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8  
9 **BEFORE THE**  
10 **CALIFORNIA STATE WATER RESOURCES CONTROL BOARD**

11 HEARING IN THE MATTER OF THE  
CALIFORNIA DEPARTMENT OF WATER  
12 RESOURCES AND UNITED STATES  
BUREAU OF RECLAMATION REQUEST  
13 FOR A CHANGE IN POINT OF DIVERSION  
FOR CALIFORNIA WATER FIX  
14

**TESTIMONY OF DEIRDRE DES  
JARDINS**

15 I, Deirdre Des Jardins, do hereby declare:  
16

17 **I. SUMMARY**

18 My name is Deirdre Des Jardins. I am the principal at California Water Research. I have  
19 previously testified in this matter. A summary of my expertise is included in Exhibit PCFFA-81 (typos  
20 corrected as Exhibit PCFFA-81-errata) and a true and correct copy of my statement of qualifications  
21 has previously been submitted as Exhibit PCFFA-75. This testimony addresses the proposal by the  
22 California Department of Water Resources and the U.S. Bureau of Reclamation that the WaterFix  
23 Change Petition be approved under the permit terms in Decision 1641 which implement the 2006 Bay-  
24 Delta Water Quality Control Plan. I first explain why further analysis needs to be done of the impacts  
25 of exempting the 2006 Bay-Delta Water Quality Control Plan export to inflow calculation and resulting  
26 export limit, and why generally there needs to be an update to the 2006 Bay-Delta Water Quality  
27 Control Plan EIR which explicitly considers the effects of the North Delta diversions.  
28

1 Second, I examine the history of compliance with the existing Decision 1641 permit term requiring  
2 that the California Department of Water Resources and the U.S. Bureau of Reclamation submit an  
3 operations plan for the protection of fisheries prior to use of the Joint Point of Diversion, and conclude  
4 that the projects never fully complied with this permit term.

5 Third, I examine the predictions in the Decision 1641 EIR of the effects of the Joint Point of  
6 Diversion on the survival of salmon migrating through the Delta, and compare them with actual  
7 survival. I conclude that survival is significantly less than predicted.

8 Fourth, I look at releases from Oroville reservoir before and after the 1995 Bay-Delta Water Quality  
9 Control Plan was enacted, and find a dramatic shift of releases to the summer. I conclude the shifts  
10 may be happening to avoid the “Port Chicago trigger” which requires increased outflows for estuarine  
11 habitat. I conclude that upstream bypass requirements for the State Water Project (SWP) and Central  
12 Valley Project (CVP) may be needed, and would be consistent with “inflow based outflow”  
13 recommendations in the Phase 2 Water Quality Control Plan update.

## 14 **II. EXPORT TO INFLOW RATIO**

15 Most of the operating scenarios for the proposed WaterFix project assume that the North Delta  
16 Diversions are exempted from the 2006 Bay-Delta Water Quality Control Plan export to inflow  
17 calculation and resulting export limits, also referred to as the D-1641 export to inflow ratio in reference  
18 to Decision 1641. The export to inflow ratio (E/I ratio) generally provides that the SWP and CVP can  
19 only export 35% of Delta inflow from February to June, and 65% from July to September.<sup>1</sup>

20 The E/I ratio limit on exports was included in the 1995 and 2006 Bay-Delta Water Quality  
21 Control Plans to limit the amount of fresh water that can be diverted by the SWP and CVP export  
22 facilities. The State Water Resources Control Board staff noted in the 2009 Staff Report on the  
23 Periodic Review of the 2006 Water Quality Control Plan (Exhibit SWRCB-26) that these limits are  
24 broadly protective of fish and wildlife beneficial uses:

25 In addition to reducing entrainment, the existing export limits are intended to provide  
26 general protection of the Delta ecosystem and a variety of fish and wildlife beneficial  
uses by limiting the portion of freshwater that may be diverted by the SWP and CVP

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27 <sup>1</sup> February exports may be increased to 45% in February if the 8 River Index is below 1.5 million  
28 acre-feet.

1 export facilities. Additional ecosystem benefits beyond reducing entrainment may  
2 include reduction in losses of nutrients and other materials important for the base of the  
3 food web, food organisms, habitat suitability, fishery management, and more natural flow  
4 and salinity patterns. (p. 21.)

5 Exempting the North Delta diversions from the existing export limits would thus be a major  
6 change to the 2006 Bay-Delta Water Quality Control Plan. The Bureau of Reclamations 2004  
7 Operations Criteria and Plan (OCAP) Biological Assessment (Exhibit PCFFA-162), stated,

8 The biological rationale of the E/I ratio requirement is to require the CVP-SWP export  
9 operations to avoid exporting the leading edge of increased inflows produced by rain  
10 events into the Delta environment. Prior to D-1641 E/I ratio standards, the CVP-SWP  
11 export operations often increased exports prior to the leading edge of increased Delta  
12 inflow based on anticipated inflow quantity and duration to the Delta and estimated  
13 incremental effects to the Delta water quality environment. (p. 2-14)

14 Removing the D-1641 E/I ratio requirement could thus potentially allow the North Delta  
15 diversions to export up to the first 9,000 cfs of a storm pulse. This is contradictory to the conclusions  
16 of the Water Board's 2010 Delta flow criteria report (Exhibit SWRCB-25) that restoring some of the  
17 natural hydrology in the Delta is necessary. For this reason, I believe that the D-1641 export to inflow  
18 limit should not be eliminated. To achieve the Water Board's goals, it may be necessary to reduce the  
19 percentage of exports in the spring.

20 If the Water Board does consider reducing or eliminating the E/I ratio, the Water Board should  
21 analyze effects of changing the regulations with and without any potential bypass criteria to protect  
22 endangered salmon. This should be done for two reasons. One, the criteria are not yet defined. The  
23 federal Biological Opinions indicate that all operational criteria in the Preferred Alternative are subject  
24 to change. Reclamation's Draft Biological Assessment states in part:

25 Presentation of the PA in this biological assessment does not amount to a project  
26 approval by DWR or Reclamation. DWR must complete CEQA review, as well as  
27 compliance with several other federal and state environmental laws and regulations,  
28 before it can construct, operate or use any new facilities associated with the PA.  
Reclamation must complete NEPA review prior to implementing any federal actions  
associated with the PA. In conducting its CEQA review, and completing other  
environmental compliance processes, DWR may be required to modify, add, or remove  
elements of the PA consistent with the requirement to adopt mitigation measures and/or  
alternative in order to address specific environmental impacts. Consistent with the  
directives of CEQA, DWR may determine, at the completion of the CEQA process, to  
deny approval of the PA or specific elements of the PA based on any significant  
environmental impact that cannot be mitigated. Prior to the conclusion of formal  
consultation, the BA will be supplemented if substantive changes are made to the PA  
relevant to the analysis of listed species or designated critical habitat.

1 (Exhibit SWRCB-104, p. 3-8, underlining added.) The National Marine Fisheries Service Biological  
2 Opinion also states in part:

3 [...] Some of the criteria identified in the PA may have substantial water supply  
4 effects while providing limited ability to minimize effects to species. As a result,  
5 operational criteria identified in the CWF PA may be modified, relaxed or removed and  
6 may no longer apply to an operation with CWF, while other operational criteria, not  
7 currently identified in this CWF consultation or those already identified may be included  
8 or modified. Therefore, the operational criteria that are described in the CWF BA and in  
9 this Opinion are likely to change between now and when CWF becomes operational.

8 (Exhibit SWRCB-106, p. 16, underlining added). The U.S. Fish and Wildlife Service Biological  
9 Opinion also states in part:

10 Agency decisions related to identifying the final CWF operational criteria will be made in  
11 a subsequent consultation, and Reclamation and DWR have committed to analyze and  
12 further address species effects from CWF operations at that time.

12 (Exhibit SWRCB-105, p. 12-13.)

13 Second, the Sacramento River Chinook winter and spring run Evolutionarily Significant Units  
14 (ESUs) are highly endangered, and I believe the Water Board should not assume that these ESUs will  
15 survive for the entire period of early operations of the WaterFix project, or even for the period that the  
16 Phase 2 update to the Bay-Delta Water Quality Control Plan is in effect. Peter Moyle et. al. rated both  
17 ESUs as of critical concern in the report, *State of the Salmonids: Status of California's Emblematic*  
18 *Fishes, 2017*<sup>2</sup> (Exhibit PCFFA-163) and gave the Sacramento River Chinook winter run (p. 99) and  
19 spring run (p. 74) ESUs a high likelihood of extinction. The Board should act immediately to ensure  
20 that adequate bypass flows and cold water pool is available to protect these vulnerable Sacramento  
21 River Chinook ESUs, but should also not base long-term protections for all Sacramento Chinook ESUs,  
22 other species, and estuarine habitat on assumptions that the winter and spring run ESUs will continue.

23 If the Board does decide to consider changing the E/I ratio limit, the Board needs to do an  
24 analysis of when the E/I ratio limit and other D-1641 permit terms are controlling, with and without the  
25 North Delta Diversion bypass requirements to protect Sacramento River winter and spring run. Armin

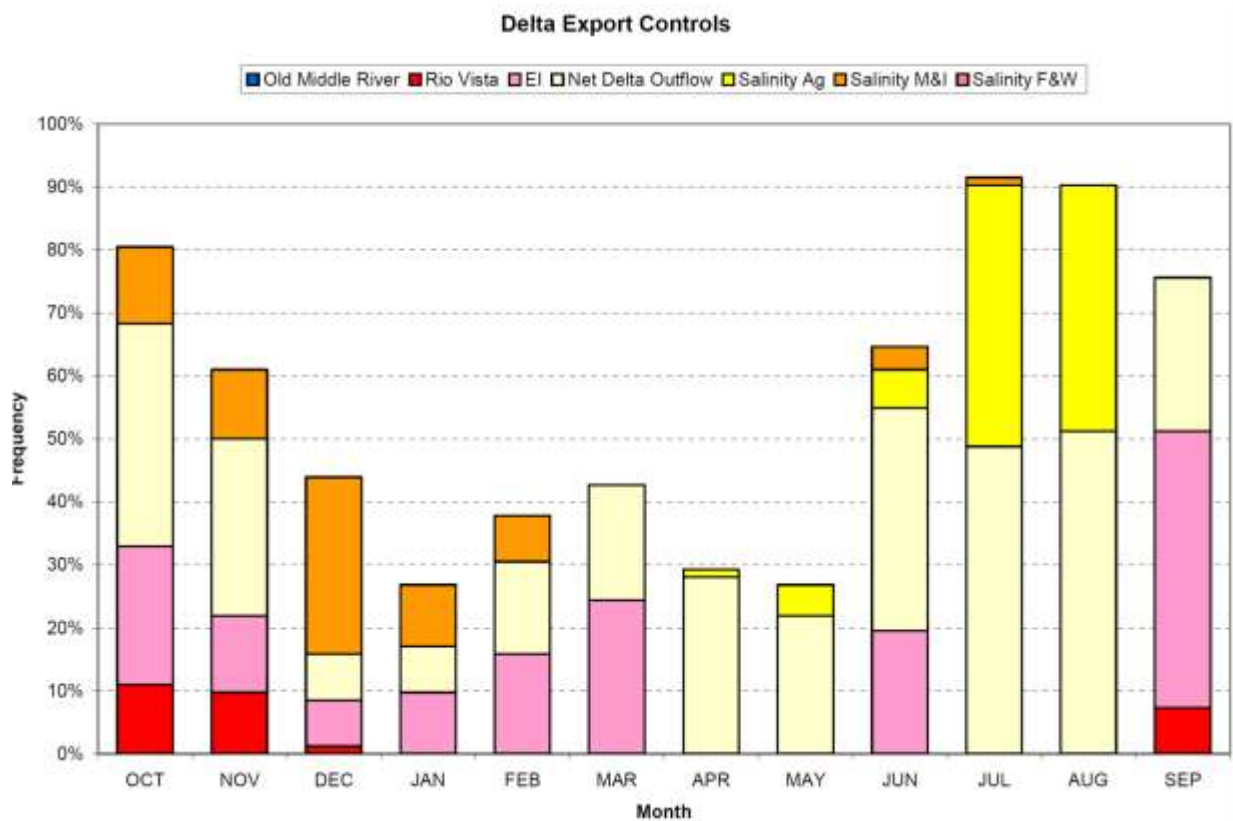
26 <sup>2</sup> Moyle, Peter, Lusardi, Robert, Samuel, Patrick, Katz, Jacob. *State of the Salmonids: Status of*  
27 *California's Emblematic Fishes, 2017*, report for Cal Trout. Obtained from  
28 [http://caltrout.org/wp-content/uploads/2017/08/SOS-II\\_Final.pdf](http://caltrout.org/wp-content/uploads/2017/08/SOS-II_Final.pdf)

1 Munevar performed such an analysis after the Wanger decision which showed percentage of the time  
 2 the E/I ratio and other Decision 1641 permit terms, and the new OMR flow limits were controlling.<sup>3</sup>  
 3 (Exhibit PCFFFA-164.) CALSIM II runs were done for the following conditions:

- 4 Base: representing pre-Wanger conditions
- 5 – Alt 2: representing more restrictive of Wanger criteria
- 6 – Alt 3: representing less restrictive of Wanger criteria (p. 6.)

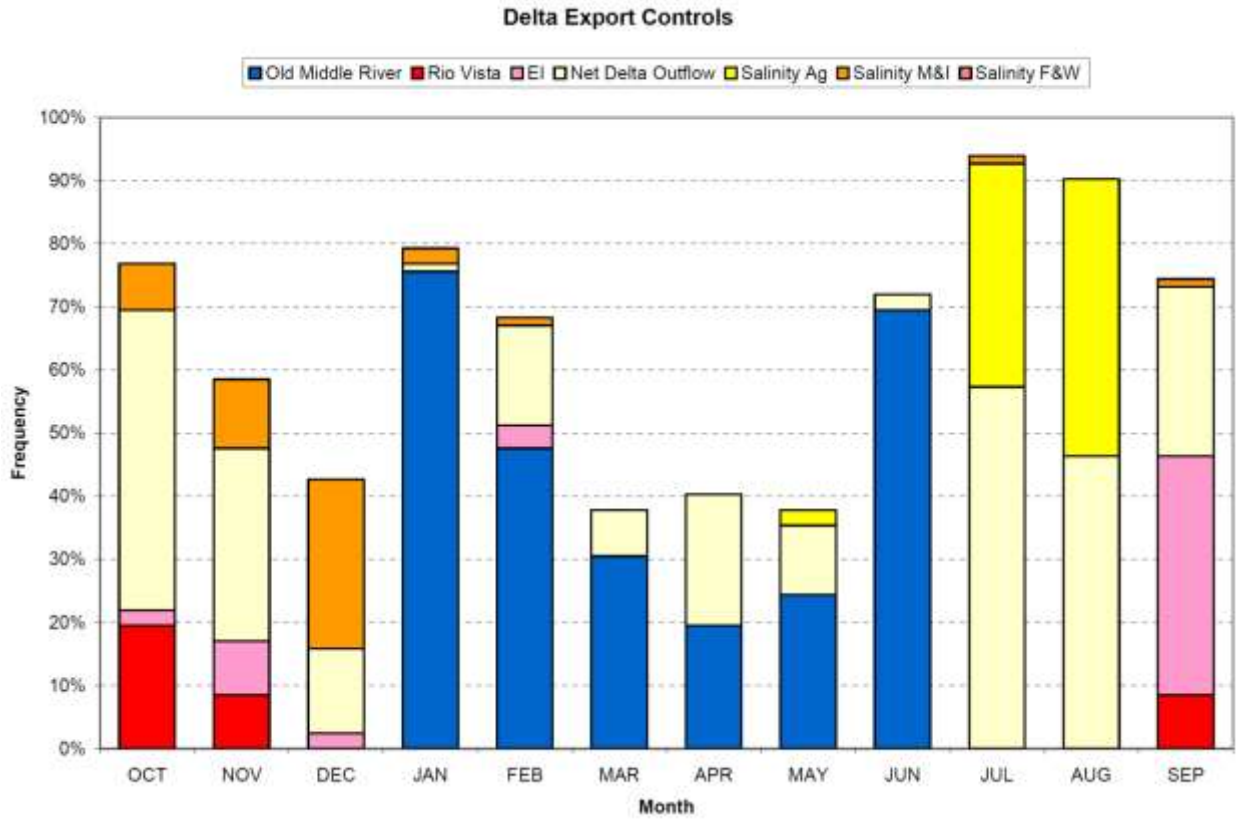
7 The graphs from Munevar’s analysis (Exhibit PCFFFA-164) are shown for illustrative purposes  
 8 to show the information that can be obtained from an analysis of controlling permit and BiOp terms for  
 9 State Water Project and Central Valley Project exports.

10 Base (pre-Wanger) (Exhibit PCFFFA-164, p. 14.)

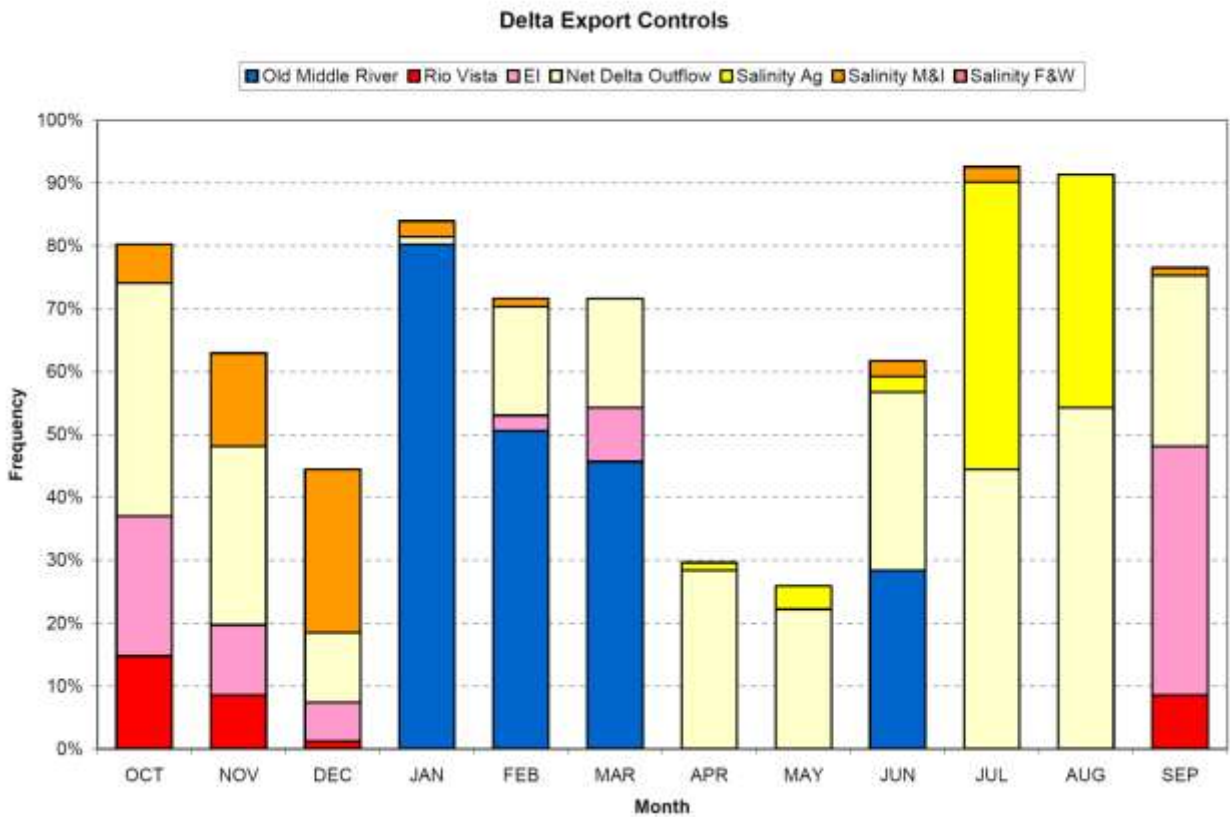


26 <sup>3</sup> Munevar, A., *Modeling Estimates of Potential Water Supply Impacts of the Wanger Smelt*  
 27 *Decision*, California Water & Environmental Modeling Forum Annual Meeting, February 28,  
 28 2008. Obtained from <http://www.cwemf.org/Asilomar/Armin.pdf>.

1 Post-Wanger (Alt 2) (Exhibit PCFFA-164, p. 15.)



15 Post-Wanger (Alt 3) (Exhibit PCFFA-164, p. 16.)



1 From Munevar's graphs, one can generally see that, before Old and Middle River flow limits  
2 were required by the revised Biological Opinions, E/I ratio controlled a significant percentage of the  
3 time in September through March. The North Delta diversion exports will not be limited by Old and  
4 Middle River reverse flow limits. I conclude that if the Board considers removing the E/I ratio limit,  
5 the Board should also evaluate replacing the E/I ratio limit with appropriately protective fall and spring  
6 Delta outflow criteria that apply in all years.

7 This is part of a more general issue, that the 1995 Bay-Delta Water Quality Control Plan  
8 (Exhibit SWRCB-30), nor the 1995 Bay-Delta Water Quality Control Plan EIR (Exhibit PCFFA-165)  
9 nor the 2006 Bay-Delta Water Quality Control Plan (Exhibit SWRCB-27) nor the 2006 Bay-Delta  
10 Water Quality Control Plan EIR (Exhibit SWRCB-27, Appendix 1) ever considered diversions in the  
11 North Delta. In approving the 1995 Bay-Delta Water Quality Control Plan as meeting the requirements  
12 of the Clean Water Act, the Environmental Protection Agency specifically noted that new diversions  
13 would require a new review of the estuarine habitat protection measures to ensure that the designated  
14 uses of the estuary are protected (Exhibit PCFFA-166, p. 4)<sup>4</sup>:

15 In this attachment, EPA is highlighting certain assumptions and conclusions it made  
16 during its evaluation of the 1995 Bay/Delta Plan. To ensure that the designated uses of  
17 the estuary are protected, and that Bay/Delta Accord is fully implemented, data  
18 concerning these assumptions and conclusions should be collected during implementation  
19 of the Plan, and this data should be considered during the next triennial review of the  
20 State's plan.

21 (1) Effect of New Delta Configurations EPA's evaluation of the estuarine habitat  
22 measures included in the 1995 Bay/Delta Plan relied on the expected effect of those  
23 measures on the position of the 2 ppt isohaline during the critical spring runoff period. In  
24 modeling this expected effect, the DWRSIM model assumed certain baseline conditions,  
25 and also assumed the present delta configuration. If those baseline conditions change, or  
26 if the configuration of the delta changes due to changes in the location or operation of  
27 delta control and export facilities, the estuarine habitat measures must be reviewed to  
28 assure that the designated estuarine habitat uses are still receiving protection.

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26 <sup>4</sup> U.S. Environmental Protection Agency, September 6, 1995 letter to the State Water Resources  
27 Control Board approving the Board's 1995 Bay-Delta Water Quality Control Plan as meeting the  
28 requirements of the Clean Water Act. Obtained from  
<https://www.epa.gov/sites/production/files/documents/wqcp1995usepaapproval.pdf>



1 Long term changes under the BDCP/WaterFix were included in the 2012 supplemental scoping  
2 notice for the Phase 2 update to the Bay-Delta Water Quality Control Plan (Exhibit PCFFA-167)<sup>5</sup>,  
3 which stated,

4 In considering potential changes to the Bay-Delta Plan, the State Water Board will be  
5 reviewing changes that should be made to water quality objectives and the program of  
6 implementation to protect beneficial uses in the Bay-Delta in the immediate future under  
existing conditions and in the longer term with and without changes to the environment  
that may occur as the result of current planning efforts such as the BDCP. (p. 3.)

7 However, there is no analysis in the State Water Board's Final Phase 2 Bay-Delta Water Quality  
8 Control Plan Update Scientific Basis Report (Exhibit PCFFA-168) of the effects of the major changes  
9 to diversions in the Delta from the BDCP/WaterFix project. I believe this analysis does need to be  
10 done. The State Water Resources Control Board's staff also stated in comments on the 2013 Second  
11 Administrative Draft Bay-Delta Conservation Plan (Exhibit PCFFA-169)<sup>6</sup>, with respect to Water  
12 Quality Certification:

13 A certification is issued when the State Water Board determines that an application for  
14 certification is complete and there is reasonable assurance the operation of the Project  
15 will comply with water quality standards and other appropriate requirements. The State  
16 Water Board must analyze potential Project-related environmental impacts to Project  
17 affected water bodies prior to making a determination that continued operation of the  
18 Project will be protective of the designated beneficial uses of the watershed.

19 (p. 5, underlining added.)

20 A thorough analysis of the potential impacts on the North Delta diversions on the Sacramento  
21 River, the Sacramento Bay-Delta, and San Francisco Bay does needs to be done and the "operating  
22 scenarios" in the BDCP/WaterFix EIR/EIS are not sufficient for this analysis.

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23 <sup>5</sup> State Water Resources Control Board, 2012 Supplemental Notice of Preparation and Notice of  
24 Scoping Meeting for Environmental Documentation for the Update and Implementation of the  
25 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary:  
26 Comprehensive Review. Obtained from  
27 [https://www.waterboards.ca.gov/waterrights/water\\_issues/programs/bay\\_delta/bay\\_delta\\_plan/en  
28 vironmental\\_review/docs/notice\\_baydeltaplancompreview.pdf](https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/environmental_review/docs/notice_baydeltaplancompreview.pdf)

29 <sup>6</sup> State Water Resources Control Board, Comments on the Second Administrative Draft  
30 Environmental Impact Report / Environmental Impact Statement for the Bay-Delta Conservation  
31 Plan, July 5, 2013. Available at  
32 [http://baydeltaconservationplan.com/Libraries/Dynamic\\_Document\\_Library/State\\_Water\\_Resou  
33 ces\\_Control\\_Board\\_Comments\\_on\\_BDCP\\_EIR-EIS\\_7-5-2013.sflb.ashx](http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/State_Water_Resources_Control_Board_Comments_on_BDCP_EIR-EIS_7-5-2013.sflb.ashx)



1 **III. DECISION 1641 OPERATIONS PLAN**

2 Decision 1641 required an operations plan to protect aquatic resources from any significant  
3 impacts of increased exports. The requirement for the operations plan was the basis for the finding by  
4 the Board in Decision 1641 that increased exports would not unreasonably affect fish and wildlife.

5 Decision 1641 stated:

6 2. The second stage is use of the JPOD for any authorized purpose under the permits, up  
7 to the limits specified in the current USCOE permit. Use of the JPOD at the second stage  
8 will be subject to the preparation and implementation of an operations plan acceptable to  
9 the Executive Director of the SWRCB that provides adequate protection to aquatic  
10 resources and other legal users of water. DWR will be the state lead agency for any  
11 required environmental documentation under CEQA for the operations plan. The  
12 operations plans shall be prepared in consultation with the USFWS, NMFS, and DFG and  
13 shall include measures for the protection of aquatic resources and their habitat.

14 3. The third stage is use of the JPOD for any authorized purpose under the permits, up to  
15 the physical capacity of the pumping plants. Use of the JPOD at the third stage will be  
16 subject to the operation of barriers or other mechanisms to protect water levels in the  
17 southern Delta, an operations plan acceptable to the Executive Director of the SWRCB  
18 that adequately protects aquatic resources and other legal users of water, and certification  
19 of a project-level EIR by the DWR for the ISDP or other barriers project.

20 (Exhibit SWRCB-21, p. 115.)

21 The Department of Water Resources and the U.S. Bureau of Reclamation submitted a fisheries  
22 protection plan in 2006 based on the 2004 Biological opinion (Exhibit PCFFA-170.)<sup>7</sup> But the plan  
23 contained no specific criteria or procedures to monitor operations at Oroville. The Feb 8, 2007 approval  
24 letter by State Water Resources Control Board Executive Director Tom Howard (Exhibit PCFFA-171)<sup>8</sup>  
25 declined to approve the plan for the State Water Project, stating:

26 The Fishery Plan states several times that Stage 2 JPOD operations are unlikely to affect  
27 operations at Oroville Reservoir, and the Fishery Plan contains no specific criteria or  
28 procedures to monitor operations at Oroville. Accordingly approval of the Fishery Plan

29 <sup>7</sup> U.S. Bureau of Reclamation and California Department of Water Resources, December x, 2006  
30 Plan for Protection of Fish, Wildlife, and Other Legal Users of Water During Stage 2 Joint Point  
31 of Diversion. Obtained from

32 [http://www.waterboards.ca.gov/waterrights/water\\_issues/programs/bay\\_delta/jpod/docs/fish\\_plan\\_122606.pdf](http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/jpod/docs/fish_plan_122606.pdf)

33 <sup>8</sup> February 8, 2007 letter From Tom Howard to U.S. Bureau of Reclamation and California  
34 Department of Water Resources, titled, *Fishery Protection Plan for Joint Point Of Diversion*.  
35 Obtained from

36 [https://www.waterboards.ca.gov/waterrights/water\\_issues/programs/bay\\_delta/jpod/docs/fish\\_plan\\_approval020807.pdf](https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/jpod/docs/fish_plan_approval020807.pdf)

1 extends only to operations at Shasta and Folsom reservoirs and applies only to the water  
2 rights of the U.S. Bureau of Reclamation (USBR) (D-1641, page 152).

3 (p. 1, underlining added, citation to D-1641 in letter text.)

4 The Feb 8, 2007 approval letter by Tom Howard (Exhibit PCFFA-171) also required the plan to  
5 be updated when a new biological opinion was issued:

6 Because changes in the BOs may in the future result in inconsistencies between this  
7 Fishery Plan and the BOs, this Fishery Plan's approval is conditioned upon it being  
8 submitted to the Executive Director for review after any relevant BO is rescinded,  
9 amended, adopted or revised in the future. If, upon review, the Executive Director finds  
10 that the Fishery Plan requires changes to make it consistent with a BO, the Fishery Plan  
11 shall not be considered approved until such changes are made and approved by the  
12 Executive Director.

13 (p. 2.)

14 The State Water Resources Control Board JPOD web page (Exhibit PCFFA-172) shows no  
15 indication that the fishery operations plan was ever updated by either the Bureau of Reclamation or the  
16 Department of Water Resources to reflect the new Biological Opinions. On April 17, 2017, the  
17 Department of Water Resources notified the Executive Director of the State Water Resources Control  
18 Board, Tom Howard, that DWR had begun using the JPOD because of emergency repairs to Clifton  
19 Court Forebay (Exhibit PCFFA-173.)<sup>9</sup> However, Tom Howard refused to give retroactive approval or  
20 approval for further use of the JPOD because DWR hadn't updated the required operations plan since  
21 2006 (Exhibit PCFFA-174.)<sup>10</sup> The letter stated in part:

22 Stage 2 JPOD requires a plan to ensure that JPOD diversions do not impact fish and  
23 wildlife and other legal users of water (operations plan). DWR and Reclamation  
24 currently have approved water level and water quality response plans in place; however,  
25 the 2006 fisheries and legal user of water operations plan needs to be updated since  
26 biological opinions (BOs) were subsequently issued by the U.S. Fish and Wildlife  
27 Service (USFWS) and the National Marine Fisheries (NMFS) Service in 2008 and 2009,  
28 respectively. D-1641 states that the operations plan shall be submitted to the Executive

<sup>9</sup> April 19, 2017 letter from Department of Water Resources to SWRCB Executive Director Tom  
Howard, titled, *Request for a Short-Term Exemption from JPOD limits*. Obtained from  
[https://www.waterboards.ca.gov/waterrights/water\\_issues/programs/bay\\_delta/jpod/docs/041920  
17\\_dwrltr.pdf](https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/jpod/docs/04192017_dwrltr.pdf)

<sup>10</sup> May 4, 2017 letter From Tom Howard to John Leahigh, Chief, Water Operations Office,  
California Department of Water Resources, titled Joint Points of Diversion Request. Obtained  
from  
[http://www.waterboards.ca.gov/waterrights/water\\_issues/programs/bay\\_delta/jpod/docs/0504201  
7\\_swbltr.pdf](http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/jpod/docs/05042017_swbltr.pdf)

Director of the State Water Board for approval at least 30 days prior to use by the DWR of Tracy [Jones] Pumping Plant.

(p. 1.)

Figure 9 from Walter Bourez' surrebuttal testimony in Part 1 (Exhibit SVWU-302) shows that the Bureau of Reclamation used the Joint Point of Diversion in the following years after the new Biological Opinions came out: 2009, 2010, 2012, 2013, 2014, and 2015.

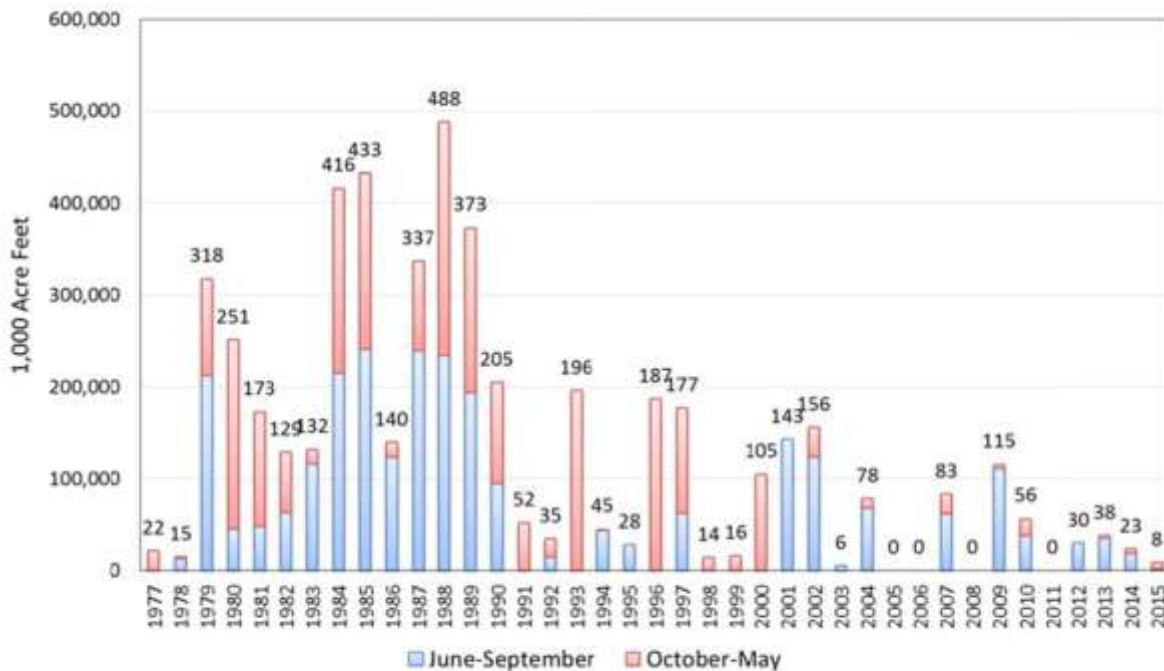


Figure 9 - Historical Federal Export at Banks Pumping Plant (JPOD)

The Bureau of Reclamation also appears never to have updated the 2006 fishery protection plan, and there is no indication of any reporting of JPOD use on the Board's JPOD web page. The fishery protection plan also states that use of the JPOD would stop if daily catch of juvenile salmon at Knights Landing and/or the Sacramento Trawl was greater than 5. There were also salvage loss density limits (p. 4.) It is unclear that this requirement was ever followed by the Department of Water Resources in providing use of Banks pumping plant to the Bureau of Reclamation.

#### IV. JUVENILE SALMONID SURVIVAL FORECASTS IN DECISION 1641

The Department of Water Resources did modeling for the State Water Resources Control Board of impacts of the proposed Joint Point of Diversion on Sacramento River Chinook salmon for the Board's Environmental Impact Report (EIR) for Implementation of the 1995 Bay/Delta Water Quality

1 Control Plan. The Final EIR is Exhibit SWRCB-31. The Board based their approval of the Joint Point  
2 of Diversion in part on the model projections of survival for Chinook salmon migrating through the  
3 Delta. But those predictions have proved dangerously wrong – actual survival of migrating Sacramento  
4 River Chinook has been significantly lower than predicted. The graphs on the next page are from page.  
5 XIII-66 to page XIII-67 of Exhibit SWRCB-31. The following table identifies the alternatives:

6 Alternative 1, No JPOD, D-1485

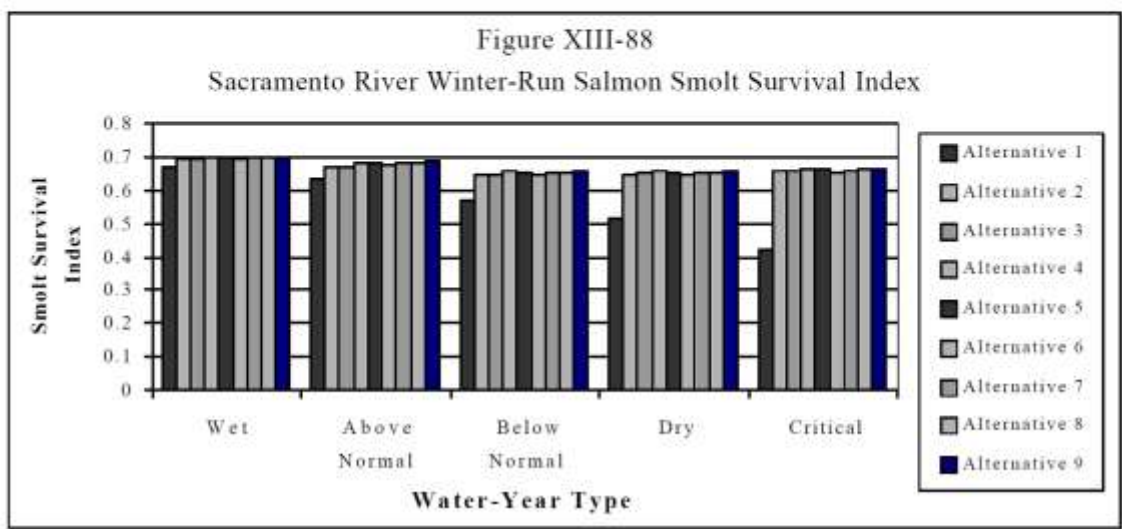
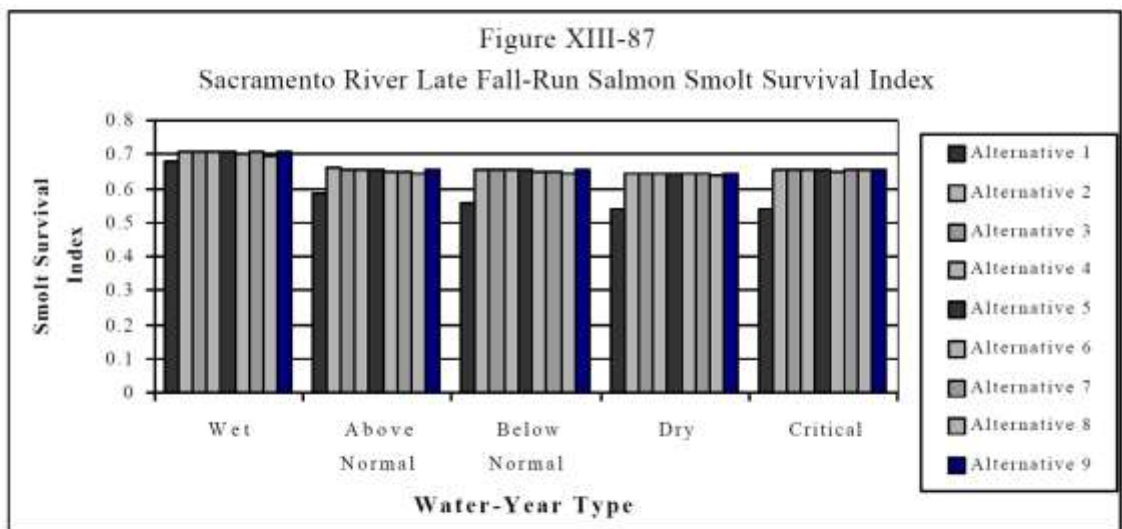
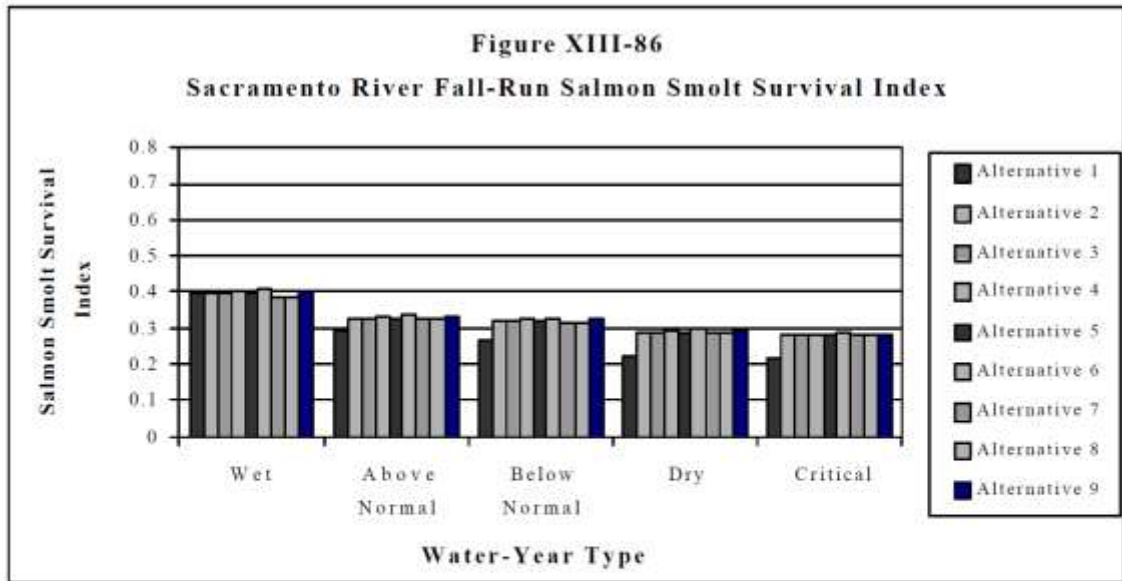
7 Alternative 2, No JPOD, 1995 WQCP

8 Alternative 7, JPOD limited by permitted rates of diversion

9 Alternative 8, JPOD limited only by physical capacities of pumping plant

10 Alternative 9, JPOD limited only by physical capacities and ACOE PN 5820-A (I think this was  
11 the one chosen.)  
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1 A coded wire tag study by Perry et. al. showed that survival of migrating fall run Chinook  
2 salmon was .174 in Dec 2007 and was .195 in January 2008 (Exhibit PCFFA-175, Table 2, p.  
3 20).<sup>11</sup> This was a dry year. A comparison with the graphs shows that survival of fall run was about  
4 33% lower than predicted. A followup study by Romine and Perry et. al. in winter of 2008-2009<sup>12</sup>  
5 found overall survival of tagged fall run juveniles was .188. (Exhibit PCFFA-199, Table 2, p. 21.)  
6 This was a critically dry year. Again, survival was about 33% lower than predicted.

7 The modeling for the EIR/EIS for implementation of the 1995 Bay-Delta Water Quality Control  
8 Plan found that survival of migrating salmon and other species could be increased because exports  
9 during spring would be reduced:

10 Modeling analysis shows that exports would be reduced in the spring months under the JPOD  
11 alternatives compared to base cases, potentially reducing entrainment in the critical period for  
12 spawning, rearing, and outmigration of many aquatic species in the Delta.

12 (Exhibit SWRCB-31p. ES-10, pdf p. 69.)

13 The reason for the discrepancy in predicted versus actual outcomes needs to be examined.

14 **V. RESERVOIR RELEASES SHIFTED UNDER THE 1995 WATER QUALITY**  
15 **CONTROL PLAN**

16 A retrospective examination in 2012 showed that not only were exports reduced in spring  
17 months under the 1995 Water Quality Control Plan, but releases from Oroville reservoir were also  
18 significantly reduced. The graph on the next page is from American River's 2012 presentation to the  
19 SWRCB in one of the 2012 Phase 2 Bay-Delta Water Quality Control Plan update workshops (Exhibit  
20

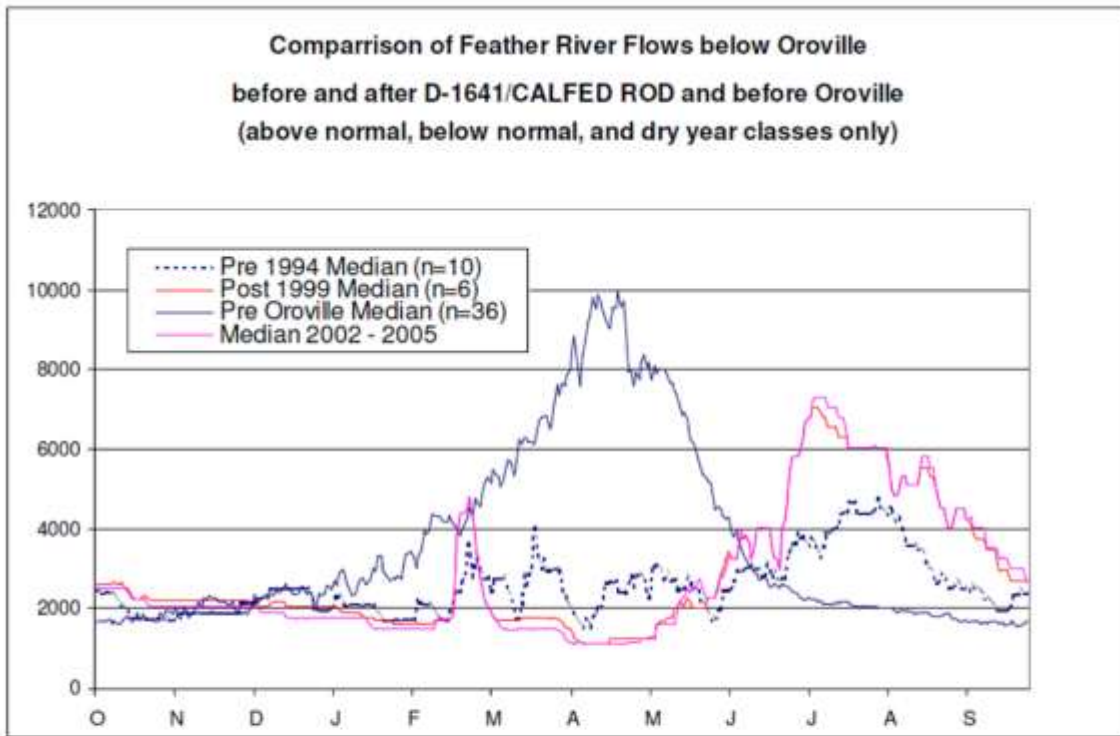
21 \_\_\_\_\_  
22 <sup>11</sup> Perry, R., and Skalski, J. July 15, 2009, *Survival and Migration Route Probabilities of*  
23 *Juvenile Chinook Salmon in the Sacramento-San Joaquin River Delta during the Winter of*  
24 *2007-2008*. Obtained from  
<http://www.deltarevision.com/Issues/fish/sediment/Perry%20et%20al.%20Delta%20survival%202008%20to%20USFWS%20Final%201.pdf>

25 <sup>12</sup> Romine, J. Perry, R. Brewer, S. Adams, N. Liedtke, T., Blake, A., and Burau, J., Open-File  
26 Report 2013-1142. *The Regional Salmon Outmigration Study—Survival and Migration Routing*  
27 *of Juvenile Chinook Salmon in the Sacramento-San Joaquin River Delta during the Winter of*  
28 *2008–09*. U.S. Department of the Interior and U.S. Geological Survey. Available at  
<https://pubs.usgs.gov/of/2013/1142/pdf/ofr20131142.pdf>



1 PCFFA-200, p. 5.)<sup>13</sup> It shows dramatic shifting of reservoir releases to the summer. Part of the reason  
2 may be to avoid triggering requirements for increased releases for estuarine habitat.

3 The U.S. EPA in 1995 enacted regulations requiring increased spring outflow to provide



16 **Figure 1:** Influence of the Sacramento-San Joaquin Delta Regulations on Feather River Hydrograph.  
17 The blue line depicts pre-Oroville median flows and approximates the natural flow regime. In 1995  
18 the Water Quality Control Plan tightened restrictions on the timing of Delta diversions. The pre-  
19 1994 hydrograph compared to the post-1999 hydrograph illustrates how the hydrograph shifted  
20 spring flows to summer releases to optimize water diversions with the Delta export/inflow  
21 requirements.

22 estuarine habitat in Suisun Bay, according to the following table (Exhibit PCFFA-201, p. 10):

23

24

25 <sup>13</sup> [American Rivers, letter and report to State Water Resources Control Board, RE: Bay-Delta](https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/cmnt091412/john_cain.pdf)  
26 [Workshop 2: Bay-Delta Fishery Resources. Obtained from](https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/cmnt091412/john_cain.pdf)  
27 [https://www.waterboards.ca.gov/waterrights/water\\_issues/programs/bay\\_delta/docs/cmnt091412/](https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/cmnt091412/john_cain.pdf)  
28 [john\\_cain.pdf](https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/cmnt091412/john_cain.pdf). I have personally examined the data the graph was created from and agree that  
the graph is correct.



TABLE 1.—PROPOSED 2 PPT ESTUARINE HABITAT CRITERIA <sup>1</sup>

Year type	Roe Island [km 64]	Chippis Island [km 74]	Confluence [km 81]
Wet .....	133 days .....	148 days .....	150 days.
Above normal .....	105 days .....	144 days .....	150 days.
Below normal .....	78 days .....	119 days .....	150 days.
Dry .....	33 days .....	116 days .....	150 days.
Critically dry .....	0 days .....	90 days .....	150 days.

<sup>1</sup> Numbers indicate the required number of days (based on a 14-day moving average) at or downstream from each location for the 5-month period from February through June. The water year classifications are identical to those included in the 1991 Bay/Delta Plan for the Sacramento River Basin. Roe Island salinity shall be measured at the salinity measuring station maintained by the USBR at Port Chicago (km 64). Chipps Island salinity shall be measured at the Mallard Slough station, and salinity at the Confluence shall be measured at the Collinsville station, both of which are maintained by the California Department of Water Resources. The Roe Island number represents the maximum number of days of compliance, based on the adjustment described in the text.

The State Water Board instead enacted the table on the following page, changing the compliance location to Port Chicago from Roe Island (2006 Bay-Delta Water Quality Control Plan, Exhibit SWRCB-27, p. 21.) The outflow requirements in Table 4 are only triggered when electrical conductivity (EC) at Port Chicago has been below 2.64 mmhos /cm for the final two weeks of the immediately preceding month. This is known as the Port Chicago trigger (Exhibit SWRCB-27, p. 21, footnote (d.))

This standard applies only in months when the average EC at Port Chicago during the 14 days immediately prior to the first day of the month is less than or equal to 2.64 mmhos/cm.

It appears that the SWP may be holding back water in Oroville in the spring to avoid the Port Chicago trigger. For this reason, I believe that “appropriate Delta flow criteria” need to require both inflow at Freeport and outflow at Rio Vista. Upstream bypass requirements for the SWP and CVP would also be consistent with the Phase 2 Bay-Delta Water Quality Control Plan Update proposal of “inflow-based outflow” (Exhibit PCFFA-167.)

**Table 4. Number of Days When Maximum Daily Average Electrical Conductivity of 2.64 mmhos/cm Must Be Maintained at Specified Location**

Number of Days When Maximum Daily Average Electrical Conductivity of 2.64 mmhos/cm Must Be Maintained at Specified Location <sup>[a]</sup>																	
PMI <sup>[b]</sup> (TAF)	Chipps Island (Chipps Island Station D10)					PMI <sup>[b]</sup> (TAF)	Port Chicago (Port Chicago Station C14) <sup>[d]</sup>					PMI <sup>[b]</sup> (TAF)	Port Chicago (Port Chicago Station C14) <sup>[d]</sup>				
	FEB	MAR	APR	MAY	JUN		FEB	MAR	APR	MAY	JUN		FEB	MAR	APR	MAY	JUN
≤ 500	0	0	0	0	0	0	0	0	0	0	0	5250	27	29	25	26	6
750	0	0	0	0	0	250	1	0	0	0	0	5500	27	29	26	28	9
1000	28 <sup>[c]</sup>	12	2	0	0	500	4	1	0	0	0	5750	27	29	27	28	13
1250	28	31	6	0	0	750	8	2	0	0	0	6000	27	29	27	29	16
1500	28	31	13	0	0	1000	12	4	0	0	0	6250	27	30	27	29	19
1750	28	31	20	0	0	1250	15	6	1	0	0	6500	27	30	28	30	22
2000	28	31	25	1	0	1500	18	9	1	0	0	6750	27	30	28	30	24
2250	28	31	27	3	0	1750	20	12	2	0	0	7000	27	30	28	30	26
2500	28	31	29	11	1	2000	21	15	4	0	0	7250	27	30	28	30	27
2750	28	31	29	20	2	2250	22	17	5	1	0	7500	27	30	29	30	28
3000	28	31	30	27	4	2500	23	19	8	1	0	7750	27	30	29	31	28
3250	28	31	30	29	8	2750	24	21	10	2	0	8000	27	30	29	31	29
3500	28	31	30	30	13	3000	25	23	12	4	0	8250	28	30	29	31	29
3750	28	31	30	31	18	3250	25	24	14	6	0	8500	28	30	29	31	29
4000	28	31	30	31	23	3500	25	25	16	9	0	8750	28	30	29	31	30
4250	28	31	30	31	25	3750	26	26	18	12	0	9000	28	30	29	31	30
4500	28	31	30	31	27	4000	26	27	20	15	0	9250	28	30	29	31	30
4750	28	31	30	31	28	4250	26	27	21	18	1	9500	28	31	29	31	30
5000	28	31	30	31	29	4500	26	28	23	21	2	9750	28	31	29	31	30
5250	28	31	30	31	29	4750	27	28	24	23	3	10000	28	31	30	31	30
≤ 5500	28	31	30	31	30	5000	27	28	25	25	4	>10000	28	31	30	31	30

Executed on this 29th day of November, 2017, in Santa Cruz, California.

