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**BEFORE THE
CALIFORNIA STATE WATER RESOURCES CONTROL BOARD**

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

REVISED TESTIMONY OF CHRIS
SHUTES

I, Chris Shutes, do hereby declare:

I. INTRODUCTION

My name is Chris Shutes. I work as a consultant to the California Sportfishing Protection Alliance (CSPA). My titles with CSPA are FERC Projects Director and Water Rights Advocate. I have worked on hydropower and water rights issues for CSPA since 2006. Prior to beginning my work as a consultant to CSPA, I worked as a volunteer in the relicensing of two hydropower projects in the American River watershed over the course of five years. Primarily through my hydropower work, I have developed expertise in interpreting the output of water balance models and in analyzing the interrelation of reservoir storage, instream flow, hydropower production and consumptive water use. In my water rights work for CSPA, I have provided written and oral testimony in three hearings before the State Water Resources Control Board (Board) relating to water rights applications, including the 2008 hearing on the revocation

of the Bureau of Reclamation's permits for Auburn Dam. I have also provided oral and written comments in multiple Board workshops and board meetings. In 2014, 2015 and 2016, I drafted many of CSPA's protests, objections and petitions for reconsideration of Temporary Urgency Change Petitions filed by the Department of Water Resources (DWR) and the Bureau of Reclamation (Bureau) in response to hydrological conditions created by drought and by the operation of the State Water Project (SWP) and Central Valley Project (CVP). My statement of qualifications (Exhibit CSPA-3) lists many of the hydropower projects on which I have worked and some of my experience before the Board; it also provides more detail regarding work experience relevant to my testimony.

The bulk of my testimony concerns operation of SWP and CVP reservoirs. I will describe how the operation of the California Water Fix (CWF) will increase already-existing systemic pressure deplete storage in the reservoirs of the SWP and CVP. I will describe how recent SWP and CVP operation, and other factors, make it reasonable to expect that the Department of Water Resources (DWR) and the Bureau of Reclamation (Bureau) will operate SWP and CVP reservoirs to increase export of stored water through the new North Delta Diversion. Such operation will reduce the availability of stored water to meet all in-Basin uses, which will in turn injure legal users of water.

A second aspect of my testimony will discuss the improper reliance of DWR and the Bureau in the CWF proceeding on water rights permits whose time to put water to beneficial use has expired.

II. OVERVIEW OF TESTIMONY

A. Reservoir Operations

The testimony of DWR and the Bureau in this proceeding, and the NEPA and CEQA review that they have offered in support of CWF, have not defined or quantified either current operation of the SWP and CVP reservoirs or planned future operation of these reservoirs if the proposed CWF North Delta Diversions (NDD) are constructed and operated. DWR and the

Bureau have provided only general descriptors: they claim that their reservoir operations are “conservative,” and that they will not change if CWF facilities are constructed and operated. There are no numeric carryover storage requirements for any of the major project reservoirs (Trinity, Shasta, Oroville, Folsom, New Melones, and Millerton).

CalSim II modeling in support of the proposed CWF does not clarify baseline reservoir operations, No Action Alternative reservoir operations, or planned reservoir operations under CWF. The reservoir levels simulated in CalSim II model runs in support of CWF are not binding on SWP and CVP operators, and the documentation for the modeling does not describe the actual rules that govern the modeled operations. Within the constraints (especially D-1641) of CWF model runs, real world operators have significant discretion to draw down project reservoirs lower than the levels shown in modeling results.

There is no evidence that, if CWF is approved and constructed, DWR and Bureau will maintain baseline reservoir operations (whatever they may be) or reservoir operations that are more conservative than baseline. On the contrary, the projects will be under tremendous pressure to increase export of water stored in SWP and CVP reservoirs, particularly in wetter water years. Increased export of water stored in SWP and CVP reservoirs would exacerbate storage conditions in those reservoirs in subsequent dry water years, particularly when subsequent dry water years become part of dry year sequences. Increased exports of stored water in wetter water years will increase the risk that during dry year sequences, storage in project reservoirs will be insufficient to meet in-Basin uses.

There is no basis to assume that additional diversion of unregulated flow using CWF facilities will reduce pressure on SWP and CVP reservoirs. Instead, it is much more reasonable to expect that the availability of greater, more frequent and more efficient export capacity because of CWF will add unregulated exports to existing and in some cases greater levels of export of stored water.

Based on my experience with diverse reservoir operations in California, including those of the SWP and CVP, it is reasonable to expect that DWR and the Bureau will seek to minimize

the effect of constraints on project operations in order to increase contract deliveries and exports if CWF is approved. It is also reasonable to assume that SWP and CVP contractors will advocate to regulators, to the media, and to political representatives to weaken those constraints, both in the long-term and in short-term periods of low storage levels, in order to allow greater export of stored water to SWP and CVP contractors.

Over the past 15 years, and particularly during the 2012-2015 drought period, operation of SWP and CVP reservoirs already affected legal users of water by limiting water supplies and degrading water quality in the Sacramento – San Joaquin Bay-Delta. The Biological Assessment for the CWF has already indicated that with CWF operating, DWR and the Bureau will count on Temporary Urgency Change Petitions (TUCPs) in successive dry years to weaken in-Basin standards. Operation under such TUCPs in particular will injure legal users of water.

B. Water Rights Improprieties

DWR and the Bureau have presented their petitions to add a point of diversion and rediversion in their respective water rights permits. However, the permits that the petitioners seek to amend have expired.

On June 23, 2009, the Bureau filed an en bloc petition for extension of time for its CVP permits, many of which are now the subject of the current change petition for CWF. The supplement to the Bureau's 2009 petition states that the time limit to put water to beneficial use under the Bureau's permits ended in 1990, with the exception of one permit whose time limit ended in 1997. The Bureau sought in 2009 to extend the time on its subject permits to 2030. The Board noticed the Bureau's June 23, 2009 petition on September 3, 2009. Many parties filed protests. On behalf of CSPA, I timely filed a protest of the Bureau's June 23, 2009 petition on October 30, 2009. On December 14, 2009, the Board accepted CSPA's protest. The Board has not acted on the Bureau's 2009 petition. CSPA's protest remains unresolved.

On December 31, 2009, DWR filed an en bloc petition for extension of time for its SWP permits, many of which are now the subject of the current change petition for CWF. The

supplement to DWR's 2009 petition states that the time limit to put water to beneficial use under the permits expired on the date DWR filed the petition. DWR sought to extend its permits for five years, until 2015, at which time DWR suggested it might need to file an additional petition. Several parties filed protests. On behalf of CSPA, I timely filed a protest of DWR's December 31, 2009 petition on October 13, 2010. On December 9, 2010, the Board accepted CSPA's protest. The Board has not acted on DWR's December 31, 2009 petition for extension of time. CSPA's protest remains unresolved.

Both DWR and the Bureau pointed in 2009 to the outcome of the Bay-Delta Conservation Plan (BDCP) as likely determinative in their ability to provide greater definition to their respective petitions for extension of time. The Bureau went so far as to suggest that the EIR/EIS for BDCP might serve as the environmental document for its petition for extension of time.

In our joint 2016 protest of DWR and the Bureau's petition for change in the point of diversion for CWF, CSPA, CWIN and AquAlliance raised the irregularity and procedural impropriety of petitioners' effort to change the point of diversion in permits that have expired, without resolving that expiration. The Board has until now also not moved to close this procedural loop.

In my testimony regarding water rights below, I provide a rationale for why the Board should not allow modification of DWR and the Bureau's expired water rights permits, but should require DWR and the Bureau to apply for new water rights. I also provide supporting documentation.

III. PETITIONERS DWR AND THE BUREAU HAVE NOT DESCRIBED OR QUANTIFIED BASELINE SWP AND CVP RESERVOIR STORAGE OPERATIONS, NO ACTION RESERVOIR STORAGE OPERATIONS, OR PROPOSED RESERVOIR STORAGE OPERATIONS UNDER CWF.

The NEPA and CEQA documents in support of CWF, and the case-in-chief of petitioners DWR and the Bureau, provide no description of baseline reservoir operations, reservoir operations under the No Action Alternative, or reservoir operations under CWF.

~~A. The NEPA and CEQA Documents Provide Modeling Results in Place of an Affirmative Description of Baseline, No Action, and Proposed Future SWP And CVP Reservoir Operations.~~

~~In *County of Amador et al. v. El Dorado County Water Agency et al.* (1999) 76 Cal.App.4th 931 [91 Cal.Rptr.2d 66], a California court of appeals laid out basic requirements for describing reservoir operations in a CEQA document. The court stated at pp. 955-956:~~

~~We agree that a mere recitation of end-of-month lake levels does not provide an adequate description of the existing environment or how PG&E determined water releases. The hydrologist himself referred to this data as a "a presentation of historical observations, rather than an operational analysis."~~

~~The month-end water level is only one element of the operation. Just as important to fisheries, river habitation, and recreational users is how those lake levels were determined. When were releases made and at what rate? What were the factors that determined when releases would be made? Are those factors equally applicable for purposes of power generation and inelastic consumptive use? ... Reliance on lake levels alone is insufficient to describe the current release program or to assess the impacts of the proposed project.~~

~~Nor does the FERC license describe existing conditions. Minimum stream flow requirements do not describe actual water releases. An EIR must focus on impacts to the existing environment, not hypothetical situations. [internal citation omitted] The fact that water flow must be kept at a certain minimum level does not reveal what flows were actually maintained; higher water flows would comport with FERC requirements, but might adversely affect lake levels and/or the downstream environment.~~

~~The underlying message of *Amador v. El Dorado* is that it is inadequate to say that reservoir operations will not change with a proposed project. A CEQA document has to describe and analyze both the baseline operation and the operation under the proposed project. The voluminous 2013 DEIS/DEIR for the Bay Delta Conservation Plan and the 2015~~

~~RDEIR/SDEIS for WaterFix do not meet this basic requirement. Instead, these documents default to model output in Chapter 5 and Appendix 5A of the DEIS/DEIR, and to Chapter 4 of the 2015 RDEIR/SDEIS, which provide modeled end-of-month storage plots. In addition to the lack of narrative explanation, reliance on model output is deficient because it does not describe baseline conditions based on historic operations.~~

~~The practical effect of this deficiency for an analyst who seeks to evaluate reservoir operations under the proposed project, and the effect of these operations on legal users of water, is the need to turn to other sources to understand the range of existing and proposed future CVP and SWP reservoir operations and their effect on legal users of water. *Amador v. El Dorado* describes substantive as well as legal deficiencies that hinder reasoned analysis.~~

B.A. The Testimony of DWR and the Bureau Does Not Describe Baseline, No Action, or Proposed Future SWP and CVP Reservoir Operations.

The Hearing Officers for the CWF elected to stagger the deadlines for testimony in the CWF hearing process because the operation of the proposed CWF was not clear from the environmental documentation. The testimony of the proponents, and cross-examination, was supposed to help illuminate how the SWP and CVP would operate under CWF.¹

The California WaterFix Overview (DWR-1e) told us “What isn’t changing.” This included “upstream operations of SWP/CVP.”² However, on cross-examination, Ms. Pierre and others clarified that this statement alluded to the fact that the *criteria used to meet regulatory constraints* on upstream operations would not change. The Operations presentation made as part of DWR’s case-in chief (DWR-4e) starts with an “overview of water system operations” that says nothing about existing or proposed reservoir storage.³

¹ The February 11, 2016 Prehearing Conference Ruling of the Hearing Offices explains at p. 2: “The other parties participating in Part 1 of the hearing will present their cases in chief beginning on June 23, 2016 (now Part 1B of the hearing). This approach will give petitioners the opportunity to fully explain their proposed project and should give the other hearing parties the ability to better evaluate how their interests may be affected before they begin their cases.”

² Exhibit DWR-1e, page 11.

³ Exhibit DWR-4e, pp. 2-4.

The same Operations presentation says that North Delta Diversions will “[i]ncrease opportunity to use existing water rights” through “[r]e-diversion of stored water during balanced conditions.”⁴ However, on cross-examination, witnesses clarified that their understanding was primarily that this applied to short-term operations, and was unlikely to affect reservoir storage on an annual basis.

On cross-examination, Mr. Leahigh offered the qualification that as operator of the SWP he might consider exporting more stored water in “wetter” water years. Neither in direct testimony nor in cross-examination did Mr. Leahigh define “wetter” water years or how much additional stored water he might consider exporting. While in oral testimony and cross-examination, SWP operator Mr. Leahigh and CVP operator Mr. Milligan both characterized their respective reservoir operations as “conservative,” neither of these witnesses, nor any of their colleagues, provided a written description of operating rules of that would provide definition to this characterization.

~~Testimony in a water rights proceeding is not the same as analysis in a CEQA document. However, the absence of a CEQA document that describes reservoir operations strongly suggests that basic analytical requirements must apply in a water rights proceeding.~~ Simply defining how an existing project operates to meet the constraints that condition a project, or how a project with proposed new facilities would operate to meet constraints, is not the same as providing an operational description and analysis of how an existing project operates to meet *all project purposes* or how proposed new facilities will change such operation. ~~This is the practical issue that is lucidly stated as a legal mandate in *Amador v. El Dorado* as quoted above.~~

Stated differently, part of the water to meet SWP and CVP contracts comes from export of stored water. The testimony of Mr. Leahigh and Mr. Milligan does not explain how the SWP and CVP determine how much stored water their respective projects will deliver in any given year. Mr. Milligan simply calls out a few of the elements that go into the allocation process, stating:

⁴ *Id.*, p. 35.

The allocation process typically occurs from February through May, potentially longer if hydrologic conditions change. Each month beginning in February, Reclamation utilizes the forecasted runoff prepared by DWR to develop a forecast of water available for CVP operations. ... After meeting all regulatory criteria and obligations in this forecast process, Reclamation determines the project water supply available for delivery to water service contractors. Reclamation's initial allocations are typically made in February and can be adjusted throughout the year to reflect changing hydrology, regulatory conditions or other factors.⁵

The testimony offers no description of the criteria the Bureau uses to determine allocations, let alone the criteria by which it would determine how much stored water it would export when CWF's NDD facilities were in place. Instead, the testimony is limited to what might be called the sideboards within which the Bureau makes allocation decisions. The testimony of Mr. Leahigh is no more forthcoming on this issue than that of Mr. Milligan.

C.B. The NEPA and CEQA Documents for CWF, and DWR and Bureau Testimony, Improperly Substitute Rule Curves Embedded in CalSim II Modeling for a Description, Quantification and Analysis of Baseline, No Action Alternative, and Proposed Future Reservoir Operations.

The modeling of reservoir operations that proponents have presented to the Board in this proceeding fundamentally confuses the map and the territory. A proper description of existing and proposed future operations describes what proponents have asked modelers to model and then describes how the model makes fundamental and basic decisions to achieve the requested outcome. The proponents in this proceeding have done so only selectively: they have chosen and presented certain elements that they seek to emphasize and compare. Their decision makers have provided the modelers different alternatives for those elements. Between alternatives Boundary 1, Boundary 2, H3, H4, and the No Action Alternative, the proponents describe different inputs for Delta outflow, OMR restrictions, Head of Old River Barrier/Gate, South

⁵ Exhibit DOI-7, p. 3.

Delta export preference, and fall X2. DWR provides these modeling inputs in Exhibit DWR-515.

Insofar as operation of SWP and CVP reservoirs is concerned, the proponents describe upstream operations for all modeled alternatives as “[historical] with modifications for operations upstream of rim reservoirs and with changed climate at Year 2030.”⁶ Exhibit DWR-515, Table 4 shows that reservoir assumptions are unchanged from No Action Alternative, which is the same as baseline adjusted for climate change and for additional predicted deliveries as of 2025. However, in order to discern what these adjusted historical inputs for reservoir operations actually are, including the baseline, the proponents require that affected parties dig into modeling code in order to understand what modelers told the model to do and how the model would prioritize operational decisions at those reservoirs.

CSPA lacks the expertise to dig into modeling code, and lacks the resources to hire a consultant with such expertise. It is beyond my current personal expertise and resources to dig into even the model output for CWF from the CalSim II modeling that DWR provided in May to parties in the CWF hearing. For my testimony regarding reservoir operations, I therefore rely on the written and oral testimony of DWR and the Bureau in this proceeding, on statements their representatives made on cross-examination in this proceeding, and on documentation and analysis that DWR and the Bureau have provided in their NEPA and CEQA documents in support of CWF and its predecessor, the “Bay-Delta Conservation Plan” (BDCP). From these combined sources, I believe it is possible to draw inferences about why CWF will injure legal users of water that in some cases were not discernable from the NEPA and CEQA documentation alone.⁷

⁶ Exhibit DWR-515, p. 1 “Table 4.”

⁷ CSPA also lacks the resources to purchase transcripts of these proceedings. Therefore, I rely on video where available and on notes I have taken while attending hearings or watching on webcast to report and discuss the statements of DWR and Bureau witnesses as accurately as I possibly can.

IV. THE BOARD CANNOT RELY ON THE CALSIM II MODEL OUTPUT PRESENTED IN THIS PROCEEDING TO EVALUATE STORAGE OPERATIONS OF CVP AND SWP RESERVOIRS UNDER CWF.⁸

A. There Is No Variation Within Modeled Scenarios of Rules Governing Reservoir Operations.

The use of the term “boundary” in the testimony of DWR and the Bureau suggests that CWF proponents have analyzed the range of conditions under which they might operate their projects. Ms. Pierre discusses the function of the boundary analysis: “These boundaries are sufficiently broad so as to assure the State Water Board that any operations considered within this change petition proceeding have been evaluated with regard to effects on legal users of water.”⁹ In cross-examination, at least one witness for proponents used the term “bookend” to characterize the boundary approach. Yet referring again to Table 4 of Exhibit DWR-515, there is no variation among modeled alternatives in how the proponents modeled reservoir operations. The “bookends” only contain one book. For reservoir operations, CalSim II model output cannot be used in the manner described by Mr. Munévar in his testimony: “CalSim II results are intended to be used in a comparative manner, which allows for assessing the changes in the SWP/CVP system operations and resulting incremental effects between two scenarios.”¹⁰

Under cross-examination by Mr. Lilly, Mr. Munévar admitted that the San Luis rule curve and the rule curves for upstream reservoirs do not vary in any of the modeled alternatives. More affirmatively, Mr. Munévar admitted that for all alternatives presented in this proceeding, the rules employed in the model are to maintain storage or improve upstream storage in modeled scenarios. Mr. Munévar further stated that he had not analyzed variations that would move more stored water to San Luis that are not included in the Boundary Analysis, but that one could “concoct” them.

⁸ In objections to testimony and cross-examination, some parties to this proceeding have questioned the technical validity of CalSim II on various grounds. My testimony does not address this issue, and is not dependent on its resolution.

⁹ Testimony of Jennifer Pierre, Exhibit DWR-51, p. 10, ll. 11-14.

¹⁰ Testimony of Armin Munévar, Exhibit DWR-71, p. 13, ll. 2-4.

Mr. Munévar’s use of the term “concoct” in this context on cross-examination was, in my opinion, very unreasonable. In my professional experience in many watersheds, I have routinely used the output from water balance models to analyze and evaluate trade-offs between reservoir storage, instream flow and water deliveries. The CalSim II modeling for WaterFix should have treated reservoir storage as a variable, not a constant. In order to evaluate potential impacts to legal users of water, as well as to public trust resources, the project proponents should have defined, catalogued and evaluated a range of reservoir operations scenarios independent of the other variables that they analyzed. The proponents should then have used these scenarios to perform sensitivity analyses against the existing simulations (Existing Condition, the No Action Alternative, Boundary 1, Boundary 2, H3 and H4). In particular, the proponents should have defined and run a “High Exports, Low Storage” scenario in which the SWP and CVP conformed to all in-Basin requirements with a frequency equivalent or close to already-modeled scenarios, but otherwise prioritized exports over storage. Running this scenario under each of the existing simulations would have served the function of providing close to a boundary analysis for purposes of evaluating the impacts of reservoir operations to legal users of water.

B. Rule Curves Embedded in Calsim II Do Not Constrain Project Operators in CVP and SWP Reservoir Operations.

Both Mr. Leahigh and Mr. Milligan stated on cross-examination that none of the major SWP and CVP storage reservoirs have numeric carryover storage requirements, and that they would oppose such requirements. No numeric carryover storage requirements for any of the SWP and CVP reservoirs are embedded in CalSim II. Both Mr. Leahigh and Mr. Milligan confirmed on cross-examination that the rule curves in CalSim II do not bind their operational decisions. On cross-examination by Mr. Kelly, Mr. Leahigh stated that his operational decisions about reservoir storage levels depend on what he is “comfortable with.” Mr. Leahigh confirmed this statement on cross-examination by me. Mr. Leahigh stated that he does not use CalSim II in developing water supply allocations in any given year. Both Mr. Leahigh and Mr. Milligan

stated on cross-examination that they primarily use spreadsheet models and forecasting by DWR to develop annual operations plans and contract allocations.

On cross-examination by Mr. Lilly and others, both Mr. Leahigh and Mr. Milligan confirmed that neither DWR nor the Bureau is proposing to require either numeric carryover storage requirements for project reservoirs. They also confirmed that neither DWR nor the Bureau is proposing permit terms that would maintain baseline carryover storage levels or that would replicate the upstream reservoir storage rule curves embedded in CalSim II.

V. INCREASED DEMANDS, CLIMATE CHANGE, RECENT OPERATION OF CVP AND SWP STORAGE RESERVOIRS AND THE RATIONALE FOR THAT OPERATION, AND ONGOING POLITICAL AND ECONOMIC PRESSURE PROVIDE EVIDENCE THAT RESERVOIR OPERATIONS UNDER CWF WILL BE INCREASINGLY RISKY.

A. Future Reservoir Levels Are Likely to Be Lower than Baseline Conditions Because of Increased Project Deliveries as well as Climate Change.

Exhibit DWR-514, Figures 12-15 provide in summary form the output from how DWR and Bureau modelers modeled reservoir operations using CalSim II. Chapter 4 Figures in the 2015 RDEIR/SDEIS for the Bay-Delta Conservation Plan and CWF (RDEIR/SDEIS) provide similar output for the No Action Alternative and Alternatives H3 and H4. A notable difference between the displayed output in Exhibit DWR-514 and that in Chapter 4 of the RDEIR/SDEIS is the absence in the Exhibit DWR-514 of output for “Existing Conditions.” I provide figures from the RDEIR/SDEIS that show average end-of-May and end-of-September storage exceedance plots for Trinity, Shasta, Oroville and Folsom reservoirs as slides 4 to 10 in Exhibit CSPA-36.¹¹

In Exhibit CSPA-36, Slide 3, I also provide text from Chapter 4 of the RDEIR/SDEIS that describes in narrative form the difference between the “Existing Conditions” evaluated

¹¹ The RDEIR/SDEIS does not provide an end-of-May plot for Trinity Reservoir.

under CEQA and the “No Action Alternative.” Existing Conditions assume conditions as they were on February 13, 2009, the date of Notice of Preparation for the EIS/EIR for the Bay-Delta Conservation Plan.¹² As described in Chapter 4, the RDEIR/SDEIS anticipates lower average storage levels for each of the major reservoirs by 2025, the “Early Long-Term” date assigned for evaluation and modeling of the No Action Alternative:

Lake Oroville storage would decrease by 430 TAF (21%) in September average end of month storage. Trinity, Shasta, and Folsom lakes September carryover would decrease by 119 TAF (9%), 249 TAF (9%), and 80 TAF (15%), respectively under No Action Alternative at ELT as compared to Existing Conditions.¹³

It is unknown how the causes of these anticipated end-of-September storage decreases between 2009 and 2025 break down among climate change, sea level rise, additional north-of-Delta deliveries, additional SWP south-of-Delta demands, and other factors described in the RDEIR/SDEIS.¹⁴ However, the added stress on the system over the course of just 16 years is significant. Particularly notable in my opinion are the anticipated average annual decrease in end-of September storage of 430 TAF at Oroville and the overall anticipated average annual end-of-September storage decrease of 878 TAF north-of-Delta.

B. Recent Management of CVP And SWP Reservoirs Has Shown a Pattern in which Project Operators Accept a High Level Of Risk.

Managing carryover storage is fundamentally managing risk. The anticipated average annual reduction in project north-of-Delta carryover storage described in RDEIR/SDEIS Chapter 4 indicates in my opinion that the SWP and CVP operators have already determined that they will increase the level of risk by which they will operate project reservoirs, even without CWF. It is not reasonable to think that the anticipated reduction of north-of-Delta

¹² Pursuant to discretion allowed under CEQA, the Existing Condition also includes the August 2009 Biological Opinion for the Operations and Criteria Plan of the SWP and CVP.

¹³ RDEIR/SDEIS, p. 4.2-4. Reproduced in Exhibit CSPA-36, Slide 3.

¹⁴ *Id.*, p. 4.2-3. Reproduced in Exhibit CSPA-36, Slide 2.

average annual carryover storage by 878 TAF in just 16 years is solely attributable to natural hydrology and climate change.

This means that any additional export of stored water under CWF to “increase [the] opportunity to use existing water rights” through “[r]e-diversion of stored water during Balanced Conditions”¹⁵ will either enable future planned increased risk in reservoir operations by CVP and SWP operators or else add to it.

Since 2006, the existing SWP and CVP system has twice been stressed to the point that the Governor declared drought emergencies: in 2008-2010, and in 2014-2016. In each case, in the year that immediately preceded that stress (2007 and 2013 respectively), SWP and CVP operators drew project reservoirs down precipitously.¹⁶ In Exhibit CSPA-37, I reproduce graphs from DWR’s California Data Exchange Center that show actual storage in Shasta, Oroville and Folsom reservoirs between 1/24/2007 and 2/28/2008, and in Trinity, Shasta, Oroville and Folsom reservoirs between 1/24/2013 and 2/28/2014. The graphs show that between 1/24/2007 and 2/28/2008, the difference between high and low reservoir elevations at Shasta was 2,295,545 acre-feet; at Oroville, 1,854,050 acre-feet; and at Folsom, 568,104 acre-feet. In the period between 1/24/2013 and 2/28/2014, the differences between high and low reservoir elevations at the reservoirs were almost identical: the difference at Shasta was 2,238,432 acre-feet; at Oroville, 1,850,108 acre-feet; and at Folsom, 573,355 acre-feet. In addition, Trinity Reservoir, spared in 2007-8, underwent a similarly precipitous drawdown in 2013-2014 of 992,284 acre-feet.¹⁷ In each of these time periods of just over one year, project operators had discretion to release water or retain it in storage. They chose to release it, only to find themselves in a situation where the Governor declared a drought emergency the following year.

When I asked him on cross-examination, Mr. Leahigh stated when shown historical storage graphs for Oroville¹⁸ that he would not be greatly concerned when, in December 2007,

¹⁵ Exhibit DWR-4e, slide 35.

¹⁶ The 2007 drawdown of Trinity Reservoir did not fit the pattern discussed here; the 2013 drawdown of Trinity reservoir did.

¹⁷ Exhibit CSPA-37, slides 2-9.

¹⁸ Exhibit CSPA -101, submitted as part of CSPA cross-examination of Mr. Leahigh.

Oroville storage reached 1.23 MAF, or when, at the end of December 2013, Oroville storage reached 1.3 MAF. Mr. Leahigh's expressed lack of concern regarding storage at the end of December 2013 is particularly remarkable, considering that at the end of January 2014, DWR and the Bureau filed the first of a dozen-odd Temporary Urgency Change Petitions for the SWP and CVP that they would file over the subsequent year and a half.

Mr. Leahigh, on cross-examination by Mr. Kelly, stated that the condition in which he would consider exporting more stored water was in "wetter" water years. Presumably, in such years there would be an opportunity to export stored water that was not allocated to defined purposes such as the current year's in-Basin requirements. However, this must be considered in the context under which DWR and the Bureau, in 2007 came close to tapping out and in 2013 did tap out the system. In this context, consider what might have happened had DWR exported an additional 300 TAF or 500 TAF of stored water from Oroville in 2006 or 2012. It is unknown whether DWR operators would have reduced Oroville releases in 2007 and 2013 by an amount equivalent to the additional hypothetical 2006 and 2012 releases. However, there are no explicit constraints that would have prevented 2007 and 2013 end-of-December storage levels from going that much lower, and the pattern of actual releases demonstrates little restraint on the part of project operators.

C. The CVP and SWP Have Strong Incentives to Increase Exports.

The table from the 2013 DEIR/DEIS Appendix D labelled Exhibit CSPA-40 shows that SWP and CVP allocations in many years since 2000 have been significantly less than export demand. As noted above, the 2013 DEIR/DEIS predicts and assumes that the demand north of Delta, particularly for the CVP, will increase compared to existing conditions. Exhibit CSPA-38 shows figures from the 2013 DEIR/DEIS that give existing and 2025 export demands; these annual demands over 7 MAF are far less than the 50% exceedance for CalSim II simulated exports shown in Exhibit DWR-514, Figure 11.¹⁹ Exhibit DWR-514, Figure 11 shows a

¹⁹ 2013 DEIR/DEIS, Appendix 5A-B; as shown in Exhibit CSPA-38, slides 2-4.

deficiency of 1 MAF even for the Boundary 1 simulation, as well as simulated exports in some cases excess of 7 MAF; this excess would presumably be held in storage in the SWP’s southern California reservoirs or in groundwater banks in the southern San Joaquin Valley.

In almost all years, SWP and CVP demand greatly exceeds supply.

D. The SWP and CVP, and Those Who Regulate Them, Are Likely to Experience Increasing Pressure to Increase Exports.

In Exhibit CSPA-39, I provide excerpts from two pieces of federal legislation that are pending before Congress. The first, S. 2533, is legislation by Senator Feinstein pending in the Senate that pertains to current drought conditions in California. The bill if enacted would require, on a temporary basis until the Governor declares that drought conditions in California are ended: “That the Secretaries of the Interior and Commerce shall provide the maximum quantities of water supply practicable to the Central Valley Project”²⁰

The second excerpt is from HR 2898 by Congressman Valadao, which passed the House of Representatives in July 2015. Mr. Valadao’s legislation does not limit itself to current drought conditions, but seeks on a permanent basis to condition (among other things) the implementation of the Delta smelt Biological Opinion for the SWP and CVP. HR 2898 would if enacted require that: “[the] Commissioner [of the Bureau of Reclamation] and the Director [of the U.S. Fish and Wildlife Service] will execute a Memorandum of Understanding (MOU) to ensure that the smelt biological opinion is implemented in a manner that maximizes water supply while complying with applicable laws and regulations.”²¹

These pieces of pending legislation that, respectively, explicitly propose delivery to CVP contractors of the “*maximum* quantities of water supply practicable” under drought conditions, and that seek to “*maximize* water supply” available to the SWP and CVP permanently, are recent legislative examples of how I expect pressure to be exercised to increase exports if the CWF is

²⁰ S 2533, p. 124, as shown and linked in Exhibit CSPA-39, slide 2.

²¹ HR 2898, p. 19-20, as shown and linked in Exhibit CSPA-39, slide 4.

constructed.²² It is important to recognize that for such legislation to receive the level of support it already has, it must have substantial economic as well as political backing. On separate tracks, I have personally seen intensive pressure on the Water Board and other decision makers to increase exports, and have reviewed hundreds of newspaper articles that discuss advocacy for increased exports and op-eds that openly advocate increased exports.

Based principally on my experience with the implementation of hydropower licenses, it is also my opinion that if CWF is constructed and implemented project operators will try to increase the yield of the combined system for water supply. They will do this through technical analysis and the evaluation of multiple scenarios in order to devote the least amount of resources required to meet project constraints. It is my opinion that project operators will also attempt to create efficiencies in water supply deliveries by modifying project constraints, either through adaptive management or by explicitly seeking modification of controlling requirements.

Finally, it is reasonable to expect that SWP and CVP contractors and their constituents will place significant pressure on DWR and the Bureau, as well on regulators and politicians, to prioritize deliveries over carryover storage. The project proponents have not stated in their testimony what they expect the cost of CWF facilities to be. They have also not defined the funding source or sources for construction of these facilities. However, a cost figure widely used in the press is \$15 Billion, with the SWP and CVP contractors picking up the bulk if not all of that cost. Given this expense, it is reasonable to anticipate that these contractors and their constituents and customers will use their considerable political and economic resources to influence the operation and the regulation of CWF facilities.

VI. NORTH DELTA DIVERSIONS WOULD LIKELY REDUCE THE WATER COST OF EXPORTING STORED WATER.

Based on my understanding of SWP and CVP operations and on my review of the proposed constraints for operations of the CWF North Delta facilities in Exhibit DWR-515 for

²² Emphasis added to both quotes.

the July through November time period shown on page 6, I anticipate that DWR and the Bureau would operate export operations from July through November under CWF as follows:

DWR and the Bureau will export the first 3000 cfs by moving water through the Delta to the south Delta pumps. They are unlikely to export less than 3000 cfs through the Delta at any given time because they will need to bypass water past the North Delta Diversion facilities to meet outflow and Delta water quality requirements, and there will be efficiency in exporting at least 3000 cfs in order to recapture some of the water released to meet requirements. It is highly unlikely that the July through September 5000 cfs bypass requirement downstream of the North Delta Diversion facilities will be controlling, and almost as unlikely that the October and November 7000 cfs bypass requirement will be controlling. Depending on specific tide and flow conditions, DWR and the Bureau will bypass additional water past the North Delta Diversion facilities as required to meet Delta outflow and water quality requirements. Project operators will export as much of this bypassed water as possible while still meeting outflow and Delta water quality requirements.

The geographic focus of real-time operations to meet outflow and Delta water quality requirements will shift from project reservoirs (particularly Folsom) to the North Delta intakes. For this operation, project operators will keep water available for export at the North Delta facilities whenever possible. Real-time operations will consist of closing and opening the North Delta intakes as needed to meet Delta water quality requirements. By shifting the operational focal point from project reservoirs downstream to the North Delta Diversion facilities, operators will greatly reduce~~ing~~ travel time to the Delta of water they need to meet Delta outflow and water quality requirements, and project operators will thus be able to skate closer to the edge of compliance. It will be in the interest of DWR and the Bureau to preferentially operate the North Delta Diversion in July through November, because exports from that location will not be reduced by conveyance through the Delta.

Under balanced conditions, the North Delta Diversion facilities will export transferred water in addition to contracted export water released from project reservoirs. According to the

RDEIR/SDEIS, “a separate North Delta facility ... provides a longer transfer window than allowed under current regulatory constraints.”²³ Transferred water will likely not be subject to carriage water requirements currently required for exported transfer water, because the traditional rationale for carriage water has been to make up for water lost in transit across the Delta. Whenever possible, likely most of the time, transfers from north-of-Delta to south-of-Delta will be carried out through the North Delta Diversion facilities.

As explained by the DWR and Bureau operators on cross-examination, increasing through-Delta exports reaches a point of diminishing returns when it comes to reducing salinity at some water quality stations in the Delta. When they are high enough, reverse flows entrain salt water into the Delta. The North Delta Diversion facilities will avoid this condition. However, exports from the North Delta Diversion facilities will also reduce flows in the Sacramento River downstream of these facilities, as well as flows through the Cross Channel Gates and Georgiana Slough.

Because of the efficiencies I have described above, the North Delta Diversion facilities under the constraints proposed by DWR and the Bureau would therefore incentivize exports of stored water during balanced conditions from July through November.

VII. INCREASED RISK IN RESERVOIR MANAGEMENT UNDER CWF WILL INCREASE THE FREQUENCY OF TEMPORARY URGENCY CHANGE PETITIONS (TUCPs), WHOSE IMPLEMENTATION WILL INJURE LEGAL USERS OF WATER.

The Draft Biological Assessment (Draft BA) for the California WaterFix that DWR and the Bureau released in January 2016 contained Section 3.7.2 entitled “Proposed Future Drought Procedures” that explicitly contemplated: “a list of generalized procedures for implementation of future drought response actions for operations of Delta Facilities.” As a final step, these procedures included: “Reclamation and DWR will prepare TUCPs, as needed, for submittal to

²³ RDEIR/SDEIS, Alternative 4A description, p. 4.3.1-9. Reproduced in Exhibit CSPA-41.

the SWRCB.”²⁴ In the Final Biological Assessment (Final BA) for the California WaterFix (August 2, 2016), identified as Exhibit SWRCB-104, the language in Section 3.7.2, also entitled “Proposed Future Drought Procedures,” was revised to read:

While a drought contingency plan may recommend adhering to the operations as identified in existing regulatory authorizations, in longer periods of dry conditions, the plan could also propose other drought response actions. Such a contingency plan should, at a minimum, include information pertaining to: an evaluation of current and forecasted hydrologic conditions and water supplies; recommended actions or changes needed to respond to drought (including changes to project operations, contract deliveries, and regulatory requirements)²⁵

Although the revised language concerning drought procedures in the Final BA is more vague than was the language in the Draft BA, the Final BA explicitly contemplates that during drought conditions, DWR and the Bureau “may” (and thus presumably may not) recommend “adhering to the operations identified in existing regulatory authorizations.” The Final BA also explicitly contemplates that in conditions of prospective drought, DWR and the Bureau will develop a drought contingency plan that may recommend “changes to ... regulatory requirements.” Substantively, there is no difference between the two drafts; the Final BA simply does not identify the mechanism by which DWR and the Bureau might seek modifications to regulatory requirements: TUCPs.

I have discussed above the reasons for which it is reasonable to conclude that DWR and the Bureau will increase the level of risk with which they manage project reservoirs and, in particular, the calculus of the trade-off between exports and carryover storage. It is important to understand that the potential for injury because of increased risk in reservoir management develops over more than one year, and does not always result in actual injury. A Wet year might follow a Critically Dry year or a sequence of dry years. However, as 2008 and 2014 have

²⁴ Draft Biological Assessment for the California WaterFix. The section of this document quoted here presented by Mr. Lilly in cross-examination as Exhibit BKS-2, p. 5.

²⁵ Final Biological Assessment for the California WaterFix, Section 3.7.2. This document is identified as Exhibit SWRCB-104.

recently and dramatically shown, a Wet year might not follow a Critically Dry year or a sequence of dry years.

It is also important to note that injury is often bound up with systemic factors such as the need to meet instream in-Basin uses and requirements such as water temperature and Delta water quality. While the impact of risky water management on instream uses is not the subject of Part 1 of the WaterFix hearings, one cannot dismiss instream uses entirely because impacts to those uses are often the mechanism through which low storage in SWP and CVP north-of-Delta reservoirs initially stress^{es} the system and ultimately cause^s injury to legal users of water. Sacramento River water temperatures and the management of the Shasta Reservoir to preserve its cold-water pool during 2014 and 2015 are recent obvious examples.

There is a requirement that the Board, in considering a TUCP, must evaluate injury to legal users of water. However, this injury analysis is time-bound to the period for which TUCP may be in effect. When lack of carryover storage in SWP and CVP reservoirs contributes to the need for the TUCP, the management opportunities to avoid injury have already passed. This was clearly evident in 2014. When the Board's Executive Director considered TUCPs in 2014, he did not consider past operations of SWP and CVP reservoirs in his injury analysis.

VIII. FOR PROCEDURAL AND POLICY REASONS, DWR AND THE BUREAU SHOULD BE REQUIRED TO APPLY FOR A NEW WATER RIGHT FOR THE CWR

A. The Board Should Not Grant DWR and the Bureau Preferential Procedural Treatment to Petition for Substantive Changes to Expired Permits.

In its closing brief for in the Auburn Dam hearing, the Bureau argued: "Contrary to assertions made at the hearing by California Sportfishing Protection Alliance (CSPA) and

Friends of the River (FOR), Reclamation is not requesting that the Board apply a different set of rules and regulations to the Federal Government.”²⁶

Such a contention does not pass muster in this case. The Bureau’s time to put water to beneficial use under its CVP permits ran out 26 years ago. The Bureau is not even asking as it seeks to add a point of diversion that the Board extend permits as it modifies those permits. In its 2009 petition for extension of time for its CVP permits, the Bureau did not say how much water it has already put to use under each permit, how much water it intends to put to use, or how soon it plans to use additional water. To the contrary, the Bureau claimed that it could not disaggregate its water use by permit, pleading in the supplement to its time extension petition: “The reason Reclamation cannot provide any more specific data is that Reclamation operates the CVP in an integrated fashion where water is diverted under a variety of CVP permits and is commingled to meet project purposes.”²⁷ Further, the Bureau contemplated that the EIR/EIS for BDCP would provide environmental review for its petitions for extension of time: “Reclamation believes that the final BDCP EIR/EIS will describe and evaluate Central Valley Project operations and future water use during the term of the extension requested for the subject permits. Therefore, the BDCP EIR/EIS could potentially function as the environmental document for this project [petition for extension of time]”²⁸

DWR, for its part, filed its petition for extension of time for its permits on the final day it was supposed to have put water under the permits to full use, December 31, 2009. Attached to its petition for Application #5630 et al, DWR included its own supplement that explained its irregularities. DWR requested extension of time for only five years, effectively a time-out, stating that it was unknown what the time horizon would be to put its permits to full use. Like the Bureau, DWR stated it could not disaggregate use by permit: “The SWP is a complex system and, as such, it is difficult to separate water diverted under the provisions of specific

²⁶ Bureau of Reclamation, Closing Brief for the State Water Resources Control Board’s July 21, 2008 Hearing on Proposed Revocation of Auburn Dam Project Permits, undated and unsigned, p. 2. Shown as Exhibit CSPA-42.

²⁷ “Reclamation’s Supplement to petition for extension of time [of CVP permits]. June 23, 2009, p. 2. Shown as Exhibit CSPA-43.

²⁸ *Id.*, pdf p. 10

individual permits. The permits operate together, consistent with the provisions governing overall SWP operations. The water is commingled to meet overall project purposes.”²⁹

In sum, both the Bureau and DWR ask for numerous substantive exceptions in support of their irregular procedural decisions, including exceptions for accounting and exceptions for stating a time in which they will put permitted water to full use. Above all, the Bureau and DWR seek to add a point of diversion in their permits with the enormous irregularity that their permits have expired, a condition that the Bureau and DWR propose to continue to place on indefinite hold.

B. The Expansive SWP and CVP Water Rights Permits Must Be Handled with Appropriate Procedural Safeguards.

As CSPA quoted in our protest of the WaterFix:

...[t]he total face value of the approximately 6,300 active water right permits and licenses within the Delta managed by the State Water Board, including the already assigned portion of state filings, is approximately 245 million AFA. ... The Central Valley Project and State Water Project hold 75 permits and licenses within the Delta watershed that account for 53% of the total face value of the water rights within the watershed.³⁰

Many people have pointed out that the face value of water rights often does not translate into actual water. However, in the case of the WaterFix, millions of acre-feet per year of actual water may actually be at play.

The CVP never contemplated a north-of-Delta diversion in its permits; it not only seeks to backdate them a quarter century, it seeks to rewrite them. DWR, for its part, had a point of diversion in the general area of the proposed CWF North Delta Diversions in its permits, but the location was not the same and that location became moot with the electoral defeat of the peripheral canal in 1982. Now DWR seeks a do-over and, like the Bureau, the opportunity to fill in the blanks as it goes forward.

²⁹ DWR, Petition for Extension of Time for Application #5630 et al, Supplement. Shown as Exhibit CSPA-44. pdf. p. 5.

³⁰ Quoted and linked on p. 13 of CSPA et al protest of WaterFix: Letter from Board staff to Delta Vision, September 26, 2008, pp. 2-3. Available at: http://deltavision.ca.gov/BlueRibbonTaskForce/Oct2008/Response_from_SWRCB.pdf

The magnitude and geographic coverage of the SWP and CVP water rights permits magnify the importance of process. The procedural decision the Board makes on how it treats the expired SWP and CVP permits has the potential to affect every water user in the Central Valley. It also has the potential to set a precedent for every other permit holder whose time to put water to beneficial use has expired. The Board should avoid any irregularity in its treatment of these permits.

IX. CONCLUSION

The California WaterFix would provide opportunities for and incentivize increased risk in the management of SWP and CVP reservoirs. There are no numeric carryover storage requirements for these reservoirs, and both DWR and Bureau operators are on record as opposing them. The recent track record in managing carryover storage in SWP and CVP reservoirs shows an already unacceptable management of risk. The Board and legal users of water cannot rely on the judgment and decisions of DWR and the Bureau in reservoir operation. The California WaterFix as proposed will not protect legal users of water from injury.

The Board should treat the CWF petition as an application for a new water right and establish process it accordingly.

Executed this 31st day of August, 2016 at Berkeley, California.

Executed to correct for errata and revised to comply with the October 7, 2016 Order of Hearing Officers this 16th day of October, 2016 at Berkeley, California.



Chris Shutes