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Dear Chairman Isenberg and Council Members,

Contra Costa Water District (CCWD) appreciates the opportunity to comment on the Fifth Staff Draft Delta Plan dated August 2, 2011. We appreciate the incorporation of many of our previous comments but some issues remain outstanding.

❖ **WATER QUALITY POLICY**

The Delta Plan does not contain a single water quality policy despite numerous calls in the Delta Reform Act to improve water quality to protect human health and the environment. On p. 138 the Delta Plan states, “[a]llowing salinity to vary in a way that benefits native fish species might further degrade the quality of Delta water for agricultural and municipal uses”. This recommendation begs two important questions that the Delta Plan should address: 1) which species would benefit from increasing salinity beyond current levels; 2) how would impacts of increasing Delta salinity to ‘benefit native species’ be mitigated? At a minimum the Delta Plan should include the following water quality policy to ensure that covered actions are consistent with the Delta Reform Act and existing water quality regulations, and other in-Delta water users are protected:

WQ P1      *Covered actions shall avoid degrading water quality to the extent feasible consistent with existing regulations and anti-degradation policies (State Water Resources Control Board (SWRCB) Resolution No. 68-16, SWRCB Resolution No. 88-63, 40 Code of Federal Regulations section 131.12). Significant water quality degradation associated with a covered action shall be mitigated to a less than significant level.*

The idea of increasing salinity variability has gained traction in state-wide planning circles recently but there is great uncertainty as to what this means and how it would benefit the environment. Most of the Delta, particularly the Western Delta, has become saltier, not fresher, compared to historical and unimpaired conditions as a consequence of changes to the landscape and water management. This is discussed further below. The recent increase in Delta salinity has been shown to be detrimental to several native species including

Delta smelt, threadfin shad and striped bass<sup>1 2</sup>. Until there is peer-reviewed science to support the idea that increased salinity would benefit specific native species, the Delta Plan should omit any recommendations to increase Delta salinity at the expense of other Delta water users and include assurances to protect other in-Delta water users that go beyond what is currently in the Delta Plan. ER P1 states that “[p]rior to the establishment of revised flow objectives criteria identified above, the existing Bay-Delta Water Quality Control Plan objectives shall be used to determine consistency with the Delta Plan”. The Delta Plan should note that changes in water quality can still have significant impacts to other water users, and the advancement of several of the state’s Delta policies, even if salinity levels are below the standards specified in the Water Quality Control Plan. Increases in salinity equate to revenue and resource losses for Delta water users and those losses should be mitigated.

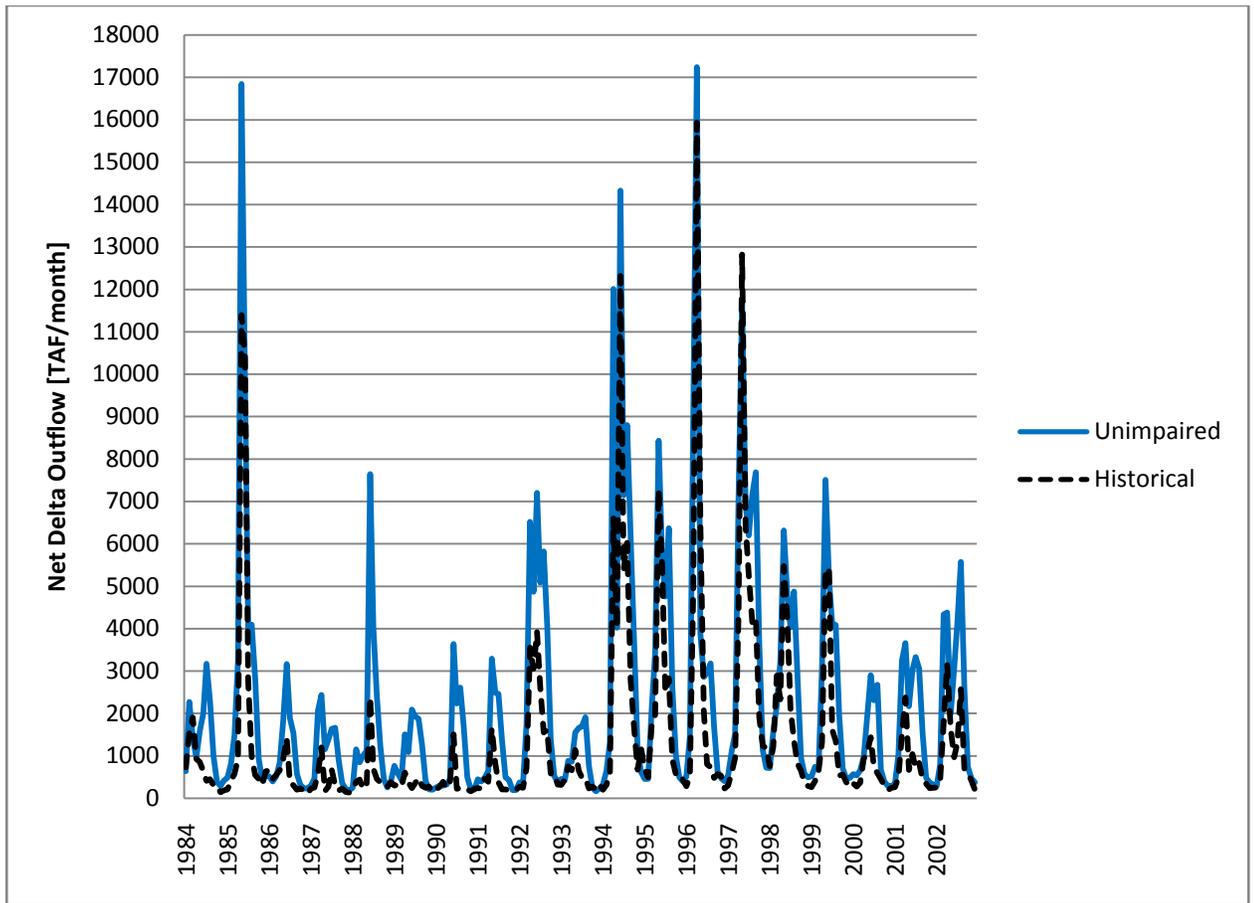
❖ **RESTORING FLOWS AND SALINITY IN THE DELTA**

There is persistent confusion about current flow and salinity conditions in the Delta compared to historical conditions and unimpaired conditions. Since 1985, net Delta outflow has been less than unimpaired outflow almost every month, including the summer and fall months. Restoring flows to more closely mimic the natural hydrograph will mean more flow and consequently lower salinity in the Western Delta and Suisun Marsh. The problem statement in Chapter 4 page 112 reads, “[n]ative aquatic species in the Delta are adapted to flow regimes characteristic of California’s natural climate and hydrology. This includes higher flows in the winter and spring and lower flows in the summer and early fall.” This sentence last should be modified as there is no point of reference given to understand what this statement means. Does this mean flows need to be higher in the spring than they have been historically or just higher compared to flows during the summer and fall (the latter is already met)? Figures within the text box on page 111 show long term averages but the pattern has been different for the last 25 years. Figure 1 below shows a monthly timeseries of historic net Delta outflow compared to the unimpaired estimate since 1985. It is evident that managing flows to more closely resemble the unimpaired hydrograph would require increased Delta outflow every month. It is inconsistent to suggest that managing flows to more closely resemble the ‘natural’ hydrograph would lead to reducing flows in the summer and fall from current levels.

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<sup>1</sup> Nobriga, M. L., T. Sommer, F. Feyrer, and K. Fleming. 2008. Long-term Trends in Summertime Habitat Suitability for Delta Smelt (*Hypomesus transpacificus*). San Francisco Estuary and Watershed Science 6(1).

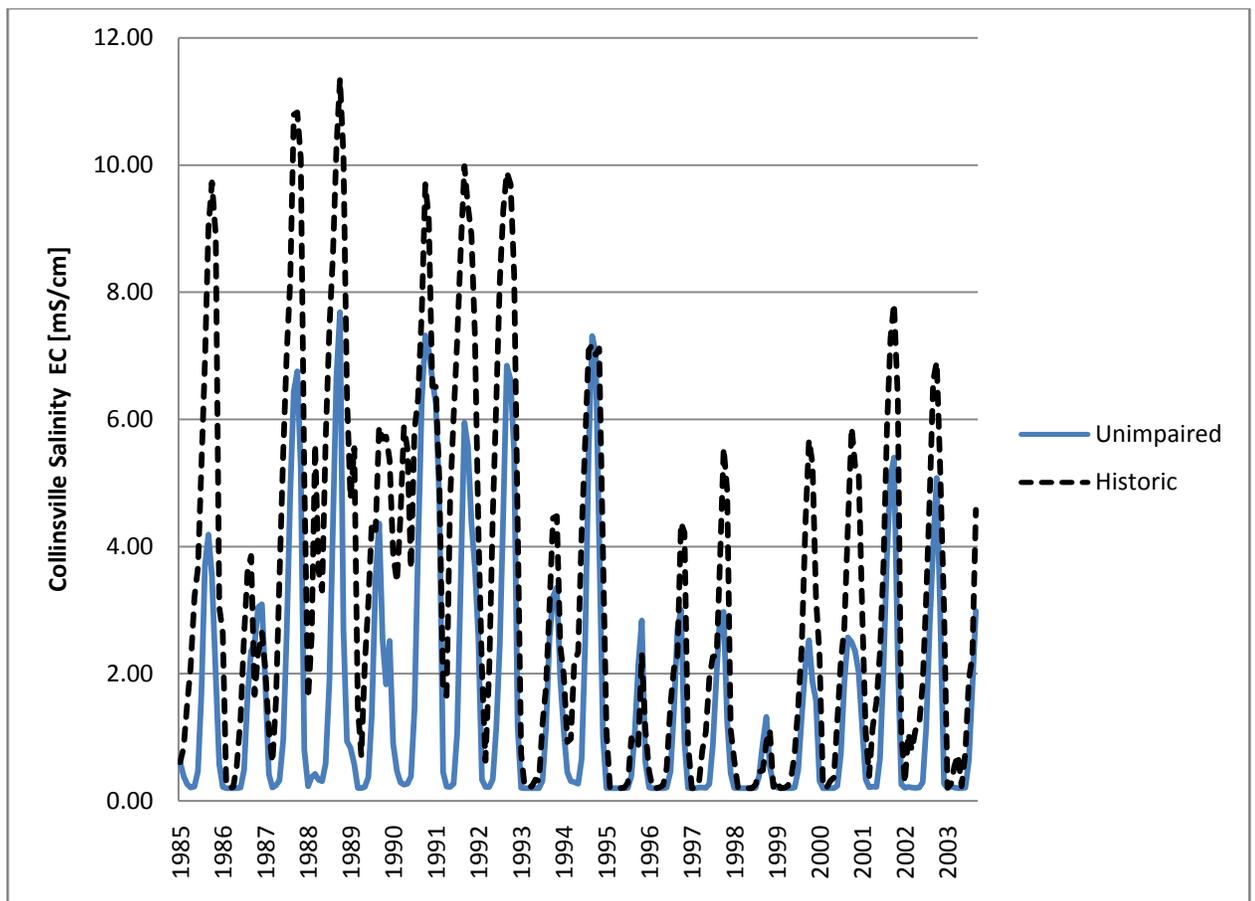
<sup>2</sup> Freyer, F., Nobriga, M., Sommer, T., 2007. Multidecadal trends for three declining fish species: habitat patterns and mechanisms in the San Francisco Estuary, California, USA. *Canadian Journal of Fisheries and Aquatic Sciences*, 2007, 64:(4) 723-734.



**Figure 1 Comparison of historic and unimpaired net Delta outflows from 1985 through 2003. Unimpaired flows are available through 2003.**

As correctly noted in the Delta Plan on page 136, “the primary driver of salinity variability in the western Delta and Suisun Marsh continues to be the amount of precipitation in the watershed.” If flows through the Delta were managed to more closely resemble the unimpaired hydrograph, salinity in the Western Delta and Suisun Marsh would be less year-round than it has been for the past 25 years. This is in contrast to one of the Delta Plan’s progress measure; on page 150 it states “[p]rogress toward increasing interannual variability of salinity in Suisun Bay and Suisun Marsh. In future years, salinity will trend higher during periods of low river flow and trend lower during periods of high river flow”. Figure 2 below demonstrates that salinity in the Western Delta is almost always higher than it would be under unimpaired flow conditions. Because salinity is inversely related to flow, it is high during periods of low flow and low during periods of high flow. Does the Delta Plan salinity goal mean that the seasonal pattern will remain so that salinities are low during the spring and winter compared to salinity during summer and fall? Or does it mean salinity in Suisun Marsh should increase during the fall relative to historic conditions? Does it mean that

operations of the Suisun salinity control gate will change or that salinity in Suisun Marsh will change consistent with the new flow standards established by the State Board? It is evident from Figure 2 that salinities have been higher nearly every month compared to what they would be under the unimpaired flow conditions so the performance measure specifying that salinities should increase is not consistent with the goals of restoring a more natural flow regime. Please rewrite the goal on page 150 to say “[p]rogress toward restoring salinity variability in Suisun Bay and Suisun Marsh consistent with the unimpaired hydrograph”.



**Figure 2 Unimpaired and Historical Salinity at Collinsville. Unimpaired Salinity is Calculated using the G-model.**

CCWD appreciates the removal of language contained in fourth draft Delta Plan in ER R7 stating varying salinity could reduce impacts of nonnative invasive species while providing overall ecosystem benefits. However, Appendix F of the current draft continues to promote the idea “that periodic salinity intrusion into the Delta may help to reduce the abundance and/or distribution of certain harmful invasive species, and give

*native species a competitive advantage*". While there is evidence that shows *Egeria densa* is sensitive to salinity, there is no evidence that increasing Delta salinity to the level that would be required to control *Egeria densa* would be beneficial to the ecosystem and native species. CCWD strongly discourages promoting increased salinity as a restoration measure without scientific justification because it would be detrimental to native species, drinking water, agriculture, and industry. A detailed discussion of the topic is presented in Attachment 2. CCWD has provided similar comments to the Department of Fish and Game regarding the Ecosystem Restoration Program Conservation Strategy for the Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions (ERP Strategy). There needs to be scientific justification for increasing salinity as an ecosystem restoration measure and the impacts other Delta water users would suffer due to increased salinity must be mitigated.

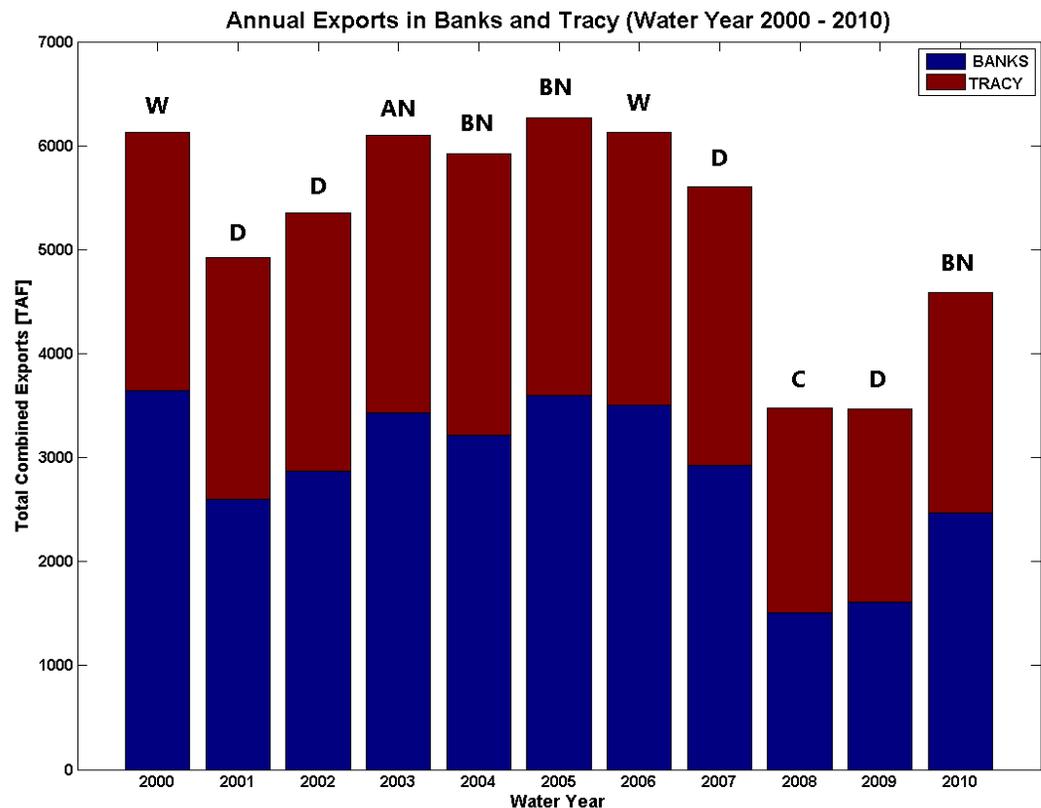
❖ **BDCP**

On page 62 the Delta Plan states, "[t]he Council has determined that any consideration or use of BDCP-related studies or concepts in the Delta Plan will not have a pre-decisional effect on any possible future appeal of a DFG determination related to BDCP". However, on page 69 the Delta Plan states that the BDCP is one of the six key strategies that "[m]ust be implemented to achieve the coequal goal of a more reliable water supply for California". This statement suggests that the Council has already determined that the BDCP will meet the criteria necessary for incorporation into the Delta and that it is consistent with the Delta Reform Act. There are substantial concerns among many stakeholders that the BDCP may not be consistent with all of the Delta policies contained in Chapter 2 of SBX 7-1 including reducing reliance on the Delta, protecting and enhancing the Delta as a place, and improving water quality to protect human health and the environment. The Delta Plan should defer judgment on incorporating the BDCP into the Delta Plan and recommendations to implement the BDCP until the EIR and effects analysis have been publicly released. The Delta Plan should state that "improvements to conveyance and alteration of state-wide operations must be implemented to achieve the coequal goal of a more reliable water supply for California" so there is no pre-decisional language regarding the BDCP in the Delta Plan.

❖ **Performance Measures**

Although CCWD has urged the Council to include quantifiable objectives in every draft of the Delta Plan, the performance measures that have been included in the fifth draft can be improved by clarifying whether they are part of a Delta Plan policy and therefore a regulation, who is responsible for achieving the performance measure, and how performance should be quantified. For example, on page 98 one of the driver performance measures is listed as "[p]rogress in each hydrologic region in reducing actual or projected reliance on Delta water supplies (reported in 5-year increments from 2000)". Who is reporting to

whom? Does '5-year increments' mean a 5 year average or just values from the 5<sup>th</sup> year? Water year 2000 was wet and exports from the Delta were near the record high. It is clear from Figure 3 below that exports have been down nearly every year (the exception is 2005) since 2000. What does this performance measure mean for the future of the Delta? Does it mean a covered action is in compliance with the Delta Plan if total exports remain below 6 MAF/yr regardless of water year type?



**Figure 3 Total exports from water year 2000 through 2010.**

It is also not clear which performance measures will become regulations and which ones are part of recommendations. Are there any repercussions for falling short of the goals outlined in the Delta Plan? Who is responsible for reviewing and compiling the information to assess whether the goals or progress measures are achieved on a state-wide scale? The performance measures should be clarified to indicate whether they are part of a Delta Plan policy and therefore a regulation, who is responsible for achieving the performance measure, and how performance should be quantified.

❖ **USE OF BEST AVAILABLE SCIENCE**

The independent science board has told the Council that peer-reviewed journal articles are the best available science and should be used whenever possible. The original peer-reviewed articles should be cited whenever possible. For example, throughout the Delta Plan, “55 inches of sea level rise by 2100” is reported as a consequence of climate change (p. 25, 36, 162), with citations to government reports rather than the scientific article where this number originated. Rhamstorff (2007)<sup>3</sup> predicted that sea level could rise between 19 and 55 inches by 2100 relative to 1990 conditions. While this paper was published in a well-respected journal, there are many other legitimate peer-reviewed articles published, including more recent articles, available to accompany this one estimate. There is little scientific dispute that sea level is rising on a global scale but there is considerable variation in predictions of the rate and extent of sea level rise, particularly at the local scale. The Delta Reform Act requires the BDCP to evaluate sea level rise up to 55 inches (Section 85302 (2) (C)) but the Delta Plan should acknowledge the scientific uncertainty of that estimate and allow for updates as the science evolves and new estimates are established. Typically the scientific literature publishes a range of expected future sea levels that are generated by multiple model runs. The Delta Plan should strive to use the best available science and acknowledge a range of possible future sea level conditions. The Delta Plan should clarify that 55 inches of sea level rise by 2100 is the on the higher end of estimates available and state-wide planning efforts based on that assumption are conservative.

Our recommendations addressing these important issues and other outstanding issues are attached. CCWD looks forward to providing further input to the Delta Plan as the process continues. Please call me at (925) 688-8018 or Maureen Martin at (925) 688-8323 if you have any questions or concerns.

Sincerely,



Marguerite Naillon  
Special Projects Manager

MN/MM:wec

Attachments

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<sup>3</sup> Rhamstorff, S., 2007. A semi-empirical approach to projecting future sea-level rise. *Science* 315 (5810), pp: 368-370.

# **Attachment 1**

## **Detailed Comments on Fifth Staff Draft of Delta Plan**

### **Chapter 1**

p. 23 line 8 – There are terrestrial endangered species in the Delta in addition to fish. Please include all endangered species.

p. 23 line 9 – Should read “reduced Delta outflow”, not inflow.

p. 23 line 14 – The list should include habitat loss.

p. 25 Table 1-2 – The references should be peer-reviewed articles whenever possible. For example, the sea level rise estimates reference California Ocean Protection Council report but that is not the original source of those numbers. Rhamstorff 2007 is typically cited for the 55 inches by 2100 estimate. Update all references throughout the document to use peer-reviewed articles whenever possible.

### **Chapter 2**

p. 36 - As noted above, although the text box about planning for sea level rise does say that 55 inches by 2100 is the upper end of estimates, the range from the original literature should be used and cited.

p. 42 lines 19 through 44 – The Delta Stewardship Council should do more to ensure that their staff is responsible for assessing progress towards achieving the coequal goals and communicating their findings. Each agency charged with implementing an individual action to advance the policy goals of the Delta Plan cannot be responsible for the aggregation of data needed to assess the Delta as a whole, while the Delta Stewardship Council, and the Independent Science Board staff, have the capability and authority to analyze, synthesize, evaluate and communicate the relevant data. Their role should be clarified in the Delta Plan.

p. 48 - Much of the monitoring that occurs in the Delta is required by permits. The Delta Science Plan should address the best way to utilize and integrate the required biological and water quality data that is reported to permitting agencies. It should also address the best way to insure that monitoring requirements that are included in permits will be designed in such a way as to contribute to the greater knowledge of the Delta and protected species.

### **Chapter 3**

p. 62 lines 20 through 23 - *“After BDCP’s incorporation, an agency proposing a covered action that is included in the BDCP or qualifies for credit under the BDCP must file a consistency certification indicating only that the covered action is consistent with the BDCP. The Council retains the authority upon appeal to find the covered action inconsistent with BDCP and therefore the Delta Plan.”* This section is pre-decisional with respect to the BDCP. It should be modified to read, “If the BDCP is incorporated into the Delta Plan then, after that incorporation, an agency proposing a covered action ...”

## Chapter 4

p. 68 text box - Water quality objectives do not explicitly limit the amount of exports, unlike many of the environmental regulations to protect fish; since the Delta Accord, fishery protection measures (minimum outflows or X2 standards) have largely controlled operations, not salinity standards. Please change text box bullet about water quality to “Legal requirements to maintain water quality standards to protect human health and agriculture may limit the amount of water available for other purposes.”

p. 69 line 27 - The BDCP bullet is pre-decisional and should be revised as described above.

p. 82 lines 4 through 8, WR P1 is poorly worded and needs to be clarified. Suggested language: A covered action to export water from, transfer water through, or use water in the Delta is inconsistent with the Delta Plan if the covered action negatively impacts one or more of the coequal goals and the proponent of the covered action has failed to comply with one or more of the following:

p. 83 lines 5 through 6 - “*shall document actual or projected reduction in reliance on Delta exports*”. A baseline for comparison must be established. The Delta Plan needs to clarify reducing relative to what conditions. The 20% by 2020 specifies a baseline of 10 consecutive years between 1980 and 2010 (modifications of that can be made under certain circumstances). This is a key issue that the Delta Plan will need to address when evaluating the BDCP. The baseline should not be arbitrary and should take into consideration hydrologic factors.

p. 84 lines 1 through 5 - This item should be removed from the plan since local districts should retain control over how water rates are set. Agencies may be required to meet conservation goals, but should retain the ability to choose implementation methods that work best for local conditions.

p. 84 lines 11 through 15 - “*...should develop and include in the future California Water Plan updates the information needed to track the water supply reliability performance measures identified in the Delta Plan and assess improvements in regional self-reliance, reduced reliance on the Delta, and statewide water supply reliability.*” This recommendation is vague and not easily quantified. It is not clear if the CA Water Plan already includes the information required to assess water supply reliability. If they need to start tracking new information, how long will it take to implement any new data collection required, a baseline for assessing improvements? Will the CA water plan report on water supply reliability or just in the metrics outlined in the Delta Plan? Will a definition of water supply reliability be provided and a quantitative assessment made?

p. 98 – The driver performance measures are unclear. Who is reporting to whom? Is this required? Which ones are part of recommendations vs policies? Choosing one date, 2000, is not sufficient to remove the hydrology and is an arbitrary baseline. Water use and demand are still ruled largely by hydrology. Water year 2000 was a wet year and exports exceeded 6 MAF. South of Delta CVP Agricultural allocations were 65% of contract amount; urban was 90%. Are

south of Delta users supposed to conserve more because their allocations were less than those north of Delta that particular year? This snapshot of a wet year baseline could be a disincentive to conservation in areas that always get their full amount of water.

## Chapter 5

p. 108 lines 36 through 39 – *“The once pronounced seasonal and interannual flow variability has given way to more stable and artificially regulated conditions, and the formerly highly complex landscape of the past has been replaced by a much more uniform landscape resembling a simplified grid of straightened river channels, fixed in space and time, used for north-south and east-west water conveyance and shipping.”* Flow will continue to be artificially regulated even if the State Board adopts new flow standards.

p. 112 lines 34 through 37 - It should be noted that since 1985 measured flows are less than unimpaired flows in the fall. Modify this sentence - *“This includes higher flows in the winter and spring and lower flows in the summer and early fall.”* The sentence gives the impression that flows are currently lower in the spring than the fall, which is not the case. Modified language should specify higher and lower than what and when. It is vital that the Delta Plan contain accurate information about the existing conditions.

p. 123 text box - Although this list of ERP actions is from another document, it would be beneficial in the Delta Plan to include information such as who is responsible for these actions; is there a timeline; are these priorities for state funding?

## Chapter 6

p. 133 line 20 – *“salinity patterns should be consistent with a more naturally variable hydrograph with high quality river inflows.”* This sentence should be revised as noted below.

p. 138 lines 37 through 38 – *“Allowing salinity to vary in a way that benefits native fish species might further degrade the quality of Delta water for agricultural and municipal uses.”* Which species would benefit from increasing salinity beyond what it is now? All evidence is that native species are suffering because of a lack of flow (and increased salinity). What evidence is there that they will improve if salinity increases further (citations are needed here that quantify the levels sought). And more importantly, if that does happen, there should be mitigation to offset those impacts to drinking water suppliers and agricultural users.

p. 148 line 20 - The Delta Plan should include a description of why there are no water quality policies despite that one of their policy goals laid out in legislation is to improve water quality.

p. 150 lines 15 through 17 – *“Progress toward increasing interannual variability of salinity in Suisun Bay and Suisun Marsh. In future years, salinity will trend higher during periods of low river flow and trend lower during periods of high river flow.”* This should be replaced with “progress towards salinity variability will be consistent with establishing a more natural hydrograph”.

## **Chapter 7**

p. 162 - See comments above about citing original sources of data, neither of those citations develops the 55 inches estimate of sea level rise by 2100.

p. 182 RR R10 - Will the new flood control agency take local money and give it to state and federal agencies to develop plans and perform inspections? Who is responsible for improving the levees or repair after a failure? Who is responsible for paying for levee improvements?

## **Chapter 9**

p. 210 lines 16 through 33, FP R1 –To the extent public and private agencies are required to protect their own assets, then they should do so with local control. The idea of implementing a fee and passing it over to another agency for allocation creates unnecessary administrative costs, and takes the decisions for expending funds away from the local agencies who are best suited to make decision on how best to protect their assets.

p. 210 lines 39 through 41, FP R3 – This proposal appears to circumvent the “beneficiary” and “stressor” pays guiding principles, in that it earmarks Proposition 1E funds for a specific purpose “acquisition of land or easements for the propose San Joaquin/South Delta Flood Plain”. No projects/regions should get special designation at this point in the process.

p. 211 lines 1 through 6, FP R4 – This proposal is devoid of specifics as to how the funding would be utilized, or what degree of oversight and control there would be over the funds. This proposal should be eliminated unless a clear scope work/business purpose and accountability structure can be demonstrated.

p. 211 lines 19 through 32, FP R6 – CCWD is not opposed to user fees as long as they have a direct purpose with a direct nexus to the user, they are developed and applied equitably across all beneficiary and stressor groups, and as long as they are allocated and distributed at the local level. There is no basis for funding operations of the Council, etc. on an advance basis for ten years, when it is not clear yet what their ongoing mission will be, or what exactly the benefits will be that are being funded.

p. 212 lines 10 through 18, FP R12 – It is not appropriate to establish a Public Goods Charge for Water to fund obligations currently funded by the State General Fund. This approach would circumvent the guiding principles of “beneficiary” and “stressor” pays since that analysis has not been completed, and take an activity that has broad application (ecosystem costs) and fund it from a specific group (water utilities). It should remain funded from the General Fund unless and until the “beneficiary” and “stressor” pays analysis is completed and determines another funding approach is more appropriate.

## Attachment 2

### Ecosystem Restoration and Increased Delta Salinity

The Ecosystem Restoration Program Conservation Strategy for the Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions (ERP Strategy) and by reference the Delta Plan promote the idea “*that periodic salinity intrusion into the Delta may help to reduce the abundance and/or distribution of certain harmful invasive species, and give native species a competitive advantage.*” This language is typically in connection with controlling the invasive waterweed *Egeria densa*. While there is evidence that shows *Egeria densa* is sensitive to salinity, there is no evidence that increasing Delta salinity to the level that would be required to control *Egeria densa* would be beneficial to the ecosystem. CCWD strongly discourages promoting increased salinity as a restoration measure without scientific justification for several key reasons:

- a. **Detrimental to Native Species** - Peer-reviewed articles<sup>4 5</sup> indicate that increased salinity has been detrimental to native fish populations, especially Delta smelt. Many of the native fish species the Delta Plan aims to restore favor salinities around 2 parts per thousand (ppt). Longfin smelt, Delta smelt, bay shrimp, and threadfin shad abundance continue to have a strong relationship with X2, or the 2 ppt isohaline<sup>3 4 6</sup>. Experimental studies on the effects of salinity on *Egeria densa* revealed that both root formation and growth decline with increasing salinity<sup>7</sup>. Hauenstein and Ramirez (1986)<sup>8</sup> found no growth of roots or stems at salinity greater than 10 ppt. The laboratory studies found no net growth of *Egeria densa* after being exposed to salinities equal to or greater than 10 ppt for two weeks. To effectively ‘control’ *Egeria densa* via salinity, salinity in the Delta would need to be at least 10 ppt at locations with *Egeria* for an extended period of time. Before even proposing such a level of salinity, a number of questions must be answered. Which native species will benefit from salinities increasing in the upper estuary from less than 1 ppt to 10 ppt? What areas would have salinities up to 10 ppt and where would that put the 2 ppt (X2) isohaline? Since delta smelt are almost entirely found in salinities less than 10 ppt, where will they be located under these circumstances? What would be the consequences for overbite clam populations (a species that thrives on saline water, is repressed by fresh water and is likely responsible for a significant loss of primary food in the Delta)? Pelagic organism populations significantly increased from 1995 to 2000 in the Delta, when conditions were fresher than the prior and subsequent years, during which their populations were low; what evidence is there that saline

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<sup>4</sup> Nobriga, M. L., T. Sommer, F. Feyrer, and K. Fleming. 2008. Long-term Trends in Summertime Habitat Suitability for Delta Smelt (*Hypomesus transpacificus*). San Francisco Estuary and Watershed Science 6(1).

<sup>5</sup> Freyer, F., Nobriga, M., Sommer, T., 2007. Multidecadal trends for three declining fish species: habitat patterns and mechanisms in the San Francisco Estuary, California, USA. *Canadian Journal of Fisheries and Aquatic Sciences*, 2007, 64:(4) 723-734.

<sup>6</sup> Kimmerer, W.J., 2004. Open Water Processes of the San Francisco Estuary: From Physical Forcing to Biological Responses. San Francisco Estuary and Watershed Science 2(1).

<sup>7</sup> Obrebski, S., and R. Booth. 2003. Experimental Studies of the Effects of Temperature, Salinity and Light Intensity on Growth of *Egeria densa*. Report to the California Department of Boating and Waterways, December 2003.

<sup>8</sup> Hauenstein and Ramirez, 1986. The influence of salinity on the distribution of *Egeria densa* in the Valdivia river basin, Chile. *Arch. Hydrobiol.* 107:511-519.

conditions, rather than fresh conditions, are desirable for pelagic organisms in the Delta? The Delta Plan should acknowledge that significantly increasing salinity would likely come at a severe cost to Delta smelt, threadfin shad, longfin smelt, and bay shrimp populations by severely constricting the habitat and food available for these species.

- b. **Physically Infeasible** – Even if controlling *Egeria densa* with salinities above 10 ppt is desirable and more important than maintaining populations of the above-mentioned species, it would be extremely difficult to achieve those salinities at locations in the Delta where *Egeria densa* is most problematic. For example, Franks Tract has long been plagued with dense growth of *Egeria densa* and the Department of Boating and Waterways is involved in a multi-year program to eradicate the waterweed with herbicide. Long-term average salinity in Franks Tract is roughly 500  $\mu\text{s/cm}$ , approximately 0.34 ppt, with an average seasonal high between 730  $\mu\text{s/cm}$  and 1200  $\mu\text{s/cm}$ , approximately 0.49 – 0.81 ppt, occurring September through December (note that this is significantly higher than salinity was in this area prior to water development activities, as shown in the attachment to this letter). During the last critically dry year in 2008, when net Delta outflow was less than 3,700 cfs on average from July through the end of October, X2 was approximately 89 km, and salinity reached a maximum of 1500  $\mu\text{s/cm}$  near Franks Tract, approximately 1.0 ppt, for less than a day. To achieve the recommended levels of salinity, Delta flows would need to be far less than they were during the most severe drought conditions on record in 1931. In 1931, salinity peaked in September around 12 ppt near Franks Tract<sup>9</sup> at high tide and for a single day. During the peak salinity intrusion of 1931 drought, X2 was located between Walnut Grove and Hood (again at high tide for a single day). If *Egeria densa* had been present in 1931, salinity may have caused necrosis in some of the plants near Franks Tract had it persisted for a longer period of time, but it is unlikely to have had a significant effect for the time that it actually lasted (a few hours); the estimated Delta outflow that caused this level was *negative* 3,000 cfs (i.e. a net reverse flow from the Golden Gate inward) for three months. Achieving an average salinity of 10 ppt in Franks Tract for a month or more to control *Egeria* would require outflows less than -3,000 cfs for longer periods. Unless the Delta Plan can provide a robust plan detailing desired levels of salinity, how those levels would be achieved and the expected ecological consequences for a broad range of species in the Delta, the suggestion to increase salinity as a restoration measure should be removed.
- c. **Detrimental to Drinking Water and Agriculture** - Maintaining salinities within the Delta high enough to control *Egeria densa* would not only severely limit habitat and food availability for native species, it would also severely limit water available for drinking water or agriculture. Based on the State Water Resources Control Board Water Quality

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<sup>9</sup>Department of Public Works. 1931. Variation and Control of Salinity in Sacramento-San Joaquin Delta and Upper San Francisco Bay. Bulletin No. 27. State of California, Department of Public Works, Division of Engineering and Irrigation. See <http://www.archive.org/details/variationcontrol27calirich>

Objectives protecting agriculture in the south Delta, salinities should be below 1,000  $\mu\text{s}/\text{cm}$ , or 0.67 ppt, to avoid salt damage to crops. During 1931, when salinity in Franks Tract exceeded 10 ppt at high tide for a single day, salinity levels exceeded the agricultural standards as far north as Walnut Grove along the Sacramento River and upstream of Stockton along the San Joaquin River, so that the entire legal Delta was too salty for farming. U.S. EPA secondary standards for drinking water quality limit chloride to 250 mg/L, or 0.25 ppt. During the 1931 drought, water quality near Clifton Court exceeded this drinking water quality standard from July through November. Water quality above Hood along the Sacramento was sufficient to meet this drinking water standard during the peak salinity intrusion in 1931; however, the peak salinity intrusion was for a single day at high tide. In order to control *Egeria*, the mean salinity would need to reach 10 ppt consistently for an extended period; under such circumstances, and especially if a large diversion at Hood were to be used to lower the outflow to negative levels, salinity would intrude well north of Hood, rendering use of an intake there impossible. If low outflows were to be achieved by reducing reservoir releases, then flows in the Sacramento and San Joaquin Rivers would be so low that navigation, in-basin diversions and migratory species such as winter and spring run salmon would all be threatened.