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BEFORE THE

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD

HEARING IN THE MATTER OF THE CALIFORNIA DEPARTMENT OF WATER RESOURCES AND UNITED STATES BUREAU OF RECLAMATION REQUEST FOR A CHANGE IN POINT OF DIVERSION FOR CALIFORNIA WATER FIX	**PART 2 REBUTTAL TESTIMONY OF DEIRDRE DES JARDINS**

I, Deirdre Des Jardins, have previously testified in this matter. My statement of qualifications is provided in Exhibit PCFFA-75. I submit the following testimony on behalf of protestants Pacific Coast Federation of Fishermen's Associations ("PCFFA") and Institute for Fisheries Resources ("IFR") and declare:

SUMMARY OF TESTIMONY

I. THE 2006 BAY-DELTA WATER QUALITY CONTROL PLAN STANDARDS DID NOT ADDRESS THE PELAGIC ORGANISM DECLINE

Petitioner Department of Water Resources' ("DWR's") witness Douglas Rischbieter testified that beneficial uses of the Delta are protected under the proposed project, because modeling outputs show that the standards in the 2006 Bay-Delta Water Quality Control Plan ("2006 Plan") will continue to be met. DWR witness Marin Greenwood also relied on differences with the "No Action Alternative"

to conclude that the proposed change in Point of Diversion would adequately protect unlisted species. But the 2006 Plan did not take into account the Pelagic Organism Decline ("POD"). As California Department of Fish and Wildlife ("CDFW") Biologist Randall Baxter testified on April 11, 2018, there has been a profound shift in the Delta ecosystem toward ecological collapse. My rebuttal testimony shows that it will take significant, sustained changes in management to save the Delta's ecosystem from further, potentially catastrophic, collapse. I conclude that the State Water Resources Control Board ("Board") must not base a conclusion that beneficial uses of the estuary are protected on the 2006 Plan's deficient standards.

II. EXPORTS FROM THE NORTH DELTA DIVERSIONS COULD WORSEN EXISTING CONDITIONS

I rebut Mr. Rischbieter's testimony that the proposed project protects beneficial uses by showing that the bypass requirements in the CWF H3+ operational scenario could significantly reduce existing Sacramento River flows in the fall, further constricting the low salinity zone and worsening existing conditions. Moving the compliance point for the Export-to-Inflow limit calculation in the 2006 Plan to a location downstream of the North Delta diversions could significantly worsen this effect. I recommend against moving the compliance point for the Export-to-Inflow limit calculation, and instead recommend putting more protective bypass criteria into the permit.

III. REQUIRED STUDIES OF THE INTAKE DESIGN AND FISH SCREENS HAVE NOT BEEN DONE.

I explain that Mr. Greenwood's testimony regarding the effectiveness of fish screens is inaccurate because the flows on the Sacramento River above the Delta Cross Channel are tidal at tidally averaged flows of 5,000 cfs and thus downstream velocities can be negative. The field studies and numeric studies required to validate the proposed intake design and operational criteria for the fish screens, including the minimum bypass criteria, have also not been done. Higher minimum bypass flows and requirements for minimum sweeping velocity would help resolve some – but not all – of the uncertainty.

IV. THE BOARD NEEDS TO MANDATE COMPLETE REPORTING OF DATA AT MONITORING LOCATIONS AND SWP AND CVP DIVERSIONS

Dr. Earle testified that under adaptive management, the operational needs and uncertainties will be assessed by research projects in a collaborative setting. I will show that DWR is no longer reporting flow data necessary for stakeholders to participate in scientific assessments and adaptive management. I explain that, as of the date of this testimony, DWR has stopped publishing tidally filtered data for monitoring locations in the Delta. The State Water Resources Control Board (Water Board) needs to add the North Delta intake locations as required monitoring locations. The Water Board should also mandate that 15 minute data for flow, stage, and velocity be reported for all stations, as well as tidally filtered flow data. In addition, the Water Board should require reporting of hourly diversions at the North Delta diversions, and at the Banks and Tracy Pumping Plants, so that the full effects of combined diversions can be assessed.

Finally, as I previously testified, the Joint Point of Diversion analysis for Decision 1641 assumed that only the South Delta diversions would be operated. As explained below, the CWF H3+, H3 and H4 scenarios do not bound the full potential effects of Joint Point of Diversion with the new intakes. The Board needs to include a permit term that the Joint Point of Diversion only applies to diversions in the South Delta. The Board must also require DWR and the U.S. Bureau of Reclamation ("Reclamation") to submit their maximum proposed diversions at the North Delta diversions, and also maximum proposed simultaneous diversions in the North Delta and South Delta, for complete and adequate assessment of water rights compliance, and inclusion of appropriate terms in the permit.

V. CWF H3+ IS ONLY AN OPERATIONAL SCENARIO, NOT FINAL OPERATIONAL CRITERIA.

Eight witnesses for DWR testified that "the adopted project is referred to as CWF H3+."[1] My testimony will explain that CWF H3+ is an operational scenario analyzed during the Endangered Species Act, 16 U.S.C. section 1531, *et seq.* ("ESA") Section 7 review process and the California Endangered Species Act, Fish and Game Code section 2050 *et seq.* ("CESA") section 2081 review

[1] Aaron Miller, Marin Greenwood, Richard Wilder, Christopher Earle, Tara Smith, Erik Reyes, Michael Bryan, and Douglas Rischbieter.

process. As explained below, the CWF H3+ criteria were not adopted by DWR in the Notice of Determination ("NOD"), the 2016 Final Environmental Impact Report/Environmental Impact Statement ("Final EIR/EIS"), or DWR's 2017 documents associated with its approval of the project under the California Environmental Quality Act, Public Resources Code section 21000, *et seq.* ("CEQA"). The CWF H3+ operational scenario is derived from the ESA and CESA consultations, which are ongoing. The Biological Opinions state that the ultimate operational criteria for the WaterFix project ("WaterFix" or "CWF") have not been finalized, and Reclamation has initiated a second ESA Section 7 consultation. Thus the CWF H3+ operational scenario is based on merely a snapshot in time of ongoing consultation processes. Therefore, the results and impact analyses based on modeling of the CWF H3+ scenario are fundamentally speculative and uncertain. The Part 2 testimony of DWR's witnesses based on CWF H3+ fails to acknowledge this uncertainty.

VI. THE H3 AND H4 OPERATIONAL SCENARIOS DO NOT BOUND THE ULTIMATE OPERATIONS CRITERIA.

Eight witnesses for DWR testified that the initial operating criteria "would fall within a range of operations described as H3 to H4."[2] My testimony will show that the H3 and H4 operational scenarios, presented in Part 1 of the WaterFix hearing, and used in impact analyses in the WaterFix Recirculated Draft EIR/Supplemental Draft EIS and Final EIR/EIS, are not mentioned as bounds on future operational criteria in the 2017 Biological Opinions. Thus the results and impact analyses based on modeling of the H3 and H4 operational scenario are fundamentally speculative and uncertain. The Part 2 testimony of DWR's witnesses based on H3 and H4 fails to acknowledge this uncertainty.

VII. THE CWF H3+ CRITERIA LIKELY CANNOT BE OPERATIONALIZED WITHOUT THE CURRENT COORDINATED OPERATING AGREEMENT.

DWR witness Aaron Miller testified that it is possible to "operationalize" the CWF H3+ operational scenario. But the scenario assumes the obligations in the current Coordinated Operating Agreement ("COA"), under which Reclamation provides 75% of storage releases to meet in-basin needs. Reclamation's witness testified that the COA is being renegotiated. I explain why it may not be

[2] Aaron Miller, Marin Greenwood, Richard Wilder, Christopher Earle, Tara Smith, Erik Reyes, Michael Bryan, and Douglas Rischbieter.

possible to meet in-basin needs if the COA changes. If the Board approves the petition based on the CWF H3+ modeling and the current COA, the Board must put the current COA obligations in the permits, or approve diversion at the North Delta diversions only during excess flow conditions until the new COA has been submitted to the Board for approval.

DETAILED TESTIMONY

I. BENEFICIAL USES ARE NOT PROTECTED BY THE 2006 BAY-DELTA WATER QUALITY CONTROL PLAN STANDARDS

The written testimony of Douglas Rischbieter states:

> The 2006 Delta Water Quality Standards also determined that the water quality objectives in Table 3 provide reasonable protection of the beneficial uses of COMM, as well as the other recreation related beneficial uses which protect and benefit fish and wildlife including EST, COLD, WARM, MIGR, SPWN, WILD, SHELL, and NAV. (Exhibit SWRCB-27.)

(Exhibit DWR-1024, 5:14-18.) Marin Greenwood's testimony also relies on the 2006 Bay-Delta Water Quality Control Plan and differences with the CEQA No Action Alternative ("NAA") to determine that the proposed project will adequately protect aquatic species (Exhibit DWR-1012, p. 52:8012.) But the 2006 Plan was issued *before* the report of the Pelagic Organism Decline Synthesis Team was available, and did not address the POD. The Plan Amendment Report, Appendix 1 to the 2006 Plan (Exhibit SWRCB-28) states:

> the reasons for the POD are still unknown, and water project operations are included in the conceptual model for many of the POD studies as a possible factor/cause for the decline. The study results are expected in 2007, and may have an impact on the Delta Outflow objective and its implementation. The study results could help staff assess when the current Delta outflow objective must be met to protect the beneficial uses and whether the objective can be relaxed without causing an additional negative impact to sensitive species. In light of this, the State Water Board did not change this objective in the 2006 Plan. The State Water Board will not consider changing the Delta Outflow objective until the POD studies are completed or the Board receives other reliable technical information, warranting a change.

(Exhibit SWRCB-28, pp. 45-46.)

Mr. Rischbieter's and Mr. Greenwood's failure to take into account the POD is a major failure in analyzing whether the project will adequately protect public trust aquatic resources. CDFW

Biologist Randall Baxter testified in Part 2 of the Hearing on the Interagency Ecological Program 2010 Pelagic Organism Decline Work Plan and Synthesis of Results ("IEP POD Synthesis of Results"). (Exhibit FOR-60.) It is clear that there has been a profound shift in the Delta ecosystem, starting in the

Old Regime	Environmental Drivers	New Regime
Variable, High	Outflow	*Variable, Lower*
To the west, Variable	Salinity gradient	*To the east, Constricted*
Complex, Variable	Landscape	*Simplified, Rigid*
Low, Variable	Temperature	*High, Uniform*
High, Variable	Turbidity	*Low, Less variable*
High P, low N	Nutrients	*Low P, High N (NH_4+)*
Few, Low	Contaminants	*Many, High*
Predation, Fishing	"Harvest"	*Predation and Entrainment*

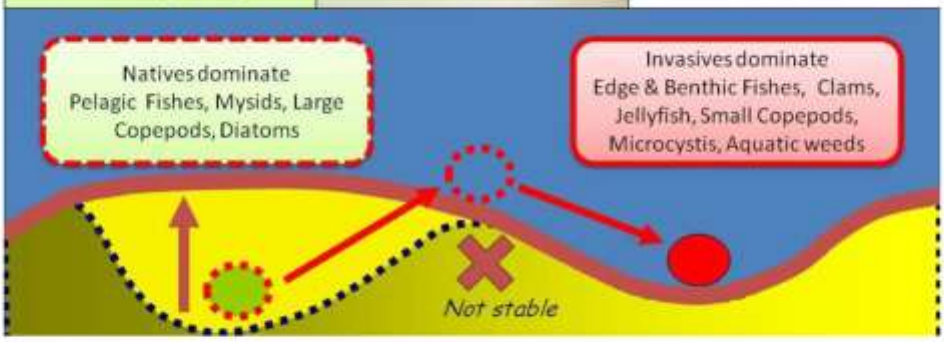

Figure 8. The ecological regime shift in the Delta results from changes in (slow) environmental drivers that lead to profoundly altered biological communities and, as soon as an unstable threshold region is passed, a new relatively stable ecosystem regime.

early 2000s. Mr. Baxter testified that populations of pelagic species have crashed, as shown in Exhibit DDJ-282, and Delta smelt and Longfin smelt are on the brink of extinction. (R.T. April 11, 2018, 11:16-16:25.)

Mr. Baxter also testified that the Delta's food web is also less nutritious than in the past and the benthic population has shifted to include the invasive potamcorbula clam. (R.T. April 11, 2018, 11:16-16:25.) Mr. Baxter testified that the Pelagic Organism Decline Management Team hypothesized that there has been a regime shift in the Delta, as shown in Figure 8 of the IEP POD Synthesis of Results, which is displayed above. (Exhibit FOR-60, p. 144.)

As attested by Mr. Baxter (R.T. April 11, 2018, pp. 18:12-19:14), the POD Management Team ranked the abiotic drivers of the regime shift in the following order:

> The environmental, slow drivers we propose for the POD regime shift are (1) outflow, (2) salinity, (3) landscape, (4) temperature, (5) turbidity, (6) nutrients, (7) contaminants, and (8) harvest. These drivers are listed in our hypothesized order of their importance to the resilience of the system and approximate rate of change.)

(Exhibit FOR-60, p. 90:3991-3994.)

It is clear from the IEP POD Synthesis of Results and Mr. Baxter's testimony that the Delta ecosystem is a dynamic system with multiple state variables, including the abiotic drivers and the species populations. The abiotic drivers and the species populations interact in ways which give the system "memory" of the previous state, making it a complex system. To the extent that the perturbations to the abiotic drivers are so profound that they have triggered a shift of the Delta ecosystem to a different basin of attraction, it is my opinion, based on my background in dynamic systems theory and complex systems theory, that it would take significant, sustained changes in the abiotic drivers to shift the ecosystem out of the invasive-dominant regime described in Figure 8.

Dr. Earle testified on the Adaptive Management Plan (Exhibit DWR-1014, 6:3-7:3.) Based on information in DWR-1143, and the underlying Biological Opinions, as described in more detail below, the proposed increases in outflow over existing D-1641 requirements are clearly subject to reduction. The danger is that, if there has been a regime shift, small perturbations around the existing equilibrium state would be unlikely to shift species populations, giving a false conclusion that changes to major abiotic drivers will not affect the ecosystem. In addition, analyses of perturbations of the system in the existing regime may not show the system response to major changes in the abiotic drivers. In this respect, the 1994 EPA approach of comparing the current system with a period in which populations were stable is a sound one.

Based on the IEP POD Synthesis Report and Mr. Baxter's testimony that flow is the major driver, the new North Delta diversions will have a profound effect on the abiotic drivers identified in the IEP POD Synthesis of Results. The effects are difficult to predict, and, as I previously testified, DWR's success with modeling impacts of operational changes to aquatic species has been poor. What is clear is that major new diversions when the ecosystem is in collapse could have catastrophic results. It has been eight years since the 2010 POD Synthesis Report was published. It represents the best

available science, synthesized by a team of agency experts from a broad range of studies and hundreds of peer reviewed papers. The Board should implement "appropriate Delta flow criteria" based on the best available science, and set clearly defined, numeric targets for species populations and survival of migrating salmonids, before allowing major new diversions.

Mr. Rischbieter's testimony states:

> Based on modeling output for each parameter at the respective compliance locations with CWF H3+ in place, the water quality objectives in Table 3 will continue to be met. (Exhibits DWR-1015 and DWR-1016.) Thus operating CWF will continue to reasonably protect COMM, EST, COLD, WARM, MIGR, SPWN, WILD, SHELL, and NAV beneficial uses.

(Exhibit DWR-1024, p. 5:22-25.).

But the water quality objectives in Table 3 in the 2006 Plan are clearly not protective of Estuarine Habitat, based on current scientific evidence. Mr. Rischbieter's and Mr. Greenwood's testimony appear to essentially be an argument that the No Action Alternative in the WaterFix Final EIR/EIS is "reasonably protective," which is a CEQA argument, not a scientific hypothesis – let alone data-based conclusion.

In addition, as explained below, the more protective flows in the CWF H3+ operational scenario are speculative and uncertain at this point, so any determinations based on the CWF H3+ operational scenario are equally speculative. As I testified previously, the Department of Water Resources has a long history of relying on speculative operations that never materialize, dating back to Decision 1275, when DWR promised to augment the flow of the Sacramento River by 900,000 acre-feet a year. To the extent that the Board relies on the assumed operations in the CWF operational scenario, they should be included as permit terms.

II. EXPORTS FROM THE NORTH DELTA DIVERSIONS COULD WORSEN EXISTING CONDITIONS.

According to the 2006 Plan (Exhibit SWRCB-27), the following beneficial uses are protected by Table 3:

> The water quality objectives in Table 3 provide reasonable protection of fish and wildlife beneficial uses in the Bay-Delta Estuary including EST, COLD, WARM, MIGR, SPWN, WILD, and RARE. Protection of these fish and wildlife beneficial uses also provides protection for the beneficial

uses of SHELL, COMM, and NAV.

(*Id.*, p. 11.) Mr. Rischbieter testified that these beneficial uses would continue to be protected, based on compliance of the modeling results with the objectives in Table 3 (Exhibit SWRCCB-1024, p. 5:22-25.) The table below, from page 11 of DWR-1143, shows the late summer and fall bypass requirements in CWF H3+.

Level I Post-Pulse Operations			Level II Post-Pulse Operations			Level III Post Pulse Operations		
If Sacramento River flow is over...	But not over...	The bypass is...	If Sacramento River flow is over...	But not over...	The bypass is...	If Sacramento River flow is over...	But not over...	The bypass is...
Bypass flow requirements in other months:								
If Sacramento River flow is over...			But not over...			The bypass is...		
Jul–Sep								
0 cfs			5,000 cfs			100% of the amount over 0 cfs		
5,000 cfs			No limit			A minimum of 5,000 cfs		
Oct–Nov								
0 cfs			7,000 cfs			100% of the amount over 0 cfs		
7,000 cfs			No limit			A minimum of 7,000 cfs		

The graph shows flows from September through November in 2010, a below normal year, above the Delta Cross Channel. Under the CWF H3+ bypass requirements, these required flows would be reduced to 5,000 cfs in September and 7,000 cfs in November.

The 2010 POD Synthesis Report (Exhibit FOR-60) states, "based on a 36-year record of concurrent midwater trawl and water quality sampling, there has been a long-term decline in fall habitat suitability for delta smelt and striped bass, but not for threadfin shad (Feyrer et al. 2007)." Mr. Baxter testified to this as well. (R.T. March 9, 2018, 25:10-29:6.) Reducing Sacramento River flows in the Delta in the fall could shift the low salinity zone further to the east and upstream, worsening indices of habitat suitability described by Feyrer, et al. In addition, the Fall X2 criteria, which apply in Above Normal and Wet years, are subject to change under adaptive management, as are the more protective bypass flow requirements from December through June. This is explained in more detail below.

Moving the compliance point for the Export-to-Inflow limit calculation in the 2006 Plan to below the North Delta diversions could significantly worsen this effect. In addition, Exhibit DWR-1143 states that petitioners can divert at low-level pumping below the minimum bypass criteria. It states on page 8 that "allowable diversion will be [the] greater of the low-level pumping or the diversion allowed by the following bypass flow rules." This would be a new water right, allowing diversion no matter how low flows are on the Sacramento River, and one for which there is no water

availability. For these reasons, the Board must put minimum bypass criteria in the permit.

III. REQUIRED STUDIES OF FISH SCREENS HAVE NOT BEEN DONE.

The level of environmental uncertainty that the proposed fish screen design will create is high. The 2011 *BDCP Fish Facilities Technical Team Technical Memorandum* states

> "[t]here is a high level of uncertainty as to the type and magnitude of impacts that these new diversions will have on covered fish species that occur within the proposed diversion reach." (DWR-219, p. 33.) The proposed screens are experimental and have never been employed anywhere else. Their size (multiple, very large, and in close proximity), type (on-bank flat plate), and tidally influenced location make it almost impossible to conform to existing screening criteria.

(*Id.*, pp. 22, 33.)

At the lower end of the proposed bypass flows for the Sacramento River in the permit, the closest downstream gauge, maintained by the U.S. Geological Survey, shows that there are significant tidal effects in the reach of the Sacramento River above the Delta Cross Channel, and that flow velocities can be negative at low flows. (See attached technical memo, Exhibit PCFFA-205.)

But Marin Greenwood's testimony assumes that sweeping velocities will be above 0.4 feet per second when the North Delta Diversions are occurring:

> … the NDD would be screened with approach velocity of less than or equal to 0.2 feet per second, which is the USFWS recommended criterion for Delta Smelt.[] Per the incidental take limit of the NMFS BO (Exhibit SWRCB-106, Table 2-290, p. 1159), the screen sweeping velocity would be twice the approach velocity.

(Exhibit DWR-1012, p. 18:11 (footnote omitted).)

This assumption is clearly not met at the lower end of proposed tidally averaged bypass flows, which is 5,000 cfs. The range of tidally averaged bypass flows at which the screens would be protective would be clearer if the technical studies proposed in the National Marine Fisheries Service's ("NMFS'") 2013 *Work Plan: Intake Design Criteria and Performance Monitoring Development*[3] ("2013 Work Plan") had been done. The studies were proposed to be done within two years (*id.* at p. 9), and included the following:

[3] Exhibit PCFFA-206 is a true and correct copy of the document, obtained from http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/BDCP/fish-facilities-studies-work-plan.pdf

1. **Site Locations Lab Study** Optimize hydraulics and sediment transport issues at the selected sites.

2. **Site Locations Numerical Study** Develop site-specific numerical hydraulic models to characterize the tidal and river hydraulics and the interaction with the intakes under all proposed design operating conditions.

3. **Refugia Lab Study** Test and verify final recommendations for location, size, and configuration of refugia for the project.

4. **Refugia Field Study** Evaluate the effectiveness of using refugia as part of intake structure and fish screen design to provide holding habitat for juvenile fish passing the screen to recover from swimming fatigue and to avoid exposure to predatory fish.

5. **Predator Habitat Locations** Identify the locations and physical and biological characteristics for locations where predatory fish congregate, and develop design and management criteria that would serve to reduce predation risk at the proposed north Delta diversions.

6. **Predator Reduction Methods** Compile and synthesize information on effective methods to control predation on covered fishes by predatory fish, birds, and mammals.

7. **Flow Profiling Field Study** Characterize the water velocity distribution at river transects within the proposed river reach under varying flow conditions for calibration of the hydraulic models.

8. **Deep Water Screens Study** Identify the hydraulic characteristics for deep fish screen panels on the Sacramento River.

(*Id.*, p. 5.)

The Flow Profiling Field Study (#7), Site Locations Lab Study (#1), and Site Locations Numeric Study (#2) are essential to verify that the screens would have adequate sweeping velocities at the proposed lower bypass flows of 5,000 cfs. Without the studies, the assertions that the fish screens will be effective at the proposed locations and proposed minimum bypass flows is speculative. In my professional judgment, the Board should not approve the Change Petition without studies validating the proposed intake design, including locations and minimum bypass flows. But if the Board does approve the Petition, requiring higher minimum bypass flows in the permit (greater than 7,000 cfs) would help reduce the risk of severe adverse consequences.

Operating the North Delta diversions only with a positive sweeping velocity of at least 0.4 feet per second, as assumed in Mr. Greenwood's testimony, would also reduce the level of uncertainty about the effects of the screens. If the Board approves the North Delta diversions based on Mr. Greenwood's testimony, and without appropriate field studies and modeling, the Board should make these conditions a requirement in the permits. I therefore recommend the following permit terms:

> Permittee shall operate the North Delta diversions so that the approach velocity for the intake screens is less than or equal to 0.2 feet per second.
>
> Permittee shall not divert from the North Delta diversions when the downstream velocity at the intake screens is less than or equal to 0.4 feet per second.

The requirements would need to be met in real-time to avoid negative velocities due to tidal effects. To monitor that the requirements have been met, the Board should require real-time monitoring and reporting of velocities at each screen, and also of instream flows and diversions, in 15 minute increments, as well as tidally averaged. There is a precedent in the standards for the Delta fish protective facilities in Table II of Decision 1485. (Exhibit SWRCB-23, p. 45.)

IV. THE BOARD NEEDS TO MANDATE COMPLETE REPORTING OF DATA AT MONITORING LOCATIONS AND SWP AND CVP DIVERSIONS

Dr. Earle testifies that under adaptive management, the operational needs and uncertainties will be assessed by research projects in a collaborative setting:

> Through *Phase 2: Assess*, translate operational needs and uncertainties into research projects in a collaborative setting similar to the CSAMP process. The products developed during this phase will receive independent review led by the Delta Science Panel, and the outcomes of this research will provide the basis for future proposals for management adjustments developed during Phase 3.
>
> In *Phase 3: Integrate*, interagency and agency-stakeholder discussions, based on the results of Phase 2's scientific assessments, will inform development of management adjustment proposals and additional research alternatives through a structured decision-making process. This process will also lead to the development of additional adaptive management questions to continue to address operational needs, assess benefits and identify uncertainty.

(Exhibit DWR-1014, p. 6:15-26.)

The CWF H3+ modeling also contains specific projections of the changes in flow that will be caused by the North Delta Diversions. Examination of changes in flow in the lower Sacramento River and the Delta and correlations with trends in species populations will be critical for assessment of impacts of the new diversions.

But the Department of Water Resources is no longer reporting flow data necessary for stakeholders to participate in scientific assessments and adaptive management.

As explained in my technical memo, Exhibit PCFFA-205, as of the date of this testmony, the Department of Water Resources has stopped publishing tidally filtered flow data for monitoring locations in the Delta on the California Data Exchange Center ("CDEC") website. No flow data is being published on CDEC at DWR's station at Hood. The Water Board needs to add the locations at the three intakes as required monitoring locations, and require that 15 minute data for flow, stage, and velocity be reported at all monitoring locations, as well as tidally filtered flow data.

In addition, the CDEC only reports daily average diversions at the Banks Pumping Plant. The Water Board should require reporting of 15-minute average diversions at the North Delta diversions and Clifton Court Forebay, and hourly average diversions at the Banks and Tracy Pumping Plants, so that the full effects of combined diversions can be assessed.

Finally, as I previously testified, the Water Board's Environmental Impact Report and Joint Point of Diversion analysis for Decision 1641 relied on sources of water from Old River, and also assumed that only the South Delta diversions would be operated. Without an updated analysis, it is impossible to determine what the permit term allowing diversions "up to the full physical capacity of the facilities" would mean, and what the potential impacts would be on tidal levels.

The Board needs to include a permit term that the Joint Point of Diversion only applies to diversions in the South Delta. The Board should require DWR and Reclamation to submit their maximum proposed diversions at the North Delta diversions, and also maximum proposed simultaneous diversions in the North Delta and South Delta, for assessment of water rights compliance, and inclusion of appropriate terms in the permit.

V. CWF H3+ IS ONLY AN OPERATIONAL SCENARIO, NOT FINAL OPERATIONAL CRITERIA.

One of the key issues in this hearing has been whether the Petitioners would develop a final initial operating plan, completing what Dr. Earle referred to in his testimony as Phase 1 of the adaptive management process**:**

> During *Phase 1: Plan*, initial operation and research priorities are set through an *Operations Plan* and a *Science Plan*. These plans will set water supply expectations, clarify operational needs, and address uncertainties.

(Exhibit SWRCB-1024, p. 6:12-14.)

As explained below, although eight of DWR's witnesses have testified that an initial operations plan has been adopted for the WaterFix project, the underlying documents are clear that initial operations have *not* been finally determined and are subject to change. As a result, initial water supply expectations and operational impacts are still not finally determined. There has also been no analysis of any diversion permit terms that would limit long-term operations.

I also explain why, in my opinion, it would be against basic principles of computer simulation to rely on modeling scenarios which do not fully represent the boundaries of potential future operations for determination of impacts. To comply with the requirements to set "appropriate Delta flow criteria" and to avoid the same outcome as that of the required operations plan to protect fisheries in Decision 1641, the Water Board should define initial operations to protect fisheries as part of any order approving the Change in Point of Diversion. Changes to the "appropriate Delta flow criteria" can be addressed as part of review of the Bay-Delta Water Quality Control Plan.

The following discussion examines testimony by 8 of DWR's witnesses that CWF H3+ is the adopted project. The discussion is unavoidably lengthy, because it is like looking for the pea under coconut shells in a shell game. The discussion carefully examines the testimony and the referenced documents (the coconut shells), looking for the "pea" of a final initial operations plan. As explained below, the "pea" of actual adoption of CWF H3+ as the actual initial operations is missing.

A. Testimony by 8 witnesses on CWF H3+

DWR Witness Aaron Miller's testimony (Exhibit DWR-1011) states:

> For purposes of Part 2 of the hearing, including this testimony, the California WaterFix project is described by Alternative 4A under an operational scenario described as H3+ that is set forth in the Final Environmental Impact Report/Environmental Impact Statement and supplemental information adopted by DWR through the issuance of a Notice of Determination in July 2017 (2017 Certified FEIR). (Collectively Exhibits SWRCB-102, SWRCB-108, SWRCB-109, SWRCB-110, SWRCB-111 and SWRCB-112.) **The adopted project is referred to as CWF H3+.**
> […]
> The interrelationship and use of these terms is further described in the testimony of Ms. Buchholz, DWR-1010.

(*Id.*, p. 2:12-24.) The exact same sentences are in the testimony of the following witnesses:

Marin Greenwood (Exhibit DWR-1012, pp. 2:23-3:11.)

Richard Wilder (Exhibit DWR-1013, p. 3:11-24.)

Christopher Earle (Exhibit DWR-1014, p. 2:15-27.)

Tara Smith (Exhibit DWR-1015, p. 2:9-23.)

Erik Reyes (Exhibit DWR-1016, p. 2:6-20.)

Michael Bryan (Exhibit DWR-1017, p. 2:14-22.)

Douglas Rischbieter (Exhibit DWR-1024, pp. 2:15-3:1.)

These sentences appear to reflect an orchestrated effort by DWR to mislead this Board and the public. They are misleading, particularly the statement that "The adopted project is referred to as CWF H3+." As explained below, the H3+ operational scenario was *not* adopted by DWR in the NOD (Exhibit SWRCB-112), and was only designated as an "operational scenario" or "modeling assumptions" in the December 2016 Final EIR/EIS (Exhibit SWRCB-102), and Developments After the Final EIR/EIS (Exhibit SWRCB-108.)

DWR's CEQA Findings of Fact and Statement of Overriding Considerations (Exhibit SWRCB-110) also clearly state that specific initial operating criteria will be determined in the future through the continued adaptive management process:

> Prior to operation of Alternative 4A, specific initial operating criteria will be determined through the continued adaptive management process as outlined in the ESA Section 7 consultation process and CESA 2081(b) permit prior to the start of construction.

(*Id.*, p. 39.)

The following points, explained in further detail below, show that the implication in the above testimony and the testimony of DWR witness Gwen Buchholz (Exhibit DWR-1010) – that initial operations of CWF are already established – is not supported by any of the other documents cited in the above testimony.

1. **Operational scenario H3+ was not adopted by DWR in the WaterFix NOD.** The July 2017 NOD (Exhibit SWRCB-112) only refers to Alternative 4A, and Chapter 3 of the December 2016 Final EIR/EIS (Exhibit SWRCB-102).

2. **Operational scenario H3+ was not adopted by DWR in the 2016 WaterFix Final EIR/EIS.** Chapter 3 of the December 2016 Final EIR/EIS (Exhibit SWRCB-102) refers to H3+ in the (then Draft) Biological Assessment ("BA"), and states that while H3+ was used for the impact analysis, "actual operations will be ultimately depend on the results of the adaptive management program."
3. **Operational scenario H3+ was not adopted by DWR in the 2017 "Developments After the Final EIR/EIS."** The July 2017 "Developments After the Final EIR/EIS" (Exhibit SWRCB-108) simply lists H3+ as one of several "operational scenarios," and states that the H3+ criteria are described in the July 2016 BA (Exhibit SWRCB-104).
4. **The operational criteria in CWF H3+ are described as "changes" to "modeling assumptions" for the ESA and CESA consultations in the 2017 CEQA documents.** The July 2017 "Developments After the Final EIR/EIS" (Exhibit SWRCB-108) describes the operations criteria in CWF H3+ as the "Proposed Action" for "the California WaterFix Biological Opinions and draft 2081(b) ITP proposed action."
5. **The operational criteria in CWF H3+ are subject to further change.** The Biological Opinions of NMFS (Exhibit SWRCB-106) and the United States Fish and Wildlife Service ("USFWS") (Exhibit SWRCB-105) both state that the operations in the BA are "likely to change" before the project becomes operational. The CEQA Findings of Fact (Exhibit SWRCB-110) state that "specific initial operating criteria will be determined through the continued adaptive management process as outlined in the ESA Section 7 consultation process and CESA 2081(b) permit prior to the start of construction."

As explained below, the implication in testimony by Aaron Miller, Marin Greenwood, Richard Wilder, Christopher Earle, Tara Smith, Erik Reyes, Michael Bryan, and Douglas Rischbieter that actual operations of the project have been determined is thus not supported by the actual documents. It appears instead to be a legal fiction, asserted "for the purposes of Part 2 of the hearing." Contrary to the testimony of these 8 witnesses, the operational criteria in the CWF H3+ scenario are based on assumptions which are speculative.

B. Testimony by Gwen Buchholz on CWF H3+

The following discussion examines Ms. Buchholz' written and oral testimony on the CWF H3+ operational scenario in the context of the actual documents, and shows that the implication of her testimony that operations of the WaterFix project have been established is contradicted by the documents she cites.

Ms. Buchholz' written testimony (Exhibit DWR-1010) states "CWF H3+ was approved by DWR through filing of the NOD with the Governor's Office of Planning and Research, State Clearinghouse, on July 21, 2017. (Exhibit SWRCB-112.)" (*Id.*, p. 2:16-18.) But the NOD (Exhibit SWRCB-112) only states that Alternative 4A became DWR's preferred project under CEQA with the publication of the RDEIR/SDEIS:

> The California WaterFix[1], Alternative 4A, became DWR's CEQA preferred project under the California Environmental Quality Act (CEQA) and Reclamation's preferred alternative under the National Environmental Policy Act (NEPA) with the publication of the RDEIR/SDEIS.

(*Id.*, p. 4, emphasis added.) Footnote 1 directs the reader that "For a detailed description of California WaterFix please see Chapter 3 of Final EIR/EIS." (*Id.*, p. 4.) Thus, *the NOD does not mention any operational criteria for the WaterFix project.*

When questioned on the above passages in the NOD Ms. Buchholz stated:

> So it's Alternative 4A using the operational criteria of H3+ as described in the Final EIR that is -- This is the Notice of Determination adopting that document.

(R.T. February 22, 2018, 261:4-7.) But the description of H3+ in Chapter 3 of the Final EIR/EIS (Exhibit SWRCB-102) simply states that H3+ is an operational scenario, reflecting "assumptions" in the BA and that actual operations will ultimately depend on the results of the adaptive management program:

> The initial range of operations that is expected to be authorized through the Section 7 consultation and 2081(b) permit processes is as assumed to range between operational scenarios H3 and H4 at the early long-term time period. In order to facilitate an efficient analysis of impacts associated with a potentially large range of different operations that could be selected between H3 and H4, the analysis of Alternative 4A utilized Scenario H3 plus additional spring outflow (H3+) as an operational impact analysis starting point, to be consistent with the assumptions in the BA,

> which were being completed at the time of the Alternative 4A analyses. While the analysis for Alternative 4A in the resource chapters utilizes H3+ modeling results, actual operations will ultimately depend on the results of the adaptive management program.

(*Id.*, p. 3-262.) Thus, *the Final EIR/EIS (Exhibit SWRCB-102) states that actual operations have yet to be determined.*

When cross-examined on the above text on p. 3-262 of the Final EIR/EIS, Ms. Buchholz stated:

> … this was what we called 4A H3+ in the Biological Assessment, in the Final EIR/EIS, and then we subsequently developed CW – refined that to CWF H3+ in the 2017 Final EIR. So this was superseded by text [sic] the Final EIR.

(R.T. February 22, 2018, 262:15-21.) Ms. Buchholz' written testimony (Exhibit DWR-1010) also states:

> CWF H3+ includes operational criteria and environmental commitments presented in the 2017 Certified FEIR, including requirements from the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) Biological Opinions for CWF H3+, as summarized in Figure 1. (collectively, Exhibits SWRCB-102, SWRCB-108, SWRCB-105, and SWRCB-106.)

(*Id.*, p. 2:21-26.) But Exhibit SWRCB-108, the July 2017 "Developments After the Final EIR/EIS," only lists H3+ as an operational scenario, and refers to the July 2016 BA (Exhibit SWRCB-104). The specific scenarios modeled are:

No Action Alternative (NAA)

Alternative 4A, operational scenario H3 (4A-H3)

Alternative 4A, operational scenario H4 (4A-H4)

Alternative 4A, operational scenario Boundary 1 (4A-B1)

Alternative 4A, operational scenario Boundary 2 (4A-B2)

Alternative 4A, operational scenario H3+ (4A-H3+ or BA scenario)

The CalSim II modeling inputs, assumptions and operations criteria for each scenario, NAA and Alternatives 4A-H3, 4A-H4, 4A-B1 and 4A-B2, are detailed and compared within an exhibit submitted by DWR marked as DWR-515 (Modeling Assumptions Table), which has been accepted into evidence.

> The criteria associated with Alternative 4A-H3+, or the BA scenario, is described within the Biological Assessment available on the California

> WaterFix website and on the State Water Board water rights hearing website for California WaterFix and marked as SWRCB-104.

(Exhibit SWRCB-108, p. 97, emphasis added.)

A search for the term "H3+" in the July 2017 "Developments After the Final EIR/EIS" (Exhibit SWRCB-108) did not turn up any other definitions of H3+. Thus, *Exhibit SWRCB-108 only mentions H3+ as an operational scenario.*

"Developments after the Final EIR/EIS" (Exhibit SWRCB-108) does discuss changes to the BA Proposed Action modeling assumptions in the 2017 Biological Opinions. It states:

> **Overview of changes in the Proposed Action Modeling Assumptions**
>
> Operations criteria for the California WaterFix Biological Opinions and draft 2081(b) ITP proposed action were developed based on the feedback from the fishery agencies on the ESA Section 7 Biological Assessment and the draft 2081(b) permit application.

(*Id.*, p. 29.) *Thus Exhibit SWRCB-108 characterizes the operational criteria in CWF H3+ as "modeling assumptions" for the ESA and CESA processes.*

C. CWF H3+ and the ESA and CESA processes

The NMFS Biological Opinion (Exhibit SWRCB-106) also does not indicate that the criteria in the proposed action are requirements. Instead, it states:

> As described in Section 1.3.1.6 Operational Uncertainties and the Collaborative Science Process of this Opinion, the operational criteria for Delta facilities that are described in the CWF BA and in this Opinion are likely to change between the issuance of this Opinion and when the CWF becomes operational.

(*Id.*, p. 17, emphasis added.)

The NMFS Biological Opinion (Exhibit SWRCB-106) also states:

> With respect to operations, Reclamation and DWR have described and analyzed in the BA one scenario for the CWF, which presents operational criteria. The criteria were largely formed, in coordination with USFWS, NMFS, and the CDFW, at the time in the development of the PA when the NDD were proposed at a capacity of 15,000 cfs and when the PA included a 50-year Habitat Conservation Plan and Natural Communities Conservation Plan covering both listed and non-listed species. Thus, the operational criteria required to satisfy regulatory requirements for the CWF at the time operations commence are likely to be different from those presented in the BA.

(*Id.*, p. 20, emphasis added.)

The USFWS Biological Opinion (Exhibit SWRCB-105) is programmatic. It states:

> The following activities requiring future Federal approvals and therefore addressed programmatically are: (1) construction of the NDD and associated structures; (2) construction of the HORG; (3) construction of the CCWD settlement agreement facilities; (4) operations of new and existing CVP and SWP water facilities under dual conveyance; (5) future maintenance; (5) future monitoring; (6) compensatory mitigation associated with construction of the NDD, HORG, and CCWD settlement agreement facilities; and (7) the CWF Adaptive Management Program.

(*Id.*, p. 2, emphasis added.)

The USFWS Biological Opinion (Exhibit SWRCB-105) also states:

> The Service has analyzed the operational scenario for CWF included in the BA. The agencies recognize this operational scenario will change between now and the time that the CWF facilities are operational. Changes to the operational scenario will be analyzed in subsequent consultation.

(*Id.*, p. 2, emphasis added.)

It is clear from these passages in the NMFS and USFWS Biological Opinions (Exhibit SWRCB-106 and Exhibit SWRCB-105) that neither the NMFS nor the USFWS has determined the actual regulatory requirements for operations of the WaterFix facilities. *Thus the criteria in Exhibit SWRCB-105 and SWRCB-106 (the Proposed Action in the BAs) are simply operational scenarios, and not actual regulatory requirements.*

Ms. Buchholz' testimony (Exhibit DWR-1010) also states that "[a]dditional criteria were imposed by the California Department of Fish and Wildlife ("CDFW") in the Incidental Take Permit (ITP). (Exhibit SWRCB-107.)" (*Id.*, p. 2:26.)

But the CDFW Incidental Take Permit ("ITP") (Exhibit SWRCB-107) states:

> As a result of 1) uncertainty associated with current scientific understanding of Covered Species' needs and effects of CVP/SWP operations under current authorizations and the Project, 2) imprecision of modeling tools and 3) other management processes affecting the Delta operational criteria including two key drivers of operations, Fall X2 and spring outflow, the individual operational components described below may be subject to change based on new scientific information developed through the adaptive management process.

(*Id.*, p. 67.) Footnote 39 in Exhibit DWR-1143 also states:

> If best available science resulting from collaborative scientific research programs shows that Longfin Smelt abundance can be maintained in the absence of spring outflow, and DFW concurs, an alternative operation for spring outflow could be developed to follow flow constraints established under D-1641. Any changes in the PA will be implemented consistent with the CWFAMP, including coordination with USFWS and NMFS.

(*Id.*, p. 6.) *Thus the criteria in the ITP are also subject to change under the adaptive management process.*

In conclusion, neither the federal biological opinions nor the ITP indicate that actual initial operations of the project have been determined.

E. Reclamation's Reinitiation of Consultation on the Coordinated Long-Term Operation of the Central Valley Project and the State Water Project

It is unclear what CDFW meant in the ITP by "other management processes," including Fall X2 and spring outflow, but in December 2016, Reclamation, DWR, NMFS, USFWS and CDFW entered into a new NEPA process, the Reinitiation of Consultation on the Coordinated Long-Term Operation of the Central Valley Project ("CVP") and the State Water Project ("SWP"), as documented by the Memorandum of Understanding (Exhibit DDJ-227.) The parameters of this process are currently unclear, but meeting notes from Reclamation's February 14, 2017 stakeholder meeting (Exhibit DDJ-228) state:

> Q: How does the scope of this ROC fit with the on-going ESA consultation for California Water Fix?
> R: Reclamation has not defined the exact approach to this ROC, however there is a basic assumption that if the project period extends to 2070, then Water Fix may be operable and this project would have to consider/model according to Water Fix impacts on CVP/SWP.

(*Id.*, p. 2.) Ms. Buchholz testified that "some of the documents published by Reclamation have indicated" that the WaterFix project is part of the consultation. (R.T. February 21, 2018, 267:1-3.) A discussion draft memo from the CVP and SWP South of Delta contractors, obtained by PCFFA/IFR by means of a subpoena to CDFW, indicates that the South of Delta contractors are discussing "modifying the current OMR range to allow for more negative OMR," and "eliminating the Fall X2 requirement." (Exhibit PCFFA-204, p. 1.) While only a draft, this document clearly illustrates the kinds of efforts

that are made by the South of Delta contractors to weaken or eliminate regulatory constraints on Delta exports.

Reclamation's February 14, 2017 meeting minutes state that CDFW's CESA process would be concurrent with Reclamation's NEPA process, and "should have meaningful interplay."

> CDFW is developing permits for SWP CESA operations; the current consistency determination is satisfied by complying with the existing BOs, but the existing permit expires in 2018. DFW will evaluate re-doing species' authorizations as well as issuing a permit for delta smelt, winter-run, and spring-run Chinook salmon versus doing another consistency determination. CESA requires full mitigation of negative effects. The CESA process will consider Water Fix, address adaptive management, and rely on peer review. NEPA and CESA should have meaningful interplay, and the processes will be concurrent.

(Exhibit DDJ-228, p. 3.) But Reclamation's operations witness, Kristin White, did not know what "meaningful interplay" of the NEPA and CESA processes meant and could not provide an answer on cross-examination. (R.T. March 1, 2017 174:8-22.) There is thus significant uncertainty in the ultimate outcome of the NEPA and CESA processes.

VI. THE H3 AND H4 OPERATIONAL SCENARIOS DO NOT BOUND THE ULTIMATE OPERATIONS CRITERIA.

The way that modelers deal with uncertainty in operational criteria (or other model inputs) is to bracket the range of potential operations (or model inputs) and do a boundary analysis. Here the written testimony of Aaron Miller (Exhibit DWR-1011) states that the initial operational criteria "would fall within a range of operations described as H3 to H4.'"

> In testimony submitted in Part 1 of this hearing, the project was described as Alternative 4A with initial operational criteria that would fall within a range of operations described as H3 to H4. These operational criteria were described in the Recirculated Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS).

(*Id.*, p. 2:8-12.) The exact same sentences are in the testimony of the following witnesses:

Marin Greenwood (Exhibit DWR-1012, p. 2:20-23.)

Richard Wilder (Exhibit DWR-1013, p. 3:6-11.)

Christopher Earle (Exhibit DWR-1014, p. 2:12-15.)

Tara Smith (Exhibit DWR-1015, p. 2:5-9.)

Erik Reyes (Exhibit DWR-1016, p. 2:2-6.)

Michael Bryan (Exhibit DWR-1017, p. 2:10-14.)

Douglas Rischbieter (Exhibit DWR-1024, p. 2:11-15.)

But the 2017 NMFS Biological Opinion (Exhibit SWRCB-106) does not specify *any* boundaries on future changes to the operational criteria in Reclamation's Proposed Action. The USFWS Biological Opinion (Exhibit SWRCB-105) is programmatic, as explained above. DWR witness Jennifer Pierre also testified in Part 1 (Exhibit DWR-51) that H3 and H4 were simply speculative "operational scenarios:"

> The operating scenarios evaluated, in conjunction with the proposed CWF conveyance improvements, in the EIR/S include:
>
> The initial operating criteria anticipated to be required for the proposed project for ESA and CESA permitting purposes, and which are presented in the RDEIR/SDEIS, Chapter 4, with Alternative 4A (the proposed project) as a range between Operating Scenario H3 and Scenario H4.

(*Id.*, pp. 10:22-11:5, emphasis added.) Ms. Pierre also testified that:

> [s]ince the BiOp has not been issued, and DWR and Reclamation do not know the initial operational criteria, the analytical framework presented for Part 1 is a boundary analysis.

(*Id.*, p. 10:8-10.) Thus Ms. Pierre's testimony in Part 1 was that the H3 and H4 operational scenarios were based on speculation about the outcomes of the ESA Section 7 and CESA Section 2081 permitting processes. The Part 2 testimony by Aaron Miller, Marin Greenwood, Richard Wilder, Christopher Earle, Tara Smith, Erik Reyes, and Michael Bryan that "In testimony submitted in Part 1 of the Hearing, the project was described as Alternative 4A with initial operational criteria that would fall within a range of operations described as H3 to H4" (emphasis added) attributes a certainty to H3 and H4 that is completely absent from Ms. Pierre's testimony in Part 1. Although the NMFS and USFWS Biological Opinions have been issued since Ms. Pierre's testimony was submitted in 2016, the outcome of the ESA consultation process is still undetermined. As explained above, both the NMFS and USFWS Biological Opinions state that the initial operating criteria will be determined in the future through the adaptive management process. So H3 and H4 remain simply speculative "operational

scenarios" and do not bound the outcome of the adaptive management process.

VI. CWF H3+ IS LIKELY INFEASIBLE UNLESS THE CURRENT COORDINATED OPERATING AGREEMENT IS CONTINUED.

Aaron Miller's testimony (Exhibit DWR-1101 states:

> . . . I have reviewed and evaluated the entire proposed operating criteria described by CWF H3+ and I have determined that it is possible to operationalize all the intended protections described by the modeling assumptions for CWF H3+.

(*Id.*, p. 6:11-14.) But Mr. Miller's testimony appears to be carefully worded. While it is *possible* to operationalize CWF H3+, the CVP and SWP shares of reservoir releases to meet in-basin needs in CWF H3+ are dictated by the current COA. Kristin White, Reclamation's Deputy Operations Manager for the Central Valley Project Operations Office in Sacramento (Exhibit DOI-41), summarized the requirements of the COA on cross-examination in Part 2, verifying that:

1. Storage withdrawals for in-basin use are 75% CVP and 25% SWP.
2. Exports of unstored flow are 55% CVP and 45% SWP.

(R.T. March 1, 2018, 178:13-22.)

Erik Reyes verified on cross-examination that these assumptions are included in the CWF H3+ model. (R.T. March 1, 2018, 181:24-182:2.) John Leahigh also testified in Part 1 of the WaterFix hearing that reservoir operations of the SWP and CVP were not changing:

> As described below in Section V, the actions SWP/CVP will take to ensure In-Basin Requirements are met before any water is diverted for export will remain unchanged with the implementation of the CWF.

(Exhibit DWR-61, p. 5:23.) Exhibit DWR-1-errata-corrected also states that upstream operations for the project are not changing.

But Kristin White testified that the COA is subject to renegotiation when there are new facilities, and that Reclamation is "working with DWR on how to – how to meet in-basin requirements and share exports." (R.T. March 1, 2018, 181:16-23.) NMFS' Biological Opinion (Exhibit SWRCB-107) also indicates that the COA is not included in the Proposed Action. (Table of "Facilities and Activities not included in the PA," pp. 3-5.)

The renegotiation of the COA has greater significance, given that the Board of Westlands Water District, voted 7-1 in September 2017 *not* to participate in the WaterFix project. (Exhibit FOR-80, p. 1.) Westlands is Reclamation's largest South of Delta export contractor. Kristin White testified that at this point in time, Reclamation does not know what part of the water conveyed through the North Delta diversions would be CVP water. (R.T. March 1, 2018, 169:10-16.)

The ability of the CWF H3+ scenario to meet the requirements in Decision 1641 and the 1995 Bay-Delta Water Quality Control Plan (Updated in 2006), is largely based on the storage releases in the COA. The 75%/25% ratio of obligations for storage releases in the COA is roughly proportional to the CVP and SWP share of the projects' reservoir storage in the Sacramento Valley, plus Trinity Reservoir. According to the CDEC, the CVP and SWP reservoirs have the following capacities:

Project	Reservoir	Capacity (MAF)
CVP	Shasta	4.55
CVP	Folsom	0.98
CVP	Trinity	2.45
SWP	Oroville	3.54
	Total	11.52

According to the CDEC capacities, Oroville reservoir has about 31% of the joint project storage capacity, and Shasta, Folsom, and Trinity have about 69%.

If the State Water Project's share of required storage releases increased, it would likely result in increased drawdown of Oroville reservoir, and draw Oroville down more rapidly to dead pool during droughts. Thus "operationalizing" CWF H3+ without adverse consequences to Oroville carryover storage is largely dependent on the current COA.

The significance of the risk to in-basin needs is greater because the Final EIR/EIS (Exhibit SWRCB-102) states that the North Delta diversions could ultimately be used to abandon salinity control in the Delta:

> The location of the north Delta diversion facility is further inland making it less vulnerable to salinity intrusion. Even with substantial sea level rise and critically dry upstream conditions, salinity could be repelled from this location. By establishing an alternative diversion point for Delta exports, a great deal of Delta management flexibility is added. Currently, management of the Delta is constrained by requirements to maintain X2 at

> specific locations during certain times of the year to ensure water diversions have low salinity and to ensure that critical fish populations stay outside of the entrapment zone. Alternatives 1A–2C, 3, 4, and 5 would allow the Delta to be managed in a number of different ways, including maintaining salinity as it is currently managed or allowing salinity to fluctuate more freely in the Delta as it did prior to the development of upstream reservoirs.

(*Id.*, p. 29:16.) Abandonment of salinity control as a response to critically dry conditions would result in unstudied, potentially catastrophic injury to beneficial uses in the Delta.

The COA was also fundamental to the Central Valley Project and State Water Project permits. In Decision 990, when the issue of shortages of water supply for the Central Valley Project and the State Water Project permits came up, the Board recessed the hearing and requested that Reclamation and DWR reach a solution (Decision 990, Exhibit DDJ-98, p. 58.) The result was the 1960 Coordinated Operating Agreement. The Racanelli decision, *United States v. State Water Resources Board* (1986) 182 Cal.App.3d 82, also mentions the COA:

> In 1960 the U.S. Bureau and the DWR entered into a preliminary agreement for the coordinated operation of the two projects. That agreement provides for a sharing of water in the Delta in times of shortage "after the consumptive use requirements of the Delta Lowlands are met" and commits the projects to meet certain requirements "for navigation, fish conservation, outflows from the Delta, and water service through direct diversions from [Feather River water] . . . to the Delta Lowlands."

(*Id.*, 182 Cal.App.3d at 131.)

The COA was also fundamental to the finding that in-basin needs would be met. The 1986 Coordinated Operating Agreement EIR/EIS states that when Bay-Delta Water Quality standards are met, "all other in-basin use requirements are being met, because the Delta gets only the water that remains after upstream uses have been satisfied." (Exhibit FOR-103, PDF p. 194.)

The Board should not issue a permit for the requested 9,000 cfs in diversions if the COA is being changed in unspecified ways. However, if the Board nonetheless issues a permit, the Board should require the Petitioners to enter into a binding coordinated operating agreement for the State Water Project and Central Valley Project with the new 9,000 cfs WaterFix facility that includes modeling that can confirm implementation of the agreement. But if the Board instead chooses to approve the WaterFix project based on the WaterFix Final EIR/EIS, and the modeling presented in Part

1 or Part 2, all of which assumes the current COA, the Board should put the current COA in the CVP and SWP permits, "until further Order of the Board." This would require the Petitioners to come back to the Board with the new Coordinated Operating Agreement for meeting Bay-Delta Water Quality Control Plan standards, when they negotiate the new Coordinated Operating Agreement. If this Board approves the permit notwithstanding our objections, I suggest the following permit terms:

CVP permits:

Until further order of the Board, permittee shall provide 75% of the storage releases to maintain water quality standards during balanced conditions.

SWP permits:
Until further order of the Board, permittee shall provide 25% of the storage releases to maintain water quality standards during balanced conditions.

If these permit terms are not acceptable to the Petitioners, the Board should put the following term in the CVP and SWP permits:

Until further order of the Board, Permittee may not divert from the North Delta diversions during balanced conditions.

This would allow Petitioners to divert unstored flows with the North Delta diversions, but require them to come back to the Board with a proposal for providing storage releases for the North Delta diversions.

I declare under the penalty of perjury that the foregoing testimony represents my best professional judgment and is based on my review of the referenced documents. Executed on this 13th day of July, 2018, in Santa Cruz, California.

Deirdre Des Jardins