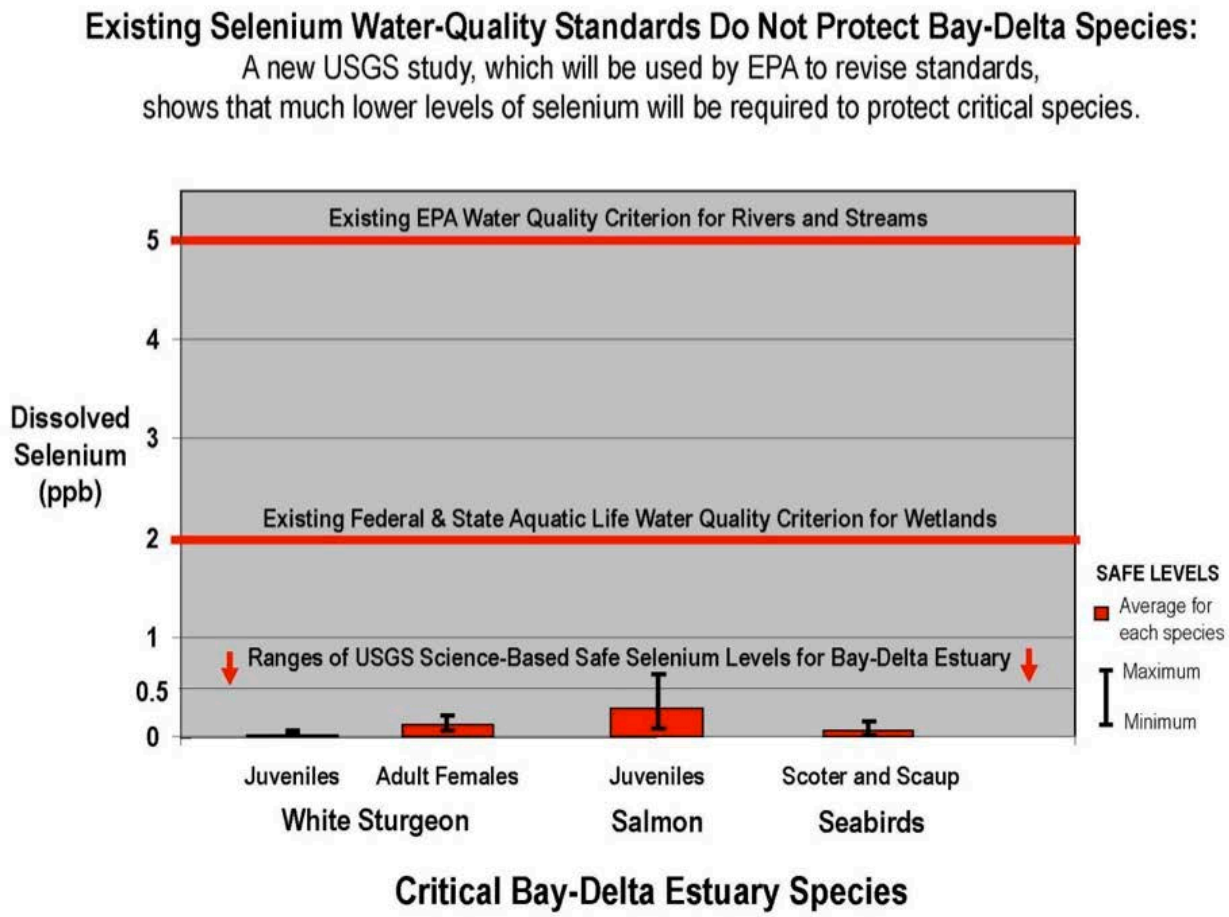
In the case of the Grasslands Bypass Project, enforcement of selenium water quality objectives in Mud Slough North and the San Joaquin River between Mud Slough and the Merced River have been waived until 2020, so the assumption is incorrect that the SWRCB and CVRWQCB will ensure compliance with existing water quality standards to protect aquatic resources. Existing selenium concentrations found in the San Joaquin River at Hills Ferry routinely exceed Basin Plan selenium water quality objectives and are inadequate to protect juvenile salmonids. See figure below.



Selenium concentrations measured in the San Joaquin River at Hills Ferry (data from the U.S. Bureau of Reclamation)

Additionally, the existing selenium water quality objectives are clearly inadequate to protect aquatic resources, as evidenced by the recent USGS Report[61] that indicates the existing Delta selenium water quality objective of 2 ppb should be reduced to no more than 0.5 ppb or even less in order to protect aquatic organisms and the species that feed on them. See figure below.

[61] Ecosystem-Scale Selenium Modeling in Support of Fish and Wildlife Criteria Development for the San Francisco Bay-Delta Estuary, California
By Theresa S. Presser and Samuel N. Luoma U.S. Geological Survey, Menlo Park, California. See http://www.epa.gov/region9/water/ctr/



Mitigation Measure 4.4 (4-86, lines 4-6)- In regard to alteration of flow patterns and water quality effects that could disrupt migratory cues for migratory aquatic species, it should specify that maintenance of adequate cold water storage behind the various rim dams (Shasta, Trinity, Folsom, Oroville, New Melones, Friant, etc.) is crucial to providing suitable spawning, incubating, rearing and migration of salmon, steelhead and other species.

(4-87, lines 10-15)- The document assumes that the Proposed Project will have less impact than No Project. However, since BDCP is to provide "full contract deliveries", it will entail greater Delta exports than the No Project Alternative, very likely through construction of a Peripheral "Chunnel" and possibly dual conveyance. The statement cannot be supported without full disclosure through qualitative analysis and an admission that increased Delta exports are possible once BDCP is incorporated into the Delta Plan.

Alternative 2 Analysis

(4-92, lines 31-32)- The finding is incorrect in that Alternative 2 would create less pollution as a result of agricultural treatment facilities. Instead, there would be a quantifiable improvement in water quality from savings in salt, selenium and boron mobilization from retirement of drainage problem lands. The permanent retirement of 380,000 acres of drainage impaired land in the San Luis Unit would decrease mobilization of selenium, salt, boron and other pollutants into the Grasslands Bypass Project and San Joaquin River, as well as the shallow and deep aquifers of the

western San Joaquin and Tulare basins. Based on analysis by the Bureau of Reclamation in the 2004 Broadview Water Contract Assignment Draft Environmental Assessment and Finding of No Significant Impact,[62] retirement of 10,000 acres in the Broadview Water District would result in the following reductions in pollutants to the Grasslands Bypass Project:

TABLE 4-1
DRAINAGE AND WATER QUALITY EFFECTS OF PROPOSED ACTION ON THE SAN JOAQUIN RIVER

	Existing Conditions	Under Proposed Action Conditions	Estimated Reduction Attributable to Proposed Action
BWD Drainage to San Joaquin River (afy)	3,700	1,100	2,600
BWD Estimated Salt Production (tons/yr)	24,300	7,300	17,000
BWD Estimated Selenium Production (lbs/yr)	2,140	640	1,500
BWD Estimated Boron Production (lbs/yr)	74,000	22,000	52,000

Source: Summers Engineering, 2003

Therefore, extrapolating the savings above, retirement of 380,000 acres of drainage impaired lands in the San Luis Unit would result in the reduction of 98,800 AF/year of contaminated agricultural drainage to surface water and groundwater, including a reduction of 646,000 tons of salt, 57,000 pounds of selenium and 1.976 million pounds of boron! Clearly, Alternative 2 cleans up significant sources of surface and groundwater pollution for the Delta and San Joaquin/Tulare basins and by far superior to any other alternative in this regard. The DPEIR does not disclose the magnitude of this improvement in water quality as a result of Alternative 2 because it lacks any quantitative analysis.

(4-93)- Alternative 2 does not have significant impacts to sensitive natural communities- The document incorrectly states that there will be significant impacts to sensitive natural communities (lines 21-21) compared to existing conditions because of the impacts of increased agricultural treatment facilities (although it gives no reason). As stated above, Alternative 2 does not contain agricultural treatment facilities because they would not be necessary if 380,000 acres of drainage problem lands in the San Luis Unit are retired. Therefore, Alternative 2 would not have significant impacts to sensitive natural communities as compared to Existing Conditions or the Proposed Project.

4.4.7.1.2 Impact 4-2: Substantial Adverse Effects on Special-status Species (4-93)- The DPEIR incorrectly assumes significant impacts from Alternative 2 compared to the Proposed Project and Existing Conditions because of an increase in agricultural drainage water treatment facilities. It also makes the nonsensical contradictory statement that:

"On balance, the temporary construction-related impacts under Alternative 2 would be greater than the Proposed Project because fewer projects would be constructed. In addition, the increased emphasis that Alternative 2 places on environmentally beneficial flows would likely contribute more to improving conditions for special-status species and arresting their decline.

[62] http://www.c-win.org/webfm_send/195, page 4-2.

Therefore, significant impacts on 4 special-status species under Alternative 2 would be *less than* under the Proposed Project."

Clearly, retirement of 380,000 acres and the huge reduction in selenium, salt and boron pollution, as well as establishment of instream flows and increased Delta outflows would vastly improve conditions for special status species and arrest their decline. The DPEIR makes incorrect and unsubstantiated findings in this regard in violation of CEQA's information disclosure requirements.

The same conclusions must also be made for **4.4.7.1.3 Impact 4-3: Substantial Reduction of Fish or Wildlife Species Habitat that** Alternative 2 does not create significant impacts compared to Existing Conditions or the Proposed Project.

The same conclusion also applies to **4.4.7.1.4 Impact 4-4: Interfere Substantially with the Movement of Any Native Resident or Migratory Fish or Wildlife Species or with Established Native Resident or Migratory Wildlife Corridors, and 4.4.7.1.5 Impact 4-5: Conflict with Any Local Policies or Ordinances Protecting Biological Resources or the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local, Regional, or State Habitat Protection Plan.**

Biological Resources Conclusion: Alternative 2 does not have significant impacts on biological resources compared to Existing Conditions or the Proposed Project. The huge reduction in creation of selenium, salt and boron pollution to surface and groundwater from cessation of irrigation of 380,000 acres in the San Luis Unit of the CVP makes Alternative 2 the environmentally superior alternative.

Chapter 5- Flood Risk

Overall, it is impossible to make a reasoned analysis of benefits or impacts to flood risk from the various alternatives in this chapter. For instance, there is no quantitative list of the number, size and cost of levee improvements included under the various alternatives. Alternative 2 should have clearly included a list of all levee work necessary to bring all Delta levees up to the PL 84-99 standard as stated in EWC correspondence on the fifth draft of the Delta Plan. Instead, the DPEIR incorrectly portrays Alternative 2 as "Actions to reduce flood risk under Alternative 2 would emphasize floodplain expansion and reservoir reoperation rather than levee construction and modification."

Specific impact analysis is put off until subsequent environmental documents. There is no discernable difference between No Action and the Proposed Action in terms of flood risk. No reasoned analysis can be made from the alternative descriptions, analysis and discussion in this chapter. Based on changes to accurately reflect the EWC's Alternative 2, Alternative 2 would have less impacts and more benefits than the Proposed Action in relation to flood risk.

Figure 5-3 is the wrong map. It is supposed to be the San Joaquin River Flood Control Project but instead it shows the Sacramento River Flood Control Project, the same as Figure 5-2.

5.4.7.1.1 Impact 5-1 (5-76)- We disagree that Alternative 2 would have greater impacts on drainage pattern alteration than the Proposed Project because Alternative 2 does not contain ocean desalination projects or agricultural drainage treatment facilities, but it does include

significant levee improvements by bringing all levees up to the PL 84-99 standards. Therefore, Alternative 2 would have the least impacts and certainly less impacts than the Proposed Project.

5.4.7.1.2 Impact 5-2 (5-77)- We agree that Alternative 2 would have less impacts than the Proposed Project for alteration of drainage patterns and polluted surface runoff.

(5-78) 5.4.7.1.5 Impact 5-5: Place Within a 100-year Flood Hazard Area Structures Which Would Impede or Redirect Flood Flows, or Inundation by Seiche, Tsunami, or Mudflow- We agree that "Overall, significant impacts associated with placement of structures within a 100-year flood hazard area under Alternative 2 would be **less than** under the Proposed Project."

Chapter 6- Land Use and Planning

Overall, this section doesn't say much. In regard to comparisons of impacts between the Proposed Project and Alternative 2, it assumes equal or greater impacts from Alternative 2, especially for the impact related to conflicts with applicable land use plans, policies, regulations, or land use restrictions from construction and operations (page 6-71, lines 5-7). This is largely from water conservation, recycling and the erroneous assumption that there would be more agricultural drainage treatment facilities. If anything, Alternative 2 should be equal or lesser impacts than the Proposed Project especially when one considers that the Proposed Project will ultimately include a Peripheral Canal or Tunnel that will have very significant impacts on Delta communities from a land use perspective- turning large acreages from agriculture to the environment as well as right of way for the Chunnel and its construction footprint (which is not disclosed).

Chapter 7 - Agriculture and Forestry

(7-62/63)-Alternative 2 Conversion of Farmland to non-agricultural use- This section mischaracterizes the Environmental Water Caucus' (EWC) Alternative 2. The EWC merely recommended consideration of a feasibility study of surface storage for the Tulare Lake Basin. The EWC also did not recommend ocean desalination or an increase in the number of agricultural drainage treatment facilities. The 380,000 acres of farmland recommended for retirement by the EWC will ultimately go out of production anyway because there is no viable cost effective technology to deal with the problem of toxic drainage from the San Luis Unit of the CVP.

Additionally, the Proposed Project will also include a significant amount of farmland conversion for the footprint of the Peripheral Canal or Tunnel being proposed by BDCP, in addition to required mitigation acreage. Given that impact and the above changes to Alternative 2, Alternative 2 should have the same or less impact on conversion farmland to non-agricultural use.

We agree that Alternative 2 has less impacts on agriculture than the Proposed Project for impacts 7-2 (Zoning for Ag use or Williamson Act lands), 7-3 (Loss/conversion of forestland), 7-4 (Zoning conflicts w/forestland) and 7-5 (Other changes to farmland/forest land).

Chapter 9 - Air Quality

This section, similar to the chapter on Climate Change and Greenhouse Gas Emissions (Chapter 21), fails to identify the air quality impacts from the energy demands of reverse osmosis for

agricultural drainage treatment and pumps to move water. Given that the Proposed Action includes an isolated delta conveyance facility that will likely increase pumping to South of Delta contractors, and increase the distance to pump the water, clearly there will be significant energy impacts from the Proposed Action that are not identified.

Alternative 2 without agricultural drainage treatment facilities and ocean desalination, would clearly be less energy intensive for ongoing maintenance and operation, thereby reducing the burning of fossil fuels such as coal which cause emissions of pollutants and greenhouse gases. Alternative 2 is therefore the environmentally preferred alternative.

Chapter 10 - Cultural Resources

Overall, this chapter is severely lacking in references to the Interior Department's tribal trust obligations to the Hoopa Valley and Yurok Tribes and their federally reserved fishing rights. Those obligations are spelled out in an Interior Solicitor's Opinion from 1993 (M-36979).[63] Nowhere in the entire document are those rights and obligations mentioned, nor are the names of the two Indian Tribes who have those special rights linked to a division of the Central Valley Project, unique in California. For instance, the Bureau of Reclamation releases water from Trinity and Lewiston Dams into the Trinity River for the Hoopa Valley Tribe's White Deerskin Boat Dance on odd-numbered years sometime near the end of August. That is a cultural religious ceremony flow directly plumbed to the CVP, but is nowhere mentioned in this document. The DPEIR is deficient in not addressing the existence of these tribal rights and flows, let alone impacts to them from the various alternatives.

Overall, since Alternative 2 would allow the smallest Delta exports (no more than 3 MAF/year), it would have the least impact on the Tribal Trust/cultural resources of the Hoopa Valley and Yurok Tribes because it would leave the largest amount of water in Trinity Reservoir to meet downstream temperature and flow requirements to fulfill Interior's tribal trust obligations.

Since the document and Proposed Project do not disclose actual construction projects like the Peripheral Canal, it is impossible to disclose or evaluate impacts to cultural resources from construction activities. In general it does find significant unavoidable impacts to various cultural resources from the Proposed Project and all alternatives, but specifics are severely lacking. The Proposed Project has greater impacts on cultural resources than any of the other alternatives, which is significant. The Proposed Project is not compared to Existing Conditions, even though the other alternatives are. It is disingenuous for them to not include a general map of the proposed Chunnel sites that BDCP is considering for the proximity to known sites of significance. The DPEIR could have had a lot more detail.

(10-23)- Thresholds of significance- The DPEIR fails to mention that impacts to extant cultural and religious ceremonies of Tribes such as Winnemem Wintu, Hoopa Valley and Yurok should be considered a significant impact (puberty ceremony, white deerskin boat dance, etc.). For instance, a lack of water in Trinity Reservoir might prevent the Bureau of Reclamation from releasing water into the Trinity River for the Hoopa Valley Tribe's White Deerskin Boat Dance.

(10-25) 10.4.3.1.1 Impact 10-1a: Disturbance or Destruction of Prehistoric and Historic-Era Archaeological Resources- The DPEIR fails to identify increased reservoir drawdown from the

[63] See http://www.doi.gov/solicitor/opinions/M-36979.pdf

Proposed Project to meet "full contract deliveries" to CVP and SWP contractors. The resulting reservoir drawdown will result in increased exposure of historical resources now within the inundation areas of major reservoirs such as Shasta, Trinity and Oroville. Overall this section is a cop out, as there are known routes for the PC that are part of BDCP. The DPEIR pretends that those plans and maps don't exist through BDCP! The DPEIR could have, at a minimum, shown a potential range of locations for the Chunnel with a numerical status of potentially affected known historic or prehistoric sites in the vicinity and severity of expected impacts (how many might be totally removed/destroyed because they are in the direct path of the "facility"?).

The same logic above applies to several other impacts to cultural resource sites, historic buildings human remains, etc.- Impacts 10-1a, 10-2a, 10-3a and 10-4a.

Chapter 14- Hazards Hazardous Materials

Overall, this chapter overestimates the hazmat impacts from Alternative 2 under the incorrect assumption that the EWC alternative includes increased construction and use of ocean desalinization and agricultural drainage treatment facilities and therefore greater exposure (greater impacts) compared to the Proposed Project. Alternative 2's reduction in selenium, salt and boron production and elimination of the need for agricultural pollution treatment facilities more than offsets hazmat impacts from increased recycling and sewage treatment facilities compared to the Proposed Project. Using information from the Broadview Contract Assignment Draft Environmental Assessment (Reclamation, 2004), extrapolating the savings from retirement of 380,000 acres of drainage impaired lands in the San Luis Unit would result in the reduction of 98,800 AF/year of contaminated agricultural drainage to surface water and groundwater, including a reduction of 646,000 tons of salt, 57,000 pounds of selenium and 1.976 million pounds of boron! Clearly, Alternative 2 cleans up significant sources of surface and groundwater pollution for the Delta and San Joaquin/Tulare basins and is by far superior to any other alternative in this regard. The DPEIR does not disclose the magnitude of this improvement in hazardous material production, storage, transport and disposal, as a result of Alternative 2 because it lacks any quantitative analysis. Alternative 2 is environmentally superior for Hazards and Hazardous Materials.

This chapter also substantially fails to estimate the INCREASE in disease vectors (mosquito habitat) by delivery of more water from the Delta and increased reliability of water to south of Delta agricultural water contractors. Alternative 2 would have substantially less impact for disease vectors compared to Existing Conditions and the Proposed Project because of the permanent retirement of 380,000 acres in the San Luis Unit of the CVP and a limit on Delta exports to 3 MAF, which is less than any other alternative. (note- we may not want to mention it but increased urban water supply reliability through reinstatement of the SWP urban water preference may slightly increase mosquito habitat in urban areas served by the SWP.)

Alternative 2 is clearly the environmentally preferred alternative in regard to hazards and hazardous materials.

14.3.4- Methyl Mercury (14-4)- There should be a similar section for selenium (14.3.5), as it is a hazardous material and is mobilized into the food chain by irrigated agriculture in the WSJV, which the proposed project through BDCP will increase to "full contract deliveries" and resultant increase in selenium contamination of SJR, aquifers and SF Bay Delta Estuary. Selenium is a significant issue because Alt 2 would effectively reduce this amount to zero from agricultural lands by retiring 380,000 acres in San Luis Unit- an improvement compared to existing

conditions or the Proposed Project. The document should discuss sources of selenium and the SLDFR and GBP efforts to create selenium collection/concentration facilities and compare to Alt 2 where no agricultural selenium pollution is created due to ending irrigated agriculture on drainage problem lands.

14.4.3- Other areas in CA (14-15)- This section should include areas such as Westlands/Grasslands/San Luis Unit drainage problem/toxic lands. Ending irrigation of these lands will significantly reduce creation and need for treatment of seleniferous toxic pollution from agricultural lands and subsequent exposure to humans and environment from this hazardous material. Also Table D-1 indicates a monthly mean 15 ppb interim performance goal for selenium. Under the Clean Water Act, there are no "interim performance goals." The GBP is not meeting state or federal selenium standards. The EPA Toxics rule was adopted in 2000, not 1992 yet USEPA has yet to comply with the law. The adopted EPA standard is 5 ppb 4 day moving average. As noted elsewhere in these comments, USGS has determined the selenium criteria for the Bay-Delta needs to be revised 50x less to protect aquatic species.

(14-17)- Proposed Project – Reliable water supply 14.5.3.1- The DPEIR does not disclose the amount of agricultural drainage treatment facilities that will be constructed for the Proposed Project (which is contained in the SLDFR EIS and ROD, Reclamation, 2007), which is actually greater than Alternative 2. There will be a substantial amount of toxic drainage created by Proposed Project, especially if BDCP purpose and need to provide "full contract deliveries" is fulfilled, and therefore there is a need for treatment facilities and associated risks to exposure from hazardous selenium, as well as other harmful substances extracted in planned treatment facilities. These impacts are fully mitigated in Alternative 2 by not allowing irrigation of the 380k acres and reduced Delta exports and increased urban water supply reliability for SWP, which decreases water deliveries to toxic lands in SWP service area in Western Tulare and Kern basins.

The same comment above applies to **14.5.3.1.1 Impact 14-1a** for the proposed project **(pages 14-17 to 14-19).**

(14-20) 14.5.3.1.3 Impact 14-3a: Create Vector Habitat That Would Pose a Significant Public Health Hazard- This section fails to identify that the Proposed Project would increase impacts due to providing "full contract deliveries" to CVP and SWP agricultural contractors south of the Delta and therefore increases creation of standing water for mosquito breeding and disease vectors. Again, Alternative 2 has reduced impacts due to reinstatement of the SWP urban water preference taking water away from Ag in SWP service areas and elimination of irrigation of 380,000 acres in San Luis Unit of CVP.

(14-26) 14.5.3.3 Water Quality Improvement- This section should include descriptions of the Grasslands Bypass Project, Panoche Demonstration Selenium Treatment Plan and SLDFR treatment systems/plants in the list of projects at the bottom of 14-26/top of 14-27. This is a significant omission that results in falsely making the Proposed Project superior in impacts to Alternative 2 where there are no such treatment plants needed for selenium contamination of agricultural runoff but the document mistakenly says there are.

(14-27) 14.5.3.3.1 Impact 14-1c: Create a Significant Hazard to the Public or the Environment Through the Routine Transport, Use, or Disposal of Hazardous Materials or Through Reasonably Foreseeable Upset and Accident Conditions Involving the Release of

Hazardous Materials into the Environment- There needs to be a description of what exactly are the technologies and costs of the CV Salts program (lines 17-18) and how much hazardous materials it is expected to produce. Lines 23-24 should describe the alternative conveyance that the BDCP is expected to result in construction of (Chunnel).

(14-28) 14.5.3.3.2 Impact 14-2c: Impact 14-2a: Be Located on a Site Which Is Included on a List of Hazardous Materials Sites Compiled Pursuant to Government Code, Section 65962.5 and, as a Result, Would Create a Significant Hazard to the Public or the Environment- This section makes a statement that the GBP EIS/EIR stated that there were no impacts from hazardous materials, making it appear that there are no hazardous material issues related plans to deal with toxic drainage from continued irrigation of the San Luis Unit (380,000 acres) under the Proposed Project and all alternatives other than Alternative 2. However, the GBP EIS/EIR did not include evaluation of selenium treatment facilities. The more recent Panoche Demonstration Selenium Treatment Plant Draft EA/FONSI states that 55,000 lbs. of hazardous waste annually will be created from this small demonstration project and will need to be transported to a Class 1 hazardous waste facility such as Kettleman City. It is important to note that the San Luis Drainage Feature Re-Evaluation (SLDFR) EIS and ROD (Reclamation 2007) are not even mentioned in the Delta Plan DPEIR. Furthermore, the SLDFR EIS and ROD contain no mention or analysis of hazardous materials. However, according to USGS Open File Report 2008-1210[64] the waste pile from implementing the SLDFR alternative with the existing condition of 100,000 acres of land retirement would create a selenium contaminated waste pile of 311 acres one foot deep per year. That is the equivalent of 412,000 tons a year, or 13.24 million cubic feet. Many of those wastes will contain hazardous waste concentrations of selenium (over 1,000 ug/l). Over the fifty year life of the project, it would create a pile of salts and selenium 50 feet high covering 311 acres (662 million cubic feet or 20.6 million tons of material). This is a significant amount of hazardous waste that from Existing Conditions and the Proposed Project that would not exist under Alternative 2.

(14-36) 14.5.3.6.1 Mitigation Measure 14-1- The mitigation measure to use BMP's to prevent spills, etc. would be needed more for Proposed Project than Alt. 2 because there are many less toxic substances created by cessation of irrigation of the San Luis Unit by 412,000 tons/year.

(14-45)- General description of Alternative 2- Incorrectly states more agricultural drainage treatment and ocean desalination facilities. Therefore, Alternative 2 would involve less facilities that would use or create hazardous materials than the Proposed Action.

(14-45) 14.5.7.1.1 Impact 14-1: Create a Significant Hazard to the Public or the Environment Through the Routine Transport, Use, or Disposal of Hazardous Materials or Through Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials into the Environment- This discussion erroneously says that Alternative 2 has more impacts than the Proposed Project (or existing conditions). It fails to recognize that under Alternative 2, there is no need for treatment of agricultural drainage treatment facilities. Alternative 2 has less impacts than Proposed Alternative and is much less than Existing Conditions because Existing Conditions includes irrigation of 280,000 acres (380,000 acres minus 100,000 acres already retired) in San Luis Unit that aren't included in Alternative 2.

There will be less selenium, boron and salt toxic drainage created than Existing Conditions or

[64] http://pubs.usgs.gov/of/2008/1210/of2008-1210.pdf page 27-28

Proposed Action which both have less land retirement than Alt. 2.

(14-46)- 14.5.7.1.3 Impact 14-3: Create Vector Habitat That Would Pose a Significant Public Health Hazard- This section incorrectly concludes Alternative 2 would create more vector habitat than the Proposed Project or existing conditions. However, since Alternative 2 has less water going to Agriculture south of delta due to land retirement and a limit on exports to 3 MAF, there would be less vector habitat created. Again, Alternative 2 is environmentally preferred because it creates less vector habitat than existing or Proposed Action or any other alternative.

Chapter 18 - Recreation

(18-52)- Alternative 2 does not include construction of additional agricultural drainage treatment facilities or ocean desalination facilities, therefore, there would be less impacts to recreation than the Proposed Project. We agree that Alternative 2 would have less impacts to recreation than the Proposed Project in relation to impairment or degradation of recreational facilities and activities. However, because Alternative 2 would improve water quality, Delta flows and fish populations, we disagree that it would have significant impacts compared to Existing Conditions in relation to degradation of recreational facilities and activities.

(18-53)- We agree that Alternative 2 would have less impacts on physical deterioration of recreational facilities, but we disagree that it would have significant impacts compared to Existing Conditions. Improved water quality in the Delta, including improved freshwater flows would decrease salt in the Delta compared to Existing Conditions, and that alone would decrease the ongoing deterioration of Delta recreational facilities such as marinas, boats, etc.

We agree that Alternative 2 would have less impacts than the Proposed Project for construction or expansion of recreational facilities.

Chapter 22 - Cumulative Impacts

Water Resources and Biological Resources- Trinity River- The Trinity River Record of Decision, which is not mentioned anywhere in the DPEIR analysis includes, among other things, a 474,000 AF increase in Trinity River instream flows compared to Reclamation's existing Trinity River water permits that have a minimum instream flow of only 120,500 AF. Fulfillment of "full contract deliveries" per the BDCP Purpose and Need will cumulatively impact the Trinity River and cold water storage in Trinity Reservoir necessary to meet the federal fishery restoration goals for the Trinity River. See Biological Resources discussion on Trinity River for more detail and mitigation measures.

22-3- Groundwater resource impacts (lines 36-39). The document incorrectly states that impacts to groundwater resources will be less than significant for the Proposed Project because of "the likelihood of overall beneficial effects." This assumes that groundwater management plans will adequately protect groundwater resources, which is incorrect in that some plans still allow overdraft and aquifer compaction/settling.

North Coast Wild and Scenic Rivers- The cumulative impact of the Delta Plan, once BDCP is accepted into the plan, will create political pressure to un-designate California's North Coast Rivers from Wild and Scenic River protections (Trinity, Eel, Klamath and Smith rivers). The

BDCP's purpose and need to provide "full contract deliveries" to SWP and CVP customers cannot be met without diverting North Coast Rivers currently protected under Wild and Scenic designations. The State Water Project was premised on damming the Eel River and diverting it to a Peripheral Canal. The state designation of North Coast Wild and Scenic Rivers including the Eel by Governor Ronald Reagan (1972) and the federal designation by Interior Secretary Cecil Andrus in 1981 halted plans to provide millions of additional acre-feet to the CVP and SWP. As noted in the SWRCB's Bay-Delta Outflow Report, it is clear that existing Delta exports are harming the ecosystem. Increased exports through "full contract deliveries" to Delta exporters would clearly require a significant source of water not currently available, thereby creating political pressure to un-designate North Coast Wild and Scenic Rivers.

Water Resources- While the DPEIR project area includes the Trinity River and Delta tributary rivers and streams, there is no cumulative analysis of water quality or water quantity impacts to rivers/areas of origin. As stated in our comments on Chapter 3, an analysis of impacts to the Trinity River, Sacramento River and other rivers should have been completed. The ability to meet temperature and other water quality objectives as well as the ability of the various alternatives to meet prescribed flow regimes to protect Public Trust resources should have been conducted but was not.

The lack of quantifiable information on the Proposed Project's Delta outflows, instream flow regimes, water quality standards and other water resource information completely fails to disclose any cumulative impacts to water resources. Since the BDCP will include plans to increase Delta exports and construct a Peripheral Canal/Tunnel, it is logical to assume significant impacts to a variety of water resources, but this DPEIR completely fails to disclose anything. However, it is obvious that Alternative 2 would have less cumulative impacts to water resources than the Proposed Action.

There is overall no credible cumulative impact analysis for any issue area. Given the misrepresentations in Alternative 2, clearly Alternative 2 has less individual and cumulative significant impacts than the Proposed Action or any other alternative considered.

Chapter 24 - Other CEQA Considerations

There is not enough information in the DPEIR to make a reasoned analysis of other CEQA considerations. Given that there is no water availability or economic analysis in the DPEIR, it is impossible to tell what growth inducing or other impacts are likely.

Chapter 25 - Environmentally Preferred Alternative

Overall this chapter states that the Proposed Project is the environmentally preferred alternative. Alternative 2 comes in second largely because of the large amount of land retirement of drainage problem lands (380,000 acres) and the re-creation of Tulare Lake (320,000 acres). However, it is important to note that the agricultural drainage-impaired land going out of production will ultimately go out of production anyway because there is no cost effective or technologically-effective solution other than to take that land out of production. The huge impacts of salt, selenium, boron and other pollution resulting from continued irrigation of those lands until they ultimately salt up is far worse for the environmental "losses" of taking the land out of production sooner rather than later under Alternative 2.

Water Resources
We agree with the finding that Alternative 2 would have less impacts than the Proposed Project or other alternatives on water resources. While Alternative 2 would have impacts to water supply reliability for the western San Joaquin Valley from reduced Delta diversions, it would dramatically improve water supply reliability for urban areas which rely on Delta exports BECAUSE of the reduced agricultural water deliveries to poisoned lands and reinstatement of the urban preference in SWP contracts. Water quality for Delta farms would be improved. Groundwater supplies and quality north of the Delta would also be better protected under Alternative 2 than the Proposed Project because of the limitation on Delta exports that would limit north to south groundwater transfers that could negatively impact Sacramento Valley groundwater. The construction of more recycling and local water supply projects will also help mitigate negative impacts from Alternative 2's limitations on Delta exports. Alternative 2 is therefore the environmentally preferred alternative.

Biological Resources
We agree with the finding that Alternative 2 would contribute more to improving conditions for biological resources and arresting ecosystem decline than the Proposed Project, primarily because of its more rigorous pursuit of flow objectives that protect the environment and public trust resources. Furthermore, Alternative 2 would greatly improve water quality in the Delta and San Joaquin River by permanent retirement of 380,000 acres of toxic lands, a portion of which currently discharges highly toxic selenium, salt, boron and other pollutants into the San Joaquin River through the Grasslands Bypass Project. Because it limits Delta exports, Alternative 2 would also have less impacts on the Trinity River, Sacramento River and rim reservoir cold water storage for downstream fish protection.

Delta Flood Risk
We disagree that the Proposed Project would have less flood risk impacts than Alternative 2. Alternative 2 has been misrepresented in terms of providing improved levees in the Delta. Alternative should include the Environmental Water Caucus' position that all levees be upgraded to core levees above the PL 84-99 standard, in accordance with the recommendations of the Delta Protection Commission. This action is superior to the Proposed Project. If supported by the Delta Stewardship Council, this action would significantly reduce Delta earthquake and sea level rise vulnerabilities, putting Alternative 2 on a par with the Proposed Project (CEQA Guideline 15126.5, Discussion of Alternatives). Alternative 2 is therefore the environmentally preferred alternative for flood risk.

Land Use and Planning
We agree that the Proposed Project would have the greatest potential to conflict with local land use policies and plans. Since Alternative 2 would have the smallest number of projects constructed compared to any other alternatives, it is the environmentally preferred alternative for conflicts with Land Use and Planning.

Visual Resources
We disagree that Alternative 2 would have more impacts than the Proposed Project in regard to visual impacts. The DPEIR incorrectly assumes that Alternative 2 includes desalination projects and agricultural drainage treatment facilities. Since Alternative 2 does not include significant new infrastructure such as a Peripheral Canal, it should have less visual impacts. Therefore, Alternative 2 is the environmentally preferred alternative in regard to visual resources.

Air Quality
We disagree that Alternative 2 would have greater air quality impacts than the Proposed Project. The DPEIR incorrectly assumes that Alternative 2 includes desalination projects and agricultural drainage treatment facilities. Since Alternative 2 does not include significant new infrastructure such as a Peripheral Canal, it should have less air quality impacts. Reduced Delta exports would also translate directly into decreased use of fossil fuels for electrical generation to meet Delta pumping demands. Land retired under Alternative 2 could be revegetated such that dust impacts could be fully mitigated. Therefore, Alternative 2 is the environmentally preferred alternative in regard to air quality, especially after mitigation for dust from retired agricultural lands.

Cultural Resources
We agree that all alternatives other than the Proposed Project would have less impacts to cultural resources. However, Alternative 2 rises to the top as having the least cultural impacts because it reduces Delta pumping demands, which in turn reduces the following cultural impacts:

1. Reduced drawdown of CVP and SWP reservoirs, thereby reducing exposure of historical resources that are normally submerged under the reservoirs.
2. Increased water availability for cultural water flows such as the Hoopa Valley Tribe's White Deerskin Boat Dance.
3. No raising of Shasta Dam, thereby preserving remaining cultural sites of the Winnemem Tribe such as Puberty Rock.

Therefore, Alternative 2 is the environmentally preferred alternative for cultural resources.

Geology and Soils
We agree that the Proposed Project has the most construction impacts and therefore the largest impact on this resource compared to all other alternatives. Alternative 2 has the least amount of construction projects and is therefore the environmentally preferred alternative for geology and soils.

Paleontological Resources
We agree that Alternative 2 and No Action have the least impacts to paleontological resources because they have the least construction activities. Therefore, Alternative 2 is the environmentally preferred alternative for paleontological resources.

Mineral Resources
We disagree that Alternative 2 would have the same impacts on mineral resources as the Proposed Project. Alternative 2 has less construction activities and would therefore have less impacts to mineral resources than the Proposed Project. Therefore, Alternative 2 is the environmentally preferred alternative for mineral resources.

Hazards and Hazardous Materials
We disagree that Alternative 2 would have similar hazardous materials impacts as the other alternatives. Only Alternative 2 eliminates delivery of clean water to poison ground. Elimination of irrigation water to 380,000 acres of drainage impaired lands in the San Luis Unit of the CVP would reduce the creation of hazardous waste containing selenium, salt, boron and other contaminants.

We also disagree that Alternative 2 would increase vector-related hazards from construction of wetland and habitat restoration projects. To the contrary, plans to continue to irrigate 380,000 acres of land in the San Luis Unit and 320,000 acres in the Tulare Basin increases the risk of ponding water in agricultural areas that could create disease vector habitat.

The irrigation of toxic soils also poses a problem for endangered species such as the Giant garter snake and others as the selenium concentrates up the food chain.

Therefore, Alternative 2 is the environmentally preferred alternative for hazards and hazardous material resources.

Noise
We disagree that Alternative 2 would have greater impacts because of ocean desalination facilities in urban areas. Alternative 2 does not include ocean desalination facilities and has less construction than the Proposed Project. Therefore, Alternative 2 is the environmentally preferred alternative for noise.

Population and Housing
We disagree that Alternative 2 has population and housing impacts/demands similar to the other alternatives. Since Alternative 2 has less construction activities than the Proposed Project, it should have less impacts on population and housing. Therefore, Alternative 2 is the environmentally preferred alternative for population and housing.

Public Services
We agree that all alternatives have similar minimal impacts on public services.

Recreation
We agree that Alternative 2 has less impact to recreational facilities than the Proposed Action. Given the California budget mess and the fact that State Parks are closing, it is absurd for the Delta Plan to realistically think that new recreational facilities will be constructed and maintained in the Delta. Alternative 2 would improve the Delta ecosystem and fishing recreation by increased Delta outflows and improved water quality. Therefore, Alternative 2 is the environmentally preferred alternative for recreation.

Transportation, Traffic and Circulation
We agree that Alternative 2 would have less construction activities and therefore has less impacts on transportation, traffic and circulation. Therefore, Alternative 2 is the environmentally preferred alternative for transportation, traffic and circulation.

Climate Change and Greenhouse Gas Emissions
We disagree that Alternative 2 would have equal Greenhouse Gas Emissions (GHG) to the proposed project. The DPEIR erroneously assumes that Alternative 2 includes ocean desalination plants and reverse osmosis facilities to treat agricultural drainage. Since Alternative 2 should not include those 2 types of facilities, it will create less GHG's from energy generation for both pumping and other facility operation. Therefore, Alternative 2 is the environmentally preferred alternative for Climate Change and GHG.

Environmentally Preferred Alternative

An argument was previously made in these comments that the 380,000 acres of drainage impaired lands scheduled for retirement in Alternative 2 will go out of business anyway due to salt and boron buildup in the soils in comments on Chapter 2A. In all other areas, as demonstrated above, Alternative 2, as corrected, would be the environmentally preferred alternative.[i]

CONCLUSION

For all of the above mentioned reasons, this draft EIR should be withdrawn, rewritten, and recirculated consistent with these comments and the comments submitted by the Law Offices of Rossmann & Moore, the Law Offices of Stephan Volker, Lozeau Drury, Lewis Brisbois Bisgaard & Smith LLP, the South Delta Water Agency, and the Environmental Water Caucasus, as incorporated herein by reference.

Respectfully submitted February 2, 2012

s/ MICHAEL B. JACKSON

Michael B. Jackson, Esq. for
CSPA, CWIN, AquAlliance, and PCFFA

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[i] [i] References cited throughout:

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COALITION OF ENVIRONMENTAL, ENVIRONMENTAL JUSTICE, TRIBAL AND FISHING ORGANIZATIONS' COMMENTS ON THE FIFTH STAFF DRAFT OF THE DELTA PLAN

September 30, 2011

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COALITION OF ENVIRONMENTAL, ENVIRONMENTAL JUSTICE AND FISHING ORGANIZATIONS

To: Joe Grindstaff, Executive Officer
Delta Stewardship Council

From: Coalition of Environmental, Environmental Justice and Fishing Organizations

Subject: Comments on the Fifth Staff Draft of the Delta Plan

September 30, 2011

Our coalition of more than 200 organizations is pleased to provide comments as you continue the development of the Delta Plan and we look forward to your ongoing development of the Plan. We continue to be impressed with your work processes and transparency, which are raising the bar for public agencies.

At the same time, we have serious misgivings about the overall direction of the plan, especially as regards the balancing of the Public Trust, and we have recommendations for actions that are needed by the Council to arrive at a completed and legal Delta Plan. As required by Water Code §85203: "[t]he longstanding constitutional principle of reasonable use and the public trust doctrine shall be the foundation of state water management policy and are particularly important and applicable to the Delta."

Thirty plus years of failure by state and federal agencies to protect the Delta and balance competing demands for limited water resources led the State Legislature to enact the Delta Reform Act of 2009 (Act). The Act created and directed the Delta Stewardship Council (Council) to develop a legally enforceable Delta Plan to achieve the coequal goals of "providing a more reliable water supply for California" and "protecting, restoring, and enhancing the Delta ecosystem" in a manner that "protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place." The Act also established a state policy of promoting regional self-reliance and reduced reliance on the Delta in meeting California's future water supply needs.

The Delta Plan functions as a strategic document providing guidance and recommendations to cities, counties, and State, federal, and local agencies on how to restore the Delta ecosystem and provide a more reliable water supply for California. It contains regulatory policies and establishes a certification process for proposed projects to comply with the Delta Plan and envisions incorporation of other "completed" plans into the Delta Plan. In other words, the Council must "certify" that proposed plans, projects, and covered actions are consistent with the Delta Plan.

The California Supreme Court, in the Mono Lake decision, explicitly set forth the state's "affirmative duty to take the public trust into account in the planning and allocation of water resources and to protect public trust uses whenever feasible." The Council clearly has trustee

responsibilities in balancing the public trust. Planning and allocation of limited and oversubscribed resources implies analysis and balancing of competing demands. Inexplicably, we find little effort to balance the public trust obligations and resolve competing demands within the Fifth Draft of the Delta Plan.

Failure to define and quantify the coequal goals is undermining the Council's best efforts. It is not clear what is meant by: a more reliable water supply; protecting, restoring, and enhancing the Delta ecosystem; enhancement of the Delta as an evolving place; regional self-reliance; and reduced dependence on the Delta. For example, reliably receiving full contracted quantities or receiving the present level of water deliveries is considerably different than reliably receiving water after the public trust has been balanced and the Delta ecosystem protected. What are the yardsticks by which success will be documented? Failure to define "getting well together" was the genesis of the CalFed debacle and resolving California's continuing water crisis is unlikely without definition and quantification of these terms.

The inescapable reality is that consumptive water rights issued by the State Water Resources Control Board (State Board) exceed unimpaired flow into the Delta and contracts for state and federal project water are far greater than available supplies. Increased pollutant mass loading to the estuary has exhausted assimilative capacity and exacerbated water quality degradation. Ever-increasing diversion of water has led to the collapse of estuary's biological tapestry. These actions have injured beneficial uses and degraded public trust resources. Two recent state agency reports, developed through extensive public processes, conclusively establish that an increase in Delta outflow is necessary to protect and restore the estuary's aquatic ecosystem.[1]

California's water system is seriously oversubscribed, operating in deficit, and incapable of meeting competing demands on the system. The Council's charge is to resolve this imbalance. In the near term, it's largely a zero sum game. More water to protect public trust values translates to less water for consumption values. Over the longer term, redefining the CVP and SWP to reflect legally available water supplies, improved efficiencies, conservation, reclamation, reuse and improved storage and diversion methods can significantly alleviate, but likely not completely eliminate water shortages. The Council cannot evade having to make difficult decisions regarding the distribution of limited water resources. Sadly, the Fifth Draft of the Delta Plan embraces the status quo and fails to provide the structure and information critically necessary to make intelligent, but painful decisions.

Economics is the science of choice and the study of the allocation of scarce resources among competing demands. Water is scarce in California. Consequently, any process that involves water allocation and protection of biophysical (instream) or in-Delta use values needs to consider the economic value of the public trust and the economic consequences of potential choices or alternatives – i.e., the balancing of the public trust and competing municipal, industrial and agricultural beneficial uses. As a state agency with public trust responsibilities, the Council is required to balance the public trust in both the Delta Plan and Environmental Impact Report (EIR). This requirement to balance the public trust is also intrinsic to other agencies in other and

[1] State Water Resource Control Board. August 2010. *Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem*; California Department of Fish and Game. November 2010. *Quantifiable Biological Objectives and Flow Criteria for Aquatic and Terrestrial Species of Concern Dependent on the Delta.*

future proceedings, including; the State Board's current San Joaquin Flow and South Delta Salinity proceeding and equivalent EIR, their anticipated Bay-Delta water rights proceeding and the Bay Delta Conservation Plan's (BDCP) Habitat Conservation Plan and EIR.

The Mono Lake proceeding was a classic public policy proceeding of allocating a scarce resource among competing demands. It identified the ecological uses of trust resources and their biological requirements, examined the relationship between water flows and impacts on ecological uses and compared the costs to the City of Los Angeles acquiring water from other sources with the economic benefits of protecting the ecological values of the lake's public-trust resources.[2] The City claimed that the costs of alternatives to diverting water from the lake were prohibitive. However, comprehensive economic analysis demonstrated that the economic benefits of protecting the ecological uses of the Mono Lake's public trust resources were more than 47 times greater than the costs to Los Angeles.[3] The State Board considered other factors along with economic results in reaching a decision, but economic factors played a significant and pivotal role.

One of the significant flaws of previous and unsuccessful Bay-Delta proceedings has been the absence of a comprehensive economic evaluation of the benefits of protecting the estuary and in-Delta beneficial uses compared to the benefits of diverting and exporting water from the estuary. This absence has deprived decision makers and the public of critical information fundamental to reaching informed and difficult decisions on balancing competing demands.

The Fifth Draft Delta Plan is bereft of any economic analysis of public trust values. The current draft of the Delta Protection Commission's *Economic Sustainability Plan for the Delta*, which is scheduled to be completed 22 September 2011, only addresses potential economic **impacts** from several conceptual alternatives on Delta agriculture, recreation, infrastructure, and local economies. It excludes impacts to the commercial and subsistence fishing communities and the intrinsic ecological value of the Delta as an ecosystem. It ignores water quality impacts, other than agriculture. It fails to address the **value** of public trust resources, including the economic significance and the contingent valuation of fisheries, natural resources, and associated ecosystem services. Nor does it address the relative economic value of the uses to which water is applied. In short, it is a partial but wholly inadequate initial step to providing the comprehensive economic analysis necessary for the Council to balance the public trust.

The State Water Contractors recently presented BDCP with a report claiming that a peripheral canal would create about 7 to10 jobs for every million dollars spent on construction or operation. However, published estimates of jobs created by investment in water/energy efficiency projects range from 15 to 22 jobs per million dollars of direct investment, with the added benefit of enormous water savings. Furthermore, a full socio-economic analysis would likely demonstrate

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[2] Koehler, C.J. 1995. "Water Rights and the Public Trust Doctrine: Resolution of the Mono Lake Controversy." *Ecology Law Quarterly* 22: 451; Casey, E. 1984. "Water Law—Public Trust Doctrine," *Natural Resources Journal* 24: 809-825.

[3] Loomis, J. 1987. "Balancing Public Trust Resources of Mono Lake and Los Angeles' Water Right: An Economic Approach." *Water Resources Research* 23: 1449-1456. August; Loomis, J. 1997. Use of Non-Market Valuation Studies in Water Resource Management Assessments. Colorado State University; Duffield, J. 2010. *Valuing Ecosystem Services in River and Lake Systems: Methods and Western U.S. Case Studies*. Presentation, Salt Lake City, April 28.

that a restored Delta ecosystem would generate economic benefits far in excess of any benefits arising from constructing a peripheral canal.

Beyond protecting California's common property right in public trust resources, the balancing of limited water supplies must address the relative economic value of competing interests. For example, what is the societal value in providing Kern County, comprising a fraction of one percent of the state's population and economy, the same quantity of Delta water as the South Coast, with half the state's population and economy? What is the value to society of using public subsidies to irrigate impaired lands to benefit some 600 landowners (some have estimated the vertically integrated ownerships to be even less, around 350), and that, by the nature of being irrigated, discharge prodigious quantities of toxic waste that impairs other beneficial uses? What is the economic value of using twice the amount of water to irrigate an orchard in the desert than is required elsewhere? What are the costs and benefits of reclamation, reuse, conservation and development of local sources? Should consumptive use of limited water supplies be prioritized on the basis of efficiency or economic value? Does health & safety take precedence over certain other uses?

The preceding are only examples of the difficult questions that must be addressed in any allocation of limited resources and balancing of the public trust. Economic analysis is crucial to providing the insight and guidance that will enable the Council to meet its mandate. Without such analysis, we do not believe the Council can successfully or legally comply with its legislative and constitutional obligations.

Comprehensive economic analyses are not academic exercises. They are routinely employed by state and federal agencies throughout the nation to address both market and non-market costs and benefits of water projects. A sampling of these resources and best practices is included as Attachment I. It is unlikely that a successful plan which meets the co-equal goals can be achieved without defining the goals that incorporate measurable performance objectives and which provide a scientific basis for evaluating the economic consequences of diverse alternatives. In the final analysis, the restoration of the Delta ecosystem cannot be measured in money spent, programs or projects implemented or acres converted to habitat. It must be measured by specific indices that quantify improvements in water quality and the health and abundance of fisheries and wildlife.

The entire document, while professing to espouse an understanding of the Delta cannot be complete without recognition that as a cultural area the first people of the state are not included or discussed in the document and that the water rights of the California Indians are still to be mitigated at this late date. Tribal uses of water must be considered in order to begin to embrace the failure of agencies to acknowledge tribal water rights as well as cultural rights guaranteed under treaty to access and use water ways and estuaries for tribal existence. California water law has refused to include the mitigation of tribal water rights as senior to all other, as well as the non-abrogation of water rights under treaty, despite the continued inference of the government to the Winters decision.

In addition to these above comments and recommendations pertaining to the Public Trust economic analysis, we have also based our remaining comments on the following overall findings:

1. The Delta is over appropriated and unless exports are reduced to a scientifically permissible level, the Delta estuary cannot be recovered in any scientifically acceptable sense.

2. The over appropriation stems primarily from CVP and SWP contract levels which cannot be met.

3. An aggressive water efficiency program – more aggressive and of longer duration that the 20/20 program – which includes both urban and agricultural users is a necessary component for reducing reliance on the Delta.

4. The Delta ecosystems and wildlife cannot be restored without significant reductions of pollutants that are currently being poured into the Delta and without significant improvements in the fabric of ecosystem habitats essential to sustaining beneficial uses of the Delta.

5. The water use reductions and savings shown in the EWC alternatives make major structural alternatives such as a canal or tunnel around or under the Delta and further surface storage unnecessary for water supply reliability.

6. While the Delta Reform Act provides broad narrative goals for the Delta Plan, it does not provide clear, specific, and measurable objectives as called for in Adaptive Management programs. The Delta Plan must not defer this next necessary step of Adaptive Management. The Plan must begin to establish clear and measurable goals, objectives, and performance measures; it must quantify goals and provide specific accomplishment dates. It must require the same of any BDCP plan that is incorporated into the Delta Plan.

7. As recommended in recent federal biological opinions, evaluations of fish passage around major Central Valley dams connected to the Delta should be conducted in order to determine the possible benefits to endangered salmonid species.

8. The Delta Plan must include actual consultation and planning that includes California tribal nations, federally and non-federally recognized, in order to include tribal needs and concerns for the uses of the waters into and out of the delta and how the transfer and use of these waters affects tribes and the inherent, non-abrogated rights of the tribes to these waters.

Our comments on specific chapters of the Fifth Draft Delta Plan follow.

CHAPTER 2 – SCIENCE AND ADAPTIVE MANAGEMENT.

Although here are no Policies or Recommendations to respond to in this chapter, we have the following general comments and recommendations:

1. The adaptive management program outlined in the Delta Plan, while promising to incorporated science into the decision making process, is little more than window-dressing facilitating business-as-usual. Although here are no Policies or Recommendations to respond to in this chapter, we have the following general comments and recommendations:

2. The Delta Reform Act requires inclusion of science-based adaptive management in the Delta Plan for ongoing ecosystem restoration and water management decisions. While the Delta Plan requires that all covered actions include an adaptive management plan incorporating the nine-step framework, there is nothing that describes how the adaptive management will be implemented, how implementation will be evaluated, or even that it actually be implemented. Indeed, the Delta Plan does not mention the words "adaptive management" in it's *A More Reliable Water Supply*, *Restore the Delta Ecosystem*, *Improve Water Quality to Protect Human Health* and the Environment, *Reduce Risk to People, Property, and State Interests in the Delta* or Protect and *Enhance the Unique Cultural Recreational, Natural Resources, and Agricultural Values of the California as an Evolving Place* chapters. There is nothing in the Delta Plan to indicate that science, rather than the political agenda of water agencies, will determine water management decisions.

    - We therefore fully concur with the Delta Independent Science Board (DISB) recommendations that the principles of adaptive management must be applied in Chapters 4 through 8. These chapters must describe and demonstrate how adaptive techniques can be integrated into the actions proposed for the Delta Plan. Failure to do so would be a major oversight and, as indicated by the DISB, would undermine the legislative mandate for the co-equal goals.[4]

3. The panel convened by the National Research Council of the National Academies, in their 2011 evaluation of BDCP titled *A Review of the Use of Science and Adaptive Management in California's Draft Bay Delta Conservation Plan*, observes that most adaptive management efforts worldwide have failed primarily without the agreement of the water users. The failure to define and quantify critical goals and inclusion of agreements that limit requirements on water users undermine and sabotage the very concept of adaptive management because of institutional problems that include lack of resources necessary for expanded monitoring, unwillingness of decision makers to admit and embrace uncertainties in making policy choices and lack of leadership

[4] Delta Independent Science Board. *Final – Synthesis of Recommendations for the Delta Independent Science Board (DISB) on the Fifth Staff Draft Delta Plan*. September 16, 2011.

implementation.[5] The aims of adaptive management often conflict with institutional and political preferences. This is especially important, given the lack of definition of water supply reliability and ecosystem restoration in the Delta Plan and the inherent contradiction between restoration of the estuary and requirements in the BDCP Planning Agreement that provide assurances that no additional restrictions on the use of land, water, or financial resources beyond agreed-on amounts will be required.

4. Regulatory actions by state agencies, routine operation of the State Water Project, Central Valley Project and local facilities, as well as certain ministerial or emergency project and temporary water transfers are exempt from adaptive management requirements in the Delta Plan. Given the caustic review of BDCP's adaptive management program by the National Research Council's review team,[6] it is highly uncertain to what extent BDCP will include a meaningful adaptive management process. And, given the fact that the BDCP must be incorporated into the Delta Plan, it is uncertain whether the Council can fundamentally modify elements of the BDCP adaptive management program.

5. Previous adaptive management efforts in the Delta have grievously failed. CalFed's adaptive management program chaperoned the accelerated decline of the Delta's ecosystem. The "red light," signaling "take" at the export facilities, was often disregarded and the Water Operations Management Team frequently rejected the recommendations of the technical review teams. Agencies have refused to enforce requirements for project operations that they adopted. For example, the State Water Resources Control Board repeatedly refused to enforce the terms of its Cease and Desist Order against the Department of Water Resources and U.S. Bureau of Reclamation for violations of South Delta salinity standards. It further ignored blatant violations of the Vernalis and Delta outflow standards in 2009. If project operators and oversight agencies can routinely discount the results from adaptive management, then the process is little more than a Hollywood storefront implying progress that doesn't exist.

6. While the Delta Reform Act provides broad narrative goals for the Delta Plan, it does not provide clear, specific, and measurable objectives as called for in this Chapter. The Delta Plan must not defer this next necessary step of Adaptive Management. The Plan must begin to establish clear and measurable goals, objectives, and performance measures; it must quantify goals and provide specific accomplishment dates; it must model linkages between objectives and proposed actions; it must select and evaluate actions for implementation; it must design implementation actions with appropriate monitoring; and it must be peer reviewed. If the plan cannot be enforced, it is illegal:

    - As required in CEQA §15126.4 (D) (2): Mitigation measures must be fully enforceable through permit conditions, agreements, or other legally-binding instruments. In the case of the adoption of a plan, policy, regulation, or other

[5] Panel to Review California's Draft Bay Delta Conservation Plan, National Research Council. 2011. *A Review of the Use of Science and Adaptive Management in California's Draft Bay Delta Conservation Plan*: Washington D.C., page 38.
[6] *Ibid*, pages 38-44.

public project, mitigation measures must be incorporated into the plan, policy, regulation, or project design.

7. This Chapter needs to specify who makes the decisions on how to Respond or Adapt as a part of the Adaptive Management process. There must be legally binding accountability. To date, many of those decisions have been made (or in many cases not made) by the water exporters. This kind of decision-making cannot be tolerated in the implementation of the Delta Plan.

8. Adequate monitoring, which includes particulates, concentrations, and invertebrates along with sediments and flow is needed to provide early warnings and preventative actions. The extensive network of existing monitoring data needs to be analyzed by scientifically credible agencies to ensure public trust values are not being harmed or degraded.

CHAPTER 3 – GOVERNANCE.

As stated in the draft, the Delta Plan is a strategic plan to provide guidance and make recommendations. The Water Code Section 85020 places some responsibilities on the Council that are state-wide and far reaching. The Council is to establish a structure upon which it may receive guidance and recommendations, both for covered and non-covered actions. The legislature also requires the Council to establish and oversee a committee of agencies responsible for implementing the Delta Plan. In the Fifth Draft there is still no mention of an Implementation Committee. Therefore, we continue to make the following recommendations relative to this responsibility:

1. Identify what relevant agencies must be included in the *"Governance or implementation Committee."*

    - Governance should be inclusive of Delta interests and stakeholders and include at least representatives of NGO agencies, the Delta Conservancy, commercial and recreational fishing, in-Delta community representatives, and landowners. G P1.

2. It is our recommendation that other interest parties be part of the process of decision-making within the Governance Committee to broaden the process to include consideration of non-agency issues. Examples would be:

    - Delta Conservancy
    - NGO representatives
    - Commercial/recreational fishing representative
    - In-Delta Community Representatives
    - Science Advisory Board member

3. Develop an organizational chart, which will show clearly the structure of the governance process, and identifies what additional advisory boards, committees, and outside inputs will be associated with the "Governance/Implementation *Committee."*

4. Develop a clear and concise list of responsibilities for the *Governance Committee*, and make clear the difference in process between covered and non-covered actions. Some areas of possible responsibility are:

    - The guiding principle of any governance committee should be the precautionary principle – First, do no harm. The fragility of the Delta ecosystem is such that it is already operating on the edge of tolerance, even with reduced reliance as mandated by the legislature. Hence, it is inappropriate to do anything that could risk additional stress.
    - General criteria for water operations, ensuring that appropriate Delta flows are maintained, water quality objectives are met, source water is protected, public trust values are protected, and beneficial uses are not degraded.
    - Restoration oversight to facilitate and implement restoration projects within the Delta to meet established restoration timing and completion dates.

- Work with the Science Advisory team to help manage the adaptive management efforts to ensure species recovery of aquatic resources.
- Coordinate with the Delta Conservancy on efforts with Delta communities, counties, and landowners.
- Establish and manage budgets to secure necessary funding both for the Council and for the other efforts in the Delta Plan.
- Oversight and recommendations on implementation of state wide water conservation, water use efficiency and reclamation programs, and ensuring that strategic goals are being both established and met.
- Meet with the SWQCB on important Delta issues – tributary flow criteria, Delta flow criteria, pollution issues in tributaries, illegal diversions, etc.
- Meet with the Delta Protection Commission on Delta levee repairs and other Delta protection issues, and to ensure that deadlines are being met.
- Meet with Delta and watershed communities to understand the best interface with them on local issues of concern, and to take actions necessary to ensure actions of the Council are protecting and enhancing the unique cultural, educational and agricultural values of the Delta and its watersheds.
- Develop specific recommendations for the legislature or other appropriate state agencies for actions to facilitate the Delta Plan to meet its responsibilities of Delta ecosystem protection, restoration and enhancement, as well as water supply reliability.
- Establish appropriate goals and objectives as well as timelines to achieve Delta restoration and water conservation, reclamation and efficiency strategies.
- Meet regularly to discuss the obligations of the SWP and CVP, their oversight responsibilities, and ways to bring contractual obligations more in line with available water.
- In addition to the above, there are other areas of concern that must be articulated within the process of governance, and in some cases, the governance structure must be designed to provide protections against outside interference. There must be a level of independence for decision makers. It must be clear that the science board will have influence on the decision making process, and not be left only as advisors hoping their advice is followed. It is unfortunate, but too many times politics has trumped science in decision-making in the Delta, and with water management in particular. In many ways, the success or failure of the Delta Plan may hinge on the ability to design a governance structure that protects decision makers from the impacts of those who have the desire to alter the process based on limited or short-term pressures.

5. There is little substance in the section titled: How Will The Policies Of The Delta Plan Work In Practice? (Pg. 56, line 28). We would suggest this is the perfect place to include a guidance outline of the process state and local agencies, landowners, and others would go through to meet consistency requirements of the Delta Plan. It is a good place for implementation actions required, as well as what enforcement actions are consistent with the authorities of the primary agencies. For example, recommendations in the area of water rights permit approval, changes in diversion points, or other water allocation issues that impact the co-equal goal requirement of the Delta Plan. (G P1)

6. On Page 54, line 27, we recommend changing the word "promote" to "meet." The sentence would then read: "The Council may incorporate other completed plans related to the Delta into the Delta Plan to the extent that the other plans *meet* the coequal goals." It would be a stronger statement if worded this way. (G P1)

7. Additionally, on line 35, under "Information, Comments, Advice," it would be advisable to provide some guidance on how the Delta Plan Science Program would interface with the BDCP science program, with restoration, monitoring and adaptive management. Currently, the BDCP oversight and management is to be done by the permitting agencies and permittees though the Council has not yet determined which agencies will be included. None of these BDCP oversight entities are scientists, yet they would be allowed to decide questions only scientists should answer. This appears to be inconsistent with the co-equal goals responsibility of the Delta Plan. (G P1)

8. Since the Delta Plan is expected to incorporate the BDCP should state and federal wildlife agencies certify it, we recommend that the Council provide specific, consistent, and regular guidance to the BDCP on what would be required for BDCP to be consistent with the mandates from the legislature in the Delta Plan. An example of the current inconsistency is: The Delta Plan mandates the state water board to establish Delta flows and major tributary flows by 2014 and 2018. It is stated that this is **key to the achievement of the co-equal goals** (line 7, pg. 86). Yet, there is no such policy in BDCP, since petitioning partners in the BDCP are opposed to establishing these flow standards. If the BDCP does not incorporate or use these flow standards in the plan, it would then NOT meet the co-equal goals required by the Delta Plan. It is hard to understand how the BDCP could be incorporated with this current inconsistency, and if it were, the Delta Plan would likely be challenged in court.

9. There needs to be a clear policy on the role of wildlife agencies relative to governance of restoration and adaptive management. What role will they have relative to final decision-making, including on water operations, both annual planning and real-time operational changes? Since the Council may be relying on the BDCP to provide this, again, we recommend the Council provide guidance to the BDCP on what is required to meet the statutory mandate of the Delta Plan. It is our opinion that wildlife agency input is being marginalized in the current BDCP plan, and it is critical for the Council to help clearly communicate to the exporters that the engagement of the wildlife agencies is critical to success in the Delta, and critical to BDCP becoming part of the Delta Plan. (G P1)

CHAPTER 4 – WATER SUPPLY.

We view an aggressive statewide water efficiency and conservation program as a primary requisite toward reducing reliance on the Delta, as prescribed in your legislative mandate. A program that reduces overall water consumption throughout the state, especially in the intensive farming areas and major population centers relying on the Delta, makes possible the achievement of this critical mandate of reduced Delta reliance. The mandate likely will not be met without this cost effective water supply program.

One of the best opportunities to accomplish a thorough economic analysis of Public Trust values and balancing is by examining the alternatives to exported water. The alternatives to a continued high level of Delta exports are many, and they are contained in the efficiency and water use reduction solutions that are recommended in the EWC report: *California Water Solutions Now*, which is one of the alternatives being examined by your Council.

The Delta Flows Criteria promulgated by the State Water Resources Control Board clearly indicates that the state has reached – and exceeded – the amount of water that can responsibly be diverted from the Bay Delta. As a result, the Council should anticipate future limitations on Delta exports below the level of the 2000-2007 time periods in its Delta plan to meet the Delta ecosystems restoration goals. Those future reductions, at whatever levels they turn out to be, can only be accomplished if consumption levels are simultaneously decreased.

Climate change is likely to reduce the amount of water available from existing surface and groundwater sources; future climate conditions will also reduce the amount of water available for export from the Delta.

Our recommendations to be included in the Draft Delta Plan and DEIR are:

1. In view of the well-recognized over allocation of water supplies from the Delta, the SWRCB should be directed to use their constitutional authority to review and modify all CVP and SWP contracts and water rights to a yield that is historically and predictably achievable and which can be reliably supplied. "Water supply reliability" cannot be defined by the current contract levels or the current level of diversions. (WR P1)

2. The SWRCB should no longer issue permits for increased water diversions or contributions to storage until at least the SWRCB flow criteria have been established, especially in view of the over allocation of supplies from the Delta. (WR R5)

3. The water use reductions and savings shown in our alternatives may make major structural alternatives such as a canal or tunnel through the Delta and further surface storage unnecessary for water supply reliability. Cost savings to the state would conservatively approximate $15 to $20 billion. (WR R6, R7)

4. Direct the Department of Water Resources to regain public control of the Kern Water Bank and dedicate the water supply for the benefit all Californians. (WR P1)

5. The "Urban Preference" must be reinstated in the State Water Project contracts. The "Urban Preference" means that urban water users have priority over agriculture based on the California Water Code: during shortages, people take precedence over agriculture. This was arbitrarily removed from the State Water Project contracts by the Monterey Plus Amendments and needs to be reinstated. The "Urban Preference," combined with returning the Kern Water Bank back as a public asset, will assure that there will be less pressure on the Delta for water as the 2009 legislation requires. The Kern Water Bank can store the "Urban Preference" south of the Delta for times of drought for the 22 million urban users south of the Delta. (WR P1) (Version 2.1.)

6. The pumping of what is referred to as Article 21 “surplus water”, which was put in place by the Monterey Plus Amendments to the State Water Project contracts, has proven so harmful to the fish and the environment that Judge Oliver Wanger required that pumping during the times that this so called "surplus" water was being pumped had to stop. Article 21 of the State Water Project contracts must be amended to reflect this reality. (WR P1) (Version 2.1)

7. The goal of reduced reliance on the Delta can be achieved by increasing groundwater storage facilities south of the Delta. To that end, we recommend that the Council require a complete evaluation of groundwater storage possibilities in the former Tulare lake bed, as advanced by the San Joaquin Valley Leadership Forum. (WR P1)

8. Because of the critical importance of emphasizing a conservation rate structure, it should be implemented sooner than December 2020, as called for in Draft Plan. (WR P1)

9. The Council should require water suppliers to document actual or projected net reductions in reliance on Delta exports as part of their reporting obligations; the reporting obligations should indicate the impact on the total Delta water budget. (WR P1, R3)

10. Establish a more ambitious long-term urban water conservation target, as indicated in our report, *California Water Solutions Now*, to succeed the 20/20 goal. We do not concur with the Draft Plan, which puts the establishment of that future target to some unspecified future date. (WR P1)

11. Establish a statewide agricultural water conservation target of 1 MAF by 2020, 2.5 MAF by 2030 and 3.5 MAF by 2040. (WR P1)

12. IRWMP projects must provide disadvantaged communities with water for health and safety purposes and that meet drinking water standards. (WR P1)

13. The Fifth Draft Plan continues to encourage “groundwater storage” (pp. 87- 98) and “conjunctive management” or “conjunctive use” (pp. 80, 83, 84, 88, 89, 90, 93) without illustrating what conditions must be met to enable ground water storage and/or conjunctive use, whether there are known problems and legal challenges to existing ground water storage and or conjunctive use projects, and whether these possible strategies are appropriate in all hydrologic areas covered by the Delta Plan. We caution

against using sweeping language of possibility regarding ground water storage and conjunctive use when, as the Plan discusses: "…the current status of groundwater management throughout California was unknown (DWR 2003a), and remains so today," (p. 92). In addition, serious impacts from current and historic practices have already altered some ground water basins severely (pp. 91 – 93), so the depth of uncertainty and acknowledgement of past failures should accompany any suggestions of ground water storage and conjunctive use. (WR R7)

14. The Sacramento River is California's largest river, and its watershed's contribution to the State's economy and communities is unquestioned, but it is not invincible to human activities. The Sacramento River and its tributaries have many impaired segments on the 303(d) list, its salmon runs are still struggling to survive, it is home to many more imperiled species, and the farms and communities within its boundaries have significantly stretched its water resources. The State has long looked to the Sacramento River watershed as a solution for escalating demand south of the Delta. An early attempt at conjunctive use in Butte County in 1994 revealed the folly of moving forward with large ground water extractions when so little was (and still is) known about the hydrologic region.

15. Seventeen years later, the Plan's proposed ground water storage and conjunctive use proposals have the potential to cause significant impacts in both the areas of origin and the receiving areas.' As noted above, there remains minimal scientific knowledge regarding the interactions between ground water and surface water and the needs of species in the watershed that California relies upon the most. Yet it is possible that "Fundamental scientific principles (e.g., effective stress and its key role in poromechanical response of an aquifer) have been well understood for decades, and validated predictive modeling of aquifer response is well within the capabilities of modern science and engineering practice," (Mish 2008). The state of hydrological knowledge is sufficient to recommend protective actions on groundwater based on the Precautionary Principle. If ground water storage and conjunctive use remain tools in the Plan's toolbox, we insist that the DSC require the kind of scientific research on aquifer mechanics that Professor Mish explains is not only possible, but common, *prior* to implementation of any new or expanded ground water storage and conjunctive use projects. (WR R7)

16. Attempting to establish conjunctive use and ground water banking in the Sacramento Valley, and expanding efforts south of the Delta, raises serious unanswered questions regarding the risks associated with such exploitive actions that have already devastated the Owens and San Joaquin rivers and valleys. It is helpful that the Plan highlights some of the significant damage from current and past excess ground water pumping and manipulation of hydrologic systems, yet the Plan seeks to use the same practices that created the problems that the Plan seeks to ameliorate. Knowing this, we continue to encourage the Council to consider a new paradigm that is provided in our comments on the Plan's first draft. (WR R7)

17. However, relying on ground water storage and conjunctive use as a significant part of the Delta Plan, the Delta Plan and the Environmental Impact Report must disclose and

analyze the risks associated with these strategies and expound upon the uncertainty. Those risks include (WR R7):

- Hydrogeological Risks
- Water Quality Risks
- Legal Risks
- Financial Risks
- Public Health and Safety Risks

18. The Trinity River is a Delta Tributary Watershed under California Water Code Section 78647.4(b) and is shown in Figure 1 of the Delta Plan. Figure 1 states that the Delta Plan "may affect" other areas of California, including the Trinity River. However, it is clear from the legislative and administrative record that the diversion of Trinity River water is limited to water that is surplus to the needs of the Trinity River basin, which includes the amount of water necessary to meet the federal government's Tribal Trust obligations to protect and restore the fishery resources of the Hoopa Valley and Yurok Tribes. Therefore, the Delta Plan should contain a policy that meeting the co-equal goals of water supply reliability and ecosystem restoration shall not adversely impact the Trinity River, as defined by meeting the flow requirements of the Trinity River Record of Decision[7] and meeting Trinity River temperature objectives contained in the "Water Quality Control Plan for the North Coast Region"[8] by the North Coast Regional Water Quality Control Board.

[7] See http://www.trrp.net/?page_id=72, accessed 9/14/11.

[8] See "Water Quality Control Plan for the North Coast Region" Table 3-1, page 3-8.00, footnote 5, located at http://www.waterboards.ca.gov/northcoast/water_issues/programs/basin_plan/083105-bp/04_water_quality_objectives.pdf, accessed 9/14/11.

CHAPTER 5 – RESTORE THE DELTA.

As indicated in the Preface to the Fifth Draft Delta Plan: "California's Delta has long been a battleground for the many competing interests that have a stake in how it is used - and abused….. Conflict over what to do, when to do it and how to pay for it continues to embroil the Delta in controversy." An analysis of the economic and Public Trust values of the Delta, if accomplished on a par with the thoroughness of the Mono Lake case, would resolve much of the current controversy and point to solutions that would have long-term benefits for all Californians.

We were struck by the Palmer, et al 2005 criteria for successful ecosystem restoration, and their first recommendation that was included in the Fourth Draft of the Delta Plan: "The project should be based on a clear guiding image of the type of dynamic and healthy ecosystem to be achieved." We are also struck by the fact that this reference no longer exists in the Plan. Though the 5th draft gives glimpses of what the Council would like to see, there continues to be little definition of what a restored Delta should look like, or when some success is expected. We recommend that the Delta Science Board be tasked with creating measurable criteria of what a "recovered" Delta should look like.

For listed species and species that are key to the livelihood of many communities, commercial, and recreational fishing as an example, this is critical. Neither have unlimited time for restoration work to produce results. In the case of listed species, they survive on the thinnest of threads, and need action sooner than later. Defining what and when improvements are needed, and how that will happen is important. Additionally, there is a priority to what needs to be done, defined by species vulnerability, and we suggest that the Council put in language that requires the Delta Science Program to prioritize actions, with date certain, like that of the SWRCB flow requirements for the Delta and major tributaries. What are the highest priority species, and what actions need immediate funding and action?

1. We agree that development, implementation, and enforcement of new and updated flow requirements for the Delta and high priority tributaries is key to the achievement of the coequal goals. (ER P1)

2. We agree with the dates required for the SWRCB flow recommendations for both the Delta and major tributary rivers. We also agree with the review date in 2013, and ask the Council to be most demanding of the SWRCB to complete these recommendations on time, and if not, to hold to limitations of further water rights authorizations, or other increased authorization for water uses suggested in the two bullets on page 114, lines 1-7. (ER P1)

3. We would recommend adding, "establish an enforceable mechanism to ensure water exports from the Delta and water transfers are consistent with the flow standards established by SWRCB recommendations and, until they are issued, the current Biological Opinions for Delta Smelt and Salmon/steelhead should apply." (ER P1)

4. We agree with the Council's reliance on the Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento

and San Joaquin Valley Regions (DFG 2011). We would recommend that the Council require DFG to fully integrate restoration with inputs from the NMFS and FWS, both for riverine as well as terrestrial habitats. (ER P2)

5. **Additional EWC recommendation:** We ask for upstream recommendations for habitat restoration be made to other agencies that have that ability, as it will bring greater species recovery success and resiliency, and reduce overall in-Delta recovery needs. Water use and diversions north of the Delta, as well as land use decisions, have great influence on the Delta's ability to be supportive of fish and wildlife.

    - As recommended in recent federal biological opinions, evaluations of fish passage around major Central Valley dams connected to the Delta should be conducted in order to determine the possible benefits to endangered salmonid species.

    - The recent NOAA/NMFS decisions and programs to reintroduce salmon above the rim dams as well as the other restoration projects demand that any plans for the Delta consider the effects of pumping on salmonid population migration into and through the delta and on to the upper rivers of the state.

    - Alternative flow schedules that provide colder releases to sustain these fish populations during critical time periods also needs further examination.

6. We appreciate the need to expedite habitat restoration in the Delta, and the prioritization of the areas listed in this section. It is our opinion that listed species do not have time to waste, and acknowledging this through this section is critical to survival and restoration of several listed species on both the Federal and State Endangered Species list. (ER R1)

    - As stated in Chapter 5: "An overarching goal for ecosystem restoration in the Delta Reform Act is to restore fish and wildlife to include more viable and resilient populations of native resident and migratory species." We see no recommendations in this chapter that are specific to the recovery of endangered fish species; **we regard this as a major oversight.** Measurable goals for species recovery need to be included as part of the ecosystems recovery actions. (ER P1, R2)

    - We recommend language and actions which reflect that: "every effort will be made, consistent with the FWS and NMFS recovery plans for listed species, to recover all listed species to viable, self-sustaining populations." Changes in Delta conveyance that would contribute to species extinction are impermissible under the California Endangered Species Act, the Natural Communities Conservation Planning Act, the federal Habitat Conservation Plans as well as Sections 7 and 10 of the Federal Endangered Species Act. (ER R8)

7. The priorities for the Delta Conservancy all appear to be appropriate and necessary. It is appropriate for the Council to make some recommendations on timeframes for

accomplishing each of the listed tasks, or at least request the Conservancy to provide timeframes for each area, and to prioritize the projects based on which will provide the greatest return for listed species. Additionally, some recommendations on how the Conservancy should interface with private landowners and others who have ownership of Delta lands, and could contribute to recovery without land purchase. It is critical that the Conservancy, if they are to be the lead on restoration, identify and work with everyone who can be helpful. (ER R2)

- Delta counties and landowners must be full partners in developing and implementing habitat restoration programs so that a desirable mix of aquatic habitat restoration and sustainable agriculture is achieved. See the previous recommendation related to Governance. (ER P2, ER R1, ER R2)

8. We agree that State and federal fish agencies should complete ongoing negotiations toward a habitat credit agreement with water supply agencies. But with this recommendation, we request that language be put into this section that prevents water supply agencies from receiving increased water supplies based on giving a habitat credit agreement. There should be no opportunity for a quid-pro-quo on water and habitat. (ER R3)

9. The Delta Plan needs to be realistic regarding proposing habitat measures, such as riverine habitat on project levees, since vegetation is not allowed by USACE. (ER R4)

10. **Legacy Stressors -** Though we understand these came from the Delta Independent Science Board, we agree that past impacts cannot be undone, but some can be improved or eliminated in the future. We would hope that several of the listed issues will be addressed and changes made that improve conditions in the Delta.

11. **Current Stressors –** One of the recommendations we have made in all our inputs to the Council is reducing the inflow of selenium and other toxic inflows from primarily the San Joaquin valley. The current CVRWQCB waiver on meeting water quality standards from agricultural lands simply continues this "legacy stressor". We strongly recommend the Council ask the SWRCB to block the waiver, and work with the CVRWQCB to establish a process for reduction of non-point pollution in the central valley to the level that it is brought into compliance with the state and federal water quality standards, like everyone else in the state must meet. Since toxic inflows were identified as one of the three primary drivers of the pelagic organism decline (POD), it seems more than necessary to deal with its causes as soon as possible. A strong recommendation to the state water board from the Council, with a date certain (like the flow recommendations) seems a reasonable ask.

12. Although we agree that controlling and reducing impacts for invasive species is an important part of improving the Delta, it is also clear that in some cases water management has led to some of these problems. The clam problem in Susuin Marsh is one example. Additionally, there has been much focus lately on Striped Bass because they pray on listed salmonids. It is our opinion that Striped Bass have been part of this

ecosystem since 1879, and are fully integrated into the fabric of the Delta. They are one of California's prized sport fish, and their numbers have gone up and down proportionately with both Delta Smelt and Salmonids. They were present in greater numbers in 2005 when fall run Chinook numbers were close to one million, and were part of the estuary when salmon and steelhead numbers were in the several millions. Additionally, in those times Striped Bass numbers were high as well. We would recommend that invasive species control actions not include Striped Bass.

13. We agree that the Department of Fish and Game should prioritize and fully implement the list of "Stage 2 Actions for Nonnative Invasive Species" with the exception of Striped Bass, discussed above. (ER R6)

14. We agree the workshops would be a good way to engage a wider audience, and develop ways to reduce the stressor impacts. (ER R7)

15. **General Comments on the Bay Delta Conservation Plan -** The BDCP has not defined "greater water supply reliability," but it is well know that the applicants and their contractors are working to remove more water from the Delta System. Additionally, incorporation of the BDCP into the Delta Plan is anticipated if DFG, FWS, and NMFS certify it as meeting their biological standards. We ask the DSC to provide guidance to the BDCP on what is required to meet the legislative mandates of Delta ecosystem recovery, improved water quality in the system for fish and wildlife, as well as the Delta human needs, and the need to factor in the State Water Board's Delta and tributary flow requirements coming in the future.

    The definition of "water supply reliability" is important and can impact economic sustainability of the Delta. The Delta Plan acknowledges multiple strategies or objectives referenced in the Delta Reform Act that must be addressed to improve water supply reliability. A more specific definition of water reliability allows for economic analysis or at least the presentation of factors relevant to economic sustainability. For example, if water reliability is defined as export levels prior to 1970, reduced by the effects of climate change and needs within the watershed, this might represent the average level of exports which could realistically be more reliable. This level had less of an impact on fish populations than the impact of exports from 1970 to 2010. The 1970 level of export is conceivably sustainable with through Delta conveyance and this would have a different impact on economic sustainability than that of expanded exports. Expanded exports utilizing isolated facilities, which has been proposed in the BDCP, would have a footprint that takes farmland out of protection, off local tax rolls and could alter channel flows threatening the salinity of the Delta. These conflicts with the Plan's proposed performance measure in Chapter 8, which states that progress toward improving economic sustainability of Delta land uses and protection of the Delta's agricultural values should be measured by "total agricultural acreage and gross revenue in the Delta (that) will be maintained or increased in the future." A more precise definition of "water supply reliability" could avoid these kinds of conflicts.

- With reference to the Delta Flow Criteria adopted by the State Water Board, the Council should determine specific maximum quantities of water that can be exported under varying water type years and hydrological conditions in order to provide measurable criteria for the goal of "water supply reliability." We cannot manage what is not measured. (ER R8)

16. BDCP is currently developing alternatives for evaluation, focused on alternative conveyance sizing, operations, and level of restoration. We ask the Council to work with the BDCP to help them establish a list of alternatives for evaluation that would likely provide information based on the Council's understanding about **"less reliance on the Delta."**

    - Analyze, or require BDCP to analyze, at an equal level of detail, conveyance facility capacities from 3,000 cfs to 15,000 cfs as well as alternatives that would utilize existing conveyance without major new conveyance facilities. (ER R8)

    - Direct the BDCP to perform a full economic analysis with Public Trust values considered in each of the alternatives they examine. If this is not accomplished by BDCP, the Delta Stewardship Council should have the analyses performed in order to produce a legally compliant EIR. (ER R8)

17. We agree with the recommendation that they complete the BDCP consistent with the provisions of the Delta Reform Act. However, as stated above, this is unlikely to lead to BDCP meeting either the flow requirements or the water quality standards envisioned in the Delta Plan, and as such, likely would not meet the recovery objectives. Since BDCP is a 50 year plan, it must meet the Delta Reform Act mandates, and from a practical sense, the Council must work closely with BDCP on issues like developing alternatives. (ER R8)

    - The purpose of the evaluation of any Delta facility is to decrease the physical vulnerability and increase the predictability of Delta supplies, not to increase Delta diversions. (ER R8)

18. The list of performance measures is a start on narrowing in the requirements for achieving the vision of the Delta Plan. That said, it is a must that these "general" measures become more specific. The listing of the 3 types of performance measures - Administrative, Driver, Outcome - with a listing of issues is a good start to bringing specificity and targets to the process.

19. We would advise that input from the Delta Science Program could be asked to bring more "real time" timeframes to these measures, and at least provide some goals both on "due dates" as well as some numbers for restoration levels. Too many of the issues have no "due date, or target numbers". More specificity brings the process to life. How many resident and migratory fish species? What is a viable population, and how long should it take to achieve it? How many acres restored where and by when? How does adaptive management fit into performance measures? How will adaptive management be done, and how often will evaluation be done on completed projects,

and how will the adaptive management work be applied, and how will change be integrated? Some guidance from the Council needs to be part of the Delta Plan.

- Of course, who pays for what is still a huge question that looms, and must be answered so this actually has legs on the ground.

CHAPTER 6 – IMPROVE WATER QUALITY.

Nothing is more illustrative of the inherent contradiction between the coequal goals of water supply reliability and ecosystem protection than the discussion and recommendations regarding water quality in Chapter 6 of the Delta Plan. As mass pollutant loadings to the estuary have inexorably increased, residence time, flushing flows to the sea and dilution has substantially decreased. Diversions by the Central Valley Project and State Water Project caused residence time for pollutants in the Delta to increase 100% by 1987.[9] Since then, residence time and pollutant concentration have continued to increase in step with greater exports from the system.

The cumulative and interactive effects of multiple physical, chemical and biological stressors, including discharges of municipal and industrial stormwater and wastewater, agricultural return flows and ubiquitous urban and agricultural chemical application have impaired the Delta's sustainability as a viable habitat for a rich mix of productive species, compromised sources of municipal drinking water, diminished recreational activities and adversely impacted agricultural production. Increased pollutant loading and/or increased quantities of water diverted from or around the estuary will significantly exacerbate existing water quality problems and further impact Delta agriculture, recreation, municipal water supplies and the sustainability of the ecosystem.

California's Porter-Cologne Water Quality Control Act was adopted in 1969. Sections of Porter-Cologne were used as the basis of the federal Clean Water Act, which was adopted in 1972 and amended in 1977 and 1987. The Clean Water Act states that it is the "national goal that the discharge of pollutants into the navigable waters be eliminated by 1985" and it is the "national policy that the discharge of toxic pollutant in toxic amounts be prohibited."

Almost 40 years after adoption of the CWA and Porter-Cologne, virtually every significant water body in the Central Valley, including the entire Delta, is identified as "impaired" and incapable of supporting identified beneficial uses because of multiple pollutants. With the exception of several legacy pollutants, these impairments exist because the chronically understaffed[10] agency

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[9] Rozengurt, M., et al. 1987. *"Analysis of the Influence of Water Withdrawls on Runoff to the Delta-San Francisco Bay Ecosystem (1921-1983),"* Technical Report Number 87-7, Tiburon Center for Environmental Studies. May. Page I.7.

[10] The Executive Officer of the Central Valley Board, Ms. Pamela Creedon, acknowledged in an August 2007 presentation to the State Board titled *State of the Central Valley Region* that the Board had only: a) 12% of the staff minimally necessary to regulate stormwater discharges (NPDES), b) 37% of those necessary to control municipal wastewater discharges (NPDES), c) 26% of those necessary to issue WDRs, d) 16% of those required to regulate dairies, e) 22% of the staff crucial to enforcing conditions of the controversial agricultural waivers, and f) only 11 of the 38 people necessary for the basin planning unit to update the Basin Plans that are fundamental to all Board actions. The Board's surface water ambient monitoring program had only 2 person-years (PYs), its enforcement unit was assigned only 3.5 PYs, the water quality certification unit had only 2.6 PYs to process more than 400 certifications annually. Further, the underground storage tanks unit had only 17 of 41 staff needed for several thousand cases, the timber harvest unit had only 9.2 PYs to regulate and monitor discharges from thousands of timber projects covering 45% of the state's harvested timber and the Title 27 unit had only 40% of those needed to regulate leaking landfills and surface impoundments. And finally, the Board had only 16 PYs to develop, implement

charged with implementing water quality statutes has been unwilling or unable to carry out its mandated responsibilities.[11]

Despite the serious and broadly recognized impacts that deteriorating water quality poses to the viability of the Bay-Delta, Chapter 6 calls for no new, meaningful actions to address this threat. Rather, Chapter 6 simply reiterates existing efforts and already-planned initiatives that will do little to reverse the ongoing slide. It requests understaffed agencies to accomplish measures they have been unable or unwilling to do over the last 30 years.

The Water Quality Chapter plays the critical role in the Delta Plan of describing the regulatory and water quality status quo in the vast primary and secondary planning areas covered by the Delta Plan, and then making recommendations to address the uncovered problems.[12] Preventing and addressing pollution at its source is essential to ensuring that people and environment can use water safely and affordably – especially given that water treatment costs regularly exceed the costs of many water pollution prevention measures.

As was discussed in our earlier comments on the Second Draft Delta Plan, State and Regional Water Board impaired waters assessments demonstrate that water body impairments already run broadly throughout the planning area and impair numerous aquatic habitats. We provided further information demonstrating that water quality issues in the Delta and the planning areas are both pervasive and well known.

Below, we reiterate a few of numerous examples of why the Council's approach and recommendations, with respect to water quality, are inadequate, counter-productive, and unlikely to secure improvement in water quality.

1. Agricultural Discharges

It is notable and a complete failure that Chapter 6 merely mentions in passing the ineffective Central Valley Regional Water Quality Control Board agricultural runoff waiver, or the utter

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and monitor TMDLs covering over 300 water body/pollutant combinations identified as "impaired" throughout the Central Valley (Note: there are now 730 water body/pollutant combinations identified as impaired and Regional Board staffing levels have been reduced since 2007).

[11] The Central Valley Regional Water Quality Control Board is responsible for issuing 65 municipal wastewater NPDES permits (permitted discharge of 983 million gallons/day, 721 mgd in the Delta), 62 industrial wastewater permits (951 mgd, 480 mgd in Delta) and over 1,100 Waste Discharge Requirements regulating wastewater discharges to land. It is also responsible for issuing more than 90 municipal stormwater permits, approximately 2,000 industrial stormwater permits and some 5,500 construction stormwater permits, as well as regulating over 1,600 dairies, more than 400 other confined animal operations, approximately 400 wetland fill projects annually, discharges from 45% of the state's timber harvest projects and runoff from thousands of irrigated farms spanning more than 6 million acres in the Central Valley.

[12] As noted in the Notice of Preparation, the Delta itself plus the Watershed of the Delta, and areas tributary to the Watershed, span a wide swath of the central part of the state. Delta Stewardship Council, "Notice of Preparation: Draft Environmental Impact Report for the Delta Plan," Figure 1: Proposed Planning Area for Delta Plan Environmental Impact Report," p. 12 (Dec. 10, 2010), available at: http://www.deltacouncil.ca.gov/docs/DSC_Notice_of_Preparation_120910.pdf.

lack of any regulatory controls at all on agricultural runoff within the San Francisco Bay Area Regional Water Board purview. After 28 years of "conditional waivers," the Central Valley Regional Board cannot identify who is actually discharging, what pollutants are being discharged, the localized impacts to receiving waters, whether management measures are being implemented or if implemented management measures are effective in reducing pollution. This failure reinforces the gross inadequacies of this chapter in addressing water quality problems in the Delta. (WQ R1, R5, R6)

Irrigated agriculture is the largest source of pollution and impairment in the Central Valley, responsible for 57% of impairments where sources are identified and almost 80% of identified sources that can be reasonably regulated and controlled. By contrast, urban runoff is only identified as causing impairment to less than 12% of known sources of impairment.[13] The only region-wide assessment of data collected at 313 sites by U.C. Davis and the agricultural coalitions, pursuant to the Irrigated Lands Program, reveals epidemic pollution.[14] The Council should consult the State Water Board's recent report to the Legislature on data and strategies for reducing agricultural pollution runoff into the Delta, as well as a detailed summary of existing Delta agricultural regulatory programs.[15] Among other things, the report finds that "over 60 percent of the exceedances of water quality objectives we have identified occur during the

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[13] See State Board's *2010 Integrated Report Clean Water Act Section 303(d) List / 305(b) Report* that was submitted to U.S EPA in August 2010. Category 5 (impairments requiring development of a TMDL) and Category 4A (impairments being addressed by USEPA approved TMDLs) identify some 730 pollutant/water body impairments in the Central Valley. Agriculture is identified as the source of 269 pollutant/water body segments covering 1,572 waterway miles and 96,147 acres of open water. Sources of impairment to 257 pollutant/water body segments remain unidentified. However, it is likely that agriculture will ultimately be identified as causing or contributing to many, if not most, of these impairments, as the pollutants or causes are closely linked to agricultural areas and activities.[13] The largely intractable source of resource extraction caused by legacy mining is identified as causing 257 pollutant/water body impairments. Urban runoff is identified as causing 55 impairments. Invasive species, hydro-modification, recreation, construction and historic land management are responsible for approximately 2.7% of impairments. The State Board report can be found at: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml

[14] Central Valley Regional Water Quality Control Board, *Irrigated Lands Conditional Waiver Program: 2007 Review of Monitoring Data*. The report revealed that: 1) toxicity to aquatic life was present at 63% of the monitored sites (50% were toxic to more than one species), 2) pesticide water quality standards were exceeded at 54% of sites (many for multiple pesticides), 3) one or more metals violated criteria at 66% of the sites, 4) human health standards for bacteria were violated at 87% of monitored sites and 5) more than 80% of the locations reported exceedances of general parameters (dissolved oxygen, pH, salt, TSS). While the adequacy of monitoring (i.e., frequency and comprehensiveness of monitoring) varied dramatically from site to site, the report presents a dramatic panorama of the epidemic pollution caused by the uncontrolled discharge of agricultural wastes. *See, e.g.*, Letter from California Sportfishing Protection Alliance to Central Valley RWQCB, "California Sportfishing Protection Alliance Comments on Draft Irrigated Lands Regulatory Program - Program Environmental Impact Report" (Sept. 27, 2010), p. 51, available at: http://calsport.org/doc-library/pdfs/31.pdf. The Report itself can be found at http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/water_quality_monitoring/staff_monitoring_data_analysis/2007_monitoring_data_report/index.shtml

[15] SWRCB and Central Valley RWQBC, "Report to the California State Legislature Joint Legislative Budget Committee on Reduction of Agricultural Pollution Runoff into the Sacramento-San Joaquin Delta" (Dec. 2010) (Report to Legislature), available at: http://www.cacoastkeeper.org/document/report-to-legislature-on-delta-agricultural-pollution.pdf/ (Table 2, page 13 of the report provides a summary of existing Delta agricultural regulatory programs; this summary is expanded in the report's Attachment 1).

irrigation season;"[16] the Report then demonstrates the impacts of this finding through a summary in Table 1[17] (inserted below) of the significant agricultural contributions to water quality exceedances. The Report provides an expanded analysis of this summary information in its Attachment 2 ; such information should be carefully reviewed and included as appropriate.

Table 1
AGRICULTURAL CONTRIBUTIONS TO WATER QUALITY EXCEEDANCES IN AGRICULTURALLY DOMINATED WATERWAYS IN THE SAN JOAQUIN RIVER WATERSHED AND SOUTH DELTA

Parameter Category	Water Body/Pollutant Exceedances: Total Count	Irrigation Season	Non-Irrigation Season	Programs to Address	Goal date for Full attainment of Beneficial Uses
Agricultural Practices Likely Cause or Contribute to the Problem					
TDS/Electrical Conductivity	668	58%	42%	• San Joaquin Salinity and Boron TMDL • CV Salts	2014 - 2026 Under Development
Pesticides	208	72%	28%	• San Joaquin River and Delta Diazinon and Chlorpyrifos TMDLs • Irrigated Lands Regulatory Program	2010 - 2011 2011 - 2019
Legacy Pesticides	139	82%	18%	• Irrigated Lands Regulatory Program (addressing through sediment control) • Legacy Pesticide TMDL	2011 - 2019 Under Development
Toxicity, Sediment, Scud (Hyalella)	73	62%	38%	• Sediment Quality Objectives	Under Development
Toxicity, Water Column, Water Flea (Ceriodaphnia dubia)	63	69%	31%	• Irrigated Lands Regulatory Program	2011 - 2019
Nutrient	34	69%	31%	• Irrigated Lands Regulatory Program • Dairy Program	2011 - 2019
Selenium	2	33%	67%	• San Joaquin River Selenium TMDL	2010
Agricultural Practices that Potentially Cause or Contribute to the Problem					
E. Coli	611	59%	41%	• Irrigated Lands Regulatory Program • Dairy Program	2011 - 2019
Dissolved Oxygen	530	69%	31%	• Irrigated Lands Regulatory Program • Stockton Deep Water Ship Channel TMDL	2011 - 2019 2011
Toxicity, Water Column, Algae (Selenastrum)	95	57%	43%	• Irrigated Lands Regulatory Program	2011 - 2019
Uncertain Agricultural Contribution					
Metals	411	63%	37%	• Irrigated Lands Regulatory Program	2011 - 2019
pH	131	69%	31%	• Irrigated Lands Regulatory Program	2011 - 2019
Toxicity, Water Column, Fathead Minnow (Pimphales Promelas)	21	52%	48%	• Irrigated Lands Regulatory Program	2011 - 2019

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The Central Valley Regional Water Quality Control Board Irrigated Lands Regulatory Program, referenced extensively in the SWRCB Report to the legislature but essentially ignored in Chapter 6, has also produced a wealth of water quality data. In Attachment I, we provide a summary of just some of the findings of two recent reports from this effort that should be considered in developing the final Chapter 6. (WQ R1, R3, R5)

An additional missing discussion is on the cumulative impact of mixtures of contaminants on Delta health, particularly pesticides. For example, the Delta Independent Science Board's recently released Delta Stressors Memo[18] highlights pesticide pollution as a key Delta stressor, with contamination from pesticides currently killing fish and degrading ecosystems even at low and legal concentrations. For example, a study by NOAA and Washington State found that five of the most common pesticides used in California and the Pacific Northwest – diazinon,

[16] *Id.* at 2.
[17] *Id.* at 8.
[18] Memorandum from Delta Independent Science Board to Delta Stewardship Council, "Addressing Multiple Stressors and Multiple Goals in the Delta Plan," Attachment 2, p. 4 (Jan. 26, 2011), available at: http://deltacouncil.ca.gov/delta_science_program/isb/isb_meetings.html (highlighting "pesticide release" from agriculture, industry and residential use as a current Delta stressor).

malathion, chlorpyrifos, carbaryl, and carbofuran – act in "deadly synergy" by suppressing an enzyme that affects the nervous system of salmon.[19] Even where exposures to a single chemical did no harm, pairing chemicals lowered enzyme activity, sometimes fatally. Scientists concluded, "[s]ingle-chemical risk assessments are likely to underestimate the impacts of these insecticides on salmon in river systems where mixtures occur." In other words, the above research and numerous other studies[20] demonstrate that even if current laws are implemented fully, they will fail to protect fish, because the standards on which they are based are too low. Unfortunately, as is well-known, many Delta and planning watershed waterways do not even meet current, inadequate, standards, and are in fact significantly polluted, in many cases well above standards. (WQ R8, R9)

Significantly, none of the suggestions in Chapter 6 include the overhaul of the current, weak Central Valley Irrigated Lands Regulatory Program, which has failed, and will continue to fail without significant modifications, to protect the health of the Bay-Delta Estuary. Indeed, under "Policies" on page 148, the Plan incredibly states "No policies with regulatory effect are included in this section." The inadequacies of the existing Central Valley Irrigated Lands Regulatory Program have been exhaustively documented.[21] We recommend that the Delta Plan specifically address those inadequacies and recommend changes outlined by NGOs, including the following:[22] (WQ R5)

- Individual Growers Covered; Not Third Parties: Individual growers would apply for coverage. No third-party applications would be authorized.
- Farm Water Quality Management Plans (FWQMPs): Growers would be required to develop and implement individual FWQMPs in order to minimize discharge of waste to groundwater and surface water from irrigated agricultural lands.
- Tiered Approach: Fields would be placed in one of three tiers based on their threat to water quality. The tiers represent fields with minimal (Tier 1), low (Tier 2), and high (Tier 3) potential threat to water quality. The tiers would be used to adjust the monitoring requirements, assist the dischargers in determining the level of management measures

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[19] Laetz, Cathy, *et al*, "The Synergistic Toxicity of Pesticide Mixtures: Implications for Risk Assessment and the Conservation of Endangered Pacific Salmon," *Environmental Health Perspectives*, Vol. 117, No. 3 (March 2009), available at: http://www.eenews.net/public/25/9960/features/documents/2009/03/03/document_gw_01.pdf

[20] Casillas, E., *et al*, NOAA-NMFS-NWFSC, **"Estuarine Pollution and Juvenile Salmon Health: Potential Impact on Survival" (2007), available at:** http://www.nwfsc.noaa.gov/publications/techmemos/tm29/papers/casillas.htm**;** Scholz, Nat, NOAA, "Health effects of pesticide mixtures: Unexpected insights from the salmon brain," (AAAS Annual Meeting, Feb. 2008), available at: http://www.eurekalert.org/pub_releases/2008-02/nh-nsa_1021208.php; *see also* NOAA Office of Communications, "New findings on emerging contaminants: Chemicals in our waters are affecting humans and aquatic life" (AAAS Annual Meeting, Feb. 2008), available at: http://www.eurekalert.org/pub_releases/2008-02/s-nfo020808.php.

[21] *See, e.g.*, Letter from California Sportfishing Protection Alliance to Central Valley RWQCB, "California Sportfishing Protection Alliance Comments on Draft Irrigated Lands Regulatory Program - Program Environmental Impact Report" (Sept. 27, 2010), p. 51, available at: http://calsport.org/doc-library/pdfs/31.pdf.

[22] *Id.*

necessary to meet BPTC, and assist the Regional Board in prioritizing enforcement inspections.

- Non-Water Quality Monitoring: All growers would conduct nutrient tracking, pesticide tracking, and implemented tracking of management practices.
- Surface Effluent Quality Monitoring: Within areas where Coalitions are currently required to prepare and implement a management plan, all Tier 2 and 3 farms within that management area that are discharging any pollutant which triggered the management plan, must prepare and implement a discharge monitoring plan for the pollutants governed by the management plan as well as basic parameters that serve as indicators of pollution discharges.
- Groundwater Monitoring: Growers who qualify as Tier 2 or Tier 3 for groundwater pollution should be required to conduct individual monitoring annually as described for the Tier 3 groundwater growers in the PEIR.
- Additional Fee Authority: The State Board must increase current fees to cover all of the costs of the program. It is unreasonable to base a regulatory program regulating the largest source of pollution to Central Valley waters on the political reluctance of the Board or Administration to assess appropriate fees to support a regulatory program that is capable of enforcing statutory and regulatory requirements. The fees for the irrigated lands dischargers, as well as fees on existing NPDES permittees, including stormwater permittees, should also be adjusted to accommodate a separate regional monitoring program.

2. Discharges of Municipal and Industrial Wastewater

Chapter 6 briefly references permits issued pursuant to the National Pollutant Discharge Elimination System (NPDES) and "encourages" the timely development and enforcement of the program without inquiring whether or not the program is working as intended. It's not. Resource constraints and pressure from the regulated community have undermined the integrity of the NPDES permitting program.

Almost two billion gallons per day of wastewater is discharged into the Delta watershed (1.2 BGD in the actual Delta) from some 64 municipal wastewater treatment plants and 62 industrial dischargers. The Central Valley Regional Board is allowing flow limits and, in many cases, the mass loading of pollutants to be increased in many, if not a majority, of NPDES permit renewals. Frequently, these renewed permits allow for increases in loading of pollutants identified as actually "impairing" a water body. For example, in recent years, the Central Valley Regional Board has allowed increased loading of impairing pollutants into the Delta from Stockton, Manteca, Tracy, and Lodi, among others, and even issued a new permit to the municipality of Mountain House to begin discharging impairing pollutants into Old River; one of the most degraded areas of the Delta.

State and federal antidegradation requirements are routinely ignored and, consequently, the Regional Board has little idea of the total mass loading of pollutants in a watershed. For example, the Regional Board issued a permit granting Linda County Water Agency all of the remaining assimilative capacity for salt in the Feather River. Subsequently, Yuba City was granted the same assimilative capacity in their permit renewal.

It is well known that numerous constituents interact additively and synergistically. Many of these interactions are well documented in the scientific literature. Yet, the Regional Board doesn't consider these interactions in developing permit limits.

Under pressure to get NPDES permits issued, the Regional Board has embraced cookie-cutter templates and out-sourced much permit development to individuals far removed from California who are not professional engineers and who frequently lack an understanding of local conditions. NPDES permits issued by the Regional Board now routinely ignore and violate explicit state and federal regulations governing permit issuance and, consequently, are not protective of surface waters and beneficial uses. Attached is an evaluation of the failure of the Regional Board to comply with fundamental permitting regulations.

The Council should recommend that the Legislature increase funding to the water boards to ensure that they have adequate resources to comply with their NPDES permitting mandates. We also strongly urge the Council to recommend that the Regional Board fully comply with NPDES permitting regulations, including antidegradation requirements, and that it address additive and synergistic interactions in developing permit limits. The Council should further require the Regional Board to prepare pollutant specific mass load estimates for the Delta and tributary watersheds and documented estimates of progress should be provided to the Council on a yearly basis.

3. Municipal Stormwater Discharges

Chapter 6 fails to acknowledge or discuss the failure of the municipal stormwater program to reduce mass loading of toxic and impairing pollutants. Examination of stormwater monitoring reports reveals that most stormwater discharged routinely exceeds water quality criteria and is frequently toxic to aquatic life.

Not a single municipality discharging stormwater pollutants into the Delta or its tributaries can document or quantify reductions in the mass loading of pollutants over the last twenty years. Nor has the Central Valley Regional Board incorporated enforceable TMDL waste load allocations developed in TMDLs in recently issued MS-4 permits.

The Council should recommend that the State Water Resources Control Board and the Central Valley Regional Board adopt limits in municipal stormwater permits restricting increases in the mass loading of pollutants. The water boards should provide the Council with a yearly documented update on progress in reducing the concentration, toxicity and mass of stormwater

discharged pollutants, as well as, documentation that enforceable waste load allocations are being included in TMDLs.

4. TMDLs

Chapter 6 focuses much of its discussion, many of its recommendations and a number of its performance measures on the completion of TMDLs. Table 6-1 identifies 27 TMDLs approved and under development in the Central Valley, Delta, and Suisun Bay, and is indicative of the paucity of the Delta Plan's approach to water quality. The identified TDMLs are only the tip of the iceberg; State and Regional Boards are legally obligated to develop and approve literally hundreds of TMDLs.

With several exceptions, the TMDLs in the table address problems that were amply extensively identified 20, 30, even 50 years ago. For example, the pervasive toxicity of diazinon and chlorpyrifos in the San Joaquin River were identified in the late 1980s, low dissolved oxygen in the Stockton Deep Water Channel was chronicled in the early 1960's, and factors causing excessive salinity in the San Joaquin River were documented far earlier. A long string of programs, MOUs, Basin Plan amendments, legislatively mandated Toxic Hot Spot cleanup plans, and toothless waivers litter the historical landscape but the problems continue to plague the Delta and tributary waterways. TMDLs are only the latest programmatic rabbit-hole to avoid the repercussions that would accompany timely direct action.

TMDLs do not ensure compliance with Basin Plan water quality standards. While the "technical TMDLs" adopted by the Central Valley Regional Board tend to be scientifically defensible, crucial implementation plans are sadly lacking. To date, there have been few, if any, documented and quantified reductions in pollutant loading attributable to TMDL implementation. Reduction in loading of organophosphorus pesticides was the result of growers switching to less expensive and more potent chemicals, for which there is little monitoring and no TMDL under development. Treatment plant upgrades in Stockton resulted in reduced ammonia loading to the Stockton Ship Channel but the largest identified sources of low dissolved oxygen remain unaddressed. Although the Grasslands Bypass Project has reduced selenium loading to the San Joaquin River, selenium concentrations in the San Joaquin River continue to routinely exceed the 5-microgram limit at Hills Ferry and the 2-microgram limit in wetland and refuge water supply channels. Existing water quality standards are inadequate and the US Geological Survey (USGS) has concluded that standards may have to be reduced 5 to 50-fold to be protective of aquatic and avian life. Having secured the low hanging fruit, remaining technical obstacles are enormous and uncertain and any solution will cost hundreds of millions of dollars that are not likely to become available.

The poster child for the failure of the TMDL program is the San Joaquin River Salt and Boron TMDL. Salinity problems on the river have been recognized for over a century. Operation of the CVP and SWP exacerbated conditions by importing an estimated 700 thousand tons of salt

annually into the San Joaquin Valley. Some 400 thousand tons of salt migrate to groundwater. Much of this salt enters the San Joaquin River via accretion or direct discharge. The TMDL has been characterized as the first 100-foot TMDL in the nation's history, only protecting a short stretch of river below the San Joaquin's confluence with the Stanislaus River. Water quality violations continue to occur upstream of the confluence and immediately downstream: this despite the fact that EPA regulations and the Central Valley Board's Basin Plan require that standards must apply throughout a water body, not simply at a single compliance point. While TMDL implementation plans must ensure attainment of water quality standards, the salt TMDL contemplates a 19% exceedance of standards in critical years and a 7% exceedance in dry years. The TMDL fails to reserve any assimilative capacity, thus depriving downstream farmers of the ability to legally irrigate and discharge return flows. Although the State Water Board has expressly and repeatedly directed the Regional Board to move the salt compliance point upstream, it has failed to do so.

Even where TMDLs have been adopted they may not be protective. For example, the Methylmercury TMDL is not protective of subsistence fishermen and their families, or those with impaired immune systems, pregnant women, or children.

It is not enough to simply measure progress in protecting water quality by programs initiated or TMDLs completed. We recommend that the Council condition approval of covered actions on inclusion of enforceable implementation plans in TMDLs, including performance measures and interim yardsticks with specific quantifiable load reductions. This should apply to all sources of impairing pollutants, including municipal and industrial stormwater and wastewater and irrigation return flows.

Water bodies must be identified under Clean Water Act Section 303(d) as "impaired" due to low flows, rather than just chemical or biological pollution, so that flows are carefully considered in all Total Maximum Daily Loads later developed to restore the water bodies to health. However, this has yet to be accomplished in the Central Valley Region. As described in extensive comments that were submitted by a coalition of groups, the state must identify and restore water bodies impaired by altered flows, as required by the Clean Water Act.[23] This should be a specific recommendation added to the Plan to begin to ensure its effectiveness. (WQ R8, R9)

5. Grasslands Project and Selenium

It is notable in Table 1 above that selenium is the only pollutant in which water quality objectives are violated more often during the non-irrigation season. This is indicative of the pervasive selenium pollution of the shallow aquifers of the Western San Joaquin Valley

[23] Letter from California Coastkeeper Alliance *et al*. to State Water Resources Control Board, "Notice of Public Solicitation of Water Quality Data and Information for 2012 California Integrated Report" (Aug. 30, 2010), available at: http://www.cacoastkeeper.org/document/ccka-comments-on-2012-303%28d%29-list.pdf. This letter also provides relevant discussion regarding the Clean Water Act requirements to address impaired groundwater that may be threatening hydrologically connected surface water.

mobilized during the wet winter months. The 2010 goal of meeting selenium water quality objectives has passed and the Central Valley Regional Board has extended the time for compliance until the end of 2019, justifying the action because no solution exists. If the BDCP as currently proposed is implemented, a greater percentage of Bay-Delta water will come from the San Joaquin River. As a result, Bay-Delta selenium concentrations and residence time will increase with predictable disastrous biological impacts.

On September 2011, US EPA released scientific documents by the US Geological Survey documenting the existing Bay-Delta selenium water quality standard of 5 micrograms is inadequate to protect Bay-Delta fish and wildlife. The EPA documents provide the basis for changing this toxic standard to a selenium water quality standard of 1 microgram or less. This change is needed to protect economic resources of the Delta Estuary and Bay including salmon, steelhead, sturgeon, and diving birds, and should be a recommendation in the Delta Plan.

Furthermore, the just released Reclamation water quality monitoring reports for the Delta Mendota Canal adjacent to the Mendota Pool on the San Joaquin River confirm selenium violations for five months out of the first six months of 2011. This source water goes to thousands of acres of wildlife refuges, duck clubs, and wetlands in the San Joaquin Valley and is upstream of the Delta. Failure to address this water pollution and monitor the sources has been ongoing for years. The Delta Plan should recommend that the Central Valley Regional Board enforce selenium water quality standards for agricultural polluters.

Reclamation confirms that the west side drainers are no longer monitoring selenium and other pollution that is being discharged into the San Joaquin River below Crows Landing near the Merced River, nor is this pollution being monitored as it travels to and through the Bay-Delta. The Delta Plan should recommend a comprehensive selenium-monitoring program for the Bay-Delta estuary and lower San Joaquin River.

The Bay-Delta Conservation Plan's goal to provide increased water supplies to the heavily subsidized poisoned ground of the Western San Joaquin Valley will further contaminate our fish, wildlife, food, and water supplies with toxic amounts of selenium. Ceasing irrigation of these toxic lands will reduce costly public water, power, and crop subsidies, improve water quality, and decrease the demand for pumping from the Delta. There is no cost effective or technically viable solution other than to stop sending clean water from Northern California and the Sierras to poisoned ground. The Delta Plan should recommend retirement of lands from irrigated agriculture, which creates selenium contamination to the tributaries and aquifers that drain into the Bay-Delta.

Given that no selenium solution exists other than land retirement, the Delta Plan should include a recommendation that the SWRCB convene a Wasteful and Unreasonable Use hearing to revoke water permits used for the irrigation of seleniferous, saline lands which degrade Bay-Delta water quality. The Draft Plan gives the impression that this problem is solved. After a quarter of a

century of studies and legal maneuvering, selenium and other pollutants mobilized by irrigation of the toxic lands of the Western San Joaquin Valley are still not solved.

6. Inadequate or Lack of Protective Water Quality Standards

Many thousands of unregulated chemicals, including pharmaceuticals and personal care products, industrial chemicals, and other potentially hazardous chemicals, are discharged to waterways, including the Delta and its tributaries. Chapter 6 briefly acknowledges the potential toxic and sub lethal impacts from the maelstrom of emerging and industrial chemicals that gather together in the Delta. It's likely that the synergistic and additive interactions of constituents acting on the immune, endocrine, and reproductive systems of aquatic life pose a greater threat to pelagic species than overt toxicity. The Council should do more than simply recommend that the State and Regional water boards conduct special studies of selected emerging contaminates by 2014, it should make the funding and implementation of aggressive suite of such studies a condition of approval of covered actions.

Existing water criteria fails to address many issues that must be considered in considering impacts on aquatic life. For example, during the State Water Board's Delta flow hearing, Dr. G. Fred Lee testified:

> "The current US EPA criteria development approach only considers some and in some cases a small part of the impacts of chemical contaminates on aquatic life. For example, the approach currently used to develop water quality criteria does not include additive/synergistic properties of regulated chemicals that occur in concentration below the water quality criteria allowing unanticipated adverse impacts to aquatic life. Adverse impacts of chemicals to aquatic life that occur for especially sensitive species, such as zooplankton which serve as fish food organism were not included in the development of the water quality criteria. These criteria are only applicable to protecting about 90% of the species. Therefore there could readily be fish species in the Delta and its tributaries that are more sensitive to a chemical than those used to establish the water quality criterion value. There is also very limited information on chronic exposure to sub lethal impacts of a chemical and mixtures of chemicals to fish populations. Another issue is that other stressor such as low DO, ammonia etc. that can impact the lethal and especially sub lethal impacts of chemicals. It has been well known for over 40 years through biomarker studies that fish and other organisms show organism biochemical responses to chemical exposures at concentrations well below the water quality criterion. The significance of these biomarker responses to an organism or group of organisms is largely unknown. Chemicals can adversely impact the health of the fish and other aquatic life that weaken their ability to resist adverse impact of stressors such as low DO, elevated

temperature and predation as well to disease. It's been known for over 40 years that very low levels of copper affect the "breathing" rate of some fish.[24]

Developing more protective water quality standards is likely to be technically difficult, expensive and time consuming. More immediate benefits are likely to be achieved by reductions in the mass loading of pollutants to surface waters. We reiterate our previous recommendation that the Council should require the Regional Board to prepare pollutant specific mass load estimates for the Delta and tributary watersheds and documented estimates of progress should be provided to the Council on a yearly basis.

Chapter 6 notes that there are impairments in the Delta that are caused by total organic carbon, nutrients and other contaminates for which there are no federal or state water quality criteria. We recommend that the Council go farther than simply recommending that the water boards develop and adopt criteria for nutrients by 2014 and make the adoption of criteria a condition of approval of covered actions.

Recommendation 9 calls on the Water Boards to "conduct or require special studies of pollutants including selected emerging contaminants." However, this Recommendation fails to note how this effort would be different than the review already being conducted by the State Board and its contractors.[25] Furthermore, there is no mention of utilizing existing monitoring results as a foundation for preventative actions and enforcement of existing standards to prevent further degradation of drinking water supplies, higher treatment costs, and damage to ecosystem habitat, and preventing harm to other beneficial uses. A meaningful Recommendation would have considered the work already being undertaken, evaluated it for potential weaknesses, and provided useful guidance on where additional work is required. (WQ R9)

Of the approximately 100,000 chemicals registered for use in the United States, only about 200 are regulated with respect to water quality. The Priority Pollutant List is an artifact of a legal settlement several decades ago, has never been peer reviewed and is an inadequate surrogate for the maelstrom of chemicals found in our waterways today. Further, degradants, a product of chemical breakdown in the environment, are little understood but are often highly toxic. We recommend that the Council urge U.S.EPA and the State and Regional Water Boards to upgrade the Priority Pollutant List through a scientifically defensible process.

7. Drinking Water Quality

We support recommendations WQ R1, WQ R3, and WQ R4 and take no position on WQ R2. We believe that WQ R5 (CV-SALTS) while an interesting concept, will cost many billions of

[24] Lee, G. Fred. 2010. Comments on Water Quality Issues Associated with SWRCB's Developing Flow Criteria for Protection of the Public Trust Aquatic Life Resources of the Delta, 11 February 2010. Page 3. Available at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/exhibits/cspa/cspa_exh22_lee_test.pdf

[25] *See* http://www.sccwrp.org/ResearchAreas/Contaminants/ContaminantsOfEmergingConcern.aspx.

dollars and is serving as a rabbit-hole to justify a failure to pursue imposition of regulatory requirements and numerous near-term efforts that would result is significant reductions of salt loading. Effective regulatory enforcement would likely be more effective in achieving significant near-term reductions of salt loading. We recommend the Council add quantitative yardsticks to this recommendations and condition approval of covered actions on compliance with those yardsticks.

Other aspects of the Drinking Water Quality section of the plan are inadequate. While we appreciate the paragraph referring to the problem of nitrate contaminated drinking water for low-income communities, no connection is made between this observation and the larger issue of controlling salinity. The section also ignores the problem of nitrates for large communities, particularly in the North Valley. Both Ripon and Modesto, for example, report having to close several wells due to nitrate contamination in the last 10 years, and both are either using or seeking surface water to supplement the lost yield. The Delta Plan must establish a clear connection between water supply and water quality and again specify quantitative yardsticks to measure progress.

8. Lack of Timetables, Yardsticks, Performance Measures, and Consequences

Given the extensive information on pollution impacts in the Delta, a credible Delta Plan must provide the yardsticks to evaluate progress (including mass loading reductions), end points, and citizen enforcement tools to hold all polluted discharges to account, and provide consequences for failure. Chapter 6 fails to do this. Rather, it simply restates existing efforts and suggests (without mandates or accountability) future efforts that may or may not be undertaken. For example, WQ Recommendation 6, the first Environmental Quality recommendation, simply references the fact that the State and Regional Boards "are currently engaged in regulatory processes, research, and monitoring" and recommend only "these ongoing efforts be completed and if possible accelerated."

The Delta ecosystem and beneficial uses that the estuary supports cannot be restored without compliance with water quality standards. Monitoring results need to trigger automatic actions prior to violating the standards to prevent irreversible ecosystem damage and degradation of beneficial uses. (WQ R1)

Specific quantifiable timetables, yardsticks, performance measures, endpoints, and consequences for failure are the necessary drivers of any meaningful plan that realistically expects to achieve the coequal goals and improve water quality. We recommend that the Council recommend inclusion of these specific measures in all programs and projects related to salinity, drinking water quality, and environmental water quality and condition approval of covered actions on their inclusion. This should apply to all sources of pollutants including point and nonpoint discharges.

CHAPTER 7 – REDUCE RISKS IN THE DELTA.

In general, the Fifth Draft Delta Plan contains a number of good policies and recommendations to reduce Delta flood risks that we agree will be beneficial. What is needed is a partnership with local, state, and federal agencies to reduce flood risks.

1. The planning, implementation, monitoring, and evaluation of all Delta levee and floodplain improvements shall include consultation and maximum feasible participation by those living in the Delta. (RR R1 thru R12)

2. The Council should require the PL 84-99 levee standard (Class 3 in Table 7.1) or higher classes of levee standards contain a 22-foot crown width as a minimum for all delta levees. A 22-foot crown width in lieu of the 16-foot crown is recommended as a means to accommodate raising levees to meet sea level rises greatly in excess of the rates experienced in the last 300 years and to allow two-way passage of trucks in the event of a flood. The Delta Plan should identify levees that don't meet PL 84-99 criteria and develop a plan for reviewing them to determine whether they should be improved and improving the selected levees during a phased timeline. (RR R4)

3. The Delta Stewardship Council should accept and support as a covered action in the Delta Plan the Delta Protection Commission's recommendation in their Economic Sustainability Plan to: "Improve many core Delta Levees beyond the PL 84-99 standard that addresses earthquake and sea-level rise risks, improve flood fighting and emergency response, and allow for vegetation on the water side of levees to improve habitat. Improvement of most core Delta levees to this higher standard would cost $1 to $2 billion. While this is a longer-term program, planning should be initiated immediately."[26] (RR R3 thru R7)

   - There is a plausible public interest in providing public funds to Delta reclamation districts and other Delta interests for levee upgrades because the Delta serves as the water conveyance facility for much of California. Water exporters should be required to identify which levees, if any, ***they want to fund to a higher standard*** (for example more earthquake resistant) to protect their water supply, beyond the current standards. Recommendations should also include assisting Delta counties and communities in meeting FEMA/NFIP programs. The plan should also contain a recommendation to support and increase public funding for permanent continuation of existing and highly successful statutory cost-share formula and funding for Delta (Subventions) Levee Program. Public safety and flood protection must remain the top priority of the State Plan of Flood Control, including its levees and bypasses. (RR R# thru R7)

   - Because earthquake risks to the levees are one of the main justifications for a Peripheral Canal or Tunnel in the Delta, and there is evidence that the earthquake risks to the Delta levees may have been exaggerated in previous drafts of this report,

[26] Delta Protection Commission. Second Draft Economic Sustainability Plan, July 21, 2011. Chapter 11, Page 222. http://www.delta.ca.gov/res/docs/ESP%20(2)%20Ch%2011.pdf

the comparison of costs of the two alternatives ($1-2 billion for levee strengthening versus $15-$16 billion for new conveyance) is significant and should be incentive enough to immediately initiate this levee reinforcement program and make catastrophic levee failure a questionable justification for new conveyance. The comment "Delta levees are fragile' may be refuted by the fact that there has been a reduction in the number and severity of Delta levee failures since 1988. (RR R5)

4. We concur with the Policies shown in this Chapter (RR P1 thru RR P4)

5. We agree that there should be support for Delta dredging to improve flood conveyance and to provide material for levee maintenance or subsidence reversal in the Old River, Middle River and the South Fork Mokelumne. However, we have concerns about the environmental impacts from deepening the Sacramento Deepwater Ship Channel and the Stockton Deepwater Ship Channel and we reserve judgment pending comprehensive environmental review and full mitigation. (RR R2)

6. We agree in general with the concept of identifying lands that will be needed for flood control improvements including setback levees. We also agree with the importance of identifying and setting aside these lands. However, the locations for flood control improvements have yet to be identified which creates uncertainty in land use decisions and in the absence of that knowledge, private and public land use decisions may foreclose opportunities for flood control improvements in the future. Until these decisions are made, it creates burdensome uncertainties for Delta residents and communities. Therefore we urge the Delta Stewardship Council to identify these areas sooner rather than later in order to provide land use certainty to residents and local government. (RR R4)

7. We agree that the Delta Stewardship Council should convene a working group to develop and evaluate recommendations to DWR to address appropriate actions to both routine and catastrophic levee failure. We also recommend that the working group include development of recommendations for local Delta agencies as well. (RR R7)

8. We partially agree with the recommendation for termination of state leases on Delta lands subject to subsidence. However, every effort should be made to work with farmers to keep Delta lands in agricultural production. The purchase by the State and non-profits of Delta islands such as Twitchell and Sherman and elimination of agricultural activities in some of those areas negatively impacts the Delta economy. Termination of state leases should be a last resort if a farmer is completely unwilling to participate in practices and programs to halt or reverse subsidence on Delta islands. In the event a lease is terminated, every effort should be made to find a lessee who will keep the land in production who will work to reverse and eliminate subsidence. An alternative consideration should be a 400-foot easement around Delta levees and adoption of policies to add more fill behind Delta levees to reinforce them. (RR R11)

9. We concur with each of the other Recommendations in this Chapter (RR R1, R3, R5, R6 and R12.)

CHAPTER 8 – DELTA AS AN EVOLVING PLACE.

While our coalition is in general agreement with the majority of recommendations that are presented in this chapter, we feel that it has serious overall shortcomings and oversights. They are: a lack of specifics or quantitative data by which performance can be measured; no recognition that water quality and improved water flows through the Delta are an integral part of the Delta as Place; the absence of integral involvement of Delta residents and Delta communities in the planning for the Delta's future. No one can fully understand the "Delta as Place" without living there and experiencing the unique place that it is. In this present draft, Delta communities are described as theme park type of small towns rather than the working communities that they are. Furthermore, recreation and tourism are given more weight than agriculture, when agriculture is the primary economic activity within the Delta. Without comprehensive and meaningful involvement of Delta residents, there cannot be a Delta Plan that will be favorably accepted or that can be successfully implemented. In short, this chapter has not provided the focus on the Delta that it deserves.

When comparing the co-equal goals with the object of Congress in granting swamp lands to the states (1850 Swamp and Overflow Land Act), the co-equal goals should be consistent with *increasing the general prosperity* of the Delta, as required by the Act. The reflooding of Swamp and Overflowed Lands, the deprivation and degradation of the water supply to such lands, and other acts of the State detrimental to the productivity and prosperity of such lands is clearly inconsistent with the State's obligation to carry out the purpose for which the lands were granted to the State.

Additionally, Water Code Sections 12200 - 12205 are specific as to the requirements to provide "adequate water supply in the Delta sufficient to maintain and expand agriculture, industry, urban and recreational development". An evolving Delta consistent with Water Code Section 12201 is one which maintains and expands agriculture, industry, urban and recreational development. The Delta as an evolving place is to be positive not negative. The Sacramento-San Joaquin Delta Reform Act of 2009 cannot be properly interpreted to allow harm to the future prosperity of the Delta.

Other important considerations that must be an integral part of the Delta Plan are:

1. The Delta Protection Act of 1992, which was enacted to prevent inappropriate or excessive conversion and urbanization of farmland in the Primary Zone of the Delta. The Delta Plan must take this important point into consideration.
2. The Delta Protection Commission's Land Use & Resource Management Plan which identifies agriculture as the primary land use in the Delta and seeks to protect its economic production throughout whole Delta. Between 1984 and 2008 almost 560,000 acres of Prime Farmland was lost or converted statewide due to urbanization, low density rural residences, mining, and ecological restoration projects. This statewide loss is equal to the size of Solano County, and should be avoided when possible by focusing on government lands and existing habitat areas that could be improved to benefit additional species.

3. Other local plans such as Suisun Marsh Habitat Management Plan, Delta County HCPs, and Yolo Bypass Wildlife Area Land Management Plan must be factored into the Delta Plan, including many other local plans that have spent years and millions of dollars to develop and manage.

4. A recognition of the high level of uncertainty associated with BDCP Conservation Measures and recent criticism from the National Academy of Sciences for critical gaps in science, which should necessitate a cautionary approach by the Delta Stewardship Council to endorse or support widespread farmland conversion to habitat that will have significant economic impacts to the area.

5. Although a new water conveyance system is being planned by BDCP, it may never be completed or permitted, or may be stalled for decades due to litigation (the legal dispute between Sacramento County and EBMUD lasted 40 years before resulting in the new Freeport diversion facility. Therefore, the Delta Plan should include strategies on how to improve the co-equal goals if the new water conveyance facilities are delayed or not constructed.

6. The Delta Plan should not only focus on the amount of additional habitat to be restored, but should first prioritize increased management and functionality of existing habitat restoration areas that were completed in preceding years, before converting more farmlands to habitat. Over the last several decades, numerous habitat projects have been funded and constructed in the Delta, but after several years, many of these existing projects are experiencing neglect due to lack of adequate funding to manage and monitor them for species benefits. The Delta Plan should also focus on how habitat areas can be integrated into current and evolving agricultural lands.

7. The Delta Plan should set forth policies and recommendations for safe harbor agreements, good neighbor policies, and a secured endowment to cover any future claims for damages to property owners resulting from habitat restoration in the Delta.

8. The Delta Plan should reiterate the Delta Conservancy's mandate that land will be required for restoration purposes only from willing sellers. In addition, the Delta Plan should call for additional applied science and economic analysis of the tradeoff of terrestrial habitat for additional aquatic habitat, which may be good for water export permits but harmful to Delta communities.

9. The Delta Plan should create a long term funding mechanism for dealing with public nuisances if recreation is to be promoted as a greater economic driver within Delta communities. Funding needs to be secured to handle public safety issues, littering, theft, vandalism, and vagrancy for Delta landowners, as present levels of law enforcement are woefully inadequate to address any increases in tourism.

10. The Delta landowners and economy should not have a disproportionate burden for Delta fixes that intended to benefit statewide interests. Therefore, securitized endowment funding should be recommended for: fish screening and consolidation of existing intakes;

loss of local tax revenue and assessments; third party impacts; and maintenance of restored habitat areas.

There must be recognition of tribal cultural use of the Delta as a major trading place and center of many tribal community ceremonial places as well as the need and respect for the Delta as the transformation place of salmon from fresh water to salt and back again. The Plan fails to include tribal interests in the Delta and the importance of the waters to lifeway and salmon habitat restoration and continuance.

Our responses to your individual recommendations are:

1. We concur that the Delta Protection Commission's Economic Sustainability Plan should include recommendations on public safety, economic goals and policies, updates to DWR's flood management plans, and encouragement of recreational investment. (DP R1)

2. We agree that The Delta Protection Commission should initiate recommendations related to designation of the Delta and Suisun Marsh as a National Heritage Area. (DP R2)

3. We agree that The Department of Transportation should partner with local cities and counties to establish major gateways and improve access. (DP R3)

4. We agree that The Department of Parks and Recreation should develop funding sources and partner with other state and federal agencies, counties, conservancies, and nonprofits to conduct recreation use surveys as indicated in the Plan. (DP R4)

5. We support that The Department of Fish and Game's collaboration with other organizations to expand recreational opportunities. (DP R5)

6. The Department of Boating and Waterways should certainly coordinate with the U.S. Coast Guard and state and local agencies on an updated marine patrol strategy for the region. (DP R6)

CHAPTER 9 – FINANCE PLAN.

1. As stated in the cover letter to these comments, Public Trust balancing must be incorporated into all aspects of a Delta Plan, especially in the economic analyses that must be an integral part of the Financial Plan. (FP P1)

2. Based on the BDCP Costs shown on Page 209, Water Conveyance Costs (the Water Supply Reliability portion of the Co-Equal Goals) are 70% of total project costs. This represents a wide disparity in the legislatively mandated Co-Equal goals for Water Supply and Delta Ecosystems Restoration. This very unequal apportionment of project costs by BDCP is the clearest indicator that increasing water supply is the overriding objective of the BDCP sponsors and that ecosystems restoration will never be an equal goal. This discrepancy needs to be communicated by the Council to the BDCP as an indicator that the eventual DEIR produced by BDCP will not meet the legislative requirements set for the "Co-Equal Goals." (Version 2.1)

3. Under the category of "Immediate Needs," please include "public health" as requiring urgent expenditures. The Pacific Institute report cited in Chapter 6 identifies a need for capital infrastructure for communities with nitrate contamination at $150 million, but urgent expenditures are needed for interim solutions, including operation and maintenance of treatment systems, and funding for point-of-use or point-of-entry. No funding is available for either of these options to provide safe drinking water in the short term. (Page 208, line 17)

4. The call for DWR to develop an assessment of the state's water infrastructure needs through the California Water Plan is a guarantee that water quality will be slighted. Unlike DWR, both the State Water Board and the Department of Public Health develop regular Needs Surveys for wastewater and drinking water infrastructure. These surveys and the Project Priority List for the Drinking Water State Revolving Fund should inform any needs survey. While this recommendation currently looks at small-scale storage and conveyance projects, it ignores basic investments like water meters, replacement of leaking pipes, and conservation incentives for residents of small water systems. (FP R5)

5. Despite the objections to Diversion Fees expressed in previous Draft Delta Plans, we recommend that the Council continue exploration of a water diversion fee and a Delta export fee by the Council and the State Water Resources Control Board. The top priority of such diversion and export fees should be to support ecosystem restoration efforts. This system of fees is founded on the responsibility of all water users under the public trust to contribute to ecosystem restoration. Development of these fees should consider the following: (FP R6, R8, R10)

    - Long-term habitat restoration and species recovery funding required to achieve the co-equal goals.
    - An appropriate share of public funding for ecosystem restoration efforts, as well as likely state and federal funding, given the pressures on the state and federal budgets.

- Contributions by water users to other system-wide ecosystem restoration efforts. Site specific, water agency local mitigation costs (e.g. the installation of fish screens) should not be considered for crediting in the development of these user fees.
- These water fees should not be used for the purchase of water to achieve compliance with regulatory requirements, as was the former CALFED Environmental Water Account.

6. The development of information related to financing (such as the identification of beneficiaries and stressors and detailed financing scenarios) should be undertaken simultaneously with the development of major capital decisions, in order to inform planning efforts. The Council should assure that this is being accomplished by the BDCP in order for BDCP to be able to produce a plan that is consistent with the requirements of a Delta Plan. Development of finance plans should not be delayed until the conclusion of capital planning efforts. (FP R6, R8, R10)

    - We note that the word "Framework" has been added to this chapter title with the introduction of the Third Draft. While we understand that: "Many of the policies recommended in the Delta Plan will not be fully developed and more detailed costs will be determined at a later date" (from the Second Draft), we recommend that as much detail as possible on alternative costs be included in the Draft EIR; presenting only a *framework* for a finance plan will not be adequate.

7. The primary purpose of a public goods charge should be to fund investments in efficiency, water recycling, groundwater clean-up, stormwater capture, and other tools that can reduce reliance on imported supplies. (FP R12)

8. A public goods charge could ensure a minimum investment by all urban and agricultural water agencies in water user efficiency and other tools that can reduce reliance on imported water. It could also provide consistent funding over time. (FP R12)

9. The CPUC's recommended water public goods charge is focused on water efficiency – broadly defined -- including agricultural and urban water use efficiency, water recycling, stormwater capture and groundwater clean-up efforts, and resulting surface water quality impacts. We recommend that the Delta Plan require a volumetric approach to such fees as well as contributions by both agricultural and urban water users. (FP R12)

10. Finally, the Council needs to expand its vision on fee possibilities. A Water Resources Renewal and Protection fund should be established that places a volume fee on both water exported and discharged. These fees need to go to more than just conservation efficiency projects. Funding needs also to include watershed protection projects throughout the Sierra, the Coastal Regions, and other suitable areas of the state.

David Nesmith, Facilitator
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Oregon Wild

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Northcoast Environmental Center

Michael Schweit
President
Southwest Council Federation of Fly Fishers

Chris Poehlmann
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Friends of the Gualala River

Nate Rangel
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Peter Brucker
Klamath Forest Alliance

Chet Ogan
Conservation Chair
Redwood Regional Audubon Society

Susan Robinson
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Ebbetts Pass Forest Watch

Bob Dean
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Upper Mokelumne River Watershed Council

Trevor Kennedy
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Central Sierra Environmental Resource Center

Dan Silver
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Endangered Habitats League

Jane Humes
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Waldo Holt Conservancy

Michael Garabedian
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Kelli Gant
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Trinity Lake Revitalization Alliance

Sue Lynn
Secretary
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Larry Glass
President
South Fort Mountain Defense Committee

Seymour Singer
President
Pasadena Casting Club

Dick Harris
President
Santa Clarita Casting Club

Stan Elijah
President
Tracy Flyfishers

Richard Dale
Executive Director
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Mission Peak Fly Anglers

Tom Bartos
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Foothills Angler Coalition

Bill Carnazzo
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Spring Creek Guide Service

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Greg King
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Jim Yarnall
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Campaign Director
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Ron Forbes
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Executive Director
Conservation Congress

Kim Glazzard
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Bill Carnazzo
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Spring Creek Guide Service

Bill O'Kelly
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Sierra Pacific Flyfishers

Cindy Charles
Conservation Chair
Golden West Women Flyfishers

Ted Shapas
Conservation Chair
Diablo Valley Fly Fishermen

Randy Upton
President
Las Vegas Fly Fishing Club

Darrell Tichurst
Chairman
Coastside Fishing Club

Aaron Newman
President
Humboldt Fisherman's Marketing Association

Mark Micoch
Co-Chairman
Northern California Guides Association

Dan Blanton
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StriperFest

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Randy Repass
Founder
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Bart Hall
Producer
Fred Hall Shows

Brian Layng
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Galen Onizuka
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Gordon Robertson
Vice-President
American Sportfishing Association

Jeff Pontius
President
Zebco Brands

Angelo Pucci
President
P Line

Dick Pool
President
Pro-Troll Fishing Products

Ken Elie
Owner, President
Outdoor Pro Shop

Mike Shipp
F/V Chloe Marie

Bill Divens
Salmon King Lodge West

Craig Hanson
Outdoor 1050 Radio

Paul Johnson
Monterey Fish Market

Bob Kotula
Outwest Marketing

Danny Layne
Hawkeye Marketing

Gary Coe
Kokanee Power

Glen Fukumoto
Outdoor Pro Shop

Bill Divens
Salmon King Lodge West

Capt. Bill Smith
Riptide Charters

Capt Bob Ingles
Queen of Hearts Charters

Capt Brian Cutty
Chubasco Charters

Capt Brian Guiles
Flying Fish Charters

Capt Chris Acacelo
Chris's Fishing Charters

Capt Chris Chan
Ankeny St. Sportfishing

Capt Chris Duba
Silver Fox Charters

Capt Craig Shimokosu
New Salmon Queen Charters

Capt Dale Walters
Que Sera Sera Charters

Danny Layne
Fish'n Dan's Guide Service

Capt David Ryan
Caroline Charters

Capt Dennis Baxter
New Captain Pete Charters

Capt Don Franklin
Soleman Sportfishing Charters

Capt Ed Gallia
New Easy Rider Charters

Capt Frank Rescino
Lovely Martha Charters

Capt Harry Necees
Checkmate Charters

Capt Jack Chapman
Lovely Linda Sportfishing

Capt Jacky Douglas
Wacky Jacky Charters

Capt James Robertson
Outer Limit Charters

Capt Jay Yokomozo
Huck Finn Charters

Jimmy Robertson
Outer Limits Charters

Capt Joe Gallia
El Dorado III Charters

Capt John Atkinson
New Ray Ann Charters

Capt John Kluzmier
Sir Randy Charters

Capt Ken Stagnaro
Stagnaro's Charters

Capt Nick Lemons
Star of Monterey Charters

Capt Peter Bruno
Randy's Fishing Trips

Capt Randy Thornton
Telstar Charters

Capt Richard Thornton
Trek II

Rick Kennedy
Tight Lines Guide Service

Capt Rick Powers
Bodega Bay Sportfishing

Capt Robert Gallia
El Dorado Charters

Capt Sean Hodges
Hog Heaven Charters

Capt Steve Talmadge
Flash Sportfishing Charters

Capt Todd Magaline
Blue Runner Charters

Sal Vallone
Bob Sands Fishing

Capt Tim Klassen
Reel Steel Sportfishing

Vance Staplin
Vance's Tackle

Barbara Emley
F/V Autumn Gale

Chuck Powell
Guide River Run

ATTACHMENT I
A SAMPLING OF RESOURCES AND BEST PRACTICES FOR PUBLIC TRUST ECONOMIC ANALYSES
ENVIRONMENTAL COALITION COMMENT LETTER TO THE FIFTH DRAFT DELTA PLAN

1. The U.S. Water Resources Council's *The Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G).* The *P&*G helps federal agencies plan water-related projects. It's somewhat out of date but the National Research Council of the National Academies' review of proposed changes to the *P&G* contains valuable insight into current best economic practices.[27]
2. The California Department of Water Resources (DWR) developed the *Economic Analysis Guidebook (Guidebook)* in 2008 to address deficiencies in the *P&G*. The *Guidebook* employs up-to-date methods and describes the environmental consequences, social effects, and monetary and non-monetary costs and benefits of water-management alternatives economics.[28]
3. DWR has also developed a 2005 four-part study that describes the importance of considering the full range of economic costs and benefits of public policies that affect aquatic resources.[29]
4. The U.S. Environmental Protection Agency (EPA) released the third edition of its *Guidelines for Preparing Economic Analyses (Guidelines)* in December 2010.[30] It accounts for new literature published since the last revision and brings the *Guidelines* consistent with current best economic practices. The latest update includes detailed recommendations on identifying and describing baseline conditions that would exist with and without a proposed policy revision or regulation and an expanded description of methods of defining and valuing ecological benefits of projects and policies that protect natural resources.

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[27] National Research Council of the National Academies. 2010. *A Review of the Proposed Revisions to the Federal Principles and Guidelines Water Resources Planning Document*. Committee on Improving Principles and Guidelines for Federal Water Resources Project Planning, Water Science and Technology Board, Division on Earth and Life Studies.

[28] California Department of Water Resources (CDWR). 2008. *Economic Analysis Guidebook*. The State of California. January.

[29] California Department of Water. 2005A. *Ecosystem Valuation Methods. Revised Draft*. Multi-Objective Approaches to Floodplain Management on a Watershed Basis. May. 2005B. *Natural Floodplain Functions and Societal Values Revised Draft*. Multi-Objective Approaches to Floodplain Management on a Watershed Basis. May. 2005C. *Middle Creek Flood Ecosystem Restoration Project Case Study: Benefit and Cost Analysis*. Multi-Objective Approaches to Floodplain Management on a Watershed Basis. May. 2005D. *Floodplain Management Benefits and Cost Analysis Framework. Revised Draft*. Multi-Objective Approaches to Floodplain Management on a Watershed Basis. June.

[30] National Center for Environmental Economics. 2010. *Guidelines for Preparing Economic Analyses. U.S. Environmental Protection Agency*. EPA 240-R-10-001. December.

5. EPA's Science Advisory Board (SAB) has also released a report titled, *Valuing the Protection of Ecological Systems and Services* in May of 2009.[31] The report describes methods of identifying and describing the economic significance of natural resources and associated ecosystem services affected by policies or projects. The SAB noted the importance of valuing ecosystem services using up-to-date economic methods, and promoting collaboration among social scientists and biophysical scientists. Many of the recommendations have relevance to assessing the economic effects of water allocations in the Delta.
6. EPA also has prepared a guide for assessing cost-effectiveness and cost-benefit analysis for groundwater programs.[32]
7. Even a cursory review of widely used textbooks and the scientific literature reveals numerous approaches and tools that meet generally accepted and prevailing standards of practice for evaluating alternative approaches and balancing public trust uses with other beneficial uses of scarce water supplies.[33]

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[31] Environmental Protection Agency (EPA) Science Advisory Board. 2009. Valuing the Protection of Ecological Systems and Services. EPA-SAB-09-012. May.

[32] U.S. Environmental Protection Agency (EPA). 1993. *Guide for Cost-Effectiveness and Cost-Benefit Analysis of State and Local Ground Water Protection Programs*. U.S. Environmental Protection Agency, Office of Water, and Office of Ground Water and Drinking Water. April.

[33] Field, B.C. 1997. *Environmental Economics*, 2nd Edition. San Francisco: McGraw-Hill Company, Inc. - Lesser, J.A., D.E. Dodds, and R.O. Zerbe, Jr. 1997. *Environmental Economics and Policy*. - Goodstein, 1999. E.S. *Economics and the Environment*. - Field, B.C. 1994. *Environmental Economics*. - Rossi, P. and H. Freeman. 1982. *Economics*, 13th Edition. New York: McGraw-Hill Book Company. - Roback, J. 1982. "Wages, Rents, and the Quality of Life." *Journal of Political Economy* 90: 1257-1278; 1988. "Wages, Rents, and Amenities: Differences among Workers and Regions." *Economic Inquiry* 26: 23-41. - Partridge, M. and D. Rickman. 2003. "The Waxing and Waning of Regional Economies: The Chicken-Egg Question of Jobs Versus People." *Journal of Urban Economics* 53: 76-97. - Blomquist, G.C. and D.R. Johnson. 1998. "Resource Quality Information and Validity of Willingness to Pay in Contingent Valuation." *Resource and Energy Economics* 20:179-196. - Loomis, J., T. Brown, and J. Bergstrom. 2007. "Defining, Valuing, and Providing Ecosystem Goods and Services," *Natural Resources Journal* 47: 329-376. - Daily, G.C. (ed). 1997. *Nature's Services: Societal Dependence on Natural Ecosystems*. Washington, D.C.: Island Press.

Appendix B
Administrative Procedures Governing Appeals, Statutory Provisions Requiring Other Consistency Reviews, and Other Forms of Review or Evaluation by the Council

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[ADOPTED 9/23/2010]

DELTA STEWARDSHIP COUNCIL

I. ADMINISTRATIVE PROCEDURES GOVERNING APPEALS
II. STATUTORY PROVISIONS REQUIRING OTHER CONSISTENCY REVIEWS
III. OTHER FORMS OF REVIEW OR EVALUATION BY THE COUNCIL

PART I- ADMINISTRATIVE PROCEDURES GOVERNING APPEALS

Introduction

1. Purpose. These administrative procedures govern how the Delta Stewardship Council considers appeals with regard to:

a) Adequacy of certifications of consistency with the Delta Plan submitted to the council by a state or local public agency pursuant to Water Code sections 85225.10 and 85225.30; and

b) Determinations by the Department of Fish and Game that the Bay Delta Conservation Plan has met the requirements of Water Code section 85320 for inclusion in the Delta Plan.

NOTE: Authority cited: Water Code sections 85001, 85020(h), 85022, 85057.5, 85200, 85210, 85212, 85225, 85225.5, 85225.10, 85225.15, 85225.20, 85225.25, 85225.30, 85300, 85320(e).

Review of certifications of consistency with Delta Plan

2. Any state or local public agency proposing to undertake a covered action, as defined in Water Code section 85057.5 is encouraged to consult with the council at the earliest possible opportunity, preferably no later than 30 days before submitting its certification to the council pursuant to Water Code section 85225, to ensure that the project will be consistent with the Delta Plan. The council's staff will meet with the agency's staff to review the consistency of the proposed action and to make recommendations, as appropriate. During this early consultation, the agency's staff may also seek clarification on whether the proposed project is a "covered action"; provided that the ultimate determination on whether it is a covered action shall be made by the agency, subject to judicial review.

NOTE: Authority cited: Water Code sections 85212, 85225, 85225.5, 85225.30.

3. At least 10 days prior to its submission of a certification to the council, a state or local public agency that is not subject to open meeting laws (that is, the Bagley-Keene Open Meeting Act [Gov.Code sec.11120 et seq.] or the Brown Act [Gov.Code sec.54950 et seq.]) with regard to its certification, shall post, for public review and comment, its draft certification conspicuously on its website and in its office, mail it to all persons requesting notice, and include any public comments received in the record submitted to the council in the case of an appeal. A state or local public agency that is subject to open meeting laws with regard to its certification is encouraged to take those actions.

NOTE: Authority cited: Water Code sections 85225, 85225.30.

4. a) Any certification of consistency filed by a state or local agency pursuant to Water Code section 85225 shall set forth detailed findings that the covered action is consistent with the Delta Plan. The council shall prepare a checklist that agencies may use to assist them in preparing the certification and making the required findings.

b) A state or local agency shall submit to the council, no later than 10 days after receiving notice of an appeal pursuant to Paragraph 8, the record that was before the state or local agency at the time it made its certification, including a table of contents of documents contained therein and a brief chronology of events and actions relevant to the covered action. The record shall be certified by the state or local agency as being "full and complete." Given the tight, statutory deadlines for hearing and deciding appeals, a state or local agency is nevertheless strongly encouraged to submit the record at the time it files its certification of consistency, to ensure the opportunity for thorough review by the council in the event of an appeal.

c) The failure by a state or local agency to submit the record to the council on a timely basis as required by subparagraph (b), shall be grounds for the council to affirm the appeal on the basis that there was not substantial evidence presented to support the certification of consistency.

d) Any filings required by this Paragraph (4) shall be submitted in electronic form to facilitate availability and public access, and shall be public records.

NOTE: Authority cited: Water Code sections 85225, 85225.30.

5. Any person, including any member of the council or its executive officer, who claims that a proposed covered action is inconsistent with the Delta Plan and, as a result of that inconsistency, that action will have a significant adverse impact on the achievement of one or both of the goals of the Act or implementation of government sponsored flood control programs to reduce risks to people and property in the Delta, may file an appeal with regard to a certification of consistency submitted to the council no later than 30 calendar days after that submittal.

NOTE: Authority cited: Water Code sections 85225.10 (a), 85225.15, 85225.30.

6. The appeal shall clearly and specifically set forth the basis for the claim that the covered action is inconsistent with the Delta Plan. The appeal shall be in writing and set forth the following information:

a) Appellant's name and address;

b) The name and address of the party, if any, whose proposal is the subject of the appeal;

c) A description of the covered action that is the subject of the state or local public agency certification;

d) The identity of the state or local government body whose certification is being appealed;

e) The specific grounds for appeal; and

f) A detailed statement of facts on which the appeal is based.

The appeal shall be filed in electronic form.

NOTE: Authority cited: Water Code sections 85225.10 (b), 85225.30.

7. The appeal shall be considered "filed" with the council when the appellant's appeal is received, determined by staff to contain all of the information listed in Paragraph 6, and a hard-copy is printed and stamped "Filed" by the council staff with the date of filing indicated.

NOTE: Authority cited: Water Code sections 85225.10, 85225.20, 85225.30.

8. Within five working days of the filing of an appeal with the council, the executive officer shall:

a) Post a notice and brief description of the appeal and its effective date in a conspicuous location in the council's office and on its website;

b) Mail to the affected state or local public agency and to any third party whose proposal is the subject of the certification, a copy of the notice and a brief description, with a copy of the appeal documents filed with the council;

c) Mail copies of the appeal to each member of the council, and to the Delta Protection Commission for informational purposes consistent with Public Resources Code section 29773; and

d) Mail notice to the appellant that the appeal has been filed and stating the effective date of filing.

NOTE: Authority cited: Water Code sections 85225.30.

9. The council or its executive officer may request from the appellant further information necessary to clarify, amplify, correct, or otherwise supplement the information submitted with the appeal, within a reasonable period. The council or by delegation its executive officer may dismiss the appeal for failure of the appellant to provide information requested within the period provided, if the information requested is in the possession of or under the control of the appellant.

NOTE: Authority cited: Water Code sections 85225.10, 85225.20, 85225.25, 85225.30.

10. The council or its executive officer may supplement the record submitted by the state or local agency if the council or its executive officer determines that additional information was part of the record before the agency, but was not included in the agency's submission to the council.

NOTE: Authority cited: Water Code sections 85225.10, 85225.20, 85225.25, 85225.30.

11. The appellant, the state or local agency, the Delta Protection Commission, or any other person may testify before the council regarding an appeal. Presentations may be oral or in writing, shall address only whether the record supports the certification of consistency, and shall be as brief as possible. Written submissions should be provided to the council at least 10 days prior to the hearing to ensure that they, or in appropriate cases, summaries, may be circulated to council members for their review ahead of the hearing. The council's presiding officer may establish reasonable time limits for presentations.

NOTE: Authority cited: Water Code sections 85225.10, 85225.20, 85225.25, 85225.30.

12. All written submissions to the council may be in electronic form.

NOTE: Authority cited: Water Code section 85225.30.

13. The council shall hear all appeals of certifications of consistency filed pursuant to Water Code section 85225 within 60 days of filing unless:

a) The parties agree to a reasonable extension approved by the executive officer, taking into account the circumstances of the matter subject to appeal and the council's hearing schedule and associated workload, or

b) The council, or by delegation its executive officer, determines that the issue raised on appeal is not within the council's jurisdiction or does not raise an appealable issue.

NOTE: Authority cited: Water Code sections 85225, 85225.20, 85225.30.

14. The council shall make its decision on the appeal within 60 days of hearing the appeal, and shall make specific written findings defining the covered action under review and either denying the appeal or remanding the matter to the state or local public agency for reconsideration of the covered action based on the finding that the certification of consistency is not supported by substantial evidence in the record before the state or local public agency that filed the certification.

NOTE: Authority cited: Water Code sections 85225.20, 85225.25, 85225.30.

15. No covered action which is the subject of an appeal shall be implemented unless one of the following conditions has been met:

a) The council has denied the appeal;

b) The public agency has pursuant to Water Code section 85225.5 decided to proceed with the action as proposed or modified and has filed with the council a revised certification of consistency addressing each of the findings made by the council, 30 days has elapsed and no person has appealed the revised certification; or

c) The council or its executive officer has dismissed the appeal for one or both of the following reasons:

1. The appellant has failed to provide information in her possession or under her control within the time requested or
2. The issue raised is not within the council’s jurisdiction or fails to raise an appealable issue.

NOTE: Authority cited: Water Code sections 85225.5, 85225.25, 85225.30.

Review of Bay Delta Conservation Plan

16. If the Department of Fish and Game (department) determines that the Bay Delta Conservation Plan (BDCP) referred to in Water Code section 85053 meets all of the requirements of Water Code section 85320 for inclusion in the Delta Plan, it shall file the BDCP and its determination with the council.

NOTE: Authority cited: Water Code sections 85053, 85225.30, 85320.

17. Upon receipt of the department's determination, the executive officer of the council shall:

a) Post a notice and brief description of the BDCP, the department's determination, the date of filing and the right of any person to appeal that determination on its website and in a conspicuous location in the council's office;

b) Mail a notice and brief description of the BDCP, the department's determination and the right of appeal to any person requesting notice; and

c) Mail copies of the determination to each member of the council.

NOTE: Authority cited: Water Code sections 85225.30, 85320 (e).

18. Any person, including any member of the council or its executive officer, may appeal to the council the determination of the department that the BDCP meets all of the requirements of Water Code section 85320 for inclusion in the Delta Plan.

NOTE: Authority cited: Water Code sections 85225.30, 85320 (e).

19. a) Any appeal to the council made pursuant to Paragraph 18 shall be made within 30 days of the later of the following:

1. the filing with the council of the department's determination that the BDCP meets all the requirements of Water Code section 85320 for inclusion in the Delta Plan, or
2. the conclusion of the council's hearing or hearings held pursuant to Water Code section 85320(d).

b) The appeal shall be in writing and filed in electronic form. It shall clearly set forth the specific grounds for the appeal and the specific facts upon which it is based. These shall include a list of each specific requirement of Water Code section 85320 that the BDCP allegedly fails to meet. The appeal shall be considered filed with the council when the appellant's appeal is received, determined by staff to contain all the information required in this paragraph, and a hard-copy is printed and stamped "Filed" by the council staff with the date of filing indicated.

c) If an appeal is filed before the council publicly notices a hearing to be held pursuant to Water Code section 85320(d), the council, in its discretion, may combine the hearing on appeal and the hearing pursuant to Water Code section 85320(d).

NOTE: Authority cited: Water Code sections 85225.30, 85320.

20. Within five working days of the filing of an appeal pursuant to Paragraph 18, the executive director shall:

a) Post a notice and brief description of the appeal on its website and in a conspicuous location in the council's office;

b) Mail a notice and brief description of the appeal to any person requesting copies of such appeals; and

c) Mail copies of the appeal and a brief description of the appeal to each member of the council.

NOTE: Authority cited: Water Code sections 85225.30, 85320 (e).

21. The council or its executive officer may request from the appellant or the department additional information necessary to clarify, amplify, correct, or supplement the information submitted with the appeal within a reasonable period.

NOTE: Authority cited: Water Code sections 85225.30, 85320 (e).

22. Any appeal made pursuant to Paragraph 18 may be dismissed if the council or its executive officer determines that it does not raise an appealable issue or if the appellant has failed to provide requested information to support her charge within a reasonable time, if that information is in the possession of or under the control of the appellant.

NOTE: Authority cited: Water Code sections 85225.30, 85320 (e).

23. The council shall determine, based upon a preponderance of the evidence, whether the department correctly determined that the BDCP meets all of the requirements of Water Code section 85320 for inclusion in the Delta Plan. In reaching its decision, the council shall give weight to the reasoning and factual findings of the department. The council may seek clarification from the department of its reasoning and factual findings prior to the council making its final determination.

NOTE: Authority cited: Water Code section 85225.30, 85320(b), (e).

23.5 a) The council shall conduct any hearing on an appeal made pursuant to Paragraph 18 in a manner deemed most suitable to ensure fundamental fairness to all parties concerned, and with a view toward securing all relevant information and material necessary to render a decision without unreasonable delay.

b) The hearing need not be conducted according to technical rules relating to evidence and witnesses. Any relevant evidence shall be considered if it is the sort of evidence on which responsible persons are accustomed to rely in the conduct of serious affairs, regardless of the existence of any common law or statutory rule which might make improper the admission of such evidence over objection in a court proceeding.

Unduly repetitious or irrelevant evidence shall be excluded upon order of the council or its chairperson.

c) Subject to Paragraph 23, evidence before the council includes, but is not limited to, the record before the department. The record will not include a transcript of any proceedings before the department unless provided by a party to the proceedings or requested by the council.

d) Any interested person may testify before the council regarding an appeal concerning the BDCP. Speakers' presentations shall be to the point and shall be as brief as possible. Visual and other materials may be used as appropriate. The council may establish reasonable time limits for presentations; such time limits shall be made known to all affected persons prior to any hearing. Where speakers use or submit to the council visual or other materials, such materials shall become part of the hearing record and shall be identified and maintained as such. Speakers may substitute reproductions of models or other large materials but shall agree to make the originals available upon request of the executive director.

e) Council members may ask questions of the appellant, the department's representative(s), any third party appearing at the hearing or staff. Questioning of speakers at the hearing by other persons shall not be permitted except by permission of the Chairperson.

f) Interested persons may submit written comments concerning an appeal. Any such comments will be considered by the council if they are received by the council at or before the hearing on the appeal; provided that those written comments should be submitted to the council at least 10 days prior to the hearing to ensure that they, or in appropriate cases, summaries, may be circulated to council members for their review ahead of the hearing.

g) The council may continue the hearing where it determines that a continuance would be appropriate.

NOTE: Authority cited: Water Code sections 85225.30, 85320(e).

24. The council's decision shall include specific written findings. The council shall post its decision on its website and mail copies to the department and all parties requesting notice.

NOTE: Authority cited: Water Code sections 85225.30, 85320(e).

25. If the council decides that the department incorrectly determined that the BDCP meets all of the requirements of section 85320 for inclusion in the Delta Plan, and consequently grants the appeal, the department may revise its determination to meet the issues raised by the council, or may respond to the council's findings in detail, setting forth reasons why it has concluded that the BDCP meets all of the requirements of

section 85320 for inclusion in the Delta Plan. Unless the council decides that the department's determination, as submitted or revised, correctly concludes that the BDCP meets all of the requirements of section 85320 for inclusion in the Delta Plan, the BDCP shall not be incorporated in the Delta Plan and the public benefits associated with the BDCP shall not be eligible for state funding.

NOTE: Authority cited: Water Code sections 85225.30, 85320 (a), (b), (e).

Ex Parte Contact Restrictions Applicable to All Appeals

26. Hearings on appeals are subject to the ex parte communication restrictions of California Administrative Procedures Act (Gov. Code § 11430.10 et seq.). Under that Act, an ex parte communication is a "communication, direct or indirect, regarding any issue in the proceeding, to the [council or council member] from an employee or representative of an agency that is a party or from an interested person outside the agency, without notice and opportunity for all parties to participate in the communication." (Gov. Code § 11430.10.) The restrictions apply from the date that the appeal is filed to the date that the council reaches a final decision on the appeal.

NOTE: Authority cited: Government Code sections 11430.10, 11430.80, Water Code section 85225.30.

27. To ensure compliance with these provisions, members should avoid ex parte communications while an appeal is pending. If they nevertheless receive one, such as by an individual sending a letter to a member concerning a pending matter, the member should notify the council's legal adviser or executive officer so that appropriate measures can be taken.

NOTE: Authority cited: Government Code sections 11430.10, 11430.80, Water Code section 85225.30.

28. At the first appropriate meeting after an appeal is anticipated or filed, the council's legal adviser will remind the council of this restriction and answer questions about its scope.

NOTE: Authority cited: Government Code sections 11430.10, 11430.80, Water Code section 85225.30.

Official Notice

29. Notwithstanding any provision of these procedures to the contrary, the council may take official notice in any hearing that it conducts, of any generally accepted technical or scientific matter within the council's jurisdiction, and of any fact that may be judicially noticed by the courts of this State.

NOTE: Authority cited: Government Code section 11515, Water Code section 85225.30.

Filings and Mailings

30. All filings and mailings required by sections 1-29 of these procedures may be made electronically.

NOTE: Authority cited: Water Code section 85225.30.

Consolidation of Appeals

31. The council, at its discretion, may consolidate appeals raising similar issues.

NOTE: Authority cited: Water Code section 85225.30.

PART II—STATUTORY PROVISIONS REQUIRING OTHER CONSISTENCY REVIEWS (AFTER ADOPTION OF THE DELTA PLAN)

In several other sections of SB X7 1, the council is directed to review for consistency with the Delta Plan, various plans of specified public agencies. This Part is directed at those reviews, which fall outside the scope of the procedures covered by Part I.

1. Delta Protection Commission's Economic Sustainability Plan.

Public Resources Code section 29759 requires the Delta Protection Commission (DPC), by July 1, 2011, to adopt an economic sustainability plan. That plan must include information and recommendations that inform the council's policies regarding the socioeconomic sustainability of the Delta's region.

Public Resources Code section 29761.5(b) requires the DPC to transmit copies of the plan to the council within 60 days of adoption. The council is required, within 180 days of the adoption of the plan, to review the plan for consistency with the Delta Plan.

2. Local and Regional Planning Documents.

Water Code section 85057.5(b)(3), excepts from the definition of "covered action", regional transportation plans prepared pursuant to Government Code section 65080.

Paragraph (4) of that same section, excepts from the definition of “covered action”, plans, programs, projects or activities within the secondary zone of the Delta that the applicable metropolitan planning organization under Government Code section 65080 has determined is consistent with either a sustainable communities strategy or an alternative planning strategy that would achieve specified greenhouse gas emission reduction targets as determined by the Air Resources Board.

Because they are not “covered actions”, these types of local and regional planning documents are not subject to the statutory provisions governing consistency of state and local public agency actions (Water Code secs. 85225 et seq.), or the council’s Administrative Procedures Governing Appeals (Part I, above), with one exception noted in paragraph (d), below.

However, Water Code section 85212 provides a separate requirement and process for consistency review by the council of these types of local and regional planning documents.

In particular:

(a) The council is required to review and provide timely advice to local and regional planning agencies regarding the consistency of local and regional planning documents, including sustainable communities strategies and alternative planning strategies prepared pursuant to Government Code section 65080, with the Delta Plan.

(b)The council’s input must include, but not be limited to, reviewing the consistency of local and regional planning documents with the ecosystem restoration needs of the Delta and reviewing whether the lands set aside for natural resources protection are sufficient to meet the Delta’s ecosystem needs.

(c) A metropolitan planning organization preparing a regional transportation plan that includes land within the primary or secondary zones of the Delta must consult with the council early in the planning process regarding the issues and policy choices relating to the council’s advice.

(d) No later than 60 days prior to the adoption of a final regional transportation plan, the metropolitan planning organization must provide the council with a draft sustainable communities strategy and an alternative planning strategy, if any. Concurrently, the metropolitan planning organization must provide notice of its submission to the council in the same manner in which agencies file a certificate of consistency with regard to covered actions.

(e) If the council concludes that the draft strategies are inconsistent with the Delta Plan, the council must provide written notice of the claimed inconsistency to the metropolitan planning organization no later than 30 days prior to the adoption of the final regional transportation plan.

(f) If the council provides timely notice of a claimed inconsistency, the metropolitan planning organization's adoption of the final regional transportation plan must include a detailed response to the council's notice.

PART III--OTHER FORMS OF REVIEW OR EVALUATION BY THE COUNCIL

1. Interested parties, including federal, state and local public agencies, are encouraged to confer with the council or its executive officer over the scope and potential impacts of the interim plan developed under Water Code section 85084. Interested parties will be provided an opportunity to comment and provide input on the interim plan as it is developed.

2. Similarly, prior to adoption of the Delta Plan, project proponents are encouraged to consult with the council or its executive officer early in the planning stages of projects that may constitute "covered actions" under Water Code section 85057.5 once the Delta Plan is adopted. Subject to available resources, the council may review and comment on planning documents and environmental review documents regarding potential "covered actions".

3. Subject to available resources, the executive officer or his designee may meet with interested parties, upon their request, to help mediate relevant disputes, including disputes, once the Delta Plan is adopted, over whether a project constitutes a "covered action" under Water Code section 85057.5. The intent of this mediation will be to provide an objective and informal forum for dispute resolution that will serve as a more efficient alternative to costly and time- consuming litigation.

4. Interested parties, including federal, state and local agencies, are encouraged to confer and coordinate with the council or its executive officer with regard to agency plans, studies, strategies, and recommendations required, or otherwise suggested, to be considered by the council for incorporation into the Delta Plan.

NMFS Progress Assessment and Remaining Issues Regarding the Administrative Draft BDCP Document[1]

4/4/13

In April 2012, the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) submitted our "red flag" comments regarding the previous draft of the Bay Delta Conservation Plan (BDCP). These comments were developed by agency staff to flag those issues that may require significant changes to the BDCP and would need to be resolved prior to final submittal of the plan. Since then, NMFS has worked closely with the State and its consultants on the details of the revised BDCP. The following is an assessment of the materials provided to NMFS in the December 2012 Administrative Draft BDCP document as well as Section 5.5, which was submitted to NMFS in February 2013. Additional draft materials were subsequently submitted to NMFS on March 1st. We have conducted a cursory review of the March 1st materials to confirm that all of the following comments are still applicable, but we have not had the opportunity to conduct a complete and thorough review of those newer materials.

We would like to acknowledge the very significant improvements and progress that have been made in the development of the effects analysis and the plan itself over the past year. DWR has substantially amended the proposed plan by reducing the number of planned intakes and overall capacity and including significant improvements to operational criteria, including the High Outflow Scenario and improvements to South Delta Old and Middle River (OMR) limits. These changes are in direct response to our previous red flags and are critically important to providing for species needs.

We have experienced excellent cooperation and coordination with the project consultants (ICF International) along with the other planning agencies. There has been significant improvement in the expanded analytical methodologies used in the effects analysis and many technical and policy issues have been resolved. Many other technical and plan component issues are currently in active discussion, and we are optimistic they can be resolved with additional time, technical resources, and independent peer review. We look forward to continuing our close collaboration with all of the involved parties to resolve remaining issues and complete this planning process.

The first section of this document is intended to provide an assessment of the progress that has been made in addressing NMFS' initial comments provided in April 2012, following our review of the previous draft BDCP document. The format below shows our previous comments from last April, followed by our updated assessment of these issues in **bold print.** We have categorized the comment headers to allow for quick viewing:

- Critical = Significant disagreement between NMFS and consultant team and/or no significant progress made to resolve issue.
- Important = Significant progress has been made or is in process of being made on methods. We have not yet seen the results, or there is disagreement on results, or interpretation of results that NMFS believes could be resolved with more time and effort.
- Resolved = Red flag is resolved.

[1] December 2012/February 2013 version

The second section of this document describes several new comments and issues resulting from our review of the current draft of the BDCP (the December 2012/February 2013 version of the document or AdminDraft). These new concerns highlight key areas of the BDCP that will need to be addressed between now and the time that the plan and accompanying materials are submitted to us as a complete application under section 10 of the ESA. We have provided, where possible, suggestions for addressing these comments and are committed to working closely with our State and Federal partners to find resolutions to these issues. We view these comments as critical to the completion of a successful planning effort and generally they should be viewed as very important for resolution, preferably prior to issuance of the public draft. In addition to these comments, NMFS has also submitted more detailed technical comments and edits in "track changes" format for each chapter of the BDCP directly to the State and its consultants.

In summary, we note very substantial progress has been made, and we look forward to continue to work collaboratively with all parties towards timely completion of this ambitious plan.

Section 1: Progress Assessment on Resolution of Previous Comments/Issues: NMFS List of Issues Unresolved in BDCP Administrative Draft (from 4/2/2012; 2013 updates in bold print)

1.1 Hood Diversion Bypass Flows (Critical)

Previous comment: The Effects Analysis of the Preliminary Proposal (PP) raises concerns over reduced flows downstream of the North Delta diversions, especially in winter and spring months. These flows relate to:

A. Increased frequency of reversed Sacramento River flows at the Georgiana Slough junction. The January 2010 PP rules included a provision that north Delta pumping would not increase these reverse flows. CALSIM II results provided by CH2M-Hill indicate that the PP will increase the percent of time Sacramento River flows are reversed, causing increased entrainment of juvenile salmonids into the Central Delta. If the frequency of reverse flows increases due to the PP, then the diversion amounts allotted under the PP could not be implemented. The DSM2 analysis of reverse flows in the DPM suggests that tidal marsh restoration in the Delta will nearly offset both the effects of sea-level rise and large water diversions from the Sacramento River, a conclusion which needs much more explanation in the EA (see comment on tidal marsh effects).

B. Long-term viability of sturgeon populations. There are concerns that Sacramento River flow reductions will impact the reproductive success of white and green sturgeon, which have been documented to produce strong year classes mostly in years with high flows in April and May (AFRP study). We do not know if this has been addressed in revised Appendix C.

1. Further explanation and analysis of the reverse flow issue.

2. Work with the Services to find a diversion operating scheme that is still likely to be permitable after adequate modeling and analysis has been conducted.

Update: The modeling analysis in the Admin Draft indicates that the Evaluated Starting Operations (ESO) will generally result in a reduction in flows below the north Delta diversions, but that those reductions will not result in increased duration or magnitude of reverse flows at the Georgiana Slough junction. This conclusion is relatively counter-intuitive and the concepts and mechanisms that support this conclusion, and the level of uncertainty around it, need to be very clearly explained in thorough detail. We also recommend independent peer

review of these methods and results. Regardless of the modeling results, the planning parties agreed that the north Delta diversions would be operated in a manner that would not result in increased frequency, duration or magnitude of reverse flows at the Georgiana Slough junction. Therefore, the description of Conservation Measure 1 (CM1) needs to very clearly explain that real-time operations will be managed to insure that diversions in the north Delta will not result in increased frequency, duration or magnitude of reverse flows at the Georgiana Slough junction. Such a description is currently missing from CM1.

With regard to the Delta flows needed for sturgeon reproductive success, the spring outflows provided under the High Outflow Scenario (HOS) appear to meet the 25,000 cfs outflow in 50% of years as recommended in NMFS' Combined Scenario 5 (CS5) criteria. The other decision tree scenarios do not provide these flow parameters and therefore would not be likely to provide the necessary benefits to contribute to the recovery of green sturgeon.

There are additional concerns with the modeled ESO bypass flows with regard to juvenile salmonid survival downstream of the new intakes. The effects analysis acknowledges that there are potential impacts from reduced flows downstream of the intakes, as seen in the results of the Newman (2003) analysis, which shows slightly reduced (though not statistically significant) survival rates through the Delta, and the Delta Passage Model, which shows a slight decrease in smolt survival prior to the addition of survival benefits from Yolo Bypass.

NMFS has conducted a simple analysis of survival using Newman's (2003) and Perry's (2010) flow-survival relationships showing average survival rates under different bypass criteria levels (provided under separate cover). This assessment indicates a significant reduction in salmonid survival under level 3 pumping criteria for the ESO as compared to Existing Biological Conditions (EBC2). This is a key finding and should be carried through into the net effects analysis.

In summary, our recommendations on this topic are to:

- **Submit the reverse flow analysis and conclusions to independent peer review.**
- **Amend the HOS decision tree to include the green sturgeon criterion.**
- **Augment the effects analysis to include NMFS analysis and to highlight magnitude and certainty of effects associated with Level 3, as compared to Level 2 and Level 1 pumping/bypass criteria.**
- **Submit the NMFS and ICF analyses of survivals associated with varying pumping/bypass criteria to independent peer review.**
- **In light of steps above, seriously consider amending Level 3 pumping/bypass criteria prior to submitting the section 10 application.**

1.2 Salmonid Net Effects (Critical)

Previous comment: All salmonid species are grouped together, with no separate evaluations for the separate ESUs of Chinook salmon or for steelhead. It is important for the net effects analysis to describe individual ESUs/species, and provide full consideration of the life-history diversity and timing exhibited by each ESU/species. We also need the Sacramento River populations and San Joaquin populations for Spring-run Chinook, Fall-run Chinook, and Central Valley steelhead summarized by river basin, prior to the roll-up by ESU/DPS. Steelhead life-history and ecology especially warrant a separate evaluation. "Net effects" is useful for comparing alternative

operations, but will not provide the robust effects analysis needed for ESA purposes (see comment on ESA baseline).

Separate all Chinook by ESU, by San Joaquin and Sacramento populations, and separate steelhead in all analyses and discussion.

Update: The initial issue has been addressed. Each species and Evolutionarily Significant Unit (ESU) has a separate analysis.

Now that the analysis has been separated out by species and ESU, we have been able to determine the following concerns with the net effects analysis:

The net effects section does not provide a well-integrated assessment of the overall population-level effects of the plan. It is primarily a reporting of disparate segments and a summary of the different analyses, without an analytical method or over-arching conceptual model to tie them all together (i.e., feed one into another). It is still a discussion of the application of different methods to different life stages. Results are based on "environmental attributes" that are scored for magnitude of effect and uncertainty; the agencies did not have an opportunity to assess these scores and there are no tables of these attribute magnitude/certainty scores provided for salmon and sturgeon.

During the effects analysis review workshops conducted in November/December 2012, ICF and the interagency technical team agreed that the environmental attributes analysis in the net effects section should be fundamentally re-worked to make flow a much more robust element of the stressor tables by including the "five attributes" of flow (magnitude, timing, frequency, duration, and rate of change), how the project would affect each of these attributes, and how these changes would affect fish. These agreements are not reflected in the framework of the current environmental attributes analysis and should be incorporated into the next draft.

There needs to be a systematic method for selecting the number of attributes that are summed in the net effects. For example, for steelhead, there are four categories of food in the summary figure, which doesn't seem appropriate for salmonids, especially the migrants. At the same time, no benefit is assigned to channel margin habitat restoration in the figure. A table showing the summed scores for all attributes would be more helpful than the figure.

The attributes themselves need to be better defined. E.g., how does "Sacramento River Flows" differ from "Sacramento River Habitat" differ from "channel margin" or "riparian"? A conceptual model would help with this. The assessment should be of the *change* in these factors attributable to the project.

There needs to be a second level of analysis to weight the results by the proportion of each life history type exposed to the effect (e.g., the 95% migrants to 5% foragers split for juvenile steelhead seems appropriate, but each segment is given equal emphasis in the summary figure).

Some QA/QC needs to be done to make sure the conclusions from the text match the summary figure (e.g., in steelhead, the figure shows a moderate benefit from Feather River flows, but there is no discussion of this in the text).

The changes in flows mentioned for some locations need to be translated to their effects on water temperature in order to fully understand their impact. For example, a 28% reduction in flow for the American River shown under ESO and HOS in the summer and fall months could potentially cause significant temperature issues for juvenile steelhead, as these are the months that the river can get very warm in lower-flow years.

There also needs to be a more systematic method for assigning level of benefit from a CM to a species. For example, in the steelhead net effects section, the sensitivity analysis for non-physical barriers showed a 0.00 (zero) survival increase in one year, and a 0.03 increase in a second year, yet the conclusion was a moderate positive change with moderate certainty. We recommend that a facilitated workgroup including biologists from all five agencies and ICF be charged with assigning specific magnitude and certainty scores and documenting the rationale and data sources for those determinations.

As part of the South Delta Research Collaborative, NOAA's Southwest Fisheries Science Center has developed a simple "top-down" conceptual model of south Delta operational effects on salmonids, which among other things links hydrodynamics to predation. We recommend that ICF coordinate with the agency staff involved in this collaborative process and exchange information on common issues being analyzed in both efforts.

In summary, our recommendations on this topic are to:

- **Conduct a facilitated workshop with the agencies to identify conceptual models of operational effects on salmonids and sturgeon and to agree on a model to guide the quantitative net effects analysis.**
- **Conduct a facilitated workshop with agencies to discuss and define environmental attributes and scores, the methodology of combining and weighting scores, and incorporation of the five attributes of flow.**
- **Complete a thorough cross-check of conclusions in text against those in figures.**
- **Explore flow-temperature relationships in upstream areas to provide a better inference of effects of reduced flow on temperature stress.**

1.3 ESA Baseline, Future Conditions, and Climate Change (Important)

Previous comment: In order to conduct the ESA jeopardy analysis on the PP, the baseline condition and projections of future baseline conditions, including effects of climate change, need to be re-written to be consistent with the 2009 Biological Opinion and current case law. ESA regulations define the environmental baseline as "the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process." Implicit in this definition is a need to anticipate the future baseline, which includes future changes due to natural processes and climate change. For the ESA jeopardy analysis we add the effects of the proposed action[2] to the

[2] Effects of the action refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline.

environmental baseline to determine if there will be an appreciable reduction in the likelihood of survival and recovery of the species (by reducing its reproduction, numbers or distribution).

Upstream effects associated with climate change need to be in the baseline and future conditions, with any effects of the project (in the Delta or associated with upstream operations) added to that future condition to determine jeopardy. A project proposed in this type of baseline conditions needs to more than offset its effects in order to alleviate a jeopardy finding.

Update: As a result of this comment, ICF is developing a scope to conduct a new "aggregate" analysis that meets the needs of FWS and NMFS. NMFS intends to continue to work with them and the other agencies to complete this analysis and incorporate it into the effects analysis of the proposed project prior to submitting the section 10 application.

1.4 Analysis of Water Temperature Impacts (Important)

Previous comment: Lethal and sub-lethal water temperature thresholds need to be examined at a finer scale. Currently the effects analysis relies heavily on a Reclamation water temperature model which can only estimate monthly values, which have limited value for predicting project effects on fish. In addition, the effects analysis has only presented frequencies of temperature threshold exceedances, while the magnitude and duration of exceedance is also very important. We do not know if this has been addressed in revised Appendix C.

1. Provide tables and probability plots of magnitude and duration of temperature exceedances at certain upstream locations, by water year type and month.
2. Technical discussion with Reclamation and CH2MHill about how to post-process data.
3. Investigate the use of SWFSC's Sacramento River temperature model to predict project effects and make hindcasts of empirical temperatures.
4. Investigate the use of the new American River temperature (and storage and flow?) model

Update: NMFS and ICF are working to develop temperature data presentation methods that provide a more useful representation of results. Daily data will be used when available to indicate the magnitude and duration of temperature exceedances at compliance locations. These new analytical methodologies have not yet been incorporated into the effects analysis.

1.5 Assumption of Habitat Restoration CM Success (Critical)

Previous comment: In several places, the EA assumes that adverse impacts of the PP will be offset by unsubstantiated benefits of habitat restoration. The EA assumes that all restoration will be successful and work as predicted, with little or no evidence to support this prediction and no attempt to analyze the potential outcomes of less than perfect success.

1. It is imperative to avoid language such as "This conservation measure will...", because the anticipated CM outcomes are based on conceptual thinking, not execution. To be able to comprehensively think through the adaptive management and monitoring plan, implementers need to try to anticipate a range of responses that must be managed in order to be prepared for the uncertainty of the response.
2. Alternative outcome scenarios should be evaluated to bracket the range of possible outcomes from proposed habitat restoration.

Update: Language has been altered to reflect uncertainty to an extent, but alternative outcome scenarios have not been evaluated; all analyses and results assume that restoration activities will be successful. Alternative outcome scenarios showing varied effectiveness of habitat restoration efforts have not been provided, and therefore it is not possible to assess the effects of CM1 without the assumed benefits of completely successful habitat restoration. The total success of habitat restoration efforts remains highly uncertain, and an appropriate analysis should include an evaluation of the biological effects of at least a partial failure of efforts that are expected to "improve" conditions.

ICF has indicated that a comprehensive list of previously restored areas and "lessons learned" is included in the description of CM3, but we were not able to find the summary of "lessons learned". The list in Table 3.4.3-5 shows several estuarine aquatic habitat restoration projects but the "Results" column does not provide any direct links to improved biological metrics such as growth, survival, or abundance of native fishes.

1.6 Overreliance on Real-time Operations and Adaptive Management (Important)

Previous comment: In several places, the EA assumes that adverse impacts of the PP will be fully resolved through the implementation of real-time operations and adaptive management. This may not always be possible. For example, long-term trends towards reduced carryover storage may not be able to be mitigated using real-time operations. How adaptive management might work in this situation has not been fully assessed. There are going to be limitations on what adaptive management and real time operations can accomplish.

> *Examine recent (five to ten years) real-time management of the cold water pool in Shasta Reservoir to determine both the effectiveness of real-time operations and a range of adaptive management options.*

Update: The majority of upstream issues have been addressed through major changes in the proposed project (not withstanding some remaining issues with egg mortality and juvenile survival discussed below). However, there remains a need to more clearly describe how real-time operational adjustments will be implemented to achieve some of the stated objectives of the water operations. Specific examples include the need to thoroughly describe how the new intakes will be operated to: 1) avoid reverse flows at Georgiana Slough; 2) implement pulse protection when monitoring indicates that winter-run Chinook are "riding" a flow pulse; and 3) determine when a sufficient percentage of winter-run Chinook have passed the intakes to end the pulse protection and initiate standard level 1 pumping procedures. While it is understandable that these real-time criteria have not been developed to date (because they have not been necessary to complete CALSIM modeling and run monthly average models of effects), we will need greater specificity on real-time operations in order to meet section 10 permit issuance criteria and complete the underlying Section 7 analysis. We recommend that an interagency technical team be formed immediately to work with ICF to start scoping these real-time criteria.

1.7 North Delta Diversion Effects (Resolved)

Previous comment: Mortality rates from predation and other screening effects are difficult to predict, as there is a high level of uncertainty associated with predation and other effects on

juvenile salmonids. The estimate of <1% loss at all 5 screens is not sufficient without giving additional consideration to higher estimates of mortality (GCID empirical studies showed a 5% per screen loss rate, much higher than the <1% used in the DPM).

1. Bracket the analysis of screen related mortality around a 5% per screen loss assumption.

2. Investigate the use of DWR's hydrodynamic model to assess local flow alterations at the proposed diversion structures, including the creation of predator holding areas. Specific questions are whether the model can simulate on-bank structures and the additional hydrodynamic effects of active pumping.

Update: This comment has been addressed through the inclusion of a more comprehensive analysis of potential screen related mortality including an assessment of a 5% per screen loss rate. The recommendation to conduct a detailed hydrodynamic analysis of the screen face area is being advanced by the Fish Facilities Studies Group. This analysis should be incorporated into the effects analysis when it is available.

1.8 Predator Control Conservation Measure (Important)

Previous comment: We agree that predation is a significant risk factor to the listed species, but the assumed positive results of this CM are questionable and unsupported (see F.5.4.1.4 in Appendix F). As an example, localized control of striped bass may not be feasible as this species exists throughout the Plan area and are highly mobile. Few specific details have been presented on how the CM will be implemented, and an aggressive predator removal program could result in significant incidental take of listed species. Due to the high level of uncertainty, we find it very unlikely that we could rely on this measure for any benefits during the permit process.

Remove this CM measure from the plan, and move it to an experimental research program and link to adaptive management. Reflect this appropriately in the EA.

Update: The authors have generally toned down the level and certainty of beneficial effects anticipated from CM15 (Predator Control). However, the measure still lacks an appropriate metric to measure the success (or lack thereof) of the predator control program and seems to assume phase 1 (the scoping stage) will show success and phase 2 will be implemented. There is no discussion of what happens if phase 1 shows no benefits from the program. The conservation measure needs to clearly explain how the success of this action will be measured (metrics and success criteria). The analysis of CM15 also needs to take the next step and describe the expected outcomes if the measure is less than fully successful. This is a very important element of any analysis of actions whose outcome is highly uncertain and should be considered a universal recommendation for all measures where the results of implementation have high uncertainty.

1.9 Delta Passage Model (Important)

Previous comment: The Delta Passage Model (DPM) is used as the sole predictor of smolt survival in baseline and PP scenarios. However, the assumptions, inputs, and results are still being validated and reviewed. The datasets used in this model are very limited and largely based on results from hatchery late-fall run Chinook, which are then being applied to other runs of Chinook.

Continue refinement and development of DPM. Weigh validity of results against those of other models and relationships. The use of Newman, 2003 may be another tool to use for assessing the survival of fall and spring run smolts through the Delta.

Update: DPM continues to be refined through discussions with Cramer Fish Sciences and NMFS. Survival analyses based on methods in Newman (2003) have been incorporated into the effects analysis, and results of both models showing similar trends for the modeled years are discussed in the net effects section. NMFS recommends that this model continue to be used as an informative tool but that the results be closely scrutinized to determine what is driving them and if they make sense based on the system as we know it. NMFS also recommends that additional peer review should be conducted – perhaps a reconvening of those who participated in the previous workshop in June 2011.

1.10 Deficient Analysis of Fry Passage/Survival (Important)

Previous comment: Because the DPM model is only for smolt sized fish, the salmonid analysis is insufficient as it provides no information on fry-sized salmonid passage/survival**.**

Add qualitative analysis of fry survival based on best available data. Perhaps add time/added mortality to a modified version of an updated DPM model.

Update: In this new draft, fry growth is analyzed relative to the Yolo Bypass and a fry Particle Tracking Model (PTM) analysis was included (See 5C.5.3.7; 5C.5.4.1.4). ICF has acknowledged these analyses need additional agency input for the public draft. The PTM analysis was discussed at recent species-specific meetings where it was determined that it may not be appropriate for this application. NMFS has requested (and ICF is working on) more detailed (3- and 7-day) PTM output to allow a closer look at travel time through key reaches, which may potentially be linked to fry survival rates through those reaches. It is generally agreed that neutral particle movement does not necessarily mimic the movement of living fish and the SWFSC/NMFS life cycle model will include a "smart PTM" component that attempts to add more "life-like" movement to the particles, which may provide a better way to analyze fry survival.

1.11 PTM Runs Inadequately Capture Altered North Delta Hydrodynamics (Important)

Previous comment: PTM model runs did not include conditions in which ND diversions would be at the upper limits of allowable pumping (high proportion of total river flow). The technical memo from NMFS and USFWS highlighted the issue and the resolution to the problem. We will need additional modeling runs to adequately assess ND diversion impacts on salmonid travel time and route entrainment.

Do additional PTM analysis following guidelines outlined in NMFS/USFWS memo.

Update: While it appears from Chapter 5 Appendix B.6 and Appendix C.4.3.2.4 that some of the suggested time periods were included, Attachment 5C.A.9 indicates that PTM was run for 24 representative months. These are the same months that were used in the previous (February 2012) effects analysis draft. The methods attachment needs to be updated to reflect the additional runs.

The time periods recommended by NMFS and USFWS were selected based on evaluation of impacts of a 15,000 cfs capacity project. It is possible that different time periods would be more appropriate to assess the effects of a 9,000 cfs capacity diversion. NMFS will continue to look into this and determine whether the modeled periods capture an appropriate range of effects from the updated project.

1.12 D1641 Export/Inflow Ratio (Important)

Previous comment: Combined north and south Delta exports under the PP exceed the current D-1641 Delta Export/Inflow standard. (The PP calculation method measures Sac River inflow below the North Delta diversions and does not include ND diversions as part of total exports).

1) *Provide summary analysis of differences between PP and EBC by month and water year type using alternate E/I calculations.*
2) *Show resulting flow data for both calculation methods.*

Update: The Export/Inflow (E/I) ratio has been applied two different ways in the three project scenarios (ESO, HOS, and LOS). The "Partial E/I", which measures Sacramento River inflow below the north Delta diversions and excludes north Delta diversions as part of total exports, has been applied to ESO and LOS. However, HOS has been modeled using the "Full E/I", which includes the full Sacramento River inflow upstream of the diversions as inflow and the north Delta diversion exports as exports. This is an inconsistency in approach that raises questions about the subsequent analyses. ICF has indicated that new analyses have been done but have not yet been fully incorporated into the effects analysis. There is placeholder language in CM1 showing both options but the actual operational criteria to be implemented upon project completion has yet to be decided. NMFS recommends that the "Full E/I" criteria be adopted and that this methodology be applied across all scenarios for consistency.

1.13 Yolo Bypass (Important)

Previous comment: Yolo Bypass has great potential for fisheries benefits, but the current EA may be overstating the benefits without adequate studies or data to support these conclusions. Without project specific plans to help quantify the effects, concerns remain about issues such as sturgeon passage, juvenile salmonid survival under lower flow regimes, ability to get juveniles into the floodplain through notch and reduction of flows in the mainstem Sacramento River to accommodate additional flooding in Yolo Bypass. Also, some races/runs of salmon may not have access to Yolo Bypass.

Provide project specific plans and consider the risks of managing the floodplain under lower flows related to issues above.

Update: ICF has indicated that these project specific plans are not yet available, but risks related to stranding, passage, etc., are acknowledged. See 5.C.5.4.1. This is another conservation measure where a lack of specific designs and operating criteria create significant uncertainty as to the efficacy of the measure and level of biological benefits that it will provide. However, the net effects analysis attributes broad success and significant benefits from the measure with no analysis of the consequences of less-than-complete success. We suggest that this is another area where an analysis of less than fully successful implementation should be conducted to determine the sensitivity of the overall plan to the success of this CM.

1.14 Channel Margin Habitat (Important)

Previous comment: Altered flows resulting from the North Delta diversions may result in reduced water levels affecting the percentage of time that current wetland and riparian benches are inundated.

Compare anticipated water levels under future scenarios with those in the design documents of restored wetlands and riparian benches to analyze potential dewatering of those features.

Update: NMFS and ICF are coordinating to develop and execute an effective analysis of the effects of proposed operations on inundation of existing wetland and riparian benches. We will need to assess the results of this analysis with respect to effects on covered fish once the analysis is completed. This analysis should also be submitted to independent peer review.

1.15 Construction and Maintenance Impacts (Important)

Previous comment: The EA does not adequately address the potential for adverse impacts on sturgeon, fall-run Chinook adults, and steelhead adults, which are generally present in the project area during the proposed in-river work windows described for construction and maintenance of North Delta facilities.

Discuss ways of minimizing impacts and implementing mitigation for species not protected by work windows.

Update: NMFS has been working with ICF to incorporate more detail into the construction and maintenance impacts analysis. This has resulted in significant improvements in the analysis. However, several elements, particularly regarding the long-term maintenance of the facilities, lack the detail and specificity to allow NMFS to conduct a thorough assessment of the amount and extent of take that will need to be included in the permit and the section 7 consultation analysis for the project. NMFS generally requires in-water construction projects to be at the 80% design stage for section 7 consultations, and we will likely need that level of design completion to conduct a thorough assessment of the amount and extent of take for this large construction project. We request information from ICF on when this level of design will be ready in order to understand the implications for the schedule, if any.

1.16 Tidal Marsh Impacts on Riverine Flow (Important)

Previous comment: The effect analysis assumes that restored tidal marsh will act to decrease flow reversals, which has not been well explained. It seems that tidal marsh restoration was modeled as a single configuration; there has been no description of that configuration to indicate how they were implemented in the hydrodynamic models. Therefore, there is a lot of uncertainty regarding model results.

Document changes to hydrodynamic models that were implemented to characterize tidal marsh restoration.

Update: ICF has communicated to NMFS that the data that can be provided is limited, and that ICF and the California Department of Water Resources (DWR) have provided as much specificity as they can. ICF met with NMFS and other agencies on March 5, 2013, to provide

additional information regarding the relationship between restoration and tidal dampening as they relate to riverine hydrodynamics, and more specifically to reverse flows near Georgiana Slough (See 5.C). We suggest that the document include a more comprehensive narrative of the tidal hydrodynamics and the effects of tidal habitat restoration, including a discussion of the RMA modeling conducted on this topic. Because of the importance of this analysis to determining potential project effects on covered fish, we recommend that these methods be independently peer reviewed and appropriately characterized for their uncertainty.

1.17 Cumulative Effects Show Long-Term Viability Concerns for Salmon (Critical)

Previous comment: The analysis indicates that the cumulative effects of climate change along with the impacts of the PP may result in the extirpation of mainstem Sacramento River populations of winter-run and spring-run Chinook salmon over the term of the permit.

1) Incorporate operational criteria into the PP that will protect and conserve suitable habitat conditions in the upper river for the species under the 50 year HCP (these operational criteria should be designed to meet the performance criteria in the NMFS BiOp RPA).

2) Convene a 5-agency team of experts specialized in Shasta operations and temperature management to develop the above described operational criteria.

Update: The current efforts to develop a fully "aggregated" effects analysis should address the analytical concerns related to this issue, but the fact that the cumulative effects of the project when combined with effects of climate change and other baseline conditions is showing the potential extirpation of mainstem Sacramento River populations of winter-run and spring-run Chinook salmon over the term of the permit remains as a serious concern.

The reported OBAN and IOS modeling results indicate a potential issue with either the modeling tools (OBAN and IOS), or the author's assertion that the upstream flows associated with EBC2 and ESO are "essentially identical". The conclusions in this section state that "The majority of the effects of both BDCP and climate change were driven by increases in upstream temperatures affecting egg survival, which, relative to the BDCP contribution, is a potential modeling artifact and not an actual predicted effect." However, ICF has determined that these are the best modeling tools available. The results cannot necessarily be discounted because they do not show what was "expected". Since these methods were deemed acceptable, the results need to be fully acknowledged.

The results of these models signal a need for further investigation to determine why they are not what are "expected". It seems that upstream releases between ESO and EBC2 do not match as well as thought, as seen in Table C.5.2 2 titled "Difference and Percent Difference in Flows in the Sacramento River at Keswick, Year-Round". Some summertime and fall months in drier years are very different, which may be what is causing the biological models to show a negative egg survival response. The table below shows the results of month-to-month comparisons of flows out of Keswick for LLT. It indicates that the ESO flows could be as much as 6500 cfs less than EBC2 flows (November) when months are evaluated individually, and not grouped by month and water year type.

Month	Maximum Difference (ESO_LLT - EBC2_LLT)
January	-7683
February	-1571
March	-4825
April	-1221
May	-830
June	-2979
July	-5916
August	-3712
September	-2691
October	-5510
November	-6504
December	-4594

We recommend that ICF work with the Shasta operations experts at Reclamation, and possibly a broader workgroup of biological and operations experts to resolve these issues and determine if/how the entire project can be operated to insure that BDCP does not cause impacts to upstream spawning and rearing habitat in the Sacramento River.

1.18 Holistic Estuarine Evaluation (Critical)

Previous comment: The effects analysis should examine synergistic and cumulative ecological impacts associated with reducing inflows to an estuary that is already severely degraded, and discuss the importance that water quantity, quality, and the natural hydrograph have to the ecosystem, as well as the direct impacts on native fish species. So far, the impacts to fish have mostly been examined in a piecemeal fashion (e.g., examining impacts of flow reduction on adult homing).

> *Incorporate a holistic evaluation of impacts on the estuarine ecosystem. Include discussion of the importance of water quantity, quality, and the natural hydrograph to the ecosystem, and the direct impact that changes to these conditions have on native fish species.*

Update: The holistic evaluation described above in our previous recommendation does not appear in the 2013 Admin Draft of BDCP. We suggest that ICF use Carlise et al. (2010) as a starting point for this discussion. Carlisle et al. found that in an analysis of over 200 stream systems, "biological assessments showed that, relative to eight chemical and physical covariates, diminished flow magnitudes were the primary predictors of biological integrity for fish and macroinvertebrate communities". In other words, the change in flow was a better predictor of whether the biotic communities were impaired than variables such as temperature, pH, total nitrogen, or urban land cover. It is also well recognized that streamflow reductions can impair the ecological function of downstream estuaries (Drinkwater and Frank 1994; Jassby et al. 1995; Loneragen 1999; Flannery et al. 2002; Winder et al. 2011).

1.19 Burden of Proof (Important)

Previous comment: Deference should be given to known population drivers and documented relationships (e.g., sturgeon recruitment relationship with flows is well documented, though the exact mechanism is not completely understood). Since flow is a key component of habitat for aquatic species, do not assume that it can be substituted for by other actions.

> *Do not assume that incremental benefits in a conservation measure will compensate for known population drivers related to flow.*

Update: There has been significant improvement in the language used to describe the level of certainty of potential benefits attributed to those CMs that are less certain in their implementability or effectiveness for protecting covered fish. However there remain some instances of overstating/understating of beneficial/detrimental effects. For instance, the net effects analysis concludes that CM2 will "increase floodplain availability and usage and improve conditions for juvenile and adult winter-run Chinook salmon". However, the analytical methods for juveniles suggest only a low or moderate positive change. There are some stated conclusions that are based on analyses that are not yet complete (e.g., bench inundation). Some conclusions suggest that decreases in flows due to the project are "rare" because they only occur in some months of drier water years. But since dry and below normal water years can occur 40% of the time, this should not be considered a "rare" occurrence. There are numerous additional examples of these types of analytical discrepancies provided in the "track-changes" comments on the Admin Draft provided by NMFS.

1.20 Incomplete Analyses and Documentation (Important)

Previous comment: The full appendices were not released concurrently with Chapter 5 which makes review of the results problematic.

> *Provide all appendices/analysis simultaneously so Services can have all pertinent information used in Effects Analysis summaries without having to backtrack weeks later.*

Update: While NMFS received the majority of the document on 12/21/12, this did not include Chapter 5.5 Effects on Covered Fish. Appendix 5.B Entrainment was provided on 1/2/13. Chapter 5.5 Effects on Covered Fish was provided on 2/7/13. This lag reduced the ability to simultaneously view results in appendices and assess how they were incorporated into Chapter 5.5.

The "complete" Admin Draft was delivered on March 4, 2013. This presumably includes all additional outstanding sections (Section 5.3 Ecosystem and Landscape Effects, Table 5.2-5 Biological Objectives for Covered Fish and Their Assessment in the Effects Analysis, Tables C.0-3 and C.0-4 Summary Tables, Appendix 5.I Critical Habitat and Essential Fish Habitat Analyses). NMFS has not had an opportunity to conduct a thorough review of this recent submittal.

Specific documentation for all analytical methods are not included or are outdated or incorrect (e.g., SacEFT documentation is outdated according to its developers; OBAN, MIKE21, SALMOD, Reclamation Mortality Model documentation is not included at all). This makes it impossible to fully understand how these models were configured or to determine the exact drivers of the reported results. It appears at times that the chapters/appendices were written by staff unfamiliar with the model operations and intricacies of results.

NMFS suggest that future drafts include updated and correct documentation (manuscripts, user's manuals, etc.) for all analytical methods. Documentation should include listings of all relevant input parameters and relationships. ICF should also draw on the expertise of the developers of specific models to interpret model results, identify uncertainties and limitations, and verify the stated conclusions.

1.21 Insufficient Biological Goals and Objectives (Important)

Previous comment: The conservation measures are sometimes defining the BDCP species objectives, which is insufficient. 30% juvenile through-Delta survival is not a suitable goal for a 50 year conservation plan.

The BDCP objectives should be biological, species-level outcomes.

Update: This issue has generally been resolved (for salmonid BGOs) through the incorporation of the recommendations provided in NMFS' technical memo on juvenile salmonid through-delta survival. However, the text that describes the BDCP's level of responsibility for achieving the through-delta survival objectives does not match what is described in the NMFS tech memo on salmonid BGOs. The tech memo calls for the BDCP to be responsible for 100% of the improvement in smolt survival through the Delta, not >50%. This is because it will be impossible to determine causation for any measured increase in through-delta survival rate. The specific objectives are interim and should be reevaluated over time. The actual tech memo should be included as an appendix to Chapter 3.

The biological objectives for sturgeon abundance and productivity (under GRST1) are vague and rely too much on "documenting the current distribution" and future studies. There needs to be greater emphasis on the objective to provide adequate adult attraction flows.

1.22 OMR Flows Unimproved in Drier Water Years (Important)

Previous comment: Improved OMR flows under the PP occur during wetter years when OMR is less of an issue for covered fish. PP OMR flows are often worse than, or similar to, EBC in drier years. Sacramento Basin fish are most vulnerable to entrainment into the central Delta in drier years when Sacramento River flows have the potential to reverse and OMR levels are below -2,500 cfs. San Joaquin basin fish are best protected by increased Vernalis flows and/or a HORB which the PP does not address.

1. Analyze the risk in different water year types and with different flow levels in the Sacramento River.

2. Implement Scenario-6 to help address the adverse impacts seen under the PP.

Update: This issue has generally been addressed by adopting "Scenario 6" into the proposed project and including the High Outflow Scenario into the decision tree. There were additional south Delta operational criteria included in the agency recommendations developed in the CS5 process. These included additional protections in the "shoulder" months of the juvenile salmonid migratory period (March and June), as well as summer OMR criteria intended to provide protections against sturgeon entrainment into the export facilities. The potential biological benefits of these CS5 criteria should be assessed in the effects analysis. ICF's participation in the South Delta Research Collaborative will provide an important linkage between BDCP and the conceptual models and hypotheses emerging from that effort. This

remains a key issue because of the importance of improving survival of emigrating salmonids from the San Joaquin River system, which is generally less than 10%. We recommend continued iterations on these operations prior to Plan completion, and between Plan completion and full implementation (during ELT).

1.23 Non-Physical Barriers (Important)

Previous comment: Assessment of non-physical barriers is inadequate, and the potential negative effects of predation associated with non-physical barriers haven't been assessed.

Include analysis of potential adverse effects of non-physical barriers.

Update: This is another instance where the certainty of beneficial effects from a CM is overstated in relation to the amount and quality of data on which those conclusions are based. The Georgiana Slough non-physical barrier (NPB) effectiveness is based on one year of data from high flow conditions. We have yet to see results from a lower-flow year when reverse flows at the Georgiana Slough junction may be more frequent. It should also be acknowledged that under the OCAP Reasonable and Prudent Alternatives (RPA) the development and implementation of NPBs would be required if they are found to be effective.

Also, the way in which the effects of NPBs are described is confusing and potentially misleading. According to Appendix 5C.5.4 Methods, there was a 67% reduction in the proportion of fish entering GS/DCC (from 22.1% to 7.4%). However, in the text it is often stated that the NPB provides a "67% deterrence", which implies that 67% of fish approaching the junction would be deterred, and therefore stay in the mainstem. That is not true. It would be better to describe this as a "67% decrease in proportional entry into GS."

1.23.1 Carry-over of OCAP RPA's on technological improvements to South Delta Facilities (Critical)

Previous comment: By not carrying forward technological fixes in the South Delta called for in the OCAP RPAs into the Conservation Measures, we would expect the effects analysis to specifically flag this and analyze it as a degradation to future conditions (as compared to the baseline which should include the RPA improvements).

Add south Delta technological improvement RPA's to Conservation Measures

Update: ICF states that "Many RPAs are assumed to be completed prior to the implementation of BDCP and/or CM1 and are therefore assumed in the baseline (This is clarified in Tables 3.2-1 and 5.2-2.)". However, all the comparisons in the effects analysis are to current levels of pre-screen loss and salvage, not to what they might be with these RPA elements implemented. Therefore, the results overstate the benefits of the project as compared to an appropriate baseline condition which should include these RPA required improvements.

This same issue is repeated by the fact that the analytical baseline (EBC) does not include potential beneficial effects of Yolo Bypass floodplain habitat restoration, and implementation of non-physical barriers, both of which are included in the OCAP RPA. This is a significant flaw in the net effects analysis. The analysis needs a clearly stated caveat of interpretation of results to reflect this limitation. The aggregate analysis should be helpful in addressing these beneficial effects in a different framework.

1.24 Feasibility of 65K acres of Habitat Restoration (Critical)

Previous comment: Recent evaluation of land available for habitat restoration indicates potential roadblocks to acquiring all the land proposed in the PP. DWR's own analysis suggests that 65K acres is very unlikely.

Analyze the potential effects of partial implementation of habitat restoration and incorporate alternative actions or measures to compensate for this possibility.

Update: The previous comment from 2012 was referring specifically to tidal wetland habitat. Since that time DWR has revised their habitat restoration feasibility analysis and expanded the definition of the "tidal natural communities" category to include all tidally influenced habitats to be restored under BDCP. DWR believes that it will be possible to fully achieve the plan's habitat restoration goals. However, there is no specific analysis of the feasibility of acquiring 65,000 acres of land appropriate for tidally influenced habitat restoration provided in the document. All related analyses proceed as if restoration will be wholly successful; there are no bounding analyses to show the effects of CM1 operations if restoration either cannot be completed to the full extent or is not fully successful. Therefore, our previous recommendation stands: Analyze the potential effects of partial implementation of habitat restoration and incorporate alternative actions or measures to compensate for this possibility.

Section 2: Additional Issues to be Resolved for Public Draft

Chapter 1

Introduction - Track changes comments submitted separately.

Chapter 2

Existing Ecological Conditions - Track changes comments submitted separately.

Chapter 3

2.1 <u>Decision Tree process needs to include consideration of flow needs for salmonids and sturgeon (Section 3.4)</u>

Modeling results of the HOS indicate that flow requirements intended to address the needs of smelt would also be likely to address some of the flow requirements for salmonids and sturgeon identified through the CS5 process. However, the description of the Decision Tree management process states that monitoring and research used to determine which "tree branch" would be implemented would only look at smelt issues and would not attempt to determine which flow scenario would be appropriate for salmonids and sturgeon. The monitoring and research should also investigate the flow needs of salmonids and sturgeon and the determination of which flow scenario will be implemented should be based on the needs of all covered species. There also needs to be a clear understanding that while the current Decision Tree would create four possible combinations of spring and fall outflow criteria that would be included in the range of potential options for initial study, prior to commencement of conveyance operations, there will be a new determination by the permitting agencies specifying what

the spring and fall outflow criteria will be at the time the new facility begins to operate. This determination will be based on all best available science, including that developed during the decision tree process.

2.2 Sensitivity analysis of likely effects of future increase in south-of-delta storage capabilities (Section 3.4)

There is a high likelihood that south-of-delta storage capabilities will be increased over the 50-year term of this permit. There is also the potential for such an increase in storage capacity to result in water operation parameters (pumping rates/timing, OMR flows, I/E ratios, etc.) that differ from those modeled in the current analysis. There needs to be a "sensitivity analysis" of the likely effects of future increase in south-of-delta storage capabilities on these operational parameters and the resulting biological effects on covered species.

2.3 No description of "operational phasing" of north Delta facilities (Section 3.4 and 3.6)

The document lacks any language describing the agreement to use "operational phasing" in lieu of construction phasing, as agreed to by the BDCP principals. The plan will need to include significant detail on the monitoring and metrics necessary to implement the operational phasing agreement and a detailed description of how all aspects of that agreement will be implemented. We have provided the document describing the details of the Principals' agreement last spring, and these need to be accurately reflected in the conservation measures and as a separate section of the adaptive management chapter.

2.4 The Role of Adaptive Management (Section 3.6)

Almost three years ago, the Federal Agencies issued a white paper on application of the Five Point Policy to the BDCP (document attached to this memorandum). It articulated the role of adaptive management in the BDCP, saying, in part, that

> "The BDCP is a complex, landscape scale, long-term HCP with a high degree of uncertainty as to how close the initial conservation measures will come to achieving the plan's biological goals and objectives. It falls into the category of plans that will be a mixture of the two strategies, with initial prescriptions associated with adaptive management, and specific biological outcomes defining the ultimate success of the plan. This type of plan will allow management flexibility so the permittee may institute actions necessary to achieve the plan's goals while providing boundaries for future expectations and commitments. In addition, a results-based plan will address uncertainty in the ecosystem and provide the conservation assurances required by the Act. The Services will be challenged to make the findings required for permit issuance if the plan does not include clearly defined and scientifically supported biological goals and objectives, an adaptive management plan that tests alternative strategies for meeting those biological goals and objectives, and a framework for adjusting future conservation actions, if necessary, based on what is learned." (4/29/2010 memo, page 1)

The adaptive management program created by the BDCP serves the essential functions of (1) assuring that alternative conservation measure designs that might more efficiently achieve objectives are studied and, where appropriate, implemented; (2) providing a workable framework for deliberating difficult management issues and proposing solutions; and (3) providing transparency in the management of the BDCP to ensure public confidence that the conservation measures and strategies implemented under

the plan are based on the best available science. We have concerns with the current draft on all three of these points.

2.5 Adaptive Limits (Section 3.6)

"Adaptive limits" in the BDCP refers to the most extreme sets of operational parameters that might be required or authorized to the permittee through the working of adaptive management over the life of the permit. Some discussion of what such parameter-by-parameter limits might be has already occurred, but neither the concept of adaptive limits nor a draft example of them is included in the current BDCP draft. This leaves open the question of what commitment of resources might be required of the permittee.

As is clear in both the HCP Handbook and the Five Point Policy, the permittee in an HCP is protected by the inclusion of adaptive limits that "clearly state the range of possible operating conservation program adjustments due to significant new information, risk or uncertainty. This range defines the limits of what recourse commitments may be required of the permittee. This process will enable the applicant to assess the potential economic impacts of adjustments before agreeing to the HCP." 65 Fed. Reg. 35253; see also HCP Planning Handbook at 3-24 – 3-25.

In the BDCP, adaptive limits would provide an important assurance that would protect the permittee from an open-ended obligation to commit resources irrespective of circumstances. They would also provide an important level of transparency to the permittee and the public regarding the commitments represented in the plan. The range of adaptations to reflect evolving scientific understanding and improved information on the effectiveness of the various conservation measures are usually described as changed circumstances within an HCP that has high scientific uncertainty, such as this one, and therefore do not trigger a formal plan amendment. Thus, the adaptive limits serve as an important guide regarding the boundaries of the anticipated changed circumstances.

2.6 Role of BGOs (Section 3.3)

Biological Goals and Objectives form the core of the BDCP. Biological goals represent the ultimate conservation outcomes toward which the plan is striving. In some cases, achievement of ultimate goals lies within the power of the BDCP; in others the achievement of goals depends in part on factors that are outside the control of the water projects. Objectives are lower-level outcomes within each goal that are essential to achieving the overarching goal. To be effective, objectives need to be SMART: specific, measurable, achievable, relevant to the goal, and time-bound. In addition to meeting the other SMART criteria, BDCP objectives are "achievable" because they are within the power of the water projects to achieve, and essential to BDCP success because they are "relevant to the goal[s]."
BDCP conservation measures are designed to achieve the biological objectives of the plan. Because of this, BDCP adaptive management will primarily focus on adjustment of the conservation measures to achieve the objectives as efficiently as possible.

The document generally makes it clear that the BGOs will be used to guide the implementation of conservation measures, but we have important concerns with the way objectives are used.

(1) The plan needs to clearly acknowledge and articulate that achieving the outcomes described in the Objectives is the actual basis of the entire conservation strategy and its constituent conservation measures. Continuing to achieve objectives is necessary for progress toward recovery of covered species and in many cases will be required for compliance with the terms of the BDCP permit.

(2) The plan needs to clearly articulate that the adaptive management program will focus on ensuring that plan objectives are being met. Indeed, looking at alternative management strategies to achieve program objectives is fundamentally what AM is designed to do. Failure of conservation measures to achieve objectives will, therefore, be a basis for the AMT to propose changes to conservation measures. There are several statements of the role of adaptive management in chapters 3, 6, and 7 that need to be edited to make this clear.

(3) The plan needs to make clear that objectives are themselves subject to adaptive management. Objectives are ultimately based on models describing the relationship of covered species to their environments, and changes to those models might occasion any of the following: changing an objective either up or down, adding an new objective to reflect improved understanding, removing an objective that is superseded or found not to be relevant to achieving its overarching goal. Deliberations on these issues is properly a subject for the AMT, with oversight by the AEG, POG, and ultimately the fish and wildlife agencies with final authority on adaptive management decisions. Though chapter 7 lays out a clear role for the AMT in these matters, section 3.6 is currently ambiguous and contradictory on the role of the AMT and how it makes decisions. Furthermore, section 3.6 does not adequately articulate how the AMT will exercise its responsibilities with respect to the nine enumerated steps of adaptive management, making it quite unclear whether the AMT is appropriately empowered to carry out its mission.

(4) Implementation of the conservation measures as initially described in the plan does not constitute the extent of the responsibilities of the Authorized Entities. Achieving the outcomes described in the objectives is the primary responsibility of those implementing the plan.

2.7 Effects of proposed operations on Coordinated Operations Agreement

There have been frequent discussions within various workgroups and meetings on the potential for some proposed operational scenarios to affect the Coordinated Operations Agreement (COA) agreement between Reclamation and DWR, but we were unable to find anything in the document describing this subject. If this is truly an issue, and certain operational scenarios intended to benefit covered species will require amendments to the COA agreement, this should be described somewhere in the document as part of the process necessary to implement the BDCP.

Chapter 4

Covered Activities and Federal Actions - Track changes comments submitted separately.

Chapter 5

2.8 Potential project related impacts on upstream egg and juvenile survival continue to be predicted in model results (Section 5.5 and Appendix 5.C)

OBAN, IOS and SacEFT model results continue to indicate that slight differences in Keswick release strategies between the ESO and EBC will result in increased egg mortality upstream. Lower flows in key summer and fall months increase egg mortality for winter-run and spring-run Chinook salmon and potentially other runs. SacEFT habitat results show significant impacts on spawning and rearing habitat for winter-run that are above and beyond effects of climate change.

Critical year egg mortality is very high by the LLT suggesting that a few dry/critical years in a row could potentially cause significant impacts to Sacramento River-dependent ESUs over the 50 year permit timeframe. The analysis shows that ESO criteria could result in riskier operations relating to stranding risk for juveniles (over two times more low risk years under EBC). The document should provide full SacEFT results – not just a summary of "good" year conditions. We are also interested in "poor" year conditions between the scenarios.

The analysis should provide a better examination of "worst case scenarios" for indicators like juvenile production, egg survival, escapement, etc. ESO appears to have riskier operations that result in half as many juveniles in minimum estimates of SALMOD. It may be useful to develop threshold juvenile production estimates (JPEs) of concern that can be compared between scenarios.

2.9 Additional Analysis of Feather River and Oroville Reoperations (Section 5.5 and Appendix 5.C)

Increased summertime temperatures in the Feather River may have effects on the reproductive success of sturgeon, especially for the high outflow scenario. While the high spring-time Feather River flows modeled in HOS could attract sturgeon into the Feather River from the Sacramento River, summertime releases are decreased compared to EBC2 to provide for end-of-September storage requirements. The decreased summertime river flows increase water temperatures in the high-flow channel; the resulting temperatures reported in the effects analysis would be lethal to sturgeon eggs and embryos. This is not discussed in the net effects section because lethal egg temperatures are not considered in the net effects conclusions. NMFS is also concerned with the low frequency with which the ESO and HOS meet the recommended minimum spring flows in above normal and below normal water years.

The forecasting method for Oroville releases is not clearly defined in any section. The effects of relying on Oroville to meet HOS spring-time Delta outflow requirements are reviewed in Chapter 5 (Appendix C Attachment A), and there are references to reduction of exports to also meet the outflow target. Chapter 5 Appendix C.2 presents NMFS' recommended Feather River flow schedule, but there are unexplained modifications and no description of the driving constraints or storage forecasting methodology. While these operations need to be described, the effects analysis should also address any influence of the potential temperature compliance point included in the Dec 2012 Settlement Agreement for Licensing of the Oroville Facilities. This would require compliance to 64° F from May-September in the high flow channel, and the Robinson Riffle criteria for protection of spring-run Chinook in the low flow channel, which could be affected as a result of changes in end of May storage and resulting diminishment of the cold water pool. Because of the potential biological importance of re-operation of Oroville, we recommend that the entire set of decisions and effects analysis be submitted for independent peer review to further assist in predicting these effects.

2.10 Turbidity Reduction Analysis (Chapter 5 and Appendix 5.F)

While Chapter 5 and Appendix 5.F contain discussion and evaluation of water clarity and the change in sediment delivery to the Delta due to the project, it does not specifically address the localized change in turbidity or sediment transport that may result due to reduced river velocity downstream of the north Delta diversion structures.

ICF could use DSM2 results to evaluate whether any reductions in flow velocity downstream of the intakes will reduce sediment transport capacity, causing deposition and reduced turbidity.

2.11 Poor linkage between net effects results and achievement of biological objectives (Section 5.5 and Section 3.3)

The net effects analysis needs to include a section(s) that specifically ties the results of the net effects to the achievement of the BGOs for each species. We need to be able to determine the likelihood of the various operational scenarios actually achieving the BGOs for each species. A rough examination of this issue in the current draft indicates that it may be difficult to meet the through-delta survival objectives for salmonids under the proposed operational criteria.

Chapter 6

2.12 Expansion of Changed Circumstances and adaptive responses to those Changed Circumstances (Section 6.4)

There are numerous problems with the latter sections of Chapter 6 (Sections 6.4 and 6.5). The list of foreseeable changed circumstances described in Section 6.4 needs to be significantly expanded and the range of adaptive responses available to address those changed circumstances is far too narrow and limiting. At a minimum, changed circumstances should consider all foreseeable changes in storage, conveyance and operations external to the BDCP conservation measures but that could substantially affect the CALSIM runs and therefore the effects analysis that supports the BDCP permit issuance criteria. These include: new North of Delta storage, new South of Delta storage, and new State Water Resources Control Board San Joaquin and Delta flow criteria. In general, we expect any one of these would trigger a new analysis of effects and the potential for changes to conservation measures. The Five Agencies will need to review this section and come to agreement on revising its contents prior to release of the public draft of the plan. More detailed comments on the issues with this section of Chapter 6 are provided in NMFS' "track-changes" submittal.

Chapter 7

2.13 Governance

While many of the important issues regarding the governance of plan implementation have been resolved over the last few years, one of the remaining significant issues is the lack of a clear tables and graphics describing how entities relate to each other (e.g. organization charts or flow charts) and which entities will retain final decision making power over each of the major categories of decisions to be made. We recommend that the "decision table" that was developed in the Principals workshop process be included in the document, with any necessary edits, to explain the decision-making process that was agreed to in the text.

There are also some issues regarding the role of the implementing office and its employees that remain to be resolved in Chapters 3, 6, and 7. The plan needs to be clear that adjustment of the conservation measures and other actions that are necessarily and appropriately part of adaptive management are to be managed and administered by the Adaptive Management Team, and not by the Implementation Office or any of its employees, including the Program Manager and the Science Manager.

Chapter 8

Implementation Cost and Funding Sources - Section is pending changes and was not reviewed at this time.

Chapter 9

Alternatives to Take - Track changes comments submitted separately. Intend additional review upon release of revised version.

Chapter 10

Integration of Independent Science - Track changes comments submitted separately. Intend additional review upon release of revised version.

April 3, 2013

U.S. Fish and Wildlife Service Staff BDCP Progress Assessment

In April 2012, the Fish and Wildlife Service (FWS) submitted our "red flag" comments regarding the previous draft of the Bay Delta Conservation Plan (BDCP). These comments were developed by agency staff to identify those issues that may require significant changes to the BDCP and would need to be resolved prior to formal submittal of the draft plan. Since then, FWS has worked closely with the State and its consultants on the details of the revised BDCP. The following is a staff re-assessment of the materials provided to FWS in the December 2012 Administrative Draft BDCP document and Section 5.5, which was submitted to FWS in February 2013. Additional draft materials were subsequently submitted to FWS on March 1st. We have conducted an initial review of the March 1st materials to confirm that all of the following comments are still applicable, but because of the large size of the BDCP and our desire to provide this review in a timely fashion there may be issues with the March materials that we have not fully sorted out yet.

We would like to acknowledge the very significant improvements and progress that have been made in the development of the effects analysis and the plan itself over the past year. DWR has substantially amended the proposed plan by reducing the number of planned intakes and overall capacity, and the new project description includes a set of operating criteria (called the "high outflow scenario" in the BDCP) developed with FWS advice that improves on the historical baseline flows. The changes in the "high outflow" operating criteria are in direct response to our previous comments and are critically important to providing for covered species needs.

Goals and objectives are another area where the BDCP has made a great deal of progress. The draft is not perfect, and we note below that a few very important fixes are needed, but in general the goals and objectives articulated in the plan are conceptually sound and appropriate for an HCP of this magnitude and proposed duration. Goals and objectives are the foundation on which the BDCP must be built, so the cooperative progress that has brought them to their current state is very significant.

Our staff have experienced excellent cooperation and coordination with the project consultants (ICF International) along with the other planning agencies. There has been significant improvement in the expanded analytical methodologies used in the effects analysis, and many technical and policy issues have been resolved or partly resolved. Many other technical and plan component issues are currently in active discussion, and we are optimistic they can be resolved with additional time, technical resources, and independent peer review. We look forward to continuing our close collaboration with all of the involved parties to resolve remaining issues and complete this planning process.

This document is an update to the "red flags" document we provided to DWR in April 2012. The first section provides an assessment of the progress that has been made in addressing the April 2012 FWS "red flags," and reflects our review of the December 2012 draft BDCP document, which in many cases was also informed by the Delta Science Program Independent Panel (DSP IP) review last summer. We have numbered the issues and, where appropriate, edited the update to reflect our initial review of the March 2013 BDCP. The format below shows our comments from last April *in italics*, followed by our updated assessment of these issues. We made a few very minor edits to the original comments for clarity. Because our review has been informed by the Delta Science Program independent panel's "phase II review" findings, we have also commented on the degree to which the current BDCP is responsive to the panel's recommendations.

The second section of this document describes several new comments and issues resulting from our review of the current draft of the BDCP (the December 2012/February 2013 version of the document or Admin Draft). These new major concerns highlight key areas of the BDCP that will need to be addressed between now and the time the plan and accompanying materials are submitted to us as a complete application under section 10 of the ESA. We have provided, where possible, suggestions for addressing these comments and are committed to working closely with our State and Federal partners to find resolutions to these issues. We view these comments as critical to the completion of a successful planning effort and generally they should be viewed as very important for resolution, preferably prior to issuance of the public draft.

We are providing detailed technical comments and edits in "track changes" format for several chapters of the BDCP directly to the State and its consultants. We did not provide "track changes" edits to sections 3.4 (decision tree element), 3.6, 6.4, or 7.3.4, each of which is the subject of a comment in this document. We believe it would be more efficient to discuss resolution of issues in those sections with our partners as we move ahead.

In summary, we note very substantial progress has been made, and we look forward to continue to work collaboratively with all parties towards timely completion of this ambitious plan.

PART I: UPDATE TO "RED FLAGS" DOCUMENT

Issue Area 1: Incomplete conceptual foundation for the Effects Analysis

1.1. The effects analysis deals with the critical concept of uncertainty inconsistently and does not effectively integrate, use, and report uncertainty in the Net Effects.

<u>Original comment:</u> *The BDCP Independent Science Advisors, the National Research Council review panel, the Delta Science Program panel, and we have all commented on the inherent uncertainty in the scientific understanding of certain aspects of the*

Bay-Delta ecosystem. This extends to difficulty predicting how the ecosystem might respond to BDCP implementation. Uncertainty needs to be used objectively and consistently, and the appendices and Net Effects need to develop and propagate uncertainty through the threads of the effects analysis. Highly important variation in the value and uncertainty of individual conservation measure features will occur over space and time as a function of implementation strategy and other factors. Many of the current conservation measures and issues are, or appear to be, overly simplified or otherwise superficially analyzed. The list includes OMR management, fish-habitat relationships, the habitat-for-flow trade-off, predator suppression, nuisance vegetation suppression, and others. Each of the foregoing issues raises uncertainties that propagate through the threads of analysis and must be reckoned within the "net" conclusions. To the extent we can form our own conclusions about the Net Effects without having access to all the revised documents, it appears that inconsistency in dealing with uncertainty has resulted in conclusions that overly optimistically predict Preliminary Project benefits for almost all of the target fish species almost everywhere. As such, we are reluctant to rely on the conclusions of the present effects analysis. We await receipt of the outstanding appendices, and look forward to working closely with our partners to provide technical assistance as these matters are resolved.

<u>March 2013 Update</u>: The revised documents have improved treatment of uncertainty in some areas, but this comment remains a critical issue. The assessment of restoration effects remains incomplete and optimistic, as we describe as a separate issue. Elsewhere, most of the treatment of uncertainty remains informal and qualitative, including descriptions of alternative hypotheses, sentences stating the degree of uncertainty where professional judgment is relied upon for the Net Effects, etc. The Service thinks the following additional specific changes should be incorporated to better address uncertainty in the EA:

1. We are satisfied with the structure and general approach of the HSI-related analysis, but deployment of the model is restricted in scope and represents only one possible choice of input values. In order to more fully explore the possible range of outcomes, additional input value choices should be (including minimum, median, and maximum values – in addition to those values included until now). In other words, the HSI procedure should be repeated with less (and more) optimistic estimates of restoration/creation performance (similar to the fall X2 analysis in Appendix 5C). Note: the GAM analyses that underlie some of the predicted delta smelt responses to habitat gradients were already "liberal" in that they used presence-absence instead of density (Kimmerer et al. 2009). Therefore, approximations to these curves for the HSI should not extend outside the GAM data because doing so generates a modeled species response that is inconsistent with the actual trawl data.

2. The HSI-based analysis does not appropriately allow for habitat restoration to have net negative effect on covered fish species, which is a possible outcome. The HSI-based approach rates outcomes on a scale from 0 to 1. In the context of the "net effects," this means that no project or CM will ever be detrimental; the worst case is no effect. Given uncertainties about the paths and outcomes of restoration and

habitat creation, the analysis should acknowledge that some projects might be detrimental to the overall outcome (see comments, below, regarding unintentional deep-water habitat creation like Franks Tract and Mildred Island). Additionally, where variability could be introduced into the HSI analysis we sometimes find the estimates to be biased upward in favor of habitat restoration success in the future (for example, the HSI-estimated egg-larvae life stage suitability curve using the GAM-based method is up to 50% more optimistic than the sample-based data would suggest it should be – see Figure E.4-4).

3. Use of a more sophisticated splittail Habitat Suitability Index; the current one only uses depth as a determinant of splittail habitat suitability. We do not find the argument compelling. Splittail migrate to different habitats to complete different parts of their life cycle, so there must be additional factors that define habitat suitability for fish of different ages. There is information on splittail temperature limits, salinity distributions, seasonal timing of occupancy of particular regions, etc. in the literature.

4. The Net Effects summary graphs should include "uncertainty bars" that are larger when uncertainty is higher and smaller when uncertainty is lower so that both expected magnitude and confidence in the conclusion are simultaneously conveyed. The Delta Science Program independent panel's 2012 report suggested some ways to approach this.

We have also provided extensive track change edits and bubble comments in both Chapters 3 and 5 that we think will improve the document further and provide a basis for discussions to resolve these issues. Adoption of these recommendations will help the EA better respond to Recommendation 13 of the June 2012 DSP Review Panel.

1.2. A key missing piece from the Analytical Framework document is how the Effects Analysis will be framed in the context of fish population dynamics.

Original comment: *We expected this to occur in the draft Technical Appendix on the subject of fish populations, but that document did not fully analyze long-term and recent population trends in the target fishes. There is clear evidence that most of the covered fish species have been trending downward. The document should clearly and accurately lay out what is known of the foundations of each species' population dynamics (e.g., density-dependent under some circumstances?, trends in carrying capacity?, etc.) as mechanistically as possible and discuss how BDCP actions will influence these processes. Because the conceptual foundations presented to date do not frame the effects in the context of historical and present-day fish population dynamics and the most parsimonious explanations of their causes, it is unclear how the net effects should be interpreted. We await receipt of the life cycle modeling appendix to complete our review of this issue, and look forward to continuing to work with our partners to help ensure that the best available science is used in the effects analysis.*

March 2013 Update: Chapter 5 has made some improvements in its depiction and use of fish population dynamics, but this remains a critical issue. One example is the use of the longfin smelt model provided to ICF by USFWS last fall. The track changes edit of the Fish

Life Cycle Models Appendix 5G pdf provided by ICF seems to have entirely edited out the descriptions of the Maunder and Deriso (2011) and Miller et al. (2012) statistical life cycle models. We want to clarify that we did not ask for such a change to be made and do not think it is necessary or appropriate to strike descriptions of these analyses from the supporting materials for Chapter 5.

We will use this opportunity to clarify that the IEP monitoring program has decades of relative abundance data for covered fish species – some examples of which are summarized in Table 2A.1-1. These data sets are the bases for the Maunder and Deriso and Miller et al. analyses, as well as all other population assessments that have preceded them. The Service thinks the following additional specific changes should be incorporated, preferably into Appendix 5G, and then used to provide an objective foundation for the Net Effects:

1. 20 mm, Summer Townet Survey, Fall Midwater Trawl, Spring Kodiak Trawl, and Suisun Marsh abundance indices for delta smelt
2. Normalized salvage density time series for delta smelt
3. Scatterplots showing the relationships among these indices
4. Description of what is implied by these relationships and objective summaries of the factors that the following authors have explored to explain them (Stevens and Miller 1983; Jassby et al. 1995; Kimmerer 2002; Bennett 2005; Kimmerer et al. 2009; Mac Nally et al. 2010; Thomson et al. 2010; Maunder and Deriso 2011; Miller et al. 2012)
5. 20mm, Fall Midwater Trawl, Bay Study Midwater Trawl, Bay Study Otter Trawl, Spring Kodiak Trawl, and Suisun Marsh abundance indices for longfin smelt
6. Normalized salvage density time series for longfin smelt
7. Scatterplots showing the relationships among these indices
8. Description of what is implied by these relationships and objective summaries of the factors that the following authors have explored to explain them (Stevens and Miller 1983; Jassby et al. 1995; Kimmerer 2002; Rosenfield and Baxter 2007; Kimmerer et al. 2009; Mac Nally et al. 2010; Thomson et al. 2010)
9. Fall Midwater Trawl, Suisun Marsh, Chipps Island, and USFWS Beach Seine abundance indices for splittail
10. Salvage density time series for age-0 and age-1 and older splittail – *these should not be normalized as they are an abundance index of themselves*
11. Scatterplots showing the relationships among these indices
12. Description of what is implied by these relationships and objective summaries of the factors that the following authors have explored to explain them (Meng and Moyle 1995; Sommer et al. 1997; Kimmerer 2002; Moyle et al. 2004; Feyrer et al. 2006; Kimmerer et al. 2009).

These fixes will broadly help to address the 2012 independent panel review recommendations, including 1, 3, 5, 10, 13, and 15. These fixes would also provide the Service with the basic status and population dynamic trends for the covered species which we need to include in permit documents.

Issue Area 2: Inadequate conceptual models and analysis of

estuarine fish habitat, and consequent project issues

2.1. The objectives for restoring habitat addressed in the Chapter 5's Restoration Appendix are simply described, but it is not clear whether the plan will or can achieve them.

Original comment: *The draft Appendix E states that BDCP's habitat restoration has two objectives1[1]. The first is to "increase the amount of available habitat for covered fish species." This first objective is reasonable, but does not clearly articulate that new habitat needs to be good quality habitat. We know quite a bit about what determines habitat value to covered fish species. This knowledge is partly reflected in the habitat suitability indices that are currently under development, but is often discounted elsewhere in the Chapter 5 documents. The habitat for BDCP target fishes, and all estuarine fishes for that matter, is fundamentally created by the interaction of tidal and river channel flows with the broader estuary landscape. The Preliminary Project proposes to extract larger volumes of fresh water from the Delta than are currently exported against a backdrop of rising sea level and a re-design of the estuary landscape that will change tidal flows. Whether this can be accomplished while other parts of the plan simultaneously contribute to recovery of covered species is an unanswered question of central importance. Fully incorporating existing science on the interplay of freshwater flow and the Plan Area landscape and its constituent species would provide more accurate and defensible conceptual models for the Effects Analysis. We also suggest consulting the Department of Interior Adaptive Management Technical Guide and other adaptive management resources on the role of (potentially conflicting or alternative) conceptual models in the adaptive management process. We look forward to working with our partners and providing technical assistance toward the resolution of this issue.*

The second objective is "to enhance the ecological function of the Delta." This formulation is not clear. The Delta provides multiple ecological services, and alterations to different parts of the Delta may potentially contribute to them in different ways. There have been several large-scale, unintentional or quasi-intentional "wetland restoration projects" in the Bay-Delta since 1920. These include Franks Tract in the 1930s, Mildred Island in the early 1980s, Liberty Island in the latter 1990s, and Napa River marsh in the past decade to name a few. There is also the seasonal fish habitat generated by large-scale floodplain restoration along the lower Cosumnes River that started in the mid-1990s. The draft appendix never mentions these events or synthesizes what is known about them. This is a critical aspect of the analysis, and needs to be done credibly. We believe these "unintended experiments" provide useful lessons in what we may expect from actions on similar spatial scales in similar circumstances in various restoration scenarios.

A close look at the estimated elevations of restored habitats shows that much of the acreage is not at intertidal elevation and thus will not readily produce the dendritic channel mosaics on a tidal marsh plain that are frequently espoused in the appendix for their fish production

[1] 1 We note that these objectives are more akin to goals. They are not at present specific enough to function as objectives in the context of performance evaluation or adaptive management.

benefits. Particularly by the late long-term, there is a lot of the subtidal habitat types in the model outputs2[2]. We do not know if unintentional habitat restorations that have occurred have increased the productivity of the Delta beyond what it would have been without them. In a pure carbon-productivity sense they might have – because productivity is just creation of biological carbon per unit of time. However, these and other "wetland restorations" have not noticeably increased the capacity of the Delta to produce larger populations of BDCP-covered native fishes. As achieving this is a key premise of the BDCP, understanding these examples and learning from what has happened in each case is a matter of great importance. We look forward to providing assistance to our partners as these comments are addressed.

March 2013 Update: The BDCP has benefited from the addition of a version of operations (the "high outflow scenario") that includes improved Delta outflow during the spring and fall months to benefit delta smelt, longfin smelt, green sturgeon, and other species. The Service worked with DWR on this version of operations and believe it would provide better conservation outcomes for covered fish species than the other three versions presented in the project description. With regard to off-channel habitat restoration, the revised Chapter 5.5 has improved regarding its acknowledgement about the uncertainty in landscape restoration; however, critical issues in the original critique that are central to the success of the BDCP remain inadequately addressed.

Scientific literature cited in the plan, new analyses provided by DWR, and conclusions of the independent scientific review panel have reinforced our concern that the BDCP restoration plan has not been carefully thought out and has uncertain prospects for benefiting native aquatic estuarine species, particularly delta smelt and longfin smelt.

Given the occurrence and apparently favorable growth rates of delta smelt occupying the Cache Slough complex, the Service expects benefits from the creation of new open intertidal and tidally flushed habitat in that region. However, we are concerned about the effects of marsh creation in other areas, and about the net effect of the restoration proposal as a whole, given its large spatial scale.

(1) It is unclear how much food production will be available for export from new tidal marsh areas, because the percentage capture of that production into benthos by exotic bivalves that are likely to infest newly restored areas is hard to predict and might be high (Lucas and Thompson 2012). Since we expect that the benefit of these new marsh areas to the smelts would arise from export of plankton into river channels, benefits of new habitat might not scale up in proportion to the geographical area of new marshes if those marshes evolve in a way that is particularly adverse to plankton production and export processes.

[2] 2 It may be possible to manage subsided lands to encourage natural processes to raise them back to sea-level so that they can support self-sustaining intertidal marshes. However, that process can be very slow and the full realization of potential physical morphology could extend far beyond the 50-year proposed term of the BDCP.

(2) New modeling presented to a BDCP audience on March 5th, 2013 by John De George of RMA, and informal comments by USGS staff to us, suggest that tidal energy will be strongly limiting in BDCP tidal marsh restoration, with the available tidal prism spread over a much larger area by the late long-term if the proposed acreages are fully implemented. The attenuation of tidal exchange in individual restoration areas might tend to reduce the export of plankton and reduce turbidity; both of these effects would increase with the total area of newly created marsh, and might tend to reduce the value of early restoration areas as new ones are added elsewhere.

(3) The effects analysis acknowledges that a portion of the Sacramento River sediment supply will be diverted at the North Delta intakes, and that that diversion might be detrimental to native fishes, estimating the average effect to be minus 8-9% of sediment. It is hard to draw definitive conclusions about the ultimate effect of this change, but an average loss of 8-9% of the sediment supply that would ordinarily pass into the Delta and Suisun Bay likely implies higher average water clarity throughout the year. Besides potentially negative effects on delta smelt and longfin smelt and their habitat, which benefit from turbid water, clearer water would encourage growth of exotic aquatic plants and related effects in many areas of the North and West Delta.

(4) The independent science panel review recommended caution and thorough planning with respect to restoration activities (recommendation #6). It said, in part:

> Considerable uncertainty exists, however, about the likelihood of one of the co-equal goals, i.e., the conservation of the Bay-Delta system. Among the principal issues are the sequencing and scale of the implementation of the planned conservation measures. The Plan recommends a large number of conservation measures, but provides no explanation as to how and when they would be implemented, what the particular sequence would be and the intervals between implementation of conservation measures. The Plan also proposes to increase restored tidal and other habitats at a large scale. In terms of general approaches, large-scale efforts at protection and restoration are theoretically positive but on-the-ground implementation can be difficult and is fraught with uncertainty. (Panel report, pp. 18-19)

The panel proposed specific fixes in several areas (page 19). The new draft effects analysis addresses some of these fixes, but in our view further follow-up is needed on these issues to clarify what the BDCP intends to do to fill the gaps identified by the panel. The plan's ultimate conclusions regarding the outcome of creating such large new areas of tidal marsh remain more positive and certain than the literature and scientific authorities suggest they should be.

(5) We were disappointed not to see the in-depth evaluation of unintentional wetland "restoration experiments" that we requested last spring. We continue to advise our partners that this is a necessary analysis. Key references for Bay-Delta shallow water habitat issues and fish food include: Turner and Kelley 1966; Meng et al. 1994; Aasen 1999; Meng and Matern 2001; Matern et al. 2002; Lucas et al. 2002; Reed 2002; Sommer et al. 2002; Mueller-Solger et al. 2002; Brown 2003; Feyrer and Healey 2003; Feyrer et al. 2003;

[Crain et al. 2004; Feyrer 2004; Grimaldo et al. 2004 *in* Feyrer et al. 2004]; Sommer et al. 2004; Dean et al. 2005; Feyrer et al. 2005; Nobriga et al. 2005; Wright and Schoellhamer 2005; Brown and May 2006; Grosholz and Gallo 2006; Hobbs et al. 2006; Lopez et al. 2006; Brown and Michniuk 2007; Feyrer et al. 2007 [2 splittail papers in TAFS]; Cloern 2007; Cohen and Bollens 2008; Hestir et al. 2008; Lehman et al. 2008; [RL] Miller et al. 2008; Moyle 2008; McLain and Castillo 2009; Lehman et al. 2010 [Liberty Island]; Moyle et al. 2010; Howe and Simenstad 2011; Santos et al. 2011; Gewant and Bollens 2012; Grimaldo et al. 2012; Lucas and Thompson 2012; Greenfield et al. 2013. There is also a substantial relevant literature from other systems.

Many of these papers are cited in the draft BDCP documentation, but the analysis is not incisive. We certainly agree that there is considerable uncertainty regarding wetland restoration performance in the estuary (see above); however, as this extensive list of publications implies, there is already a lot that has been learned that can help distinguish potentially "good" restoration approaches from very likely "bad" ones, particularly in terms of the consequences to native fishes. The additional insight would help calibrate the BDCP net effects, or at least provide an additional, objective window into the realism of its conclusions. These authors also provide key analyses of wetland function and species occupancy that can inform relatively detailed conceptual models. We can provide ICF with copies of these papers if necessary.

The Service also recommends the following specific changes:

i. The documents accurately characterize delta smelt spawning habitat in descriptions of the species biology, but the Chapter 3 conservation measures and the Chapter 5 Habitat Suitability Indices and Net Effects make unsupportable or ambiguous linkages between habitat restoration and likely spawning habitat. Fix: Incorporate red line strikeout edits and either (1) show through modeling what subset of "tidal habitat restoration" will have sandy beaches with a turbid, active overlying water column, or (2) avoid the speculation that habitat restoration will create spawning habitat and the speculation that spawning habitat is limiting delta smelt recruitment.

ii. The documents accurately characterize longfin smelt spawning habitat in descriptions of the species biology, but the Chapter 3 conservation measures and the Chapter 5.5 Net Effects make unsupportable or ambiguous linkages between habitat restoration and likely spawning habitat. Fix: Incorporate red line strikeout edits and either (1) show through modeling what subset of "tidal habitat restoration" will have sandy beaches with a turbid, active overlying water column, or (2) avoid the speculation that habitat restoration will create spawning habitat and the speculation that spawning habitat is limiting recruitment. The stressor reduction target for longfin smelt spawning habitat proposes as a target, a condition that already occurs currently. "Increase overlap of suitable spawning substrate, flow, salinity, and water temperature in the lower Sacramento and lower San Joaquin Rivers such that spawning, as indicated by the presence of early larval

longfin smelt in DFG larval smelt surveys, occurs in at least three of the following locations in all years: Lower Sacramento, Cache Slough ROA, Lower San Joaquin, Suisun Bay, and Suisun Marsh ROA. Increasing the extent of suitable spawning habitat for longfin smelt will contribute to an increase in spawning success, thereby contributing to an increase in juvenile and, over-time, adult longfin smelt abundance." Thus, as written this target is already achieved. Fix: first, acknowledge that spring Delta outflow is a well-established driver of longfin smelt abundance, and formulate a stressor reduction target that provides spring Delta outflow in accordance with the Service's standing recommendation. Second, provide a plausible prediction of marginal longfin smelt benefits that will be realized by enhancing extent of spawning habitat or delete the corresponding stressor reduction target.

iii. It is possible that increases in QWEST associated with CM1 and SAV removal associated with CM13 might (jointly) lead to higher spawning success of both smelt species in the mainstem of the San Joaquin River where some spawning is thought to occur presently; we have suggested revisions that can articulate this potential benefit and should be considered when the adaptive management plan for these actions is developed.

iv. The current state of science regarding splittail spawning habitats is misapplied; splittail are not known to spawn in tidal environments. Fix: Do not claim that any BDCP action other than CM2 will provide spawning habitat for splittail.

v. Chapter 3.3 issue: CM18 (Conservation hatchery) is linked to wild population goals and objectives for delta and longfin smelts. This is inappropriate and contrary to the Service's present policy for these species. Fix: CM18 will need new objectives designed specifically for it.

As we have tried to make clear in this update, the uncertainties associated with restoration are of such importance that the success of the BDCP as a Delta conservation effort may hinge on the realism of plan expectations and effectiveness of the BDCP adaptive management program. Moreover, these uncertainties must be viewed as uncertainties for water operations, which are also a driver of covered aquatic species abundances. The effects analysis should more clearly acknowledge these uncertainties to motivate the intensive further study that will be required. The State should not assume the habitat restoration components of the plan will succeed in full, because they may not. We endorse NMFS's recommendation that alternative plausible levels of success for habitat restoration be evaluated in the effects analysis. The BDCP will have to jointly adaptively manage both restoration and water operations to have the best chance of favorable conservation outcomes for covered species and their habitats.

The Service is providing numerous track change edits and bubble comments that we think will improve the document further. If any track-changes comment appears to conflict with the written comments above, the written comments take precedence.

Addressing the Service's concerns described above should also improve the BDCP's responsiveness to Recommendations 1, 2, 5, 6, 8, and 16 in the June 2012 DSP Review Panel report.

We look forward to working with DWR and our other partners to resolve these issues.

2.2. The modeling shows a gain of shallow, intertidal habitats in the Plan Area by the early long-term, which is a goal of the BDCP. However, it also shows that there is a net loss of intertidal habitat and a large increase in deep water habitat by the late long-term.

Original comment: *The Bay-Delta is not currently limited in terms of deep water habitats, and some relevant historical experience suggests deeper off-channel habitats are likely to be more favorable habitat to exotic species than to natives, so an increase in the depth of restored habitats does not appear to be a desirable outcome. Thus the benefits attributed to creating the proposed habitat acreages may be quite optimistic. We look forward to providing technical assistance on this issue; a good start would be a more in-depth investigation of the expected depth distribution in potentially restored areas in the early and late long-term time periods.*

March 2013 Update: This is a resolved issue.

2.3. The effects analysis underemphasizes Bay-Delta water flows as a system-wide driver of ecosystem services to the San Francisco Estuary.

Original comment: *While climate and associated hydrology affect the magnitude of watershed runoff, system hydrodynamics downstream of the big dams (e.g., exports, OMR flows, X2, gate operations, etc.) are largely driven by coordinated water operations. All of these influence the habitats and population dynamics of listed species. It is critical that the BDCP effects analysis identify changes in operations that will importantly alter hydrodynamics, and address in depth the dependency of the ecosystem and its constituent species on flows. Reduction of flows (in full consideration of timing, magnitude, variability) is the most fundamental cause of stress and driver of change to the fishes and food web that have adapted to the tidal and freshwater mixing environment that is the Bay-Delta ecosystem. In addition, some of the other stressors listed and assumed to be addressed through the conservation measures are either directly or indirectly influenced by Delta inflows, exports, and outflows. Until the roles of flows and flow alteration, for which there is substantial literature, are adequately represented in conceptual models and developed in the effects analysis, we are reluctant to rely on its conclusions. We look forward to providing technical assistance on this issue as it is resolved.*

March 2013 Update: The EA has improved discussions of the effects of flow on covered fishes, their habitat and their survival. It also has a set of longfin smelt spring outflow

population simulations and delta smelt fall outflow habitat simulations per our previous recommendations. However, issues resulting from disagreements about the importance of water flows for fish species remain in the draft, including the subjective quality of some of the net effects conclusions, the framing of the effects analysis itself, and some of the biological objectives and stressor reduction targets. As the Service will have to determine which version or versions of water project operations meet statutory criteria for permit issuance, satisfactory resolution of this critical issue for the permit application will require framing the effects analysis appropriately. It will need to clearly articulate that each of the four versions of operations in the current project description has associated with it a distinct effects analysis based on specific assumptions about the importance of water flows through the Delta to covered species that depend on flow. These analyses have substantially different implications for the likelihood that the four operations alternatives will achieve plan biological objectives. These analyses should be presented separately, including analysis-specific net effects presentations, to show how each set of assumptions about the importance of flow leads to different conclusions about the likelihood that each of the four operations alternatives can succeed in achieving the plan's biological objectives. Until the Service can distinguish the effects analysis underlying the "high outflow scenario," which is based on technical advice we provided DWR, this comment will remain a critical issue. The Services discussed this issue with DWR and their consultant, ICF, in early August 2012, and provided them a short white paper on about August 6th, 2012 describing how the the effects analysis should be framed.

The Service also recommends the following changes:

1. Do not confound Delta outflow's influence on delta smelt or longfin smelt recruitment with "transport flows," which is a speculative and unlikely mechanism given the very massive tidal flow connection between Suisun Bay and the western Delta. Delete the analysis of "transport flows" or change it to an analysis of low-salinity zone habitat suitability consistent with Bennett et al. (2002), Hobbs et al. (2006), Hobbs et al. (2010), and Kimmerer et al. (2009).

2. The critical habitat analysis in Appendix 5-I needs to acknowledge the potential negative effect on critical habitat of lower Delta outflow during the summer months per the DOI issue paper dated October 2010.

The Service has provided additional track change edits and bubble comments that we think will improve the document further. If any track-changes comment appears to conflict with the written comments above, the written comments take precedence.

2.4. The Low Salinity Zone (LSZ) is a dynamic habitat defined by the tides and freshwater flow that requires a globally tailored conservation strategy.

Original comment: *It is widely recognized that estuarine habitat suitability is driven by the interaction of a flow regime with a brackish, tidally influenced landscape. Changing this interaction by reducing outflow can set a series of ecosystem changes in motion that degrade expected ecological services. In the Bay-Delta, both the flow regime and the landscape are highly altered, and the Preliminary Project proposes new changes. It is well established that variation in Delta outflow or X2 is correlated with many important ecosystem processes and the abundance or survival of estuarine biota. It is also well established that the most important mechanisms and seasons for species that use the LSZ vary. Chapter 5 does not directly grapple with the conservation implications of these and other relevant facts, arguing that the mechanisms causing flow effects on certain fish species are not "well-understood". But the phenomena of species-flow responses are well-developed in the scientific literature. Unless there are concerns about the adequacy of the underlying data, which there may be, flow relationships developed in the scientific literature should be used as the initial basis to predict the effects of changes in flow regime. The effects of flow regime on species and ecosystem processes in the LSZ have been an important subject of study for a long while, and, in addition to their role in the water operations consultations form part of the basis for regulatory processes underway or contemplated by the State Board and EPA. We look forward to working with our partners on resolving the framing of the LSZ habitat analysis.*

March 2013 Update: Status linked to related preceding item: partly addressed, with some issues outstanding. Two follow-up issues under this heading have arisen because the current review includes the whole BDCP and not just water operations and the effects analysis.

(1) The absence of the longfin smelt population growth objective that we have been discussing with our State partners for several months is a critical issue. The Service worked with the California Department of Fish and Wildlife on this objective in the fall of 2012 as a way to require measurable progress toward recovery while allowing the permittee(s) flexibility in how the objective is achieved. In the absence of the objective, it is not clear that the BDCP will need to show progress toward longfin smelt recovery on any timetable. Our understanding is that CDFW has been asked to review the objective now, and its absence from the plan is temporary. We look forward to working with CDFW and DWR on resolution of this issue.

(2) The lack of a "stressor reduction target" for flow for longfin smelt is a critical issue. More than forty years of science has clearly established that Delta outflow is a primary driver of longfin smelt abundance (e.g. Thomson et al. 2010). The Service believes that both tidal marsh habitat improvements and adequate Delta outflow are needed for the plan to achieve a contribution to recovery for this species. The BDCP should include flow as a "stressor" to recognize that conservation of this species involves managing water operations to assure adequate Delta outflow.

2.5. The Low Salinity Zone (LSZ) is the primary habitat for delta smelt and the primary rearing habitat for larval longfin smelt and juvenile to adult splittail.

Our update on this issue is divided into two parts, each associated with part of the original comment.

2.5.a. Original comment: *The Preliminary Proposal modeling indicates that Delta outflows during February- June will more frequently be near the minima required by the SWRCB under D- 1641. This will represent a substantial negative project effect on longfin smelt. The effects analysis and Net Effects only partly address this issue, reporting that Preliminary Project is expected to provide a large, positive impact to food resources that will offset the negative impact to "transport flows". But there are multiple mechanisms by which Delta outflow can affect longfin smelt recruitment; transport flow is only one of them. Transport flows might be managed via gates or other engineering solutions. The other mechanisms for which there is stronger scientific support are kinetic energy mechanisms (low-salinity zone habitat area and retention from gravitational circulation in the estuary). The problems that reduced outflow creates by changing these processes do not have reasonable engineering solutions, and at present appear to be manageable only via outflow. Thus, although some of the potential impact of outflow reductions is reported, the analysis is too narrowly focused.*

Both projected sea level rise and the Preliminary Proposal are also anticipated to cause the average location of X2 to move upstream during the summer and fall. The modeling indicates that intra-annual variability would be lost for several months in the late summer and fall in all water year types; even wet years would functionally become dry years for a third of delta smelt's life cycle. The effects analysis acknowledges this result, but the Net Effects concludes that habitat restoration and food web enhancement will greatly offset this loss of habitat value. The conclusion is in part speculation and in part does not reflect current scientific understanding. This has several implications for delta smelt. First, under the preliminary project delta smelt habitat would less frequently lie in Suisun Bay and Marsh during summer and fall. The habitat suitability modeling shows that this would limit the capacity of tidal marsh restoration in the Suisun region to contribute to delta smelt production. Second, lower summer outflows would increase the length of time that seasonal delta smelt habitat constriction occurs and overlaps with physiologically stressful water temperatures. This means that more food production would be required to maintain current delta smelt growth and survival rates, even in areas where temperatures remain suitable. In areas where temperatures exceed physiologically suitable levels during the summer (~ 24^0 C), no amount of food production will increase growth or survival rates. Third, the restricted distribution of delta smelt during most summers and essentially all falls would increase the chance that a localized catastrophic event could pose a serious threat to the survival of the delta smelt population.

March 2013 Update: The project description has been updated since the last review to include the "high outflow scenario" that was developed with the Service's advice. This version of operations addresses concerns we have expressed about the adequacy of Delta outflow to support delta smelt and longfin smelt. We continue to have important concerns about the restoration prospects for smelts and representation of the issue in the effects analysis in the eastern and southern regions of the Plan Area. Because delta and longfin smelts are generally pelagic fish, they are not expected to extensively rear in many restored tidal habitats except under very specific circumstances where there is somewhat deep (> 1, but < 4 meters), cool, and very turbid open water (examples: Liberty Island, Suisun Bay,

Sherman Lake). These conditions cannot be created everywhere. Current scientific understanding suggests that some regions of the Plan Area are unlikely to be good places for delta and longfin smelt – especially if the only practical option is to flood subsided Delta islands; existing examples include the interiors of Franks Tract and Mildred Island.

Looking at the proposal as a whole, estimates of tidal marsh restoration acreages may be overstated simply because the physical characteristics of the Estuary cannot support the objective. As discussed in comment 2.1, upstream areas in the Estuary (east of the major constriction at Carquinez Strait and other locations) may not receive sufficient tidal energy to be tidal habitat; this outcome would greatly reduce the expectation of benefit to the smelts if our belief that benefits arise primarily where tidal fluxes mix fish prey items into open-water river channel areas is well-founded (see Lehman et al. 2010). We are concerned that actual acreages that are restored – indeed, that *can* be restored, if there is to be an expectation of marginal benefits to native aquatic species accruing at each step – will be only a small fraction of what the BDCP proposes. This is not necessarily a fatal problem: given the uncertainties of restoration, it may prove most beneficial to attempt restoration on a smaller (but still large) scale. The remedy for this issue in the present draft is to more accurately characterize these effects and the challenges they pose, to lay a foundation for the intensive study and adaptive management that will be required during implementation.

The Service also suggests the following additional specific changes should be incorporated to better address Recommendations 2, 3, 4, 6, 13, and 15 of the June 2012 DSP Review Panel report :

1. Sensitivity analysis of the Habitat Suitability Indices including the variance that arises using alternative input assumptions as described in our detailed comments above.

2. Use of a more sophisticated splittail Habitat Suitability Index; the current one only uses depth as a determinant of splittail habitat suitability. We do not find that to be a compelling argument. Splittail migrate to different habitats to complete different parts of their life cycle, so there must be additional factors that define habitat suitability for fish of different ages. There is information on splittail temperature limits, salinity distributions, seasonal timing of occupancy of particular regions, etc. in the literature.

3. The Net Effects summary graphs should include "uncertainty bars" that are larger when uncertainty is higher and smaller when uncertainty is lower so that both expected magnitude and confidence in the conclusion are simultaneously conveyed. The 2012 independent science panel report has some useful advice on this.

As a supplemental response on this item, the Service has provided additional track change edits and bubble comments that we think will improve the document further.

2.5.b. Original comment: *Turbidity is another important component of delta smelt habitat suitability. Section C.4.1.4 ("Turbidity") states: "[f]irm conclusions regarding changes in turbidity in the BDCP Plan Area are difficult to make." But some large-scale changes in sediment fluxes might affect turbidity on scales important to smelt, and should be straightforward to analyze. The Sacramento River is the most important contributor of sediment to the Bay-Delta. According to the Effects Analysis it contributes an estimated 80% of its load during high flow events. The North Delta diversions in the Preliminary Project have the ability to take up to 15,000 cfs during high flow events. For a 70,000 cfs event, this could be 20% of the Sacramento River water including its suspended sediment load. The effects analysis makes no attempt to analyze how much sediment loss per year that would represent and whether it would change the ratio of supply to loss of sediment from the estuary. The same calculations should be done for the south Delta to give the results full context. In summary, the current Effects Analysis does not appropriately deal with critical issues involving the role of the Low Salinity Zone as habitat for longfin smelt, delta smelt, and splittail. Until it addresses the right questions regarding flow, LSZ location, and turbidity, we are reluctant to rely on its conclusions. We look forward to working with our partners as these issues are resolved.*

March 2013 Update: The proposed conveyance capacity has been reduced to 9,000 cfs and the revised EA has a greatly improved scientific discussion of turbidity, including the requested estimate of sediment that would be removed by diverting water directly from the Sacramento River. These changes are helpful responses to our prior concern, which was echoed in Recommendation 12 of the independent science panel's June 2012 report.

This remains an important issue, because we are concerned that an average loss of 8-9% of sediment will have greater negative effects on delta smelt and longfin smelt and their habitats downstream of the diversions than are acknowledged in the effects analysis and net effects, and will likely encourage the growth of exotic aquatic plants in the lower Sacramento River and in off-channel tidal marsh areas. This issue is also discussed in comment 2.1 above.

As a supplemental response, the Service has provided additional track change edits and bubble comments that we think will improve the document further, particularly in Chapter 5.5 where we think that based on the collective discussion and analysis in the EA, the likelihood of generally lower turbidity in the Sacramento River and North Delta in the future is stronger than the draft document suggests.

2.6. There is no reason to expect that invasive vegetation will not proliferate in the East and South Delta ROAs, and no reason to expect a meaningful increase in south Delta turbidity if vegetation could be successfully controlled.

Original comment: *There should not be an a priori assumption that SAV can be controlled via ecologically sound methods in the east, central and south Delta. These are comparatively low turbidity, high vegetation areas already, under the existing hydrodynamic regime. There is nothing in the Preliminary Proposal that would dramatically change channel geometry,*

increase SJR flows, or increase sediment inputs that could be expected to change the turbidity of the entire southern half of the Delta.

March 2013 Update: Chapters 3 and 5 have greatly improved scientific discussions of invasive vegetation. These changes are helpful responses to our prior concern about the effects analysis, which was echoed in the independent science panel's recommendations 6, 8, and 16 from the June 2012 report.

We suggest avoiding claims that particular projects or ROAs will contribute (by themselves) to population level goals and objectives for delta and longfin smelt. There are likely thresholds in the extent of tidal marsh habitat that needs to adjoin areas of open-water in order for the marsh to subsidize the open-water instead of generating circumstances where the productivity is consumed within the marsh or quickly consumed by bivalves (clams) as it is dispersed from the marshes and other shallow areas. Such thresholds would depend on a number of factors and might be hard to predict. This possibility, and the potential path-dependence of the outcome of restoration, represent two key uncertainties that we hope the BDCP Adaptive Management Program can address.

As a supplemental response, we have provided track change edits and bubble comments that we think will improve the document further, particularly in Chapter 3 and 5.5.

2.7. Chapter 5 is deficient in its descriptions of channel margin, riparian, and floodplain habitat restoration outside of Yolo Bypass.

Original comment: *The Yolo Bypass tends to benefit native fishes because (1) it floods frequently with major inundation events; (2) it floods during times of year that BDCP target fishes can, and have evolved to, use it; and (3) upon drying it leaves very little permanent habitat for non-native fishes to colonize and reproduce in, because most non-native fishes are late spring/summer spawners. The original habitat analysis attributed seasonal floodplain benefits along the San Joaquin River that we do not believe are plausible; however, we understand there is now general agreement on this point and we will not comment on it further. However, the Sacramento River from Sacramento to about Rio Vista is also highly constrained, in this case by levees rather than regulated hydrology, and there are strict flood control capacity requirements that are enforced by USACOE. The effects analysis does not describe how this constrained reach of the river can support the proposed changes, where they will be, or assess their feasibility.*

March 2013 Update: NMFS independently articulated these concerns last year, and we defer to their analysis of the response in the new draft BDCP (see NMFS memo comment 1.14).

2.8. Increased residence times and reduced flushing of the Delta by Sacramento River water appear likely to result in interior-Delta channels that are further dominated by agricultural runoff, invasive aquatic vegetation, warmer

temperatures, and increased algal productivity with its associated dissolved oxygen swings.
Original comment: *These environmental conditions favor non-native/invasive species (e.g. Egeria densa, largemouth bass, water hyacinth, Microcystis) and disfavor native fishes. The Delta is already more biologically similar to a lake than it once was, due to the historical accumulation of human modifications. We expect that by reducing Delta flows, the Preliminary Project would likely facilitate the spread of habitat conditions that are unfavorable to delta smelt, and and less favorable to other target fish species survival and recovery.*

March 2013 Update: Chapters 3 and 5.5 have improved scientific discussions of residence time in the southern Delta and its likely connection to invasive vegetation and *Microcystis* blooms. These changes are helpful responses to our concern about the effects analysis, which was echoed in the DSP Science Panel Recommendations 6, 7, 8, and 13 in their June 2012 report.

Issue Area 3: The Effects Analysis relies on selective use and interpretation of statistical and mathematical models

3.1. The effects analysis did not use the available splittail life cycle model at all to support its Net Effects conclusion.
Original comment: *There is a published stage-based life cycle model for splittail where the effects of various environmental variables were examined for their effects on long-term trajectory of population abundance. This model helped frame the preferred time-interval for floodplain activation necessary to ensure splittail persistence in the Central Valley. This available approach to an Effects Analysis for a listed species of native fish was not discussed in the present Effects Analysis.*

March 2013 Update: During our conversations with DWR and the consultant last fall, Service staff agreed that it was not necessary to use the splittail life cycle model in a predictive mode because that exercise had been completed to the extent it could be in the paper in which it was published. We appreciate the model description added to Appendix 5G.

3.2. The effects analysis did not use the best available longfin smelt statistical models to support its net effects conclusion.
Original comment: *The newest published statistical analyses of longfin smelt are quasi-life cycle models that account for prior abundance and spring flow influences (among other factors) on this species. These models were discussed and discounted as not being 'life cycle models'. Dismissing them because they are not 'life cycle models' is unhelpful: they are the best available scientific tools to evaluate project effects on longfin smelt. The older regression models that were used in the effects analysis are published, but can easily be shown not to perform as well as the newer models. The older models also average the flow influence on longfin smelt across half a calendar year, which likely affects conclusions about the reduction*

in springtime outflow seen in modeling outputs for the Preliminary Proposal. We look forward to working with our partners and providing technical assistance as this issue is resolved.

March 2013 Update: There has been a great deal of new data analysis on the topic of longfin smelt response to Delta outflow that has occurred since last spring in response to the "CS5" exercise, though we acknowledge this work remains to be published. The Service provided ICF with these new analytical tools last fall and one of them has been incorporated into the EA as an additional or alternative means of evaluating the expected long-term impact of BDCP influence on the spring Delta outflow "mechanism(s)" that is part of the well-established relationship between longfin smelt recruitment and Delta outflow.

We also provided ICF with a linear regression tool, but we did not see results based on it in the revised EA. This is an important issue because both its linear and nonlinear regressions should be used in the EA, as they are based on different plausible assumptions about how to represent current and potential longfin smelt population dynamic responses to flow variation and food web restoration. These are important approaches to present as part of the foundation for the adaptive management studies of outflow that are under development.

These adjustments will help address Recommendations 10 and 17 in the 2012 independent panel's review.

3.3. The effects analysis continues to insist on an analytical approach to entrainment that does not reflect the best available science.

Original comment: *The current Draft Effects Analysis (as of September 13, 2011) downplays the potential effects of entrainment to the delta smelt population: (e.g., Section B.1.1.1), "[H]owever, analyses to date have not found correlation between entrainment and population level responses of delta smelt ..." The delta smelt population is now at historicallylow abundance and population losses due to entrainment may have significant population effects depending on their magnitude and frequency. While it is true that some regression-based analyses have failed to reveal an export affect to the delta smelt population, other approaches that more effectively investigate the role of fish distribution to entrainment have revealed an important relationship between water operations and the risk of population-level entrainment effects to delta smelt. Kimmerer (2011) demonstrated that entrainment losses averaging 10% per year can be "…simultaneously nearly undetectable in regression analysis, and devastating to the population." We look forward to working with our partners to ensure that the best model-based analyses of proportional entrainment for both South- and North-Delta diversion facilities are brought to bear to resolve this issue.*

March 2013 Update: The original issue has been sufficiently addressed. We have provided additional track change edits and bubble comments that we think will improve the document further in Chapter 5.5. However, an important related issue remains. The stressor reductions targets for entrainment of the two smelt species propose to have

proportional entrainment "at a level below the average" observed from 1995-2012. Achievement of these targets is already assured by the existing USFWS BiOp, and should be improved upon in a dual conveyance scenario. Furthermore, there is no rationale to explain why positive effects of achieving low rates of entrainment will not affect the fish populations until "year 40" [delta smelt] or "over time" [longfin smelt]. Since reducing cumulative entrainment of these species to no more than 5% of the population is already a BDCP biological objective, a more sensible stressor reduction target would be framed in terms of variables that affect entrainment risk.

3.4. We think that the delta smelt state-space model is a useful framework to explore hypotheses about what drives delta smelt abundance.

Original comment: *However, the Maunder-Deriso model is a new application that needs additional collaborative work before it reaches maturity. We are concerned that the present model may have identifiability problems, as we discussed in our technical comments last fall. Until that concern is resolved, we are unsure whether the parameter estimates developed in that model represent what they are described to represent. We are also unsure why the model uses the official DFG Fall Midwater Trawl Abundance indices for delta smelt, but does not use the official DFG Summer Townet Survey or 20 mm Survey abundance indices. The rationale for this (which may be simple) is not explained. The model also assumes a specific form of density dependence between generations. We have questioned the appropriateness of this choice, because on very thin ground it limits the universe of plausible explanations for delta smelt reproductive success that can be derived from the model.*

The intent of this new model was to explain a specific historical dataset, and other than some broad assumptions it does not contain much of the mechanism presented in current delta smelt conceptual models (like DRERIP, or POD conceptual model, or the Fall Outflow Adaptive Management Plan conceptual model). The published version of the model used data through 2006. The model was updated for the Effects Analysis to include data through 2010. When this was done, the model fit deteriorated dramatically relative to what was reported in the paper. While this does not (at all) cause us to think it should be discarded, it does underscore questions about the maturity of the tool. The current model's success in fitting a specific set of historical data may not translate to good predictions of the the effects of flow and habitat change. The current model may perform still more poorly when CALSIM II water operations outside the envelope of historical experience are used as input.

It is important for the Effects Analysis to acknowledge that some data that may prove to be essential to modeling delta smelt or longfin smelt dynamics have been collected only recently. There are a number of studies now underway that address questions about fall outflow processes and delta smelt ecology as a whole. The novelty of the Maunder-Deriso model, and existence of other tools and analyses taking a process-oriented approach to to predicting the effects of flow and habitat changes, make the framing of the effects analysis very important. It is equally – possibly more – important that uncertainty at all levels be properly developed and acknowledged. Achieving these things, which are important to having an effects analysis we can rely on, will require work and a willingness to adapt on the part of ICF. We look forward to continuing to work with ICF and our other partners to ensure that the best science is identified and used defensibly in the effects analysis.

March 2013 Update: The track changes edit of the Fish Life Cycle Models Appendix 5G pdf provided by ICF seems to have edited out the descriptions of the Maunder and Deriso (2011) and Miller et al. (2012) statistical life cycle models. Here, we clarify that we did not ask for such a change to be made, and do not think it is either necessary or appropriate to strike descriptions of these analyses from the supporting materials for Chapter 5. It was mutually agreed that the Maunder and Deriso model was not a suitable *forecasting* tool in its current state, but the EA should retain a description of what it is and the findings of their exploration of the input data. The same is true for the statistical models of Miller et al. 2012, Thomson et al. 2010, and Mac Nally et al. 2010, because it is the findings that these different analytical approaches have in common, including the difficult bioenergetic situation that delta smelt face from late spring through early fall, that may emerge as robust and valuable conclusions of the modeling exercises carried out to date.

Issue Area 4: The BDCP's net effects conclusions rest on an equivocal food web conceptual model

4.1. The FWS agrees that the pelagic food web that historically supported greater abundance of estuarine fishes including longfin smelt and delta smelt has been impaired and that contributing to its restoration is a key component of a conservation strategy for the Bay-Delta.

Original comment: *However, food limitation is a ubiquitous feature of ecology in the Bay-Delta. It affects non-native species as well as the BDCP target species. Thus, the issue is not really "food limitation" per se. Rather, the issue is food web pathways and the number of steps in a food chain between primary producers (phytoplankton and plants) and the BDCP covered fishes. For the smelts, the desired food pathway would be dominated by this short food chain: diatoms calanoid copepods and mysids low-salinity zone fishes. The short food chain outlined above dominated the historical low-salinity zone food web. Longfin and delta smelt are highly dependent on it (and minor variations of it). The other BDCP target fishes also use it, but have more generalized diets that often include benthic organisms and riparian and floodplain insects. The draft appendix has a very long section on food web changes when a simpler summary of the major points would be more effective.*

The focus of food web restoration in the effects analysis is on floodplain and tidal marsh restoration. The production of diatoms may have been limited by disconnecting floodplains from their rivers and by reclaiming tidal marshes. These are the primary hypotheses behind the BDCP habitat restoration conservation measures. However, the two best-substantiated drivers of diatom suppression are overbite clam grazing and ammonium concentrations in the estuary. The suppression of diatoms is hypothesized to have provided a competitive advantage to lower quality primary producers and primary producers like Egeria densa and Microcystis *that have virtually no food web value to the BDCP target fishes. This change in the base of the food web has reduced the amount of fish production that can be supported by the historical diatom-based food chain, and forced the fish to rely on other longer and more energy-limited food pathways. Longer food chains are less productive, and do not support as many fish. Because splittail and young Chinook salmon are the covered species that most*

extensively utilize floodplains and tidal marsh networks, they should be expected to gain the greatest food web benefits that restoration of these habitats can provide. However, this is not what the Net Effects concluded. Rather, it concluded that habitat restoration would provide greater benefit for the smelts despite their limited overlap and more restricted diets.

Shortcomings in the Net Effects resulting from mischaracterization of processes limiting transfer of production in new habitat areas to native fish biomass renders the present analysis inconsistent with best available science, and we are reluctant to rely on it to judge the design of the preliminary project. As with other modeling issues, we look forward to working collaboratively with our partners as these issues are resolved.

March 2013 Update: The revised Chapter 5.5 has improved regarding its acknowledgement about the drivers of the estuarine food web (clams and nutrients). The changes would have represented a larger improvement if they had included a more detailed analysis of unintentional restoration experiments (see update to comment 2.1 above). Such an analysis would have helped address Recommendation 8 of the 2012 independent review panel report, and helped avoid logic problems like those discussed below.

The Conservation Measure 4-based approach to solving food web issues for smelts is only weakly supported in the scientific literature. The document itself states (Appendix 5E):

> To be used in the analysis, sufficient data had to be available to describe the condition at the scale of the geographic subregion, and it was necessary to be able to forecast conditions in the future with and without the BDCP either through modeling or conclusions. For example, planktonic food is an important factor in defining habitat for delta smelt (Bennett 2005) that likely relates to the presence of certain species of zooplankton (Criterion 1**). However, there is not sufficient data to characterize zooplankton abundance or community structure at the scale of the subregion (Criterion 2), nor is there an ability to project zooplankton response to future conditions [emphasis added]**.

The proposed use of turbidity as a substitute for food is also not supported by best available science:

> To incorporate a measure relating to feeding, turbidity was used as an indicator of feeding potential in the subregions and in restored habitat (the potential of the restoration to add to the food supply in the Delta was treated as a separate analysis in Section 5E.4.3). Delta smelt abundance is strongly correlated with high turbidity, and it is believed to relate to the ability of fish to find and capture prey (Bennett 2005) (Criterion 1). There is sufficient information collected as part of the regional fish monitoring programs to characterize turbidity in the subregions (Criterion 2). At the present time there is no model available to project turbidity in the future, although there is reason to expect that turbidity in the Delta may decline in the future (Ruhl and Schoellhamer 2004). Recognizing the strong association with delta smelt presence,

turbidity was used as a factor in the delta smelt model, but turbidity was assumed not to change over the BDCP period (Criterion 3).

We remain skeptical of the use of turbidity as a substitute for smelt food supply, and more skeptical of the conclusion that this supply will remain unchanging into the future given the acknowledgment that turbidity values in the Estuary are expected to decline through time. The EA itself suggests sediment supply will be reduced by 8-9% by the North Delta diversions. For additional advice, see Recommendation 8 from the June 2012 DSP review panel (Accurately characterize food resources and food webs).

The Habitat Suitability Analysis does not include an accurate estimate of food/prey availability and fate for either of the smelts for existing or proposed future conditions. The phytoplankton productivity estimate taken from Lopez et al. (2006) is an instantaneous productivity rate the authors themselves describe as not reflective of general habitat and hydrodynamic conditions in the Delta. A more accurate analysis of the productivity of Delta tidal environments would include analysis of the transport and fate of productivity in the Delta environment. Specifically, Lopez et al. (2006) underscore the evidence that much of the productivity in the Delta is being shifted to the benthos by exotic bivalves and away from the pelagic environment. The authors emphasize that analysis of instantaneous productivity estimates might, therefore, not yield meaningful answers if the role of the bivalves is neglected. The article includes the passage: "The unexplained patchy distribution of *Corbicula fluminea* in the Sacramento-San Joaquin Delta implies high uncertainty in the outcomes of creating new aquatic habitats (Lucas and others 2002)." The Effects Analysis assumes an increase of 40% in productivity available to the pelagic food web as the result of the proposed restoration program**.** Given the findings of Lopez et al. and others (e.g. Nixon 1988, Cloern 2007, Lucas and Thompson 2012), we believe the actual improvement in system-wide productivity increase to the pelagic food web is very uncertain and might be substantially less than 40%. As with some other comments (e.g., update to comment 2.5.a above), the remedy to this issue is to more objectively assess the effects.

As a supplemental response, the Service has provided numerous track change edits and bubble comments that we think will improve the document further.

Issue Area 5: The analysis and interpretation of BDCP are hindered by indeterminate model baselines and related issues

5.1. A key point of continuing analytical confusion is the use of multiple baselines.
Original comment: *The current set-up for the BDCP employs two 'base case' model runs (EBC1 and EBC2). The EBC1 does not include the full suite of elements in the current FWS and*

NMFS OCAP RPAs. The EBC2 attempts to include the RPAs in their present-day form, but it does not accurately capture them all. There are numerous cases in Chapter 5 where it is not clear what Project model result is being compared to which baseline condition. This generates confusion. We look forward to continuing to work with our partners to be sure that baselines used in the effects analysis are appropriately constructed and are used clearly and correctly.

March 2013 Update: As a result of this comment, ICF is developing a scope to conduct a new "aggregate" analysis that meets the needs of FWS and NMFS. FWS intends to continue to work with them and the other agencies to complete this analysis and incorporate it into the effects analysis of the proposed project prior to submitting the section 10 application.

5.2. CALSIM II demand representation in 2060 studies should have some justification.

Original comment: *Some explanation for, or error estimate of, assuming a 2020 level water demand for a 2060 climate change simulation should be made. Presumably portions of the State (Southern California, the American River Basin, etc.) are going to continue to grow through 2060. Some estimate in the change of cropping patterns over the 40 years (2020 – 2060) should also be made (or at least a write-up of why it cannot be made) should be included. Without clear resolution of this issue, it appears to us that the modeling may underestimate water demand in the late long-term. We are unable to provide technical assistance on this issue, but look forward to its resolution.*

March 2013 Update: ICF responded to this comment by noting that water demand in the export area was expected to top out at a 2020 level. However, this important issue remains unresolved because we could not find where in the documentation that it is stated explicitly that it is an analytical assumption of the BDCP EA that demand growth upstream of Freeport will top out at a 2020 level. Fix: please clarify that it is a modeling assumption that a 2060 climate will interact with a 2020 level of water demand in the Late Long-Term.

5.3. The proposed restoration in each "Restoration Opportunity Area" (ROA) is only compared against the lands bounded within the ROAs, which themselves lie in larger regions.

Original comment: *These comparisons of present-day ROA habitat to future ROA habitat are inappropriate – especially in cases like the east and south Delta ROAs, which are currently dry land. Mathematically, if a terrestrial habitat is subsequently flooded, the improvement for target fishes increases by an infinite percentage even if the habitat performs poorly because a habitat suitability index that is even a tiny fraction of 1 is still infinitely higher than zero, which is the suitability of dry land to fishes. Habitat analyses need to be based on comparisons against currently available aquatic habitat acreages in the entire regions containing the ROAs. They also need to be synthesized and integrated into Plan Area-wide totals, with river flow and climate changes incorporated, in order for the analyses to be meaningful.*

March 2013 Update: This specific representation issue appears to have been sufficiently addressed in the EA. Full resolution of issues related to evaluation of habitat restoration in the EA is contingent on implementation of fixes that are discussed above.

Resolution of the issue will help address Recommendations 5 and 6 of the June 2012 independent review panel report.

PART II: NEW ISSUE AREAS ARISING FROM REVIEW OF DECEMBER 21, 2012 AND MARCH 6, 2013 BDCP DRAFTS

Issue Area 6: Plan adaptability

6.1 Clarify the role of biological objectives as the basis for adaptive management of BDCP conservation measures. Biological goals represent the ultimate conservation outcomes toward which the Plan strives. In some cases, achievement of ultimate goals lies within the power of the BDCP; in others the achievement of goals depends in part on factors that are outside the control of the water projects. Objectives are lower-level outcomes within each goal that are achievable by the BDCP and essential to achieving the overarching goal.

BDCP conservation measures are designed to achieve the biological objectives of the Plan. Because of this, BDCP adaptive management must be structured to provide for adjustment of the conservation measures to achieve the objectives as efficiently as possible.

The document is generally clear that the BGOs will be used to guide the implementation of conservation measures. However, the plan needs to clearly articulate that achieving biological objectives is the whole basis of the conservation plan. Achieving and continuing to achieve objectives will be necessary for progress toward the biological goals and recovery of covered species, and may be required for compliance with the HCP permit. There are several passages in Section 3.6 and elsewhere that need to be edited to clarify the role of the biological objectives.

6.2. The BDCP must set forth governance and adaptive management plans that will facilitate adaptive management. A core feature of the management problem the BDCP is designed to address is uncertainty. Three years ago, the Federal Agencies issued a white paper on application of the Services' 5-point policy for HCPs to the BDCP. It articulated the role of two permitting strategies developed in the 5-point policy: prescriptive plans and outcome-based plans.

> "The BDCP is a complex, landscape scale, long-term HCP with a high degree of uncertainty as to how close the initial conservation measures will come to achieving the plan's biological goals and objectives. It falls into the category of plans that will be a mixture of the two strategies, with initial prescriptions associated with

> adaptive management, and specific biological outcomes defining the ultimate success of the plan. This type of plan will allow management flexibility so the permittee may institute actions necessary to achieve the plan's goals while providing boundaries for future expectations and commitments. In addition, a results-based plan will address uncertainty in the ecosystem and provide the conservation assurances required by the Act. The Services will be challenged to make the findings required for permit issuance if the plan does not include clearly defined and scientifically supported biological goals and objectives, an adaptive management plan that tests alternative strategies for meeting those biological goals and objectives, and a framework for adjusting future conservation actions, if necessary, based on what is learned." (4/29/2010 memo, page 1)

In an outcome-based plan, biological objectives provide targets that conservation measures are expected to reach, thereby contributing to the conservation outcomes required by the permit. If the objectives have been appropriately crafted, their achievement assures that a project is doing what it can to contribute to the accomplishment of the ultimate biological goals of the plan. If the CMs fail to achieve the biological objectives around which they are designed, then the plan must provide the means (adaptive management) to change the conservation measures to achieve the outcomes.

We are concerned about the ability of the draft BDCP to successfully facilitate adaptive management. Our concerns span chapters 3, 6, and 7. A large number of issues our staff have identified in Section 3.6 remain unresolved. Also, discussion between the Service and DWR regarding the content of Chapter 6 is not yet complete. Because these sections are "works in progress," the following list of critical issues is not exhaustive.

(1) <u>Absence of a decision table in Chapter 7 (Governance)</u>. The most basic function of Governance is to define who makes decisions. In July 2012, the BDCP principals adopted a draft table describing how key BDCP implementation decisions are to be made, what the elevation path is if there is disagreement, and who has final authority to decide. Unfortunately, the decision table was removed from Chapter 7 shortly thereafter. In its absence, the Governance chapter does not clearly define or summarize how important classes of decisions would be made, including adaptive management changes, and leaves equally unclear who would have final authority to decide in each class of decision. Restoring the July 2012 governance decision table, or writing a new Section conveying the information in that table, is necessary to provide a clear path for decision making in the document and for plan implementation.

(2)<u>Ambiguity in roles and responsibilities in Chapter 7</u>. There remain ambiguities or apparent conflicts in roles and responsibilities in the Chapter 7, including Section 7.3.4. Clarifying the roles of the adaptive management team, the science manager, and the program manager is a critical issue, given the potential difficulty of the decisions that lie ahead. Adaptive management is fundamental to the BDCP, and the plan should be

unambiguous that scientific studies, development of proposals to adjust the conservation measures based on new information, and other adaptive management functions will be managed and administered jointly by the parties that form the Adaptive Management Team, and not by the Implementation Office or its employees and officers, except to the extent that one of them (the Science Manager) is a member of the Adaptive Management Team.

(3) Ambiguous limits on adaptive management changes to conservation measures in Chapter 3. As an example, Section 3.6.3.3.2 limits circumstances in which adaptive changes to conservation measures can be implemented:

> With respect to adaptive changes to conservation measures that would result in a greater commitment of water, land, or money by the permittees, the scope and magnitude of an adaptive response will be limited to those actions reasonably likely to ensure that (1) the impacts (or levels of impacts) of a covered activity that were not previously considered or known are adequately addressed or (2) a conservation measure or suite of conservation measures that is less than effective, particularly with respect to effectiveness at advancing the biological goals and objectives, is modified, replaced, or supplemented to produce the biological benefit. (pages 3.6-26 to 3.6-27 in March 2013 BDCP draft)

A permanent adaptive change to a BDCP conservation measure will most likely be needed because (a) the conservation measure is not achieving or not on track to achieve the biological objective(s) it is designed to achieve; or (b) a different version of the conservation measure that costs less water or money to implement has been found that is equally effective or more effective at achieving the relevant biological objectives. This formulation should not be controversial: it is the basis of adaptive management in many other systems, and articulates the way the conservation measures would be managed to achieve the co-equal goals of the BDCP.

We are concerned by the ambiguity of the limits described in the quoted passage above. In our view, they can be interpreted to allow the changes (a) or (b) we have listed, but they can also be interpreted to prohibit them if they cost water, depending on whether "advancing the biological goals and objectives" and "produce the biological benefit" both mean 'achieving the objective(s).' It is also not clear what other kinds of adaptive management changes the limits might prohibit, or are intended to prohibit, since the text was presumably inserted for a specific reason. This sort of ambiguity, which has other examples, is very problematic in a plan that depends on adaptive management and is meant to provide a clear, cooperative mechanism to implement it. Left as is, these ambiguities seem likely to add new conflict on top of already-difficult management problems.

(4) Lack of clarity on how AMT implements adaptive management. The Service has identified a large number of issues of varying levels of importance in Section 3.6. They include confusing language about circumstances "triggering and adaptive response" that do not align with the 9-step adaptive management model adopted by the BDCP; ambiguities in how decisions are made, including at least one example in 3.6.3.3.2 (page 3.6-27) that appears to conflict with the July 2012 Governance decision table discussed in 6.2(1) above; and other issues. It will be very important to follow-up on these issues to ensure that the adaptive management process is clearly defined and workable.

The plan also needs to clearly articulate that the science program developed to support adaptive management will be structured to facilitate participation by agency scientists, stakeholders, and a broad array of academic scientists. The current provisions for participation by stakeholder participation and science do not adequately lay out the stakeholder roles in the technical dialogue and do not clearly develop an appropriately expansive role for academic scientists. The current draft is also vague on the role of the Delta Science Program, which we believe may play a crucial role in assuring the quality and transparency of science in the BDCP.

The Delta Science Plan, which is under preparation, is likely to propose a broad collaborative science structure that includes direct science/policy discussions involving agency executives and senior academic scientists. We view this as a very good idea. We also recommend that the draft Science Plan be included in the discussion going forward, since the Delta Science Plan will become part of the management environment in which a BDCP would be implemented. Separately, a recent draft memorandum prepared by the Delta Stewardship Council's Independent Science Board expressed skepticism that the current draft BDCP governance chapter does enough to facilitate cooperation in the adaptive management program. Given the stature of that panel, its critique should also be part of the dialogue going forward.

6.3 The Decision Tree. The decision tree articulates the concept that four sets of operational criteria will be proposed in the project description. They include the "high outflow scenario," which was developed with the advice of the Service, and three alternatives that provide reduced Delta water flows. Given the fundamental disagreements that exist over the importance of flows for covered fish species, it is reasonable to investigate these other scenarios as initial management alternatives through the adaptive management program. However, the March 2013 language of Section 3.4 is ambiguous on the role of these alternatives in the BDCP permit.

> CM1 includes two decision trees, one for fall outflow and one for spring outflow, that specify alternative outcomes for each criterion. Because each decision tree has two possible outcomes, the decision trees lay out four possible outcomes in outflow criteria when the spring and fall outflow components are combined, as described in Table 3.4.1-1. These four outcomes would be covered by the permit. These operating

> criteria will be subject to a determination by the permitting agencies, based on best available science developed through the decision-tree process, specifying what the spring and fall outflow criteria will be at the time CM1 operations begin. (March 2013 BDCP, page 3.4-19)

We have two concerns about this passage, as written. First, the meaning of "covered by the permit" in the third sentence is ambiguous, but it could be interpreted as an expectation that the permit would include findings that the whole project description, including all four versions of water operations, satisfies statutory issuance criteria. It is not clear how the Service could make such findings at present, since the project description as a whole does not fully implement the Service's 2008 Reasonable and Prudent Alternative for CVP/SWP water operations. We interpret the sentence to mean, instead, that all four versions of operations would be analyzed prior to potential permit issuance, findings would be made with respect to each alternative version of operations based on the best available science, and the result of those analyses would be expressed in the permit.

Second, the last sentence seems to imply ("[t]hese operating criteria will be subject to a determination…") that if the initial finding is revisited prior to the start of CM1 operations, the new finding would be limited to a choice among the four original operations alternatives. It may be that this is not the intended meaning. Bullet #3 near the bottom of the page says "[a]t the time dual conveyance operations begin, the permitting agencies identify spring and fall outflow criteria sufficient to meet the biological goals and objectives," which seems clearly to articulate that the decision at the time of CM1 operations would not be constrained to a choice among the original four alternatives. If, however, the intended meaning of these passages is that the choice of operations a decade or more in the future is to be limited to a selection among the four original alternatives, regardless of the results of new scientific studies everyone agrees are important, that would be highly problematic.

We are very concerned by the ambiguity of these statements, and other statements in Section 3.4 and its tables regarding the decision tree, which seem very likely to cause conflict in the future.

6.4 Changed Circumstances. There are numerous problems with the latter sections of Chapter 6 (6.4 and 6.5). The list of foreseeable changed circumstances described in 6.4 needs to be expanded and the range of adaptive responses available to address those changed circumstances is far too narrow and limiting. The subject of range of adaptive responses is directly related to the subject of adaptive limits, which also have not been defined. Changed circumstances should also include a time-frame for implementation of the remedial measures. The 5-Agencies will need to review this section and come to agreement on revising its contents prior to release of the public draft of the plan. More detailed comments on the issues with this section of Chapter 6, which are intended to start a dialogue on the chapter, are provided in our "track-changes" submittal.

6.5 Adaptive Limits. "Adaptive limits" in the BDCP refers to the most extreme sets of practicable operational parameters that might be required of or authorized to the permittee through the working of adaptive management over the life of the permit. Some discussion of what such parameter-by-parameter limits might be has already occurred, but the neither the concept of adaptive limits nor a draft example of them is included in the current BDCP draft. Without adaptive limits, limits to the commitment of resources that might be required of the permittee(s) remain undefined.

As is clear in both the HCP Handbook and the Five Point Policy, the permittee(s) in an HCP is protected by the inclusion of adaptive limits that "clearly state the range of possible operating conservation program adjustments due to significant new information, risk or uncertainty. This range defines the limits of what recourse commitments may be required of the permittee(s). This process will enable the applicant to assess the potential economic impacts of adjustments before agreeing to the HCP." 65 Fed. Reg. 35253; see also HCP Planning Handbook at 3-24 – 3-25.

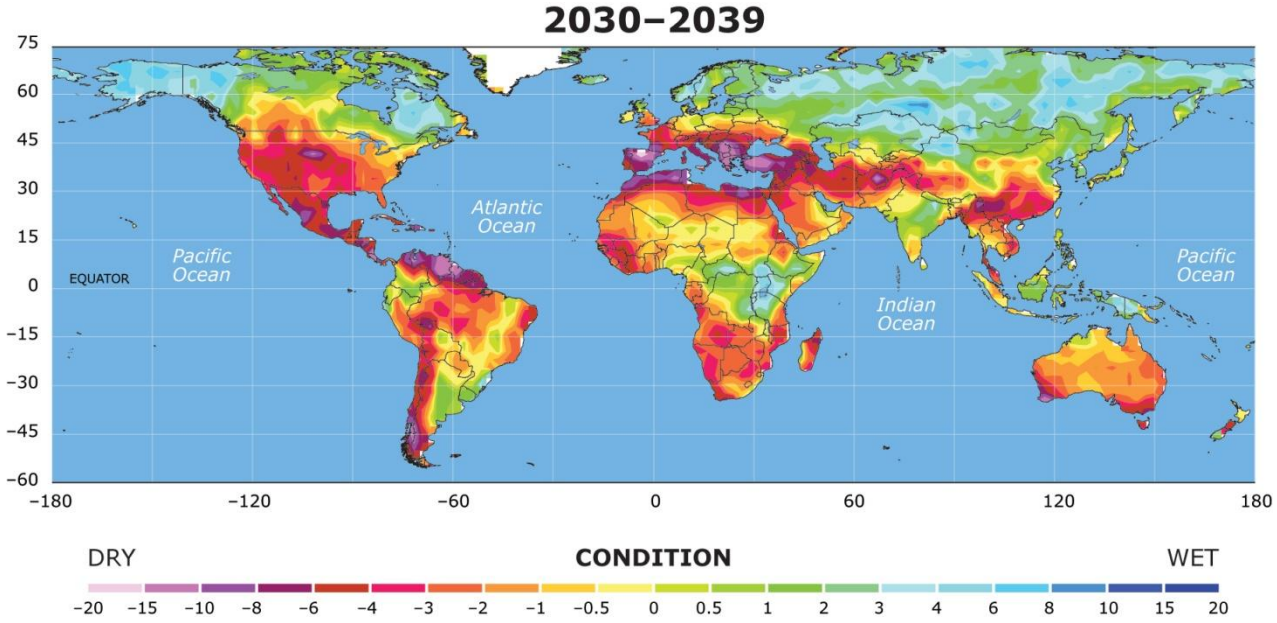
In the BDCP, adaptive limits would provide an important assurance that would protect the permittee(s) from an open-ended obligation to commit resources irrespective of circumstances. They would also provide an important level of transparency to the permittee(s) and the public regarding the commitments represented in the plan. It will be important to clarify the effect of changed circumstances (Section 6.4) on the adaptive limits.

We are also concerned that the four operational alternatives in the project description might be interpreted to represent the adaptive limits for the permit. This is not an appropriate interpretation, and it will be important to cross-check the relevant chapters to be sure it is clear that operations might be adjusted in ways that cause water yield to move up or down within the adaptive limits, depending on new scientific findings.

6.6 Real-time operations. Real-time operations, described in CM1, are discussed in chapter 3 under 3.4.1.4.5 and are described as being separate and distinct from the adaptive management process. Yet the document is confusing because Chapter 3 states that the purpose of the adaptive management process is to allow for adjustments to be made to conservation measures, including operational criteria. It will be important going forward to clarify the governance and management of real-time operations.

END

CALIFORNIA WATER RESEARCH



Incorporating Drought Risk From Climate Change Into California Water Planning

Deirdre Des Jardins

August 2012

Introduction

The Worldwide Drought

Recent years have seen exceptionally severe droughts in the United States, and across the world. The droughts have been exceptional for the combination of record heat and reduced precipitation, and some for unprecedented length. The recent record drought in the Southwest has also affected northern Mexico, and caused a 40% drop in agricultural production in that country.[1] There has also been exceptional drought in the Southeast, affecting southern Georgia from 2010-2012[2] and spreading to North Carolina this year.[3] A severe drought in the Midwest developed this year, which has extended into central and eastern Canada.[4]

1The Rio Negro, the largest tributary to the Amazon, in 2010

Photo by Raimundo Valentim/EPA/CORBIS

In South America, the Rio Negro, the largest tributary to the Amazon, dried up in 2010.[5] In 2012, rivers have dried up in northeastern Brazil, threatening the water supplies for 1,100 towns.[6] Argentina has seen two record droughts in four years, hurting soybean and corn crops.[7]

In Europe, Spain and Portugal are now facing the worst drought in 70 years,[8] and Russia saw a record drought in 2010, which caused the country to ban exports of grain.[9] Russia is experiencing another drought this year.[10]

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[1] Drought Reduces Mexico's Agricultural Production by 40%, Latin American Herald Tribune, February 2012. Available at http://www.laht.com/article.asp?CategoryId=14091&ArticleId=470584

[2] Special Report: South Georgia's Drought, WALB News ABC 10, February 20, 2012. Available at http://www.walb.com/story/16975753/special-report-south-georgias-drought

[3] Southeast Drought 2012: Georgia, South Carolina Residents Try To Make Do With Dry Weather, Jeffrey Collins, Associated Press, May 29, 2012. Available at http://www.huffingtonpost.com/2012/05/29/southeast-drought-2012-ga-sc-fl-nc_n_1552516.html

[4] Drought in Central, Eastern Canada baking crops: Weather a 'double whammy,' expert says. CBC News Canada, July 15, 2012. Available at http://www.cbc.ca/news/canada/story/2012/07/15/canada-hot-weather-lack-of-rain.html

[5] Drought brings Amazon tributary to lowest level in a century, Eric Laczi, The Amazon Rainforest Blog, October 26, 2010. Available at http://theamazonforest.blogspot.com/2010/10/drought-brings-amazon-tributary-to.html

[6] Worst drought in 50 years takes toll in northern Brazil. AFP, May 13, 2012. Available at http://www.google.com/hostednews/afp/article/ALeqM5hF2YL3XXHgebFiB6FQ91QnS-2qkw?docId=CNG.605297c60c7fe4592c03dee29f28e996.cc1

[7] Argentine Drought May Be Worst For Crops In Over 70 Years, Laura Price, Bloomberg News, Jan 6, 2012. Available at http://www.bloomberg.com/news/2012-01-06/argentine-drought-may-be-worst-for-crops-in-more-than-70-years.html

[8] Spain, Portugal face worst drought in 70 years, Daniel Woolls, Associated Press, March 15, 2012. Published in The Star (Canada). Available at http://www.thestar.com/news/world/article/1146764--spain-portugal-face-worst-drought-in-70-years

[9] Russia Suffers Severe Heat, Drought. Jim Andrews, Senior Meterologist, AccuWeather.com, July 14, 2010. Available at http://www.accuweather.com/en/weather-news/russia-suffers-severe-heat-dro/33994

[10] Russia Drought Cuts Wheat Production, Reuters, August 8, 2012. Available at http://www.agprofessional.com/resource-centers/wheat/news/Russia-drought-cuts-wheat-production-165442056.html

In Asia, China has seen a record drought from 2010-2012, which affected 6.3 million people, and dried up the Yangtze River in 2011, forcing the release of 4.5 maf of water from upstream dams.[11] India is seeing its second drought in four years, and rain in the Punjab region is 70% below average.[12] In East Africa, "the worst drought in 60 years" caused a food crisis in 2011 in Somalia, Ethiopia, Djibouti, and Kenya, and threatened the lives of 9.5 million people.[13] In southwestern Australia, a twelve year drought was declared as "without historical precedent."[14]

Drought and Climate Change

The unprecedented severity of recent droughts has been linked to climate change by numerous studies. The 2007 IPCC summary for policy makers stated in part,

> More intense and longer droughts have been observed over wider areas since the 1970s, particularly in the tropics and subtropics. Increased drying linked with higher temperatures and decreased precipitation have contributed to changes in drought. Changes in sea surface temperatures (SST), wind patterns, and decreased snowpack and snow cover have also been linked to droughts.[15]

In California, several recent climate change impact studies have predicted increased frequency and severity of droughts, as well as markedly reduced stream flow and reduced reservoir inflows. The results from these studies should be incorporated into modeling and planning by the Department of Water Resources.

In addition, prior modeling by the Department of Water Resources to assess climate change impacts on the State Water Project and Central Valley Project has used techniques which map downscaled global climate model output onto the historical record of wet and dry years. These techniques lose a great deal of information about changes in drought frequency and persistence under climate change. A 2010 analysis of modeling of climate change in DWR planning studies, noted:

> there is a lack of analysis of potential drought conditions that are more extreme than have been seen in our relatively short hydrologic record. There is significant evidence to suggest that California has historically been subject to very severe droughts and that climate change could result in droughts being more common, longer, or more severe. However, most current DWR approaches rely on an 82-year historical hydrologic record (1922–2003) on which GCM-

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[11] China crisis over Yangtze river drought forces drastic dam measures: Severe drought has forced China to release 5bn cubic metres from Three Gorges reservoir for irrigation and drinking water. Jonathan Watts, Asia environment correspondent, UK Guardian, May 25, 2011. Available at http://www.guardian.co.uk/environment/2011/may/25/china-drought-crisis-yangtze-dam

[12] India's Drought Highlights Challenges of Climate Change Adaptation, Robert Eshelman and ClimateWire, August 3, 2012. Available at http://www.scientificamerican.com/article.cfm?id=indias-drought-highlights-challenges-climate-change-adaptation

[13] 2011 East Africa Drought, Wikipedia. Available at http://en.wikipedia.org/wiki/2011_East_Africa_drought

[14] Longest, hottest drought on record, says Bureau of Meteorology. Asa Wahlquist, The Australian. October 11, 2008. Available at http://www.theaustralian.com.au/news/health-science/longest-hottest-drought-on-record/story-e6frg8gf-1111117721981.

[15] IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA., p. 9. Available at http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf

generated future climate changed-hydrologic conditions are superposed. This record is likely too short to incorporate the possibility of a low frequency, but extreme, drought.[16]

Full consideration of drought risks due to climate change and needed adaptations are essential in water resource planning. Therefore the Climate Change Adaptation Strategy for the Department of Water Resources needs to use all available information about increased drought risk due to climate change, re-evaluate prior studies on climate impacts to the State Water Project and Central Valley Project to incorporate this information, and consider strategies for reducing risk of interruption of water supplies.

Recommendations

We make the following recommendations for the California Climate Adaptation Strategy on water:

1. When evaluating Global Climate Models for application to California water resources planning, the Department of Water Resources should consider the drought-related effects mentioned in the 2007 IPCC report. DWR should also consider the accuracy of GCMs in predicting the recent, prolonged drought in the Southwest region and other areas affected by the El Nino / Southern Oscillation. (ENSO).

2. Comparison of Global Climate Model outputs with California's precipitation record should look not only at precipitation trends for the entire state, but also at regional records, which show drying in Southern California.

3. Studies from the 2009 and 2012 California Climate Change Assessments, projecting increased frequency and severity of droughts in California, should be evaluated and relevant information should be incorporated into future planning and modeling by the Department of Water Resources.

4. Previous modeling by DWR, which uses mapping onto the historic hydrology, should be re-evaluated with respect to risks of increased frequency and severity of droughts. This includes modeling of future stream flows and reservoir inflows used in the 2009 Climate Adaptation Strategy Assessment, and the 2009 and 2011 State Water Project Reliability Reports.

5. Model projections under higher greenhouse gas emissions scenarios tend to be drier. These scenarios are also more likely, given current trends. Whenever possible, information about higher GHG scenarios should be provided separately in planning studies, so that shifts under higher GHG scenarios can be assessed.

6. The method of quantile mapping of climate change models, which has been used in BDCP modeling, implicitly assumes that wetter and drier futures are equally likely. This assumption should be re-examined in light of new knowledge about global climate models and the impacts of climate change on drought frequency and severity around the world. In addition, when quantile mapping is used, the projections of the wetter and drier ensembles should be provided separately so that the range of potential climate change impacts can be assessed.

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[16] Climate Change Characterization and Analysis in California Water Resources Planning Studies, Final Report, Abdul Khan and Andrew Schwarz. Department of Water Resources December 2010, p. xvi. Available at http://www.water.ca.gov/climatechange/docs/DWR_CCCStudy_FinalReport_Dec23.pdf

7. Whenever possible, ensemble modelling should include information about the range of predictions by individual models. This provides information about the degree of uncertainty in the ensemble projections.

8. Water planning and evaluation of future water project operations should consider not only total water deliveries, but risk taken in deliveries, particularly with respect to carryover storage.

9. Information about drought risk to State Water Project deliveries should be summarized and provided to water agencies for inclusion in updates to Integrated Regional Water Management Plans.

10. Information about environmental risk from increased frequency and severity of droughts should be incorporated into environmental evaluations of proposed projects and proposed changes in long-term operations, including studies for CEQA / NEPA, FESA/CESA, and HCPs and NCCPs.

The following sections elaborate on the recommendations, citing recent research.

Discussion of Recommendations

1. When evaluating Global Climate Models for application to California water resources planning, the Department of Water Resources should consider the drought-related effects mentioned in the 2007 IPCC report. DWR should also consider the accuracy of GCMs in predicting the recent, prolonged drought in the Southwest region and other areas affected by the El Nino / Southern Oscillation. (ENSO).

The table below, from the Department of Water Resources, shows the models used in the 2009 and 2012 California Climate Change Assessments.

No.	Model name; modeling group, country	Model identification	Primary reference year
1	Parallel Climate Model; National Center for Atmospheric Research (NCAR), USA	PCM	2000
2	Geophysical Dynamics Laboratory model version 2.1; US Dept. of Commerce / National Oceanic and Atmospheric Administration (NOAA) / Geophysical Fluid Dynamics Laboratory (GFDL), USA	GFDL-CM2.1	2006
3	Community Climate System Model; National Center for Atmospheric Research (NCAR), USA	CCSM3	2006
4	Max Planck Institute (MPI) for Meteorology, Germany	ECHAM5/ MPI-OM	2006
5	Center for Climate System Research (University of Tokyo), National Institute for Environmental Studies, and Frontier Research Center for Global Change (JAMSTEC), Japan	MIROC3.2 (medres)	2004
6	Meteo-France / Centre National de Recherches Meteorologiques (CNRM), France	CNRM-CM3	2005

(CAT, 2009 and Randall et al., 2007)

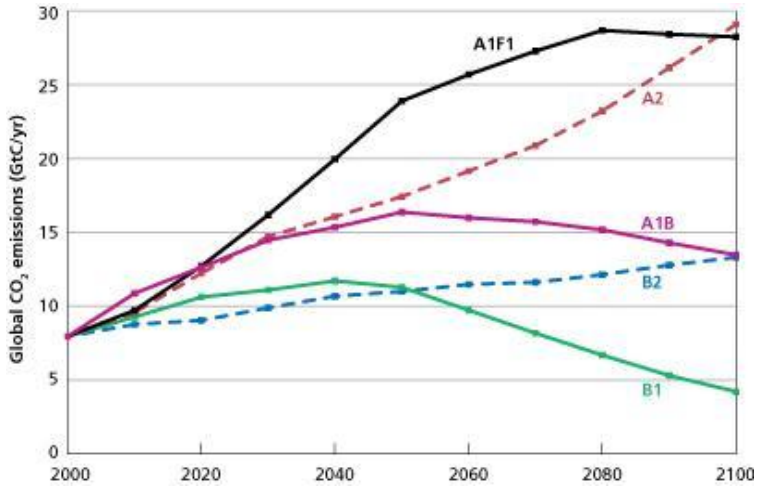
2 Table of models used in 2009 California Climate Change Assessment Source: Department of Water Resources.

The models were chosen

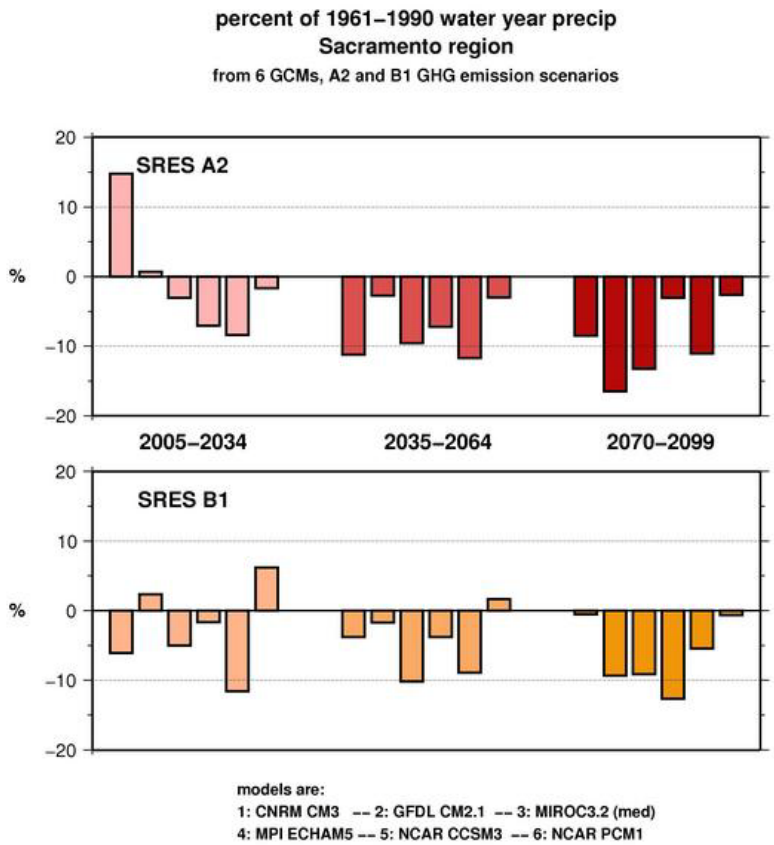
> "on the basis of providing a set of relevant monthly, and in some cases daily, data. Another rationale was that the models provided a reasonable representation, from their historical simulation, of the following elements: seasonal precipitation and temperature (Figure 1), the variability of annual precipitation, and El Niño/Southern Oscillation (ENSO)."[17]

[17] Climate Change Scenarios And Sea Level Rise Estimates for the California 2009 Climate Change Scenarios Assessment, A Paper From the California Climate Change Center. Dan Cayan, Mary Tyree, Mike Dettinger, Hugo Hidalgo, Tapash Das, Ed Maurer, Peter Bromirski, Nicholas Graham, and Reinhard Flick. Available at http://www.energy.ca.gov/2009publications/CEC-500-2009-014/CEC-500-2009-014-F.PDF

The graph below shows C02 emissions under the IPCC Special Report on Emissions Scenarios. For the 2006 Climate Change Assessment, the Climate Action Team chose two greenhouse gas emissions scenarios rom.for modeling, the A2 (medium-high) scenario, and the B1 (low) scenario., based on availability of data. These scenarios were also used for the 2009 and 2012 Climate Change Assessments.



The projections of changes in precipitation in Sacramento from the 2009 Climate Assessment are shown below. Four of the Global Climate Models project less precipitation for the current period (2005-2034) under the A2 (medium-high) scenario, as well as four under the B1 (low) scenario. By 2035-2064, all six Global Climate Models predict less precipitation under the A2 scenario, and four of the six predict significantly less.



3 Predictions of change in precipitation at Sacramento for 6 Global Climate models

Source: 2009 California Climate Change Assessment

Discussions of climate modeling in California frequently mention that the state experiences a great deal of natural variability in precipitation from fluctuations in sea surface temperatures, including the El Nino / Southern Oscillation (ENSO) and the Pacific Decadal Oscillation.

Looking at how climate change may have affected recent droughts in the Southwest and in Australia gives more information. These regions experience similar climactic variability from the ENSO. While the 2011 drought in Texas was strongly influenced by the La Nina phase of the ENSO, Rupp and Mote found that global warming could be decreasing the return period for low precipitation events, and that heat waves are now 20 times more likely when compared with similar large-scale weather patterns in the 1960s.[18] Karoly, Risbey, and Reynolds also thought the combination of low precipitation and record heat was contributed to the severity of the unprecedented drought in Australia, and was related to climate change.[19]

[18] David Rupp and Phillip Mote et.al. Did Human Influence On Climate Make The 2011 Texas Drought More Probable? In Explaining Extreme Events of 2011 From A Climate Perspective, Thomas Peterson, Peter Stott And Stephanie Herring, Editors. Published in the Journal of the American Meterological Society, July 2012. Available at http://journals.ametsoc.org/doi/pdf/10.1175/BAMS-D-12-00021.1

[19] Global Warming Contributes to Australia's Worst Drought. David Karoly, James Risbey, and Anna Reynolds. World Wildlife Fund Australia, January 14, 2003. Available at http://qualenergia.it/UserFiles/Files/Cl_IC_EE_03_Global_Warming_2003.pdf

It has also been noted that ocean warming can cause climate signals from ocean temperaturs to act synergistically. In 2003, Hoerling and Kumar discussed the dynamics behind the 1998-2002 droughts spanned the United States, southern Europe, and southwest Asia. These droughts were associated with persistently warm sea surface temperatures in the western tropical Pacific and Indian Oceans for these years, as well as cold temperatures in the eastern tropical Pacific. The climate signals acted synergistically, contributing to widespread mid-latitude drying and creating a widespread, mid-latitude drought. They noted that the scenario was ideal for a spatially expansive, synchronized drought. [20]

In sum, while there is a great deal of variability of precipitation in California due to the El Nino / Southern Oscillation and the Pacific Decadal Oscillation, global warming appears to be affecting both the oscillations, and their resulting climate impacts. Recent droughts in the Southwest and Australia show that global climate models may have important information about these changes.

The global climate models chosen for 2009 and 2012 California Climate Assessments were chosen in part for reproducing the ENSO variability. Five of the six models predicted an increased precipitation minus evapotranspiration anomaly in the Southwest, indicating a shift towards a more arid climate.[21] The exception was the National Center for Atmospheric Research Parallel Climate Model (PCM), which predicts such a shift much later in the 21st Century. The PCM model is also the only one of the six models to show a trend of increasing precipitation in California the near term and at mid-century.

2. Comparison of Global Climate Model outputs with California's precipitation record should look not only at precipitation trends for the entire state, but also at regional records, which show drying in Southern California.

Discussions of climate modeling in California also mention that the set of Global Climate Models chosen for the 2009 and 2012 Climate Change Assessment are drier than current precipitation trends in the state, which shows a slight increase overall.

Looking at regional precipitation in California gives a more complete picture. As noted by Killam and Bui et. al., examination of regional data shows a marked decline in precipitation in Southern California since 1975, a slight decline in the San Joaquin Valley and a slight increase in Northern California, with a large increase on the North Coast.[22],[23]

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[20] The Perfect Ocean for Drought, Martin Hoerling and Arun Kumar, Science, Vol. 299 no. 5607, pp. 691-694 January 31 2003. Available at http://www.sciencemag.org/content/299/5607/691.short

[21] Model Projections of an Imminent Transition to a More Arid Climate in Southwestern North America, Richard Seager, Mingfang Ting, Isaac Held, et. al., Science, Vol 316 no. 5828 p. 1181-1184, May 25, 2007. Available at http://www.sciencemag.org/content/316/5828/1181.short

[22] Killam, D., A. Bui, S. LaDochy, P. Ramirez, W. Patzert and J. Willis. 2011. Precipitation trends in California: Northern and central regions wetter, southern regions drier. Unpublished. Cited in Temperature and precipitation trends in California: Global warming and Pacific Ocean influences, LaDochy and Ramirez et. al. (See reference 20.)

[23] Regional precipitation data with linear trends also available from Western Regional Climate Center, California Climate Tracker. Available at http://www.wrcc.dri.edu/monitor/cal-mon/frames_version.html

Mean precipitation Linear trends/ 100 yrs	N Central	N Coast	NE	Sierra	Sac Delta	Central Coast
1895-present	+247.9	-21.1	+52.1	+114.6	+128.8	+77.7
1949-present	-75.9	-219.7	-67.3	-8.1	+61.0	+82.3
1975-present	+98.8	+479.6	-31.5	-74.2	+26.9	+71.6
	San Joaquin	S. Coast	S. Interior	Mojave	Sonora	
1895-present	+36.6	+88.1	-10.2	+39.9	+24.1	
1949-present	+50.3	+75.7	+28.4	+57.9	+43.4	
1975-present	-135.4	-340.4	-642.4	-205.2	-245.1	

4 Annual Precipitation linear trend in mm/100 years. From Killam et. al.

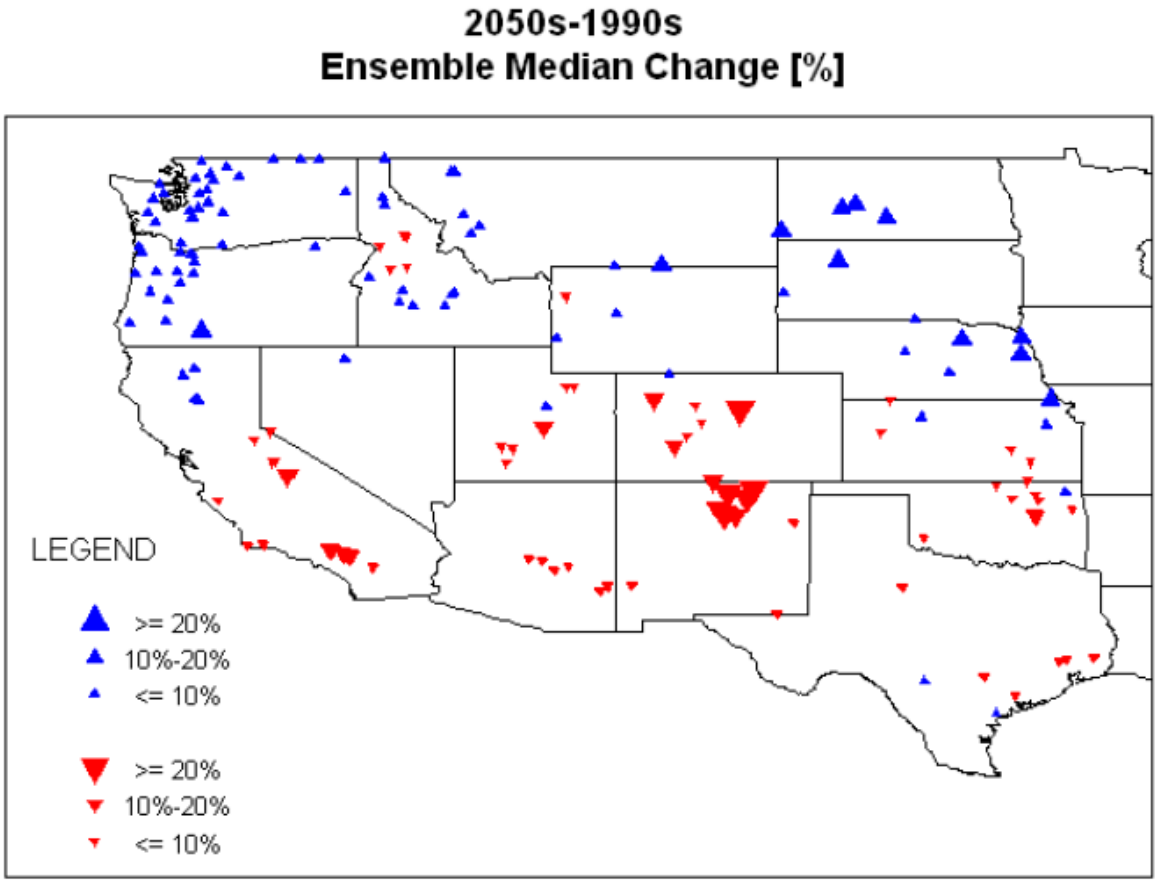
La Dochy and Ramirez, et. al. suggested that the precipitation decrease in Southern California may be due to a northward shift in the storm track position in the West in later winter and early spring, and that the subtropical anticyclone belt may also shifting northward.[24] Such a shift has also been observed in global climate change models, and Seager et. al. conjectured that it was associated with the recent severe drought in the Southwest.[25]

The shifts are in agreement with projections by the large ensemble of 112 GCM / scenario combinations used by the U.S. Bureau of Reclamation for the 2011 Westwide Climate Risk Assessment.[26] The ensemble median projected drying in Southern California and the Central Sierras by mid-century, as well as drying across the Southwest. By the 2070s, the ensemble median projected drying throughout California.

[24] Temperature and precipitation trends in California: Global warming and Pacific Ocean influences. Steve LaDochy, Pedro Ramire1, Dan Killam, Ann Bui, William Patzert and Josh Willis. AMS Climate extended abstract. Available at https://ams.confex.com/ams/91Annual/webprogram/Manuscript/Paper177504/AMS%20climate%20Extended%20abstract-pedro(2).pdf

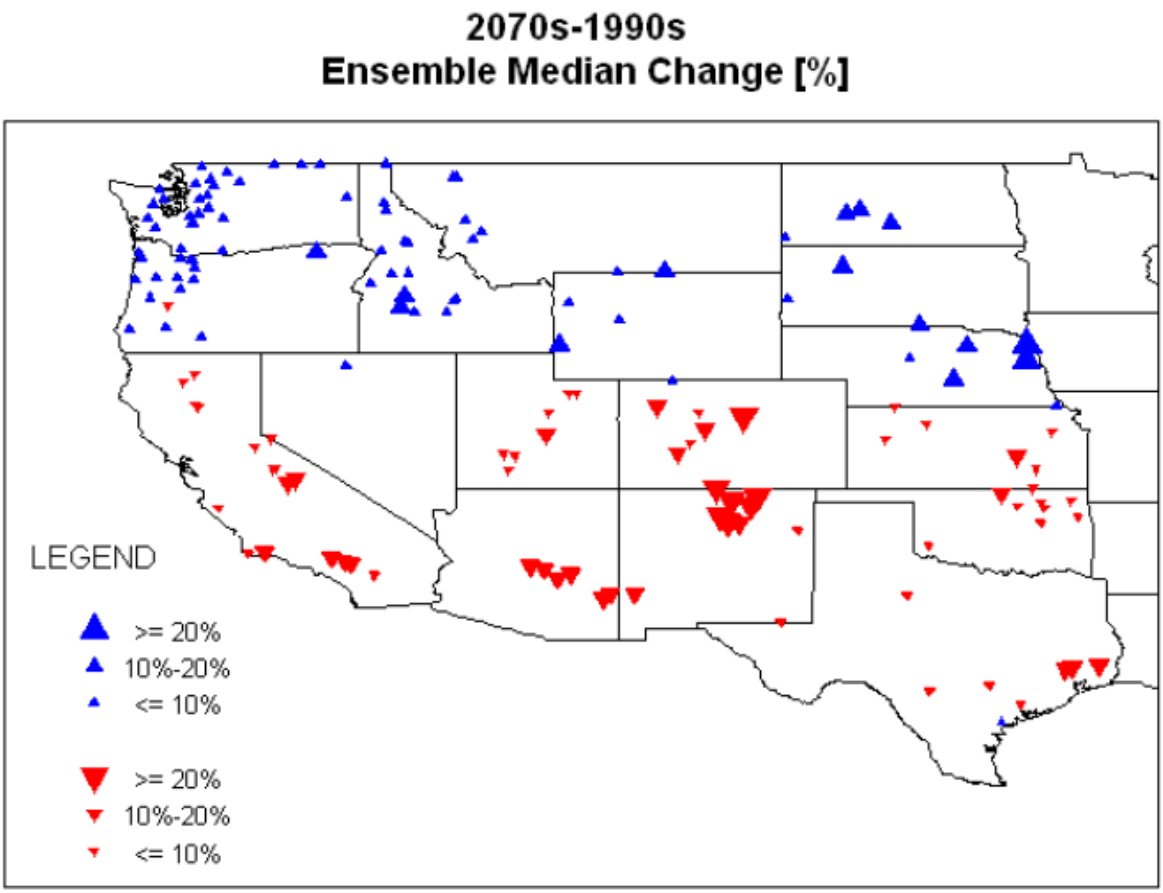
[25] Model Projections of an Imminent Transition to a More Arid Climate in Southwestern North America, Seager et. al., op. cit.

[26] West-Wide Climate Risk Assessments: Bias-Corrected and Spatially Downscaled Surface Water Projections, U.S. Department of the Interior Bureau of Reclamation Technical Memorandum No. 86-68210-2011-01, March 2011. Available at http://www.usbr.gov/WaterSMART/docs/west-wide-climate-risk-assessments.pdf



5 Median projected changes in annual precipitation from ensemble of 112 GCM / scenario combinations, mid-century

Source: US Bureau of Reclamation, West-wide Climate Risk Assessment, 2011.



6 Median projected changes in annual precipitation from ensemble of 112 GCM / scenario combinations end of century
Source: US Bureau of Reclamation, West-wide Climate Risk Assessment, 2011.

3. Studies from the 2009 and 2012 California Climate Change Assessments, projecting increased frequency and severity of droughts in California, should be evaluated and relevant information should be incorporated into future planning and modeling by the Department of Water Resources.

There are now enough studies of impacts of climate change on frequency of droughts in California for the Department of Water Resources to include potential increases in frequency of dry and critically dry years in planning and modeling. An assessment of possible increase in drought risk is essential for reliability planning for the State Water Project and the urban water agencies which contract with the State Water Project.

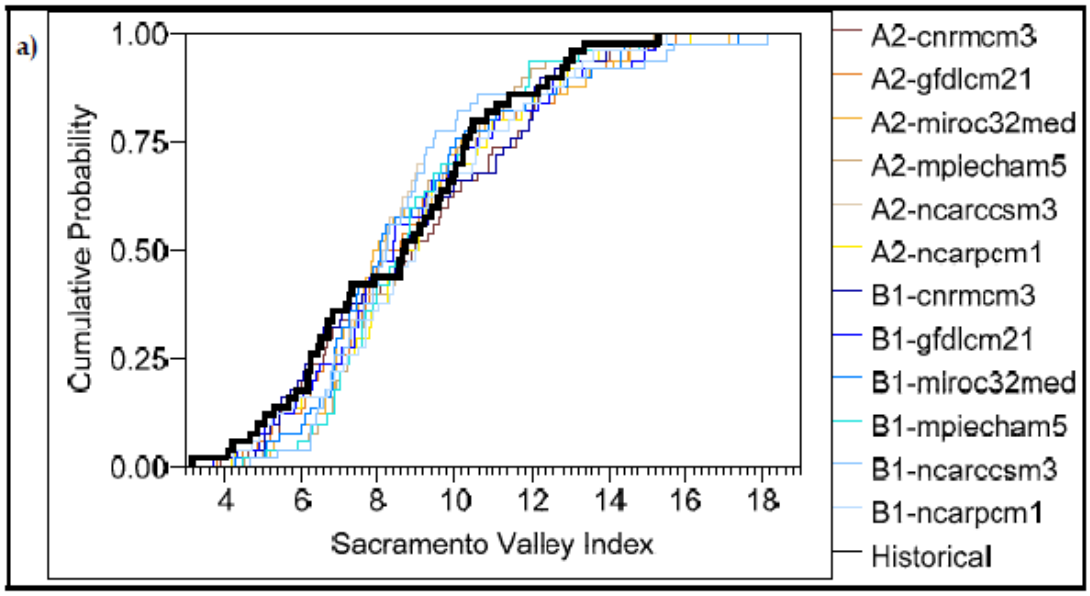
We describe two recent studies below, which were sponsored by the California Climate Change Center and released in support of the 2012 and 2009 California Climate Change Assessments.
.

A. Water and Energy Sector Vulnerability to Climate Warming in the Sierra Nevada: Water Year Classification in Non-Stationary Climates, July 31, 2012.

As part of the 3rd California Climate Change Assessment in 2012, the California Climate Change Center released this study by Sarah Null and Josh Viers at UC Davis.

The study used the six global climate models from the second California Climate Assessment, and made projections under the SRES A2 (medium-high) and B1 (low) greenhouse gas emissions scenarios that were used in that assessment. (see Appendix.) The study also used the same Variable Infiltration Capacity model that DWR used for downscaling, with Bias-Corrected Spatial Disaggregation.

The main difference between the non-stationary study and modeling by the Department of Water Resources, is that the non-stationary study did not correct model outputs to the historical hydrology. Instead, researchers ran the models without climate forcing, and compared the results to the historical hydrology. The graph below shows the cumulative probability of the different models compared with the observed 1951-2000 hydrology.



ANOVA and t-tests using a 95 percent confidence level found that results were not significantly different from historic hydrology. The graph and the statistical tests show that the models do a good job of capturing historic hydrology. This was one of the criteria for model selection.[27]

The results of the models under the A2 and B1 scenarios show a marked shift in climate. Most of the models show major increases in dry and critically dry years, and decreases in wet and below-normal years. The histograms on the next page shows the changes in the frequency of water year types for the Sacramento Valley Index.

All of the models show a significant increase in dry and critically dry years by the latter half of the century, with a corresponding decrease in wet and above normal years. Many of the models also show an increase in dry and critically dry years in the first half.

The table below shows water year types, averaged over all six GCM models, for the two scenarios.

[27] Climate Change Scenarios And Sea Level Rise Estimates for the California 2009 Climate Change Scenarios Assessment, A Paper From the California Climate Change Center. Cayan et. al. op. cit.

Table 6. Percentage of Years in Each Water Type by Modeled Time Period and Emissions Scenario (italicized values are percent change from historical period)

	SVI					
	1951-2000 (%)		2001-2050 (%)		2051-2099 (%)	
	A2	B1	A2	B1	A2	B1
Critical	8.7	8.3	11.3 *(2.7)*	6.7 *(-1.7)*	18.4 *(9.7)*	14.0 *(5.6)*
Dry	7.7	10.0	12.0 *(4.3)*	15.7 *(5.7)*	19.4 *(11.7)*	20.1 *(10.1)*
Below Normal	23.3	21.3	23.3 *(0.0)*	17.3 *(-4.0)*	18.7 *(-4.6)*	19.4 *(-1.9)*
Above Normal	21.0	22.7	16.7 *(-4.3)*	20.7 *(-2.0)*	12.9 *(-8.1)*	18.4 *(-4.3)*
Wet	39.3	37.7	36.7 *(-2.7)*	39.7 *(2.0)*	30.6 *(-8.7)*	28.2 *(-9.4)*

The medium-high emissions scenario (A2) projections showed dry and critically dry years in the Sacramento Valley increasing to 23% of all years between 2000 and 2050, and to 38% of all years in the latter half of the century. Under this scenario, the incidence of dry and critically dry years would more than double.

The projections also showed a decrease in wet years.

In the Sacramento Valley, the A2 projections showed wet and above normal years decreased to 53% of all years in 2000-2050, and to 41.5% of years by the latter half of the century.

The lower greenhouse gas emissions scenario (B1) showed similar but less dramatic shifts.

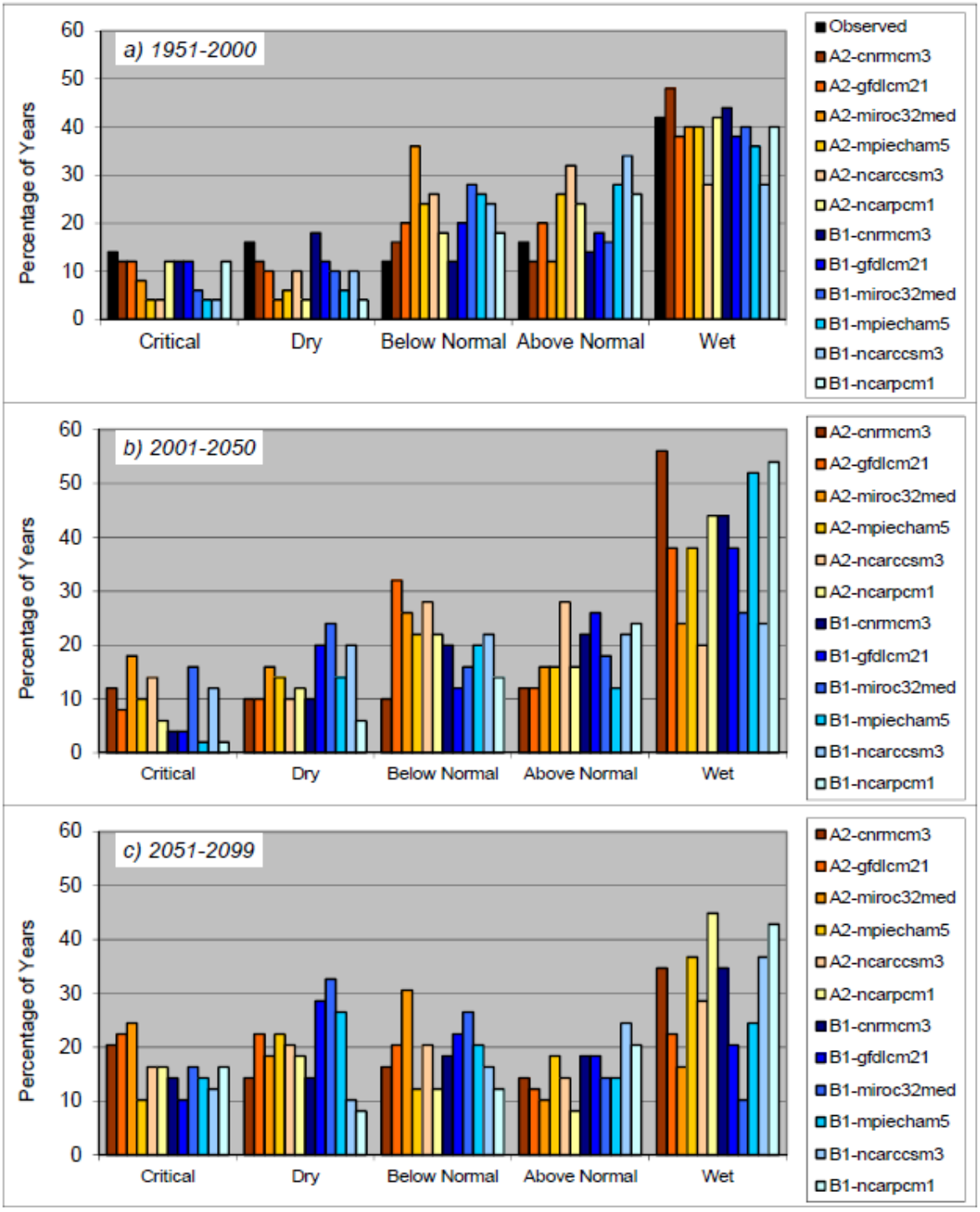
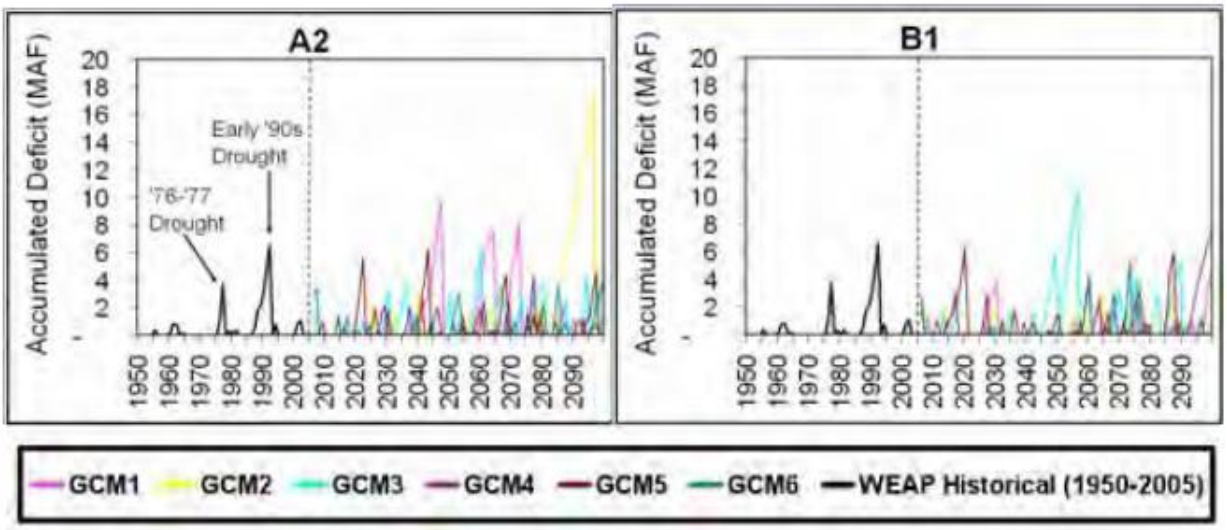


Figure 6. SVI Relative Frequency Histograms for (a) 1951-2000, (b) 2001-2050, and (c) 2051-2099

B. Climate Change Impacts on Water Supply and Agricultural Water Management In California's Western San Joaquin Valley, and Potential Adaptation Strategies, August 2009.[28]

This study, done by Brian Joyce, Vishal Mehta and David Purkey from the U.S. Center for the Stockholm Environmental Institute, Larry Dale from Lawrence Berkeley National Lab, and Michael Hanemann from the California Climate Center was released as part of the second California Climate Change Assessment in 2009, and used the same set of twelve global climate models / climate change scenarios. The study used a application of the Water Evaluation and Planning (WEAP) system developed for the Sacramento River basin and Sacramento Delta. WEAP is an integrated rainfall / runoff and water resources modeling framework that was developed in Stockholm, and has been used for water resources planning around the world. WEAP has also been used in climate modeling for the 2009 California Water Plan, and is being used in preparing the 2013 California Water Plan.

WEAP has the advantage that it does not rely on perturbation of historical precipitation or runoff patterns for projections. This allows the model to capture major shifts in historical patterns. The study found marked increases in the frequency of droughts, and under the A2 scenario, a mega-drought towards the end of the century. The graph below shows the results for different models.



In sum, two recent studies using two different methods of downscaling showed major changes in the structure of droughts in California. Both indicated an increase in the frequency and severity of droughts. This information is highly relevant to California water resources planning, and should incorporated into future planning studies.

[28] Climate Change Impacts on Water Supplies and Agricultural Water Management in the Western San Joaquin Valley and Possible Adaptation Strategies, Brian A. Joyce, Vishal K. Mehta, David R. Purkey, Larry L. Dale, and Michael Hanemann. California Climate Change Center, August 2009. Available at http://www.energy.ca.gov/2009publications/CEC-500-2009-051/CEC-500-2009-051-F.PDF

4. Previous modeling by DWR, which uses mapping onto the historic hydrology, should be re-evaluated with respect to risks of increased frequency and severity of droughts. This includes modelling of future streamflows and reservoir inflows used in the 2009 Climate Adaptation Strategy Assessment, and the 2009 and 2011 State Water Project Reliability Report.

For the 2006 California Climate Change Assessment,, the Department of Water Resources assessed the potential impacts of climate change on deliveries of the State Water Project and Central Valley Project. The modellers downscaled the global climate models using Bias Corrected Spatial Disaggregation, and then from the assessment as input to the Variable Infiltration Capacity model to generate regional estimates for runoff, snowpack, and soil moisture content. However, instead of using the predicted runoff information directly, the monthly stream flows were compared for a 30 year period with historic monthly stream flows to obtain a ratio. The monthly ratios were then mapped onto the historic record, multiplying each water year by the percentage increase or decrease.[29]

The problem with mapping the VIC model outputs back onto the 82 year historic record, is that it loses information from the global climate models that would change the frequency and severity of droughts, as well underestimating changes in annual and seasonal runoff. This can seriously underestimate impacts of climate change on both river flows and water supply.

The 2009 assessment of climate change impacts to the State Water Project and Central Valley Project attempted to solve some of the problems with the 2006 assessment by adjusting the predictions to correct annual and seasonal runoff to the mean values projected by the global climate models. However, this mapping still lost information about the structure of drought persistence.[30]

The Climate Change Modelling group noted these deficiencies in the final report, Using Future Climate Projections to Support Water Resources Decision Making in California.[31]

In Section 4.4 on "Future Climate Variability," the authors stated:

> In water resources planning, it is often assumed that future hydrologic variability will be similar to historical variability, which is an assumption of a statistically stationary hydrology. This assumption no longer holds true under climate change where the hydrological variability is non-stationary. Recent scientific research indicates that future hydrologic patterns are likely to be significantly different from historical patterns, which is also described as an assumption of a statistically non-stationary hydrology. In an article in *Science*, Milly et al. (2008) stated that "Stationarity is dead" and that "finding a suitable successor is crucial for human adaptation to changing climate."

The authors also noted that

> Some of the climate change impacts analyses currently conducted at DWR implicitly assume statistically stationary hydrology, such as the streamflow estimation method presented in Section 4.2.

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[29] Progress on Incorporating Climate Change into Management of California's Water Resources. Department of Water Resources, 2006. Available at http://www.water.ca.gov/climatechange/docs/DWRClimateChangeJuly06.pdf

[30] Using Future Climate Projections to Support Water Resources Decision Making in California, Francis Chung et. al., California Climate Center, Final Report, May 2009. Available at http://www.water.ca.gov/pubs/climate/using_future_climate_projections_to_support_water_resources_decision_making_in_california/usingfutureclimateprojtosuppwater_jun09_web.pdf

[31] Ibid.

The impacts analyses that used this streamflow estimation method and implicitly assumed statistically stationary hydrology included the 2009 impacts analysis of climate change on the State Water Project and Central Valley Project,[32] and the 2009 State Water Project Reliability Report.[33] It also appears that the same method was used in the 2011 State Water Project Reliability Report, without change.[34]

Since all of the Integrated Regional Water Management Plans that use State Water Project water used the SWP Reliability report in their planning analysis, the net effect of using this streamflow estimation is that all of these water agencies are implicitly assuming statistically stationary hydrology in their water planning. This could create systemic risk if the projections in the studies previous section are correct.

In addition, the 2009 State Water Project Reliability Report used a linear interpolation of global climate model outputs from 2050 with unforced data from the current period to estimate changes for 2029.[35] This essentially assumse that any 2029 reductions in inflows would half that of 2050 inflows. But comparing this assumption with the predictions for changes in precipitation in the 2009 Climate Scenarios assessment gives a much different picture. For most models, the changes at the Sacramento point in the 2005-2034 period are quite a bit more than half that of the 2035-2069. This could mean that there is a overestimation of potential deliveries in the near term. The same issue may also be present in the 2011 Delivery Reliability Report.

The Bay-Delta Conservation Plan modelers have modified the reservoir inflow estimation method to also include estimates of the changes to the probability distribution of global climate model predicted streamflows, including changes in the skew and standard deviation. This will include some information about the increased variability from heavier winter precipitation as well as drier months[36]. However, the monthly mapping technique still loses information about the structure of drought persistence, because it essentially assumes that it is a roll of the dice as to whether a dry month is followed by another dry month.

As discussed in previous sections, Global Climate Models contain information about persistence in increases sea surface temperatures, which can affect the ENSO and other circulation patterns, and influence the structure and persistence of droughts. Mapping output from global climate models onto the historic record of water years will inevitably lose much of this information.

In sum, while the techniques used by DWR to map output from global climate models to the historic record have improved, there are fundamental limitations to this approach. Wherever possible, projections should be compared with other modelling that does not map onto the historic record.

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[32] Using Future Climate Projections to Support Water Resources Decision Making in California, op. cit.

[33] The State Water Project Delivery Reliability Report 2009, Department of Water Resources, August 2010. Available at http://baydeltaoffice.water.ca.gov/swpreliability/Reliability2010final101210.pdf

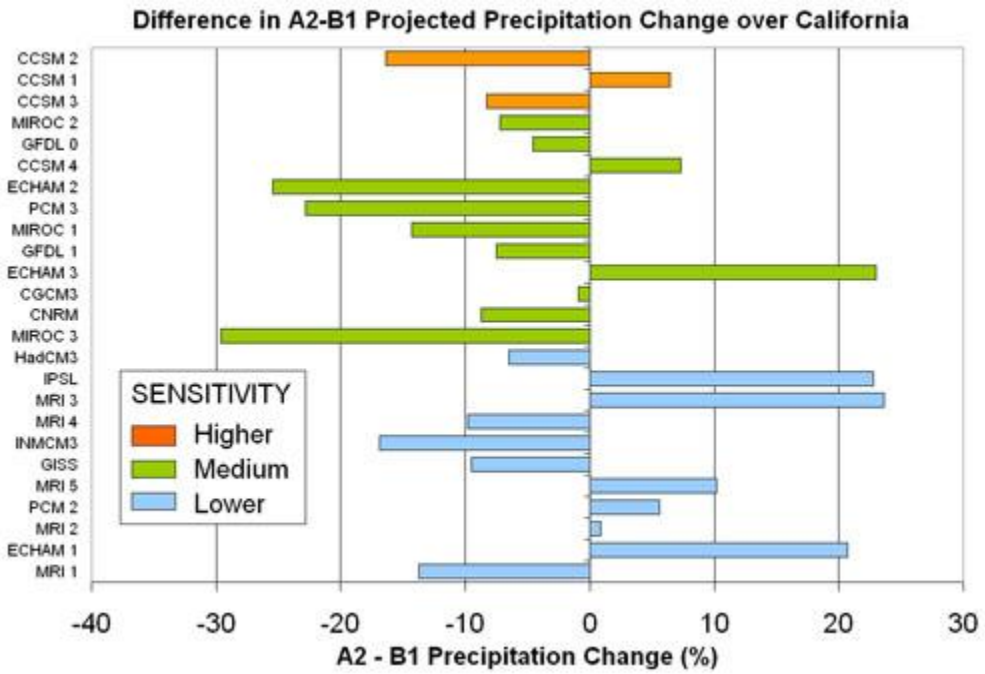
[34] Technical Addendum to The State Water Project Delivery Reliability Report 2011, Department of Water Resources, June 2012. Available at http://baydeltaoffice.water.ca.gov/swpreliability/2011DRR_FINAL_TechAddendum_062112.pdf

[35] SWP Delivery Reliability Report 2009, Ibid.

[36] Bay Delta Conservation Plan, Effects Analysis, Chapter 5, Section 5.2 Climate Change Approach and Implications for Aquatic Species. Available at http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/BDCP_Effects_Analysis_-_Appendix_5_A_2_-_Climate_Change_Approach_and_Implications_for_Aquatic_Species_4-30-12.sflb.ashx

5. Model projections under higher greenhouse gas emissions scenarios tend to be drier. These scenarios are also more likely, given current trends. Whenever possible, information about higher GHG scenarios should be provided separately in planning studies, so that shifts under higher GHG scenarios can be assessed.

The graph below, from the California Climate Scenario Assessment team, shows the differences in projected precipitation change over California, between the B2 and A1 scenarios, for 25 models.[37] Sixteen of the 25 models (64%) show a decrease in precipitation with increased GHG emissions, and fifteen show a very significant decrease.

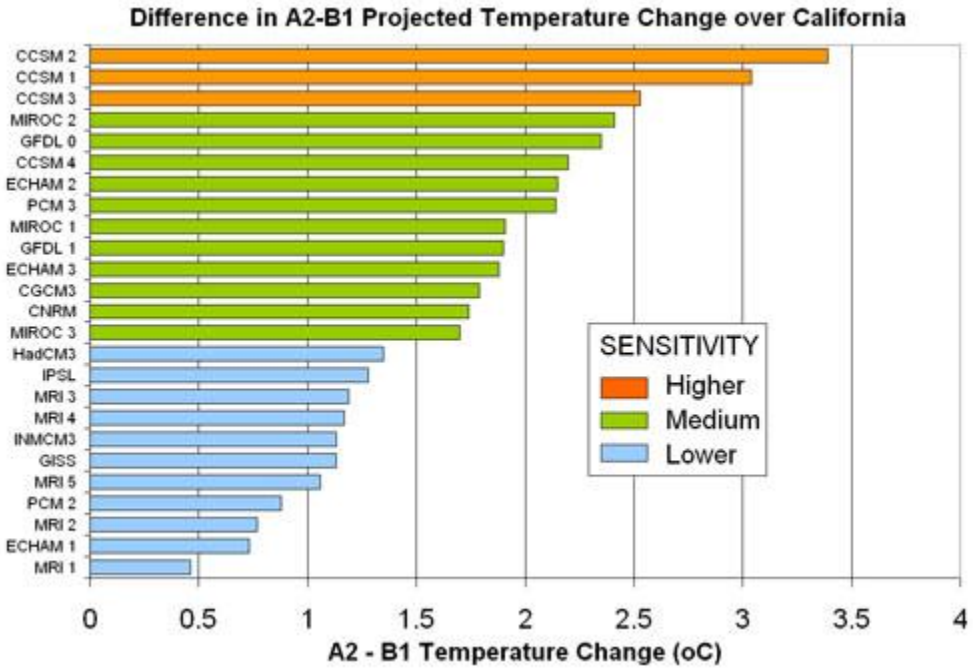


Source: California Climate Scenario Assessment team

.The graph above is color coded with regard to sensitivity of temperature change to higher GHG emissions. The graph below explains the color coding. The models were ranked on difference between projected temperatures between the A2 and B1 scenarios, and color coded. Blue was lowest sensitivity, green medium, and orange highest. The global climate models which show the highest temperature sensitivity with respect to changes in GHG emissions also tend to show large reductions in precipitation with higher GHG emission.

Of the highest sensitivity models, two thirds showed a marked decrease in precipitation between the A2 and B1 scenarios, and three fourths of the medium sensitivity models.

[37] California Climate Scenario Asssessment Team, Model Page. Available at http://meteora.ucsd.edu/cap/cccc_model_prelim.html#contents



For this reason, whenever possible, projections from the higher greenhouse gas emissions scenarios should be provided separately, so that the impacts can be assessed.

In addition, the higher GHG scenarios appear to be the most likely, given current trends in global development and increases in greenhouse gas emissions. In the discussion for the Cal-Adapt the draft Natural Resources Agency policy on Climate Adaptation states:

> "Of the two options provided by Cal-Adapt, the A2 scenario is the more realistic choice for decision-makers to use for climate adaptation planning. The B1 scenario is optimistic in the high level of international cooperation assumed. This cooperation would necessitate sweeping political and socioeconomic change on a global magnitude that is as yet unprecedented. The roughly two billion-person decline in population over the last half of the century is also reliant on broad assumptions of low mortality and low fertility. Generally, the B1 scenario might be most appropriately viewed as a version of a "best case" or "policy" scenario for emissions, while A2 is more of a status quo scenario incorporating incremental improvements."[38]

These same considerations should obviously be applied to statewide planning, including water resources planning.

[38] California Natural Resources Agency, draft California Climate Change Adaptation Policy Guide, April 2012. Available at http://resources.ca.gov/climate_adaptation/docs/APG_-_PUBLIC_DRAFT_4.9.12_small.pdf

6. The method of quantile mapping of climate change models, which has been used in BDCP modeling, implicitly assumes that wetter and drier futures are equally likely. This assumption should be re-examined in light of new knowledge about global climate models and the impacts of climate change on drought frequency and severity around the world. In addition, when quantile mapping is used, the projections of the wetter and drier ensembles should be provided separately so that the range of potential climate change impacts can be assessed.

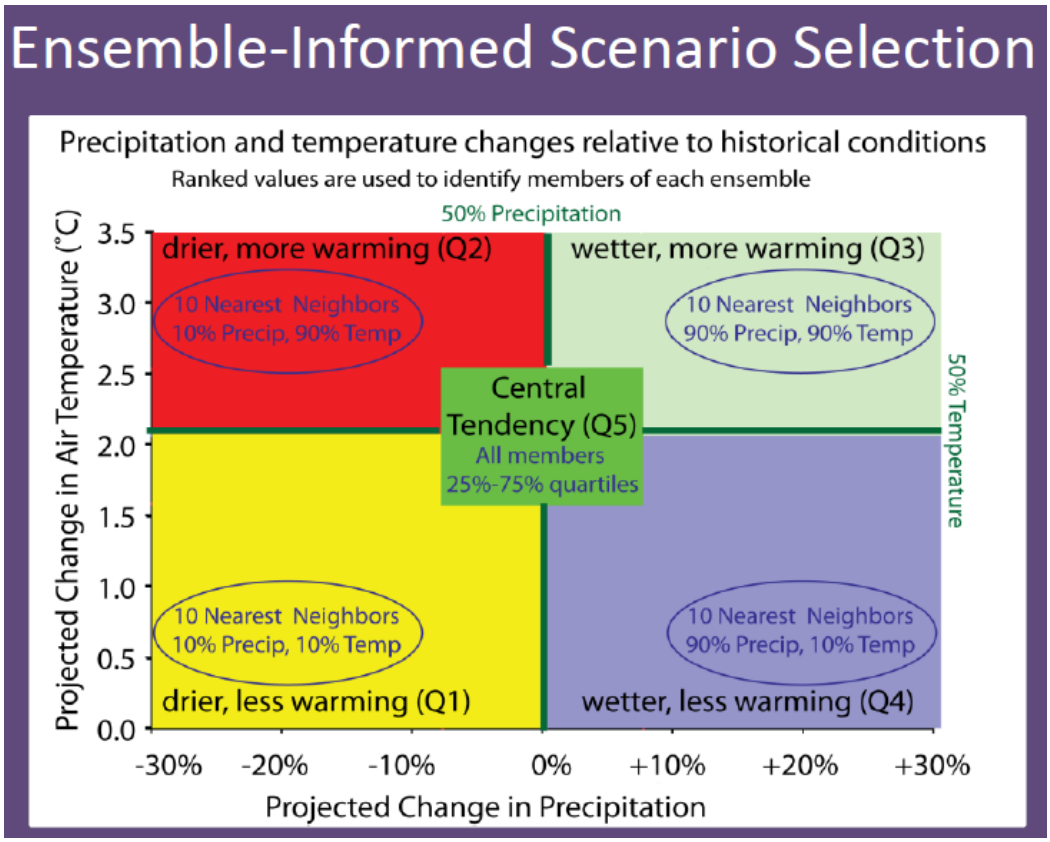
The method of quantile mapping of climate change models, used in the Bay Delta Conservation Plan assumes that wetter and drier futures in California are equally likely. This is substantially different than the median projections of 112 global climate models from the US Bureau of Reclamation Westwide Climate Risk Assessment, which were shown in the previous section. These ensemble median projection shows drying in Southern California and central Sierras by mid-century, and drying throughout California by 2070. It should also be noted that the quantile mapping method, while plausible, has not been tested and compared with the historic record in the same way that general ensemble models have.

This is a more detailed description of quantile mapping in BDCP. BDCP uses 112 climate change models, clustered under four different quartiles:

- Drier, less warming
- Drier, more warming
- Wetter, less warming
- Wetter, more warming

Each cluster of models is used to produce an ensemble model for each quartile. The ensemble models for each quartile are then combined into a fifth model, which captures the central tendency of all four of the individual models. The graph below, from a recent presentation by Jamie Anderson on selection of climate change scenarios, illustrates the ensemble scheme.[39]

[39] Jamie Anderson, presentation on Climate Change Approaches, Department of Water Resources, March 2012. Available at http://www.water.ca.gov/climatechange/docs/CCTAG_climate_change_approaches%20final_3-28-12_Jamie%20Anderson_with%20extra%20slides.pdf

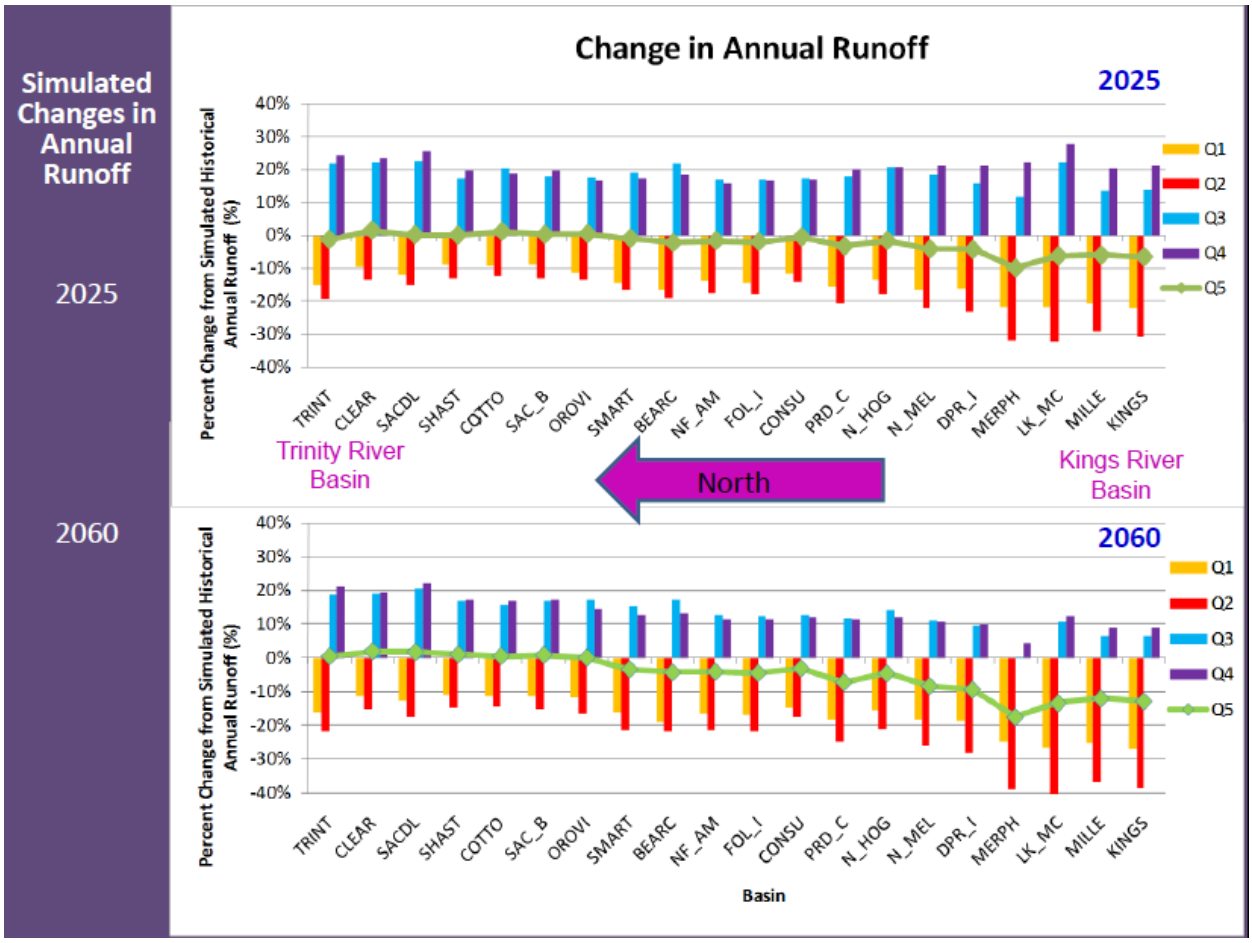


The central tendency model assumes not only that wetter and drier futures are equally likely, but that lower changes in temperatures due to global warming are as likely as higher changes. Given recent temperature trends across the globe, this assumption should be re-examined.

By its very structure, the quantile mapping process produces a central tendency prediction that is close to current norms of precipitation, since it assumes that wetter and drier futures are equally likely.

The graph below, also from Anderson, shows different trends in river runoff for the different quartiles. The drier, more warming Q2 model predictions include the worst case scenarios. The drier, less warming Q1 model predictions show weaker but still noticeable drying. The predictions of these models are red and yellow, and all show significant reductions in streamflows, more by the end of the century.

The Q3 wetter, more warming and Q4 wetter, less warming quartiles represents model which are less common in the space of all models. The graph below shows the different predictions of these wetter quartiles in light and dark blue. All the wetter models show increases in streamflow, but less by the end of the century, particularly in the San Joaquin Valley



The predictions of the final quartile, Q5, are shown in grey. Q5 is a combination of the four different wetter and drier quartile models, Q1 to Q4. This is the central tendency of the set of quartile models. As you can see, the central tendency model tends to reproduce the historical precipitation patterns in the near term. It is only over the long term, when the severe potential drying under the drier models far outweigh the effects of the wetter models, that the central tendency model begins to show some drying.

Using this ensemble model for BDCP could significantly underestimate effects of climate change in reducing precipitation and streamflow. For this reason, if the quartile mapping technique continues to be used, the predictions of the individual quartiles should also be provided.

7. Water planning and evaluation of future water project operations should consider not only total water deliveries, but risk taken in deliveries, particularly with respect to carryover storage.

One of the most notable conclusions in the 2006 climate change impacts assessment was that upstream storage was decreased, though not as seriously as in later simulations for the Bay Delta Conservation Plan. The graph below is an exceedance plot for end of year carryover storage.

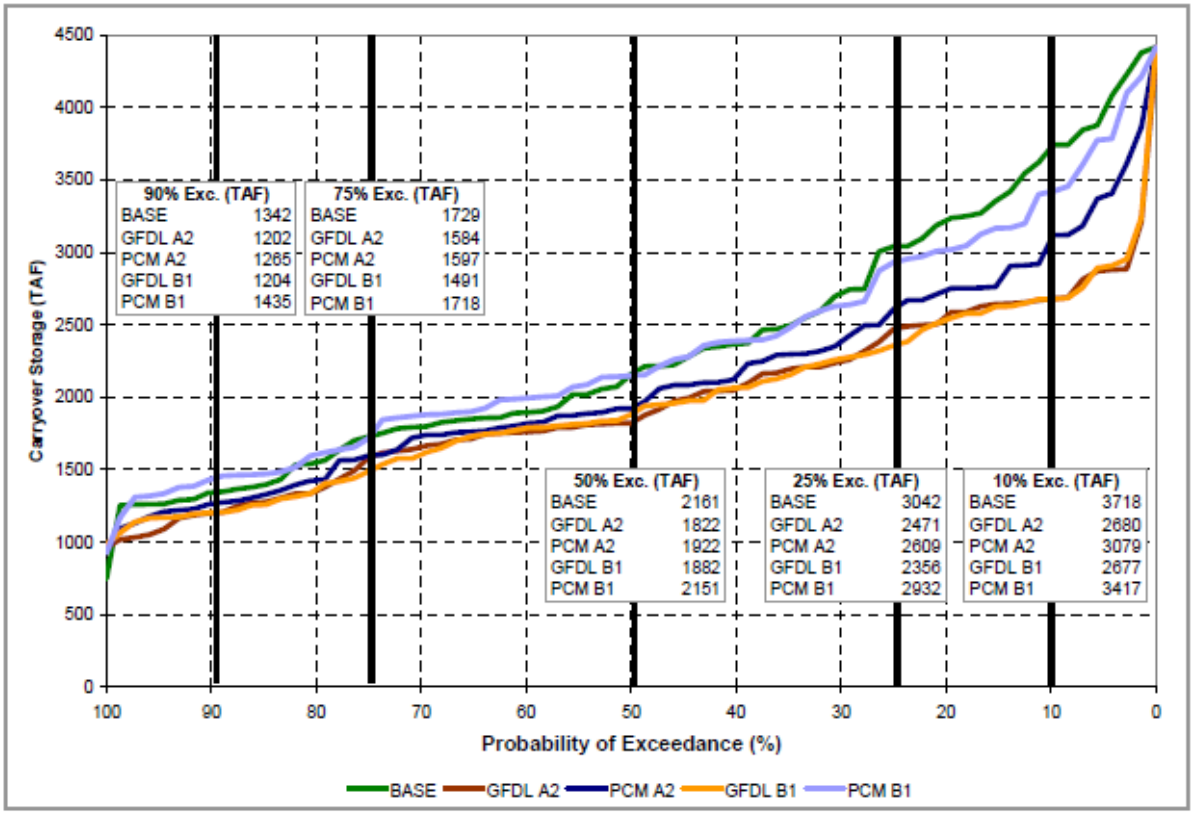


Figure 4.6 Exceedance Probability Plot of SWP Carryover Storage

The modelers noted, "Overall, with the drier climate scenarios, less water was delivered to Table A contractors and more risk with SWP carryover storage was taken to do it." Of particular concern were the number of months of dead storage in upstream reservoirs. These were months when basic demands for water supply for area of origin needs in the Sacramento Valley could not be met. The shortages would also greatly curtail exports.

Table 4.13 Months of Critical Shortages (Storage at Dead Pool)

	Shasta (months)	Oroville (months)	Folsom (months)
BASE	1	0	1
GFDL A2	31	0	28
PCM A2	29	0	22
GFDL B1	21	0	20
PCM B1	0	0	0

It is likely that actual impacts on end of year carryover storage would be much more severe, because of the limitations previously noted in the modeling. In addition, the modeling did not attempt to meet the3406b(2) requirements for Sacramento River flows to protect salmon. The modeling also only used the 2020 level of land development, and only sought to meet 2025 demands for water by Sacramento Valley water users.

The DWR modellers concluded:

> The length of shortages in GFDL A2, PCM A2, and GFDL B1 indicate that the delivery results presented for these scenarios in the next section are not always reliable. Too much risk was taken in the delivery allocation decisions of these three scenarios and not enough storage was carried into the drought periods as a result. In future climate change simulations, modifications to the rule that divides available water into delivery and carryover should be investigated as a means to prevent these shortages. Since CVP allocations are dependent on Shasta and Folsom storage, such modifications will likely alter the resulting delivery capability of the CVP as compared to the results presented in the next section.

It should be noted that maximizing water deliveries is not the same as increasing reliability. State Water Project and Central Valley Project allocation algorithms which attempt to minimize shortages and delivery interruptions could have much better performance in terms of drought deliveries. A 2000 Pier-funded simulation by Aris Georgakakos showed that an allocation algorithm which uses stochastic projections of runoff for nine months into the future to determine water deliveries could greatly improve water reliability, both in reducing shortages and meeting environmental targets.[40]

Georgakakos has done similar modeling of the Nile and Indus river valleys, the river systems in the world with the largest and second largest expanses of irrigated agriculture. The Central Valley is the third largest. Georgakakos' adaptive management system is currently being implemented on the Nile.

[40] Reducing Vulnerability with Probabilistic Hydrological Forecasts and Modern Decision Support Systems, Aris Georgakakos. Presented at the Sixth Annual California Climate Change Research Symposium, 2009.