THOMAS H. KEELING (SBN 114979)
FREEMAN FIRM
1818 Grand Canal Boulevard, Suite 4
Stockton, CA 95207
Telephone: (209) 474-1818
Facsimile: (209) 474-1245
Email: tkeeling@freemanfirm.com

J. MARK MYLES (SBN 200823)
Office of the County Counsel
County of San Joaquin
44 N. San Joaquin Street, Suite 679
Stockton, CA 95202-2931
Telephone: (209) 468-2980
Facsimile: (209) 468-0315
Email: jmyles@sjgov.org

Attorneys for Protestants County of San Joaquin,
San Joaquin County Flood Control and
Water Conservation District, and Mokelumne River Water and Power Authority

OSHA R. MESERVE (SBN 204240)
PATRICK M. SOLURI (SBN 210036)
SOLURI MESERVE, A LAW CORPORATION
510 8th Street
Sacramento, CA 95814
Telephone: (916) 4557300
Facsimile: (916) 2447300
Email: osha@semlawyers.com
patrick@semlawyers.com

Attorneys for Protestants Local Agencies of the North Delta

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 WATERFIX	**MOTION TO STRIKE THE PART 2 REBUTTAL TESTIMONY OF DR. CHARLES HANSON AND DR. PAUL HUTTON** **(Part 2 Rebuttal)**

I. INTRODUCTION

Protestants County of San Joaquin, City of Stockton, San Joaquin County Flood Control and Water Conservation District, and Mokelumne River Water and Power Authority, and Local Agencies of the North Delta (collectively herein, "Protestants") move to strike the Part 2 Rebuttal Testimony of DWR witnesses Dr. Charles H. Hanson (Exhibit DWR-1223) and Dr. Paul Hutton (Exhibit DWR-1224). The grounds are straightforward: the opinions and assertions set forth in Exhibits DWR-1223 and DWR-1224 are not proper rebuttal testimony because they do not rebut any Part 2 testimony presented in the Part 2 cases-in-chief. Although Exhibits DWR-1223 and DWR-1224 list many portions of protestants' testimony as testimony being rebutted, in fact neither Exhibit DWR-1223 nor Exhibit DWR-1224 rebut the listed testimony. Rather, the opinions stated in the DWR witnesses' proffered rebuttal testimony bear only a tenuous and indirect relationship, if any at all, to the cited protestants' testimony. DWR-1223's and DWR-1224's wide-ranging "rebuttal" testimony, including their extensive critique of the 2010 Flow Criteria Report, is not clearly tethered to Part 2 case-in-chief testimony actually presented by the protestants in Part 2.

Protestants' motions to strike the Part 2 Rebuttal testimony of Dr. Hanson and Dr. Hutton were first made orally by Mr. Keeling and Ms. Meserve during the morning session of the Hearing on Tuesday, August 14, 2018. Following a lengthy colloquy about the motions, the Hearing Officers delayed presentation of Dr. Hanson's and Dr. Hutton's Part 2 Rebuttal testimony and requested that the motions be submitted in writing on or before 5:00 p.m. on Wednesday, August 15, 2018. This joint written motion to strike the Part 2 Rebuttal testimony of Dr. Hanson and Dr. Hutton responds to that request.

II. ARGUMENT

In its February 21, 2017 Ruling, the Board stated: "[R]ebuttal evidence is limited to evidence that is responsive to evidence presented in connection with another party's case-in-chief, and it does not include evidence that should have been presented during the case-in-chief of the party submitting rebuttal evidence." (February 21, 2017 Ruling, pp. 1–2.)

Since then, the Hearing Officers have explained that proper rebuttal testimony must directly rebut testimony offered in another party's case-in-chief, and, as appropriate, have admonished counsel against improperly relying upon a tenuous, highly generalized or subjective relationship between the proffered rebuttal testimony and the testimony that it purports to rebut. The Hearing Officers have also repeatedly reminded the parties that rebuttal testimony must respond to the case-in-chief testimony itself. The mere fact that another document is referenced in a party's case-in-chief testimony (e.g., the 2010 Flow Criteria Report or the FEIR/FEIS) does not open up that referenced document for broad-based rebuttal testimony. Again, rebuttal must respond to the case-in-chief testimony itself.

As explained below, the testimony set forth in DWR-1223 and DWR-1224 does not comply with these basic rules governing rebuttal testimony in this Hearing.

A. Dr. Hanson's Testimony, Set Forth in DWR-1223, Is Not Rebuttal Testimony and Should be Stricken.

At pages 2 and 3 of DWR-1223, Dr. Hanson lists the protestants' testimony (both written and oral), which he claims his testimony rebuts. Then, on pages 3–4 of DWR-1223, he summarizes his own opinions, which he claims rebut the listed sections of protestants' testimony. He expands on those opinions in the succeeding pages and then, in his Conclusion at page 27, he again summarizes his opinions in the same language he used on page 3.

A simple comparison of Dr. Hanson's "rebuttal" opinions against the protestants' testimony he purports to rebut confirms that DWR-1223 is not rebuttal testimony at all.

1. DWR-1223's "rebuttal" opinions re: "flow alone" and the "current state of the Delta."

Dr. Hanson opines at DWR-1223, pp. 3–4:

> Multiple authors have concluded that flow alone cannot be used to restore the Delta. As stated by the NAS, "The Delta as it existed before large-scale alteration by humans cannot be recreated. (NAS 2012, p. 10, DWR Exhibit 1326) Buchanan et al. (2018, p. 663; DWR Exhibit 1327) also concluded that increased that increased flow alone will not be sufficient to resolve the low salmonid survival in the Delta.

On the same page, Dr. Hanson also summarizes the following opinions: "**Multiple historical physical and hydrologic changes have shaped the current Delta**" and, related to that, "**The current state of the Delta is the result of multiple physical and hydrologic factors operation over multiple time scales**." (DWR-1223, p. 3, bold added.)

However, none of the protestants' testimony that Dr. Hanson purports to rebut with these opinions includes any statement that flow alone can be used to restore the Delta or that flow alone would be sufficient to resolve the low salmonid survival in the Delta. Nor does any of the cited protestants' testimony deny that multiple historical physical and hydrologic factors operating over multiple time scales have shaped the current state of the Delta. The disconnect between the opinions Dr. Hanson advances and protestants' cases-in-chief becomes apparent when we review protestants' testimony Dr. Hanson purports to rebut with his opinions. It is as follows:

a. **CSPA-202, Errata (Mr. Shutes' Testimony), Page 2.**

Dr. Hanson specifically calls out the following text from page 2 of CSPA-202, Errata (Chris Shutes' Part 2 case-in-chief testimony) as testimony he is rebutting:

> In considering conditions to place on the permits for the SWP and CVP in this proceeding, the Board can and must evaluate conditions for all aspects of SWP and CVP operation, not just those immediately related to the new points of diversion.

(CSPA-202, p. 2:24-26, cited at DWR-1223, p. 2.)

Nothing in this passage from CSPA-202, Errata even remotely suggests that Mr. Shutes was claiming that flow alone could restore the Delta or that the Delta could be restored to its pre-human-alteration status. Nor does the CSPA-202, Errata testimony quoted by Dr. Hanson in any way deny that multiple historical physical and hydrologic factors operating over multiple time scales have shaped the current state of the Delta.

b. ***CSPA-204 (Mr. Cannon's Testimony), pp. 7 and 31–32.***

CSPA-204 is Mr. Cannon's Part 2 case-in-chief testimony.

At p. 7, in connection with the proposed project, Mr. Cannon discusses biological opinions for long-term operation of the SWP and CVP, and D-1641, as well as Fall X2, OMR

restrictions (Jan.-June), Delta Cross-Channel operations, and the like. Nowhere, however, does Mr. Cannon claim that flow alone could restore the Delta or that the Delta could ever be restored to its pre-human-alteration status. Nor does the cited testimony deny that multiple historical physical and hydrologic factors operating over multiple time scales have shaped the current state of the Delta.

At pp. 31-32, also, no such opinions are expressed; in fact, there is no page 32 in CSPA-204.

For the convenience of the Hearing Officers, pages 7 and 31-32 of Exhibit CSPA-204 are attached collectively as Exhibit 1 to this motion.

c. CSPA-202, Errata (Mr. Shutes' Testimony), Pages 7–12.

CSPA-202, Errata is Chris Shutes' Part 2 case-in-chief testimony.

At pp. 7-8, Mr. Shutes opines that because the "Services" are not at this Hearing, it becomes essential to review what CDFW, USFWS and NMFS have already said and that their analyses in the 2010 informational Delta flow criteria proceeding take on particular importance because they are not present in this Hearing. He also summarizes a few of the Services' analyses and discussions. But nowhere on the cited pages does he claim that flow alone could restore the Delta or that the Delta could ever be restored to its pre-human-alteration status. Nor does the cited testimony deny that multiple historical physical and hydrologic factors operating over multiple time scales have shaped the current state of the Delta.

At p. 9, Mr. Shutes continues with his summary of some of the Services' comments and analyses in the 2010 Flow Criteria proceeding. While the Services and others discussed "flow" at length in the "Flow Criteria" proceeding, not one of them, or Mr. Shutes, claimed that flow alone could restore the Delta or that the Delta could ever be restored to its pre-human-alteration status. Nor does the cited testimony deny that multiple historical physical and hydrologic factors operating over multiple time scales have shaped the current state of the Delta.

At pp. 10-11, Mr. Shutes' summary of the Service's opinions and analysis in the 2010 Flow Criteria proceeding continues. Again, though, nowhere in these pages does Mr. Shutes

opine that flow alone could restore the Delta or that the Delta could ever be restored to its pre-human-alteration status. Nor does the cited testimony deny that multiple historical physical and hydrologic factors operating over multiple time scales have shaped the current state of the Delta.

Pages 2 and 7-12 of Exhibit CSPA-202, Errata are attached collectively as Exhibit 2 to this motion.

d. NRDC-58, Errata (Dr. Rosenfield's Testimony), pp. 4–24.

NRDC-58, Errata is Dr. Rosenfield's Part 2 case-in-chief testimony. Dr. Hanson also cites NRDC-58, Errata, pp. 4-24 as testimony he is rebutting. That twenty pages of Dr. Rosenfield's written testimony covers a lot of ground, including without limitation: the proposed project's severe impacts to critically imperiled species and critical ecosystem processes; CWF's significant adverse impacts to Central Valley Chinook Salmon and Steelhead; current threats to the persistence and recovery of Central Valley Chinook Salmon and Steelhead (including unsustainable water temperatures that cause temperature-dependent mortality, entrainment caused by water diversions, hatchery management practices, and loss of rearing habitat); significant reductions in salmon survival caused by inadequate proposed bypass flows for the new North Delta Diversion; deficiencies in the Perry Model; significant adverse impacts to salmon resulting from the proposed reduction of Delta Outflows in the Winter and Spring; temperature modeling in NMFS biological opinion; failures of the Bureau of Reclamation to maintain adequate temperature control at Shasta and Keswick during the recent drought; and WaterFix's likely increased predation, entrainment, and impingement at the North Delta intakes. (See NRDC-58, Errata, pp. 4-24.)

However, at no point in pages 4-24 of NRDC-58, Errata does Dr. Rosenfield opine that flow alone could restore the Delta or that the Delta could ever be restored to its pre-human-alteration status. Nor does the cited testimony deny that multiple historical physical and hydrologic factors operating over multiple time scales have shaped the current state of the Delta.

Pages 2-24 of Exhibit NRDC-58, Errata are attached collectively as Exhibit 3 to this motion.

e. Hearing Transcript, Vol. 28 (April 11, 2018), at pages 24 and 111–112.

At page 24 of the April 11, 2018 Hearing Transcript, Ms. Des Jardine examines witness Baxter, who testifies that outflow is an "overarching driver" that influences other drivers such as temperature, turbidity and salinity gradient. However, Mr. Baxter never asserts that flow alone could restore the Delta or that the Delta can be restored to its ancient condition. Nor does he deny that multiple historical physical and hydrologic factors operating over multiple time scales have shaped the current state of the Delta.

At pages 111-112, on examination by Mr. Ruiz, Mr. Baxter acknowledges that has been new information that he hadn't integrated that into his ranking of environmental drivers and that he still considers outflow to be "a kind of an overarching driver" that influences a number of the other drivers. However, at no point in does Baxter opine that flow alone could restore the Delta or that the Delta could ever be restored to its pre-human-alteration status. Nor, again, does he deny that multiple historical physical and hydrologic factors operating over multiple time scales have shaped the current state of the Delta.

A copy of the Hearing Transcript, Vol. 28 (April 11, 2018), pages 24 and 111-112 is attached hereto as Exhibit 4.

f. Hearing Transcript, Vol. 29 (April 16, 2018) at pages 19:9 to 20:18, 22:10–18, and 24:12–19.

At pages19:9 through 20:18, Mr. Volker examines Mr. Oppenheim, who discusses the NMFS BiOp and salmon, but never makes any of the statements attributed to him in DWR-1223. At no point does he opine that flow alone could restore the Delta or that the Delta could ever be restored to its pre-human-alteration status. Nor does Mr. Oppenheim deny that multiple historical physical and hydrologic factors operating over multiple time scales have shaped the current state of the Delta.

At pp. 22:10-18 and 24:12-19, Mr. Oppenheim recommends certain bypass flows when there are sufficient flows from storm or snow melt, and he says PCFFA requests that the flow criteria described in his testimony for more protective criteria for other estuarine species be made a part of the permits for the SWP and CVP, regardless of whether WaterFix is approved. Again, at no point does he opine that flow alone could restore the Delta or that the Delta could ever be restored to its pre-human-alteration status. Nor does he deny that multiple historical physical and hydrologic factors operating over multiple time scales have shaped the current state of the Delta.

A copy of the Hearing Transcript, Vol. 29 (April 16, 2018), pages 19:9 to 20:18, 22:10-18, and 24:12-19 is attached hereto as Exhibit 5.

g. PCFFA-145 (Feb. 16, 2010 testimony of John Cain, Dr. Jeff Opperman, and Dr. Mark Tompkins submitted in the 2010 Delta Flow Criteria proceeding before this Board).

Finally, DWR-1223 cites to PCFFA-145, which is a 51-page copy of expert testimony submitted to the SWRCB in 2010 in the informational Delta Flow Criteria proceeding. (See DWR-1223, at 2:27.) Because DWR-1223 gives no page reference at all, one must read the entire 51 pages in an effort to locate whatever it is that's purportedly being rebutted.

The first problem, of course, is that PCFFA-145 is not any protestant's testimony; it is merely a scientific report submitted to this Board over eight years ago in a different proceeding.

Even so, a review of the entirety of PCFFA-145 confirms that nowhere in that document do its authors opine that flow alone could restore the Delta or that the Delta could ever be restored to its pre-human-alteration status. Nor does PCFFA-145 deny that multiple historical physical and hydrologic factors operating over multiple time scales have shaped the current state of the Delta.[1]

In short, none of the protestants' testimony cited by DWR-1223 includes the opinions or statements that Dr. Hanson says he is rebutting, i.e., that flow alone could restore the Delta,

[1] Because DWR-1223 merely cites to the entirety of PCFFA-145 and PCFFA, a lengthy document, is readily available on the FTP site, no except of PCFFA-145 is attached as an exhibit to this motion.

that the Delta could be restored to its pre-human-alteration status, or that the current Delta was somehow not shaped by multiple historical physical and hydrologic factors operating over multiple time scales.

2. DWR-1223's "Rebuttal" Opinion re: accepting "without modification" the SWRCB's 2010 Flow Report.

Dr. Hanson opines at DWR-1223, pp. 2-3:

> I am also responding to several parties who's [sic] experts suggested that the SWRCB's 2010 Flow Criteria Report and the SWRCB's Phase II Technical Basis Report should be accepted without modification, suggesting that there was no new relevant information that should also be considered.

Again, however, no protestant's expert ever said such a thing. That fact is confirmed, once again, by reviewing the testimony Dr. Hanson claims to be rebutting. He identifies that Testimony as follows:

a. CSPA-202, Errata (Chris Shutes' Testimony), pp. 7–11.

Pages 7-11 have already been summarized in the discussion above. Nowhere in those pages did Mr. Shutes say that the 2010 Flow Criteria Report or the Phase II Technical Basis Report should be accepted without modification or that there is no new relevant information that should be considered. (See Exhibit 2, pp. 7-11.)

b. Hearing Transcript, Vol. 28 (April 11, 2018) at page 122.

At page 122 of this Hearing transcript, Mr. Ruiz is questioning Mr. Baxter. The 2010 Flow Criteria Report is merely mentioned. Nowhere on page 122 does Mr. Baxter say that the 2010 Flow Criteria Report or the Phase II Technical Basis Report should be accepted without modification or that there is no new relevant information that should be considered. (See Exhibit 4 at p. 122.)

c. Hearing Transcript, Vol. 33 (April 24, 2018), pp. 110–115.

At pages 110-115 of this Hearing transcript, we find Mr. Herrick cross-examining Dr. Rosenfeld regarding the 2010 Flow Criteria Report, but the witness does not urge that the 2010 Flow Criteria Report or the SWRCB's Phase II Technical Basis Report be accepted without modification, nor does he suggest that there is no new relevant information that should

also be considered. A copy of the Hearing Transcript, Vol. 33 (April 24, 2018), pages 110-115 is attached hereto as Exhibit 6.

d. PCFFA-161 (Testimony of Deirdre Des Jardins), at p. 8:7–9.

At page 8, lines 7-9, Ms. Des Jardins observes that there is no analysis in the Board's Phase 2 Bay-Delta Water Quality Control Plan Update Scientific Basis Report (PCFFA-168) of the effects of major changes to diversions in the Delta from the BDCP/WaterFix project. Nowhere on page 8 does Ms. Des Jardins suggest that the 2010 Flow Criteria Report or the Phase II Technical Basis Report should be accepted without modification or that there is no new relevant information that should be considered. A copy of page 8 of Exhibit PCFFA-161 is attached hereto as Exhibit 7.

3. Other opinions stated in DWR-1223 are also not directly tied to any Protestants' testimony purportedly being rebutted.

In addition to the opinions discussed above, Dr. Hanson also opines that "[t]here is significant uncertainty regarding the nature, extent and magnitude of the effect of current SWR-CVP operations as well as other stressors on salmonid survival" and the [t]he relationship between Sacramento River flow rates and juvenile salmonid survival is weak . . . with high uncertainty." (DWR-1223, at 3:19-24 and 27:6-10.) These opinions purportedly rebut the same protestants' testimony cited and discussed hereinabove.

Again, however, a review of the protestants' testimony cited by Dr. Hanson in DWR-1223 confirms that the cited protestant testimony does not includes opinions or statements that are properly or fairly rebutted by Dr. Hanson's opinions. While some protestants do talk about Sacramento River flows and salmon survival, none deny that uncertainty exists with respect to the nature, extent and magnitude of the effect of current project operations or Sacramento flow rates. And, certainly, nothing in the cited protestants' testimony could possibly have been a proper rebuttal target of the wide-ranging critique of the 2010 Flow Criteria Report and rumination about the allegedly dubious relationship between flow and salmon survival we find in DWR-1223.

B. Dr. Hutton's Testimony, Set Forth in DWR-1224, Is Not Rebuttal Testimony and Should Be Stricken.

At page 2 of DWR-1224, Dr. Hutton lists the protestants' testimony which he claims his testimony rebuts. Then, on page 4 of DWR-1224, he summarizes his own opinions which he claims rebut the listed sections of protestants' testimony.

As with Dr. Hanson, a simple comparison of Dr. Hutton's "rebuttal" opinions against the protestants' testimony he purports to rebut confirms that DWR-1224 is not rebuttal testimony.

The list of protestants' testimony Dr. Hutton claims to be rebutting is remarkably similar to the list used by Dr. Hanson. That list, at page 2 or DWR-1224, is:

CSPA-202, Errata, pp. 2, 7-11
NRDC-58, Errata, p. 4
PCFFA-161, p. 8:7-9
PCFFA-145 (no page numbers provided)
Hearing Transcript, Vol. 28 (April 11, 2018), at page 122
Hearing Transcript, Vol. 33 (April 24, 2018), pp. 110-115
CCC-SC-3 (no page numbers provided)
Antioch-500, Errata (no page numbers provided)

Of these, the only protestants' testimony NOT already referenced in Dr. Hanson's testimony, and already discussed above, are CCC-SC-3 and Antioch-500, Errata.

Dr. Hutton summarizes the opinions offered in his rebuttal testimony as follows::

- Delta outflow shows no statistically significant volumetric long-term annual time trend.
- Data outflow shows statistically significant increasing and decreasing volumetric long-term seasonal time trends.
- A long-term increasing trend (i.e. higher salinity) in fall X2 has not occurred.
- Long-term trends in fall X2 can be attributed to multiple drivers.
- Under natural conditions, Delta salinity was more seasonally variable than under contemporary conditions, with more downstream X2 in winter and spring and more upstream X2 in summer and fall.
- Delta conditions in the late 19th and early 20th century do not represent natural conditions.
- Unimpaired flow is not an appropriate measure of natural flow on the valley floor or in the Delta.
- Natural conditions cannot be restored using the unimpaired flow hydrograph.

(DWR-1224, p. 4:7-16.)

As explained below, examination of each of the citations offered by Dr. Hutton on DWR-1224, p. 2, reveals that the opinions offered by Dr. Hutton go well beyond the scope of the cited testimony.

1. DWR-1224's "rebuttal" opinions re: delta outflow, X2 trends and natural flow.

Like Dr. Hanson, Dr. Hutton begins by referring to a sentence from the Part 2 Case-in-Chief testimony of Chris Shutes:

> My testimony is in response to CSPA (CSPA-202, p. 2) testimony that:
>
> > In considering conditions to place on the permits for the SWP and CVP in this proceeding, the Board can and must evaluate conditions for all aspects of SWP and CVP operation, not just those immediately related to the new points of diversion.

Yet the remainder of Dr. Hutton's testimony never discusses the issue of what conditions should be imposed on "all aspects of the SWP and CVP operation" versus the new points of diversion. In fact, there is no discussion of any conditions related to the new proposed points of diversion, and it is not even clear that Dr. Hutton disagrees with Mr. Shutes' statement that all aspects of the SWP and CVP operations should be considered. Despite Dr. Hutton's representations, his testimony does not respond to the quoted sentence of CSPA-202 errata, p. 2.

Next, very similar to Dr. Hanson, Dr. Hutton claims:

> Several parties experts recommended that the SWRCB's 2010 Flow Criteria Report and the SWRCB's Phase II Technical Basis Report should be accepted without modification, suggesting that there was no new relevant information that should also be considered.

(DWR-1224, p. 2:21-24.) Again, however, no protestant's expert said this. That fact is confirmed by briefly reviewing the testimony Dr. Hanson claims to be rebutting, which was already discussed above. Briefly:

a. CSPA-202, Errata (Chris Shutes' Testimony), pp. 7–11.

Nowhere in those pages did Mr. Shutes say that the 2010 Flow Criteria Report or the Phase II Technical Basis Report should be accepted without modification or suggest that there

is no new relevant information that should be considered, as claimed by Dr. Hutton. (See Exhibit 2, pp. 7-11.)

b. NRDC-58, Errata (Dr. Rosenfield's Testimony), p. 4.

According to the NRDC-58, errata, p. 4, lines 6-11:

> This large-scale diversion of freshwater, combined with the alteration in the natural timing of flow, has been a major driving force in the decline of ecosystems throughout the San Francisco Bay Estuary and watershed, including the endangerment or near-endangerment of many of its native fish species. The diversion of fresh water and alteration of natural flow patterns has become more severe in recent years and decades; as a result, populations of many native fish species have declined precipitously.

(See Exhibit 3.) While this portion NRDC-58 errata does refer to alteration of flow patterns, it is a summary of the conclusions Dr. Rosenfeld draws from the detailed analysis in the remainder of his testimony. Dr. Hutton does not include any other citations to the body of the NRDC testimony (or its references) that he allegedly rebuts.

c. PCFFA-161 (Testimony of Deirdre Des Jardins), at p. 8:7–9.

At page 8, lines 7-9, Ms. Des Jardins observes that there is no analysis in the Board's Phase 2 Bay-Delta Water Quality Control Plan Update Scientific Basis Report (PCFFA-168) of the effects of major changes to diversions in the Delta from the BDCP/WaterFix project. (See Exhibit 7.) Nowhere on page 8 does Ms. Des Jardins suggest that the 2010 Flow Criteria Report or the Phase II Technical Basis Report should be accepted without modification or that there is no new relevant information that should be considered.

d. PCFFA-145 (Feb. 16, 2010 Testimony of John Cain, Dr. Jeff Opperman, and Dr. Mark Tompkins submitted in the 2010 Delta Flow Criteria proceeding before this Board).

DWR-1224 cites to PCFFA-145, which is a 51-page copy of expert testimony submitted to the SWRCB in 2010 in the informational Delta Flow Criteria proceeding. (See DWR-1224, at 2:16.) PCFFA-145 is not any protestant's testimony; it is merely a scientific report submitted to this Board over eight years ago in a different proceeding. On page 6 of PCFFA-145, there is a mention of Feather River inflows to Verona, but no discussion of the entire outflow of the

Delta. PCFFA-145 does not include a basis for Dr. Hutton's extensive rebuttal testimony on outflow and other trends.

e. Hearing Transcript, Vol. 28 (April 11, 2018), at p. 122.

Page 122 of the **April 11, 2018 transcript** simply mentions the 2010 Flow Report in questioning of Mr. Baxter by Ruiz. (See Exhibit 4.) This is not a basis for Dr. Hutton's extensive rebuttal testimony on outflow and other trends.

f. Hearing Transcript, Vol. 33 (April 24, 2018), pp. 110–115.

Pages 110-115 of this Hearing transcript includes Mr. Herrick's cross-examination of Dr. Rosenfeld regarding the 2010 Flow Criteria Report, but the witness does not urge that the 2010 Flow Criteria Report or the SWRCB's Phase II Technical Basis Report be accepted without modification, nor does he suggest that there is no new relevant information that should also be considered. (See Exhibit 6.)

g. CCC-SC-3 (Testimony of Dr. Richard Denton).

CCC-SC-3 is the testimony of Dr. Richard Denton. On page 8, line 4, Dr. Denton states that:

> The salinities during 1995-2008 increase significantly in below normal, above normal, and some less wet years. This may be due to the reductions in exports in the spring to meet Spring X2 being made up later in the year. This in turn results in reduced Delta outflows in the fall. However, since 2009 and the introduction of the Fall X2 requirements, this degradation appears to have reduced.

While Dr. Denton mentions Fall X-2, there is inadequate basis in this statement to support the discussion in DWR-1224, on pages 12-27. Specifically, Dr. Denton does not opine that there is only one cause of the shift or provide a basis for the extensive analysis Dr. Hutton includes in his testimony.

h. Antioch-500 Errata (Testimony of Dr. Susan Paulsen).

Antioch-500 Errata does discuss historic conditions at Antioch's intake location (p. 4) and mentions natural conditions (p. 6). But Dr. Hutton's discussion does not directly address these assertions, instead argues that natural conditions have not been "accurately portrayed." (DWR-1224, p. 27:21-22.) Dr. Hutton goes on to include a broad discussion of natural and unimpaired flow that appears more focused on the 2010 Flow Report and the Scientific Basis

Report than the cited testimony (pp. 27-34). Yet, Dr. Hutton never cites to SWRCB-25 or SWRCB-103.

In short, none of the protestants' testimony cited by DWR-1224 includes the basis for the detailed, largely new analysis and information in Dr. Hutton's testimony.

2. The main opinions included in DWR-1224 are new and not directly tied to any Protestants' testimony purportedly being rebutted.

According to Dr. Hutton, there is a "new body of work that allows for the exploration of longer-term trends and more nuanced interpretation of the effects of drivers (including the CVP-SWP) on Delta flows and salinity. (DWR-1224, p. 3:21-23.) Dr. Hutton himself has authored some of this new work. (DWR-1224, p. 3.) The fact that there may be new work available, however, does not mean it is proper rebuttal.

a. Delta Outflow Time Trends, DWR-1224, section II, pp. 4–11.

Dr. Hutton's testimony regarding annual trends in outflow is not responsive to any testimony that he cites. The testimony in Part 2, including the Scientific Basis Report (SWRCB-103), focuses on declines in winter/spring Delta outflow, not annual trends in outflow. As explained above, the testimony cited at DWR-1224, page 2 does not address trends in outflow, which is the subject of this portion of Dr. Hutton's testimony.

b. Fall X-2, DWR-1224, section III, pp. 12–27.

Dr. Hutton's testimony regarding Fall X2 and trends in seasonal outflow may be somewhat responsive to certain testimony, but goes well beyond the direct statements made in the case-in-chief testimony cited in DWR-1224. Dr. Hutton, rather than focus on case-in-chief testimony, appears to be more focused on seeking the 2008 FWS Biological Opinion. This is not proper rebuttal.

c. Natural Flow/Conditions, section IV, pp. 27–34.

Testimony regarding "natural" delta outflow conditions in the pre-development era does not meaningfully respond to witness testimony and goes far beyond any witness testimony in Part 2 of the hearing. The cited Case-in-Chief testimony does not argue at length about pre-development conditions and natural conditions, and the cited exhibits (2010 flows report and

2017 SWRCB scientific basis report) also have not been cited in testimony for the purposes of showing what pre-development / "natural" outflow conditions would be. To the extent that DWR wanted to provide testimony arguing against the 2010 Flow Report, that may have been timely evidence in DWR's Case-in-Chief, not in rebuttal.

III. CONCLUSION

In sum, DWR-1223 is not rebuttal testimony at all. Rather, it is a "straw man" exercise: first, attribute to the other side a statement or opinion the other side never made; then, offer testimony to "rebut" the statement or opinion the other side never made. For the same reasons that this Board has stricken other proffered rebuttal testimony in this Hearing as going beyond the scope of permissible rebuttal, DWR-1223 should be stricken in its entirety. For the same reason, the related exhibits should be stricken and not admitted into evidence. Those include: **DWR-1257**; **DWR-1327**; **DWR-1328**; **DWR-1330**; **DWR-1331**; **DWR-1332**; **DWR-1334**; **DWR-1335**; **DWR-1336**; **DWR-1337**; **DWR-1339**; **DWR-1340**; **DWR-1341**; **DWR-1342**; **DWR-1343**; **DWR-1344**; **DWR-1364**; **DWR-1369**; **DWR-1370**; **DWR-1371**; **DWR-1372**; **DWR-1372**; **DWR-1373**; **DWR-1374**; **DWR-1375**; **DWR-1376**; **DWR-1377**; **DWR-1778**; **DWR-1383**; **DWR-1386** (Dr. Hanson's PowerPoint presentation); **DWR-1387**; **DWR-1389**; and **DWR-1390**.

Nor is Dr. Hutton's written testimony, DWR-1224, proper rebuttal testimony. Like DWR-1223, DWR-1224 rebuts primarily alleged opinions or statements that protestants never advanced at all, either in their written testimony or in their oral presentations. It too should be stricken, along with Dr. Hutton's PowerPoint presentation, DWR- 1385, and the reports Dr. Hutton submitted in support of his opinions, including DWR-1285, DWR-1286, DWR-1288, DWR-1289, DWR-1290 and DWR-1291.

Both DWR-1223 and DWR-1224, to the extent they may include information relevant to the Hearing issues, are not proper rebuttal and instead should have been submitted as part of DWR's Case in Chief. Since the Hearing Officer's October 30, 2015 Hearing Notice, DWR has been aware that appropriate flow criteria was identified as a key Hearing issue. DWR's late attempt to address a key Hearing issue in the form of rebuttal should be rejected.

Respectfully submitted,

Dated: August 15, 2018

FREEMAN FIRM

By: _____
THOMAS H. KEELING
Attorneys for Protestants County of San Joaquin, San Joaquin County Flood Control and Water Conservation District, and Mokelumne River Water and Power Authority

Dated: August 15, 2018

SOLURI MESERVE,
A LAW CORPORATION

By: _____
Osha R. Meserve
Attorneys for Protestants
Local Agencies of the North Delta

EXHIBIT 1

THOMAS C. CANNON
Aquatic Ecologist
5161 Oak Shade Way
Fair Oaks, CA 95628
916-988-1291 home
916-952-6576 cell
tccannon@comcast.net
Consultant to California Sportfishing Protection Alliance

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	PART 2 TESTIMONY OF THOMAS C. CANNON

I Thomas C. Cannon hereby declare:

My testimony focuses on whether the WaterFix proposed infrastructure and operation provide reasonable protections for the environment, specifically for fish and fish habitat in the Central Valley and Bay-Delta. Where protections are inadequate, I suggest reasonable further protections for fish populations and their important habitats.

WATERFIX PROPOSAL AND PERMIT CONDITIONS

WaterFix would add new North Delta screened intakes near Hood to the present South Delta diversions of the State (SWP) and Federal (CVP) water projects at Clifton Court and Tracy. The WaterFix North Delta diversion capacity would be 9,000 cfs that would be routed via twin tunnels to Clifton Court Forebay in the south Delta. The South

Other criteria under the biological opinions for the long-term operations of the SWP and CVP and D-1641 (barring revisions in the Bay-Delta Plan update process) would remain the same. Exceptions could occur under D-1641 emergency orders or BO adaptive management. Examples of such historical exceptions include temporary urgent change petitions to the State Board (TUCPs) to relax salinity standards during the 2013-2015 drought and recent changes to BO RPAs (Fall X2 criteria were relaxed for October 2017).

Biological opinion criteria that would be unchanged include Fall X2, OMR restrictions (Jan-June), Delta Cross Channel operations, and reservoir storage and release requirements. Also unchanged would be State Board D-1641 criteria for salinity, export curtailment, and outflow requirements (subject to TUCPs). Note that any formal temporary or permanent changes to these criteria would be adopted by WaterFix.

- These criteria and their relaxation in drought periods are the primary cause of drastic declines in Bay-Delta fish populations over the past five decades. These rules have not proven effective in protecting the fish and fish habitat.
- The Reasonable and Prudent Actions (RPAs) in the 2008-09 BO's and their updates have proven insufficient to protect fish and fish habitat.
- WaterFix proposes few changes or improvements to this existing array of ineffective protections.

There is discussion in WaterFix documents of some additional commitments to protect listed fish populations. One of these is a non-physical barrier at the upstream entrance of Georgiana Slough to limit juvenile fish leaving the Sacramento River channel

- Recognizing that wet years typically produce ten times the fish as dry years and how water projects exacerbate dry year conditions goes a long way in understanding the Delta fish population dynamics and probability of extinction and recovery.
- Recognizing that fish population recovery requires a slow and arduous journey of building population productivity back to reasonable levels and resiliency. It takes better than average conditions to recover populations.

Executed this 29th day of November, 2017 at Fair Oaks, California.

_____

Thomas Cannon

EXHIBIT 2

CHRIS SHUTES
1608 Francisco St.
Berkeley, CA, 94703
Tel: (510) 421-2405
E-Mail: blancapaloma@msn.com
Consultant to California Sportfishing Protection Alliance

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	TESTIMONY OF CHRIS SHUTES ON PART 2 ISSUES: EFFECTS ON FISH AND WILDLIFE PUBLIC TRUST PUBLIC INTEREST WITH CORRECTIONS OF ERRATA

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 on the relicensing of three 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 lists many of the hydropower projects on which I have worked and my experience before the Board; it also provides more detail regarding work experience relevant to my testimony.

My testimony will primarily focus on Key Issues 3(c) and 3(d) for this hearing, which ask:

> ***Key Issue 3(c) If so for a and/or b above, what specific conditions, if any, should the State Water Board include in any approval of the Petition to avoid unreasonable effects to fish, wildlife, or recreational uses?***
>
> ***Key Issue 3(d): What Delta flow criteria are appropriate and should be included in any approval of the petition, taking into consideration the 2010 Delta flow criteria report, competing beneficial uses of water, and the relative responsibility of the Projects and other water right holders for meeting water quality objectives?***

My testimony will describe the necessary scope of the conditions that the Board would need to place on SWP and CVP permits to avoid unreasonable effects to fish and wildlife. This scope is broad. The scope of conditions must be broad because of the particular breadth and effect of the SWP and the CVP. The scope of conditions must be broad because of the operation of all the parts of these Projects in an integrated and coordinated fashion. The scope of conditions must be broad because of the specific mandates of the Water Code § 85086 (Delta Reform Act of 2009). In considering conditions to place on the permits for the SWP and CVP in this proceeding, the Board can and must evaluate conditions for all aspects of SWP and CVP operation, not just those immediately related to the new points of diversion.

In some cases, I will make specific recommendations to answer Key Issues 3(c) and 3(d). In other cases, I will defer to specific recommendations responsive to Key Issues 3(c) and 3(d)

> did not determine whether the potential impacts of the changes would unreasonably affect fish and wildlife. The ESA and CESA standard of avoiding jeopardy to the continued existence of a threatened or endangered species is a minimal standard, and as such may differ from the Water Code requirement that the changes must not unreasonably affect fish and wildlife, especially when many species have already experienced extreme impacts from the drought for several years. (CSPA-301, p. 17)

CDFW, USFWS and NMFS have chosen to repeat this error in the present proceeding. They have limited their responses to those that address ESA and CESA requirements. Unless the Hearing Officers require them to appear under subpoena or similar legal instrument, CDFW, USFWS and NMFS will not appear in this proceeding and will not be subject to cross-examination. They will not be present to evaluate whether the requested change in the point of diversion would have unreasonable impacts to fish and wildlife. They will not propose permit terms that would avoid such effects. They will not offer their opinions on the "appropriate Delta flow criteria" that are required in this hearing under Water Code § 85086(c)(2).

Because of their absence ~~of~~ from this hearing, it becomes essential to review what CDFW, USFWS and NMFS have already said. Their analyses in the 2010 informational Delta flow criteria proceeding required under Water Code § 85086(c)(1) take on particular importance.

B. Analysis and recommendations by the fisheries agencies in the 2010 Delta flow criteria informational proceeding

The submittals of the fisheries agencies and all the other contributors to the 2010 Delta flow criteria informational proceeding are available on the Board's webpage at the following url or at a url linked there:

https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/entity_index.shtml

Exhibit CSPA-300 is the written submittal of the Department of the Interior to the 2010 Delta flow criteria informational proceeding. Exhibit CSPA-302 contains excerpts from Exhibit 300. Exhibit CSPA-303 is the written summary submittal of the National Marine Fisheries Service to the 2010 Delta flow criteria informational proceeding. Exhibit CSPA-304 is a copy of NMFS Exhibit 7 from the 2010 Delta flow criteria informational proceeding entitled:

Residence of Winter-Run Chinook Salmon in the Sacramento-San Joaquin Delta: The role of Sacramento River hydrology in driving juvenile abundance and migration patterns in the Delta. Exhibit CSPA-305 reproduces the first two pages of NMFS Exhibit 9 from the 2010 Delta flow criteria informational proceeding: page 2 includes recommendations for flows to protect sturgeon. In the original, NMFS followed pages 1 and 2 with the entire 544-page *Working Paper on Restoration Needs* published by the Anadromous Fish Restoration Program in 1995. Exhibit CSPA-306 contains the summary tables of flows recommended by the California Department of Fish and Game (now Wildlife) in its November 2010 Report entitled *Quantifiable Biological Objectives and Flow Criteria for Aquatic and Terrestrial Species of Concern Dependent on the Delta*. The complete document is Exhibit SWRCB-66.

All of these documents contain extensive analysis and recommendations that have merit. I summarize some of the findings below, referring to the excerpts in CSPA summary exhibits for focus and ease of reference; the CSPA summary exhibits contain citations to page numbers in the original documents. I also suggest where the agency analysis is particularly relevant for the WaterFix petitions.

USFWS emphasizes the importance of outflow in maintaining the Low Salinity Zone (X2) in Suisun Bay to promote phytoplankton productivity, to support fish rearing, and to reduce entrainment into the south Delta pumps. (CSPA-302, Slide 3).

USFWS discusses the importance of keeping fish out of the "footprint of the exports," and points out that in only a "few tidal cycles" fish can enter this footprint. (CSPA-302, Slide 4). This is particularly important if the operation under WaterFix whipsaws exports to the south Delta when the SWP and CVP are forced to reduce or limit North Delta Diversions. Ramping rates for south Delta export increases will be important, as well as limiting south Delta exports in general.

USFWS points out that San Joaquin River flows at Vernalis ~~flows~~ are of limited value in protecting San Joaquin River fisheries if those flows are directed toward the south Delta pumps. (CSPA-302, Slide 5). USFWS also points out the dramatic effect of reverse flows on Delta smelt and other pelagic species (CSPA-302, Slide 6). More positively, USFWS describes the

importance of maintaining positive (westward) flow at Jersey Point ("QWEST") on the San Joaquin River. This requirement was part of draft Decision 1630 (CSPA-302, Slides 7 and 8).

Restrictions on exports and the importance of passing inflow from the San Joaquin through to Suisun Bay remain highly relevant for WaterFix. DWR and the Bureau plan to continue to operate the south Delta export facilities in conjunction with the new North Delta Diversion. In spite of the branding that WaterFix will improve conditions for fish, there is no operations plan that describes how DWR and the Bureau will actively manage the SWP and CVP to achieve that purpose. On the contrary, the general approach in this proceeding has been to recommend limited constraints on both north Delta and south Delta operations. The Board must require permit conditions that protect fish from harm at the south Delta export facilities, whatever the SWP and CVP's operation of those facilities may eventually be.

USFWS points to the importance of maintaining flow at Rio Vista at levels of 20,000 to 30,000 cfs to protect outmigrating salmon. (CSPA-302, Slide 9). This flow range, which dates back to studies by Brandes and Kjelson in the 1980's, is a consistent theme among the fisheries agencies. The use of Rio Vista as a point of measurement is also consistent throughout agency submittals in the 2010 Delta flow informational proceeding. To the degree that I understand it, I believe that DWR and the Bureau propose to do away with Rio Vista as a flow compliance point. Rio Vista picks up downstream flow that makes it past the Delta Cross Channel and the mouth of Georgiana Slough. It is a highly relevant and important compliance point, and the Board should maintain Rio Vista as a compliance point in permit terms.

In its 2010 summary submittal for the Delta flow criteria informational proceeding, NMFS calls out the fact that prescriptions under the Endangered Species Act are less than what is required for "protection of public trust resources." (CSPA-306, Slide 3).

NMFS calls particular attention to the importance of avoiding "reverse flows" on the Sacramento River at the mouth of Georgiana Slough during "the salmon migrating period," so that salmon outmigrants do not enter the Central Delta (CSPA-306, Slide 4). This principle clearly applies to the proposed North Delta Diversions under CA WaterFix. Reverse flows created by operation of the North Delta Diversions may create reverse flows at the mouth of

Georgiana Slough. In addition, reverse or reduced flows will increase transit time past the North Delta intakes. See also CSPA-400 and CSPA-401 for the effects of extended transit times past the screens at the North Delta Diversions.

In its 2010 summary, NMFS devotes extensive attention to storage requirements in Shasta Reservoir to protect water temperatures in the Sacramento River. (CSPA-306, Slides 5, 6 and 7). NMFS explicitly connects these requirements to Delta flow criteria and to the Bay Delta Conservation Plan, forerunner of the California WaterFix. CSPA recommends that the Board incorporate the end-of-September carryover storage targets shown on CSPA-306 Slide 7 as a condition in the CVP's permits, as I discuss further below. It is likely that the end-of-April targets shown on CSPA-306 Slide 6 would not allow sufficient releases from Shasta to support Delta outflow in the spring; this requires further analysis.

In NMFS's 2010 Exhibit 7 submittal, NMFS states: "[H]igher volume of water flowing in the river during the winter run emigration period results in greater abundance of winter run smolts both entering the Delta at Knights Landing and subsequently exiting the Delta at Chipps Island." (CSPA-306 Slide 8). This relationship is later developed in del Rosario, R. B. et al. 2013. *Migration Patterns of Juvenile Winter-Run-Sized Chinook Salmon(Oncorhynchus tshawytscha) through the Sacramento–San Joaquin Delta* (CSPA-308). Del Rosario et al. (2013) is the basis for much of the analysis in the NMFS Biological Opinion for WaterFix (SWRCB-106); this document also discusses the relation between flow pulses and outmigration and extended rearing time of winter-run in the Delta.

Del Rosario et al. find that "Winter-run passed Knights Landing (rkm 144 or 51 rkm upstream of the Delta) between October and April, with substantial variation in peak time of entry that was strongly associated with the first high flows of the migration season." (CSPA-308, p. 2). Additional spikes in migration correspond to subsequent flow pulses. It is highly likely that many of the relationships and patterns del Rosario et al. describe for winter-run also hold for other runs of Sacramento River salmon. Winter-run Chinook provide opportunities for observation and study that are unique because their early development and consequent larger size relative to other runs of Chinook makes them relatively readily identifiable. In study,

winter-run thus eliminate multiple confounding factors that frustrate study of other runs of Central Valley Chinook. For runs of juvenile Chinook that pass Freeport and rear in the Delta later in the year than winter-run, it is difficult to determine when they arrived and how long they have reared in the Delta. Although other runs of Chinook are harder to study and analyze with a similar level of certainty, this does not mean that the same migration patterns and rearing behavior in the Delta does not hold for them. They too likely migrate downstream on major flow pulses. Many of them also rear for months in the Delta.

The Biological Opinion for WaterFix evaluates greatly reduced use of the North Delta Diversions based on "Pulse Protection" when "winter-run-sized" or "spring-run-sized" fish are detected in rotary screw traps at Knights Landing, although the BiOp stops short of requiring even this minimal measure. (See analysis in SWRCB-106, Appendix E). The pulse in this case refers to pulses of fish, not to flow pulses. There are multiple problems with this approach. First, it would allow operations that are more likely to entrain, impinge or otherwise place fish at risk if no target species or minimal numbers of those species are present. Other runs of salmon or other species would be compelled to run the north Delta gauntlet at lower, riskier flow levels. Second, it depends on detection, which is unreliable. Smolt sized salmon, for instance, are often capable of swimming out of rotary screw traps. Third, it does not account for pelagic fish that are too small to detect, such as larval smelt or larval stages of other species.

NMFS's 2010 Exhibit 9 submittal recommends flows to protect sturgeon. NMFS recommends Delta outflow at Chipps Island in ~~in~~ April and May of Above Normal and Wet years that average 25,000 cfs to protect sturgeon (CSPA-306, Slide 9), and flows of 31,000 cfs at Verona on the Sacramento River from February through May of Above Normal and Wet years (CSPA-306, Slide 10).

CDFW summarizes its recommendation in a flow table on pages 105-107 of its November 2010 *Quantifiable Biological Objectives and Flow Criteria* document, reproduced in Slides 3-5 of CSPA-308. The areas of focus and flow numbers are generally consistent with those of USFWS and NMFS. CDFW recommends 20,000 – 30,000 cfs at Rio Vista in April, May and June to protect outmigrating fall-run salmon. CDFW calls for positive flows at Jersey

Point from November through June "when salmon are in the Delta." While CDFW's proposed means of determining whether salmon are present is unclear, the fact that there are risk factors at lower flows is clear. DFW recommends various additional limitations in different months and at different levels for reverse flows in Old and Middle rivers to protect a variety of species.

III. THE WATERFIX PERMITS IF GRANTED MUST CONDITION OPERATIONS OF SWP AND CVP RESERVOIRS WITH FIRM CARRYOVER STORA~~T~~GE REQUIREMENTS.

"Appropriate Delta flow criteria" (Key Issue 3(d)) cannot be separated from reservoir operations. If the Board were to approve the WaterFix petitions with flow criteria that did not also appropriately constrain reservoir operations, then DWR and Bureau operators could make up all or part of any required Delta flow increases with storage withdrawals from their reservoirs. This would redirect fisheries impacts upstream to the river reaches downstream of any or all of the main SWP and CVP Central Valley storage reservoirs.

In order to assure that the construction and operation of WaterFix does not cause DWR and the Bureau to unreasonably draw down their storage reservoirs, the Board should condition the SWP and CVP permits to require responsible carryover storage amounts in SWP and CVP reservoirs. The Board should also require additional permit condition~~s the permits on additional~~ that mandate operational measures that I describe below. This will help to prevent unreasonable impacts to fish and wildlife in addition to preventing injury to other legal users of water.

It is important that the Board develop and enforce carryover storage requirements for each of the major north-of-Delta SWP and CVP storage reservoirs. Without requirements at each reservoir, requirements at one or more of these reservoirs will redirect impacts to those that have no requirements. The requirements for the reservoirs must be balanced in light of the integrated operation of the SWP and the CVP.

Witnesses for DWR and the Bureau testified in Part 1 of this hearing that there are no numeric carryover storage requirements for Trinity, Oroville and Folsom reservoirs, and that they oppose imposition of such numeric requirements (HT August 18, 2016, p. 197, line 19 to p.

EXHIBIT 3

KATHERINE POOLE (SBN 195010)
DOUGLAS ANDREW OBEGI (SBN 246127)
NATURAL RESOURCES DEFENSE COUNCIL
111 Sutter Street, 21st Floor
San Francisco, CA 94104
Telephone: (415) 875-6100
Facsimile: (415) 875-6161
kpoole@nrdc.org; dobegi@nrdc.org

Attorneys for Natural Resources Defense Council,
The Bay Institute, and Defenders of Wildlife

BEFORE THE 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 WATERFIX	**TESTIMONY OF DR. JONATHAN ROSENFIELD IN PART 2 OF THE WATERFIX HEARING - ERRATA**

I, Jonathan Rosenfield, do hereby declare:

INTRODUCTION

My name is Jonathan Rosenfield. I am the Lead Scientist for The Bay Institute (TBI), the research and policy division of Bay.Org, a non-profit organization that seeks to protect, restore and inspire conservation of the ecosystems of San Francisco Bay and its watershed, from the Sierra to the sea. I have been employed at TBI since the summer of 2008.

My chief responsibilities at TBI are to manage acquisition and analyses of scientific data on fish populations and water quality in the San Francisco Bay watershed and to translate those analyses into management recommendations aimed at protecting and restoring ecosystem function throughout the Bay's vast watershed, including populations of its many desirable fish and wildlife populations.

I earned a Master's in Resource Ecology and Management from the University of Michigan in 1996, a Ph.D. in Ecology, Evolution, and Behavior from the University of New Mexico in 2001, and conducted post-doctoral research at the University of California at Davis. In each case, I conducted independent research regarding the evolution, behavior, and/or ecology of fishes. I have authored or co-authored ten papers published in peer-reviewed journals as well as numerous peer-reviewed reports published in a variety of venues. Other details of my qualifications are outlined in the attached curriculum vitae, which is included as Exhibit NRDC-11.

Here, I offer a synthesis of my analysis and professional judgment of the effects of the "California Water Fix" (WaterFix) on the San Francisco Bay Estuary, including the Sacramento-San Joaquin Delta, as well as watersheds upstream. I have neither reviewed nor discussed with anyone the written testimony to the State Water Board of any other party or any hearing recordings, webcasts, or transcripts regarding these proceedings, as was a condition of the extension of my

testimony-filing deadline (*see*, December 29, 2017 letter from CA WaterFix Hearing Team re: Natural Resources Defense Council et al.'s Second Request for Extension of Time).

My earlier analyses of this project have been detailed in previous comments, including those submitted during the EIR/EIS process for both WaterFix (see, NRDC et al. 2015) and its predecessor, the Bay Delta Conservation Plan (BDCP, see Defenders of Wildlife et al. 2014). ~~I incorporate those comments fully by reference.~~

SUMMARY OF TESTIMONY

The San Francisco Bay Estuary (including the Delta) is the largest inland estuary on the Pacific Coast of the Americas. It is home to a wide variety of unique native organisms and, historically, supported an incredibly abundant and productive ecosystem. For example, San Francisco Bay's fisheries, including Chinook Salmon, Pacific Halibut, Starry Flounder, various smelt species, Pacific Herring, and Green and White Sturgeon, supported human populations from pre-European colonization through the middle of the 20th Century. Today, remnant (though economically important) commercial and sport fisheries remain.

The Bay Estuary ecosystem now shows numerous signs of collapse. Six unique native fish populations are officially listed as threatened or endangered under the federal and/or state Endangered Species Acts. Many public fisheries are heavily restricted, closed, and/or highly degraded. Water quality in the estuary's tributary streams and rivers are impaired and, in some parts of the Delta, may be lethal to small to medium-sized animals at various times of year.

These indicators of ecosystem decline are in large part related to human development of resources, particularly water resources, in the Central Valley and Delta. Most of the once-extensive wetland habitats in the Estuary and its watershed were destroyed by the mid-20th century. Furthermore, the volume and timing of freshwater flows to the estuary (both of which are defining characteristics of estuaries) have been radically altered by human water development and flood

control infrastructure and operations. These modifications to the volume and timing of flow entering the San Francisco Bay Estuary and its watershed began with European colonization of the watershed and have continued to intensify to the present day. Indeed, in a typical year, more than 50% of the freshwater runoff destined for the Bay during the ecologically critical winter and spring months is diverted before it reaches the Bay (TBI 2016). This large-scale diversion of freshwater, combined with the alteration in the natural timing of flow, has been a major driving force in the decline of ecosystems throughout the San Francisco Bay Estuary and watershed, including the endangerment or near-endangerment of many of its native fish species. The diversion of fresh water and alteration of natural flow patterns has become more severe in recent years and decades; as a result, populations of many native fish species have declined precipitously.

It is in this context that I have evaluated WaterFix, a proposal to add new diversions that would take water, via tunnel, from the Sacramento River to existing water export facilities in the south Delta.

Based on my review of project documents and those relating to permits necessary to build and operate the project, I can only conclude that WaterFix will harm native species, valuable fisheries, and ecosystem processes in the San Francisco Bay Estuary and its watershed. Both WaterFix proponents' analyses of the project and regulatory agencies' documentation that form the basis of the project's existing permits clearly demonstrate that WaterFix will generate severe impacts to critically imperiled species and critical ecosystem processes (I identified and commented on many of these problems in earlier iterations of the Project). Furthermore, many of the analyses used to describe and permit WaterFix underestimate the likely negative effects of the project. Other analyses are not based in the best available science and provide misleading information about the likely future of San Francisco Bay and its watershed under WaterFix operations.

Below, I describe some of the documented and likely negative effects of WaterFix on species such as the Central Valley's four runs of Chinook Salmon, Central Valley Steelhead, Longfin Smelt, and Delta Smelt. In addition, I describe ecosystem-level effects that will have negative consequences for most native fish and wildlife species that rely on the San Francisco Bay Estuary.

Finally, I provide recommended operational limitations and requirements that should govern operation of new north Delta diversions, should the State Water Board issue a permit for this new point of diversion.

I. WaterFix Would Cause Significant Adverse Impacts to Central Valley Chinook Salmon and Steelhead

The Sacramento River Valley is home to four unique populations of Chinook Salmon (more than any other single Chinook salmon-bearing river in North America) and Central Valley Steelhead (anadromous Rainbow Trout). Two of the four Chinook Salmon runs and the Steelhead are listed under the California Endangered Species Act (CESA) and/or the federal ESA (ESA) and another run of Chinook Salmon has been identified as a species of special concern. The fourth population of Chinook Salmon (the fall run) is the main contributor to the commercial and sport fishery for Chinook salmon in California and parts of Oregon.

The best available science shows that the construction and operation of WaterFix would significantly reduce the survival of juvenile Chinook Salmon and Steelhead migrating from the Sacramento River and tributaries through the Delta. Under the status quo, survival of migrating juvenile salmon through the Delta is extremely low and threatens the viability of our native salmon runs. According to its project documents and permits, WaterFix would further reduce through-Delta survival of migrating juvenile salmon compared to conditions today. Furthermore, the models and analyses used in the 2017 NMFS biological opinion fail to adequately consider and synthesize the adverse effects of WaterFix on salmon, rely on speculative measures whose implementation is

uncertain, and fail to provide protections specifically for fall run and late-fall run of Chinook salmon (i.e., the non-endangered runs). A thorough analysis of the best available scientific information makes clear that WaterFix will cause significant and adverse impacts to fish and wildlife.

A. Background and Current Status of the Central Valley's Unique Chinook Salmon Runs and Steelhead

For millennia, Chinook salmon have been extremely successful and productive throughout most of western North America. Historically, this species colonized and maintained populations in most tributaries to the Pacific Ocean north of the Ventura River in Southern California and the southern tip of the Kamchatka Peninsula (Auegerot 2005). Their productivity (intrinsic population growth rates) are very high compared to most other fish of their size and their success is particularly impressive given that adults spawn after dying (they are "semelparous"). For a semelparous fish species to maintain self-sustaining, largely independent populations in so many different watersheds over so many generations, its spawning and juvenile rearing habitats must reliably generate excellent conditions that support high survival rates; if eggs and juveniles in freshwater experienced high mortality, even periodically, these populations could not have persisted. Indeed, freshwater survival rates between the egg and smolt (ocean-ready migrant) stage in modern times are estimated to average about 10%, even in modern, non-pristine river systems (Healy 1991; Quinn 2005).

The Sacramento River is home to four temporally-distinct runs (populations) of Chinook salmon, more than any other single river in North America. Each run is named for the season when they migrate as adults from the ocean back to Central Valley rivers to spawn. Winter-run Chinook salmon are listed as endangered under both CESA and the ESA, and NOAA Fisheries have previously identified winter run as one of the most endangered fish species in the United States (NOAA 2016). The only population of winter-run Chinook in the wild spawns in the Sacramento River below Shasta and Keswick dams where population abundance has declined precipitously since

the 1960s. The drastic reduction in this population's size and geographic extent of its spawning range represent grave dangers to the continued existence of this unique population (an "evolutionary significant unit" or "species," as defined under ESA).

Unsustainable operations of Shasta Dam regularly cause very high mortality of this endangered species. According to the Anadromous Fish Restoration Program's ChinookProd database (2016), average production of winter-run salmon declined by approximately 89% from 54,439 (1967-1991 period) to 6,090 (1992-2016). It is worth noting that during the latter period, the state and federal governments expended great effort to achieve a shared goal of doubling the population from its 1967-1991 baseline. In particular, a temperature control device was added to Shasta Dam during this period in order to improve coldwater habitat conditions for incubating winter-run Chinook salmon eggs. Yet, NOAA Fisheries estimated temperature dependent mortality of eggs and juveniles below Shasta Dam reached 77% in 2014 and 85% in 2015. Overall, in both years, less than 5% of eggs survived to become fry that passed Red Bluff Diversion Dam (NMFS WaterFix biological opinion at 891-92; hereafter, "NMFS biop"). The most recent draft estimate from CDFW of the total number of adult winter run returning to spawn ("escapement"[1], including both wild and hatchery-spawned adults) in 2017 is 1,115, the second lowest since counting techniques were revised in 2003 (see, January 29, 2018 Letter from Maria Rea, NMFS West Coast Region to Mr. Jeff Ricker, US Bureau of Reclamation, Central Valley Operations).

Spring-run Chinook salmon are listed as threatened under CESA and the ESA. Once one of the largest salmon runs in the Central Valley, the natural production of spring-run Chinook salmon

[1] "Natural production" is an estimate of the number of adult salmon that were spawned in the wild which are available for harvest in the ocean. The estimate is related to "escapement", the number of adult salmon that return to a given river system to spawn. Escapement includes both naturally and hatchery spawned fish. Natural production is the metric applied by the Central Valley Project Improvement Act; CVPIA's doubling goal refers to natural production, not escapement.

has also declined substantially in recent decades. According to SWRCB 2017, average natural production of spring run declined from 34,374 (1967-1991 period) to 13,385 (1992-2015), a 61% decline from the baseline period. The abundance of this unique species, and survival of migrating juvenile spring-run Chinook salmon, declined substantially during the recent drought (Klimley et al 2017). Not surprisingly, CDFW's Grandtab reports that 2016 escapement of spring-run Chinook salmon was very low, particularly in Battle Creek, Clear Creek, Deer Creek and Mill Creek.

Fall-run and late-fall run Chinook salmon are not listed under CESA or the ESA. These runs are the backbone of the state's salmon fishery, supporting thousands of fishing jobs across California. State and federal hatcheries release nearly 32 million juvenile fall-run Chinook salmon each year. Despite this massive hatchery production, the SWRCB concluded in its Final Phase II Scientific Basis Report that the natural production of fall-run has declined by more than 50% in recent decades, as compared to the 1967-1992 baseline period (SWRCB 2017). Late-fall run Chinook salmon are listed by NMFS as a "species of special concern." Average natural production of late-fall run Chinook salmon has also declined by more than 50% since the 1967-1991 baseline period, according to CDFW's ChinookProd. Again, funds and efforts under the CVPIA were intended to double the natural (wild, not hatchery, spawned) production of fall and late-fall run Chinook salmon over the baseline period.

Juvenile salmon from one or more of these four runs are generally found rearing in, or migrating through, the Delta from the months of October to June (CDFW 2010). Juvenile winter run generally enter the Delta as early as October; according to NMFS, the first fall or winter storm that results in flows of 14,000 cfs at Wilkins Slough generally correlates with approximately 50% of the juvenile winter run migrating past Knights Landing (Del Rosario 2013; NMFS biop). NMFS estimates that juvenile spring run generally enter the Delta from December to May, and typically migrate past Chipps Island between them months of March and May (NMFS biop at 626). The

juvenile migration window for fall-run Chinook salmon is generally from December to June, although it can rarely extend to August (NMFS biop at 641).

Central Valley Steelhead are the anadromous (migratory) form of *Oncorhynchus mykiss* (the resident form are commonly known as Rainbow Trout). Central Valley Steelhead are listed as threatened under the ESA. Unlike Chinook salmon, there is no dedicated escapement survey for Central Valley Steelhead. However, where counts are available they show only a few adult Steelhead returning in any given year, and no fish returning in some years (e.g., McEwan 2001; Moyle 2002). *O. mykiss* often exist in larger numbers as the resident rainbow life history form in the tailwaters below the major rim dams, but the anadromous life history is extremely rare. Juvenile steelhead migrate through the Delta, generally between December and June (NMFS biop at 632).

B. Current Threats to the Persistence and Recovery of Central Valley Salmon and Steelhead

All four runs of salmon and the Steelhead face significant threats to their survival and recovery in the Central Valley. Major threats to salmon in the Central Valley include:

- Dams blocking access to historic spawning habitat;
- Unsustainable water temperatures that cause temperature dependent mortality to fish that spawn and/or rear below dams;
- Water diversions that entrain juveniles in the diversions, impinge them on fish screens, increase predation around in water structures, or alter and reduce instream and through-Delta flows (which reduces survival);
- Hatchery management practices; and,
- Loss of rearing habitat, particularly periodically inundated “floodplain” habitats.

This section of my testimony focuses primarily on impacts to migrating juvenile Chinook salmon and Steelhead occurring in the lower Sacramento River and Delta. TBI has made identical or

similar points in various public letters and comments on WaterFix (e.g., NRDC et al. 2015) and its predecessor, the Bay Delta Conservation Plan (e.g., Defenders of Wildlife et al. 2014).

Delta inflows and outflows have a significant effect on the survival of migrating salmon, with higher survival occurring when higher flows correspond with outmigration timing (i.e., during winter and spring). Recent scientific studies have demonstrated that the survival of migrating juvenile salmon down the Sacramento and San Joaquin Rivers and through the Delta is extremely low, except in wet years when freshwater flow volumes are higher than average – during these years, in river and through-Delta survival of Chinook salmon are significantly higher than average. For instance, Michel et al (2015) evaluated the survival of acoustically tagged late-fall run Chinook salmon released in the upper Sacramento River between 2007 and 2011; they found that through-Delta survival was highest during the wet year of 2011 (70.6% in 2011 vs 43.1-63% in other years). Survival in the Sacramento River was significantly higher in 2011 compared to drier years (63.2% in 2011 versus 15.5-31.9% in other years). Overall survival in their study areas was highest (15.7%) in 2011 versus compared to other years studied (2.8-5.9% survival). The authors concluded:

> Our study has demonstrated remarkably low survival rates for late-fall run Chinook salmon smolts in the Sacramento River. The Sacramento River is also home to three other runs of Chinook salmon that migrate at smaller sizes and later in the season (Fisher 1994), when water temperatures are higher and predators may be more active. These other runs may therefore be experiencing even lower survival.

Michel et al 2015.

Similarly, Klimley et al. (2017) documented significantly lower survival of acoustically tagged spring-run Chinook salmon in the Sacramento River at lower flows, and much higher survival in higher flows. In 2015, the survival of acoustically tagged hatchery spring run salmon was monitored in two groups from release sites to a recapture location near the City of Sacramento; survival was only 5.3% (first group) and 8% (second group). In 2016, during higher flow conditions, approximately 27% of the acoustically tagged spring run Chinook salmon survived this portion of

the downstream migration (Klimley et al 2017). Klimley et al's study occurred upstream of the proposed WaterFix diversions; however, there is no reason to believe the results would be qualitatively different in that lower stretch of river.

Low survival through the Delta is a threat to the survival and recovery of Central Valley Chinook Salmon and Steelhead. In 2013, as part of its work to establish interim survival objectives for the Bay Delta Conservation Plan, NMFS stated, "[…] because it is well established that the magnitude of mortality during Delta passage can be high (e.g., Brandes and McLain 2001, VAMP studies), it is highly unlikely that CV salmonids can be recovered without major improvement in Delta survival" (BDCP Appendix G at 11). NMFS also acknowledged that, "Climate change was not explicitly considered in developing these Interim Survival Objectives, but it may necessitate changes in the objectives at some future point. For example, if higher river temperatures reduce instream survival or ocean survival decreases, then higher Delta survival would be required to maintain the status quo" (BDCP Appendix G at 12).

In addition, the 2014 Recovery Plan by NOAA Fisheries sets minimum "through-Delta survival objectives of 57% for winter-run, 54% for spring-run, and 59% for steelhead originating from the Sacramento River; and 38% for spring-run and 51% for steelhead originating from the San Joaquin River" (NMFS recovery plan at 127). Current estimated survival rates for each of these species are well below these levels.

C. Adverse Effects of WaterFix on Chinook Salmon and Steelhead

The best available science demonstrates that the construction and operation of WaterFix will significantly reduce the survival of juvenile salmon as they migrate into and through the Delta; returns of adult salmon are also projected to decline as a result of the overall effects of WaterFix. The NMFS biological opinion concludes that the adverse effects of the new WaterFix diversions exceed the benefits of reduced pumping from the South Delta, resulting in lower survival overall –

and that assessment is based on OMR constraints that may not actually be met under real time operations (*see* e.g., ITP Table 9.9.4-1 and associated footnotes). Furthermore, the models used in the biological opinion conclude that reduced juvenile survival is primarily the result of reduced flow below the new WaterFix intakes on the Sacramento River, however, they fail to adequately consider and synthesize all of the adverse effects of WaterFix on juvenile salmon survival. Indeed, NMFS concludes that impingement and entrainment of juvenile fish passing the screens of the WaterFix north Delta diversion can be expected to adversely affect all outmigrating juvenile Chinook salmon from the Sacramento River basin (NMFS biop at 1214). As a result of the failure to incorporate additional mortality that occurs at the north Delta diversions, as well as other anticipate negative effects, the biological opinion may significantly understate the adverse effects of WaterFix on through-delta survival of juvenile Chinook salmon.

1. Inadequate Bypass Flows for the New North Delta Diversion Will Significantly Reduce Salmon Survival

The NMFS biological opinion utilizes several different models to analyze the effect of WaterFix on the survival of juvenile salmon from the Sacramento River, including the Delta Passage Model (DPM) and Perry Survival Model. These models demonstrate that through-Delta survival of juvenile salmon is lower under WaterFix than under the status quo, notwithstanding the very low survival under the status quo.

For winter-run Chinook salmon, the Delta Passage Model concludes that, "Overall, the absolute mean reduction in smolt survival is 1% to 2% for the PA, resulting in a relative survival reduction of 2-7% depending on water year type when compared to NAA" (NMFS Biop at 735). The Delta Passage Model shows that through-Delta survival of juvenile winter-run Chinook salmon was reduced in all water year types, with the largest reduction in Below Normal and Dry water year types (NMFS Biop, Table 5.4-13).

For spring-run Chinook salmon, DPM indicates that through-Delta survival is reduced in all water year types, with the largest reduction in survival in below normal and dry years (NMFS biop at 736; Table 5.4-14). The biological opinion concludes that, "Overall, the absolute mean reduction in smolt survival is 0% to 1% for the PA, resulting in a relative survival reduction of 1-4% depending on water year type when compared to NAA" (NMFS biop at 738). DPM suggests that survival of spring-run Chinook through the Delta is already lower than survival of winter run (compare Table 5.4-14 with 5.4-13).

For fall-run Chinook salmon, DPM demonstrates that survival of juveniles migrating through the Delta is reduced from the status quo under the proposed action (NMFS biop at 739-740). DPM results show fall run survival is already very low, and is lower than the through-Delta survival estimates for winter-run Chinook salmon and spring-run Chinook salmon; this is likely related to the fact that fall-run tend to migrate at smaller body size and later in the year, when water is warmer and predator are more active, than winter-run Chinook salmon. As with winter-run and spring-run Chinook salmon, DPM shows that WaterFix would reduce through-Delta survival of fall-run by 1-3%, with the largest reductions in survival in Wet and Above Normal years (NMFS biop Table 5.E-10).

The NMFS biological opinion also demonstrates that survival of juvenile steelhead migrating through the Delta from the Sacramento River will be reduced under WaterFix compared to the status quo (NMFS biop at 738).

There are significant flaws with the DPM, and we summarized some of these flaws in our prior comments on BDCP and WaterFix (Defenders of Wildlife et al. 2014; NRDC et al. 2015). In addition to the concerns previously expressed, DPM:

- does not account for reduced survival as a result of increased predation at the new North Delta Diversion, nor does it account for the reductions in survival as a result of impingement and entrainment at the fish screens. For example, NMFS has estimated that, "combined injury and mortality from impingement would be [less than] 9%," (NMFS biop at 905), *in addition to* increased mortality from predation at the permanent in-water structures for the north delta diversion facilities. In fact, the California Department of Fish and Wildlife's ITP would permit a 5% reduction from current survival rates in the very short reach of the river, and the ITP does not demonstrate how it would prevent even higher mortality. These reductions in survival would be in addition to the reductions observed in the DPM.
- does not account for the likelihood that changes in flow patterns (including reduced river depth, reduced turbidity) below the North Delta intakes will increase exposure to predators (e.g., via increased light penetration and concentration of juvenile salmon and their predators in a smaller volume of water) and thus, increase mortality of migrating salmon.

As a result, DPM likely significantly underestimates the probable reductions in survival of migrating juvenile Chinook salmon related to WaterFix operations.

The Perry Survival Model analyzes survival of salmon below the proposed north Delta intakes, based on data from acoustically tagged salmon in recent years. This model also demonstrates that through Delta survival of salmon is reduced by WaterFix for nearly all months and water year types (NMFS biop at 749-755; Appendix E). The Perry Model concludes that "Survival is reduced under operations of the either PA or L1 because reduced Sacramento River flow at Freeport results in lower survival rates for outmigrating smolts (Perry et al. 2010; Perry 2016; Newman 2003)" (NMFS biop at 750).

The Perry Survival Model was also run with "unlimited pulse protection" ("UPP"), which allows the fishery agencies to limit any use of the North Delta intakes if winter-run Chinook salmon

or spring-run Chinook salmon are detected migrating downstream in monitoring programs. If fish density triggers are met, then bypass flows of 35,000 cfs may be required. However, even with UPP, the Perry Model demonstrates that through-Delta survival of winter-run Chinook salmon, spring-run Chinook salmon, and fall-run Chinook salmon is likely to be reduced by WaterFix compared to the status quo (NMFS biop at 791). Whereas UPP may result in less impact on salmon survival compared to the originally proposed operations, median survival through the Delta is still significantly lower than the unsustainable status quo (NMFS biop at 775-76, 791, Appendix E).[2]

The NMFS biological opinion explains that the empirical data used in developing the Perry Survival Model shows that salmon survival is generally not reduced as long as flows below the North Delta Diversion (measured at Freeport) are higher than 35,000 cfs (NMFS biop at 772). When Sacramento River flows at Freeport are greater than 35,000 cfs, reverse flows at Georgiana Slough generally do not occur (NMFS biop at 606). As the biological opinion explains:

> The mechanism in which the UPP scenario mitigates for adverse effects on winter-run and spring-run Chinook salmon juveniles evident under the PA and L1 scenarios can be evaluated as follows: the new operating scenario (UPP) will be at low-level pumping (or ≥35,000 cfs bypass flow) when primary juvenile winter-run and spring-run Chinook salmon migration is occurring.

NMFS biop at 771.

The Perry Model also fails to consider several important adverse effects of WaterFix on juvenile through-Delta survival, and as a result the model underestimates WaterFix's adverse effects on migrating salmon. As with DPM, the Perry Model is unable to account for mortality due to impingement and injury from the fish screens or increased mortality from predation at the permanent in-water structures for the north delta diversion facilities that NMFS acknowledges are likely to occur (NMFS biop at 742; 905).

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[2] The biological opinion did not analyze the effects of unlimited pulse protection using any of the other models or analyses.

In addition, the biological opinion admits that it overestimates survival from UPP using the Perry Model because it assumes that monitoring programs will be 100% accurate to inform real time operations – this is an entirely unrealistic assumption. As the biological opinion acknowledges, "there is a high probability that a proportion of a target species will go undetected and therefore unprotected under real-time operations" (NMFS biop at 751). The analysis of unlimited pulse protection using the Perry Model "relies on real-time detection of salmonids to inform adjustments to the north Delta diversion" (NMFS biop at 771). However, the biological opinion admits that existing monitoring programs are inadequate for these purposes, and that the reliance on existing monitoring programs could underestimate both abundance and temporal extent of winter and spring run Chinook salmon (NMFS biop at 772). In addition, "…UPP would cease when capture of fish is fewer than 5 winter-run or spring-run Chinook sized fish for five consecutive days, thereby exposing any fish still present near or downstream of the intakes to the more adverse L1, L2, or L3 operating scenarios" (NMFS biop at 772-773, 776). Furthermore, the triggers for real time operations using UPP have not been identified: "Under the revised PA, specific fish abundance trigger criteria will be developed as part of the adaptive management and monitoring program of the PA" (NMFS biop at 772). If triggers result in less frequent use of UPP, through-Delta survival will be even lower than the biological opinion suggests. Of additional concern, the biological opinion does not authorize reductions in North Delta Diversion pumping based on the presence of fall run Chinook salmon, only for ESA listed salmon (winter run and spring run); this will result in impacts on fall run Chinook salmon and may even lead to increases in diversions (and associated impacts) during fall run migration beyond those that would have occurred if UPP were not employed.

Finally, there is ample recent evidence protective triggers based on "real time" monitoring results are unlikely to actually be implemented, and are not reasonably certain to occur. For instance, the 2009 NMFS biological opinion assumes that reductions in pumping will occur immediately upon receipt of appropriate monitoring data (NMFS 2009 biop). Given the bureaucratic and engineering considerations involved (e.g., it may take time to implement reduced export pumping rates), this is a poor assumption and one that cuts against protection of the migrating juvenile fish. Reliance on real time monitoring and operations are inadequate to protect salmon from adverse effects of WaterFix.

To summarize, both the Perry Model and Delta Passage Model used in the NMFS biological opinion show that WaterFix will reduce survival of winter-run Chinook salmon, spring-run Chinook salmon, fall-run Chinook salmon, and steelhead. Both models also underestimate the adverse effects of WaterFix because they do not incorporate all of the adverse effects of the project on salmon, such as impingement on fish screens, increased predation mortality at the North Delta Diversion facility, or further impairments to water quality. Current through-Delta survival is unacceptably low, yet WaterFix will reduce survival even further. The proposed bypass flows, even with UPP, are not adequate to protect salmon from unreasonable impacts.

2. Life Cycle Models Demonstrate that Overall Abundance and Escapement Would Be Lower under WaterFix than Under the Status Quo

The biological opinion also utilizes life cycle models to analyze the impacts of WaterFix on winter-run Chinook salmon. The life cycle models used in the biological opinion indicate that escapement (adult abundance) of winter-run Chinook salmon will be lower under WaterFix than under the no action alternative. Indeed, the IOS model estimates escapement will be 25% lower under WaterFix, with the reduction in survival through the Delta the cause of lower escapement (NMFS biop at 795).

NMFS' Southwest Fishery Science Center Winter Run Life Cycle Model (NMFS Life Cycle Model) estimates that the no action alternative to WaterFix will lead to higher winter run abundances than Water Fix under all of the scenarios analyzed; cohort replacement rates (a measure of productivity) would be 7-8% lower under WaterFix than the status quo (NMFS biop at 799; 801). Based on the NMFS Life Cycle Model results, the biological opinion concludes, "The probability that there would be higher abundance in the PA relative to the NAA at the end of the 82-year time series was approximately 0" (NMFS biop at 799). It is important to remember that:

- Winter-run Chinook salmon abundance is near historic lows;
- the status quo for this population represents significant near-term risk of extinction; and
- population recovery (i.e., significant increases in abundance and distribution) is both federal and state policy under ESA, CESA, the CVPIA, and the Bay-Delta Water Quality Control Plan.

In addition to projecting winter-run Chinook salmon abundance and productivity declines under WaterFix, there are several ways in which the NMFS Life Cycle Model underestimates the adverse effect of WaterFix on this endangered species. ~~As with models described above, the NMFS Life Cycle Model does not incorporate the negative effect of increased predation mortality or impingement mortality at the WaterFix diversion facilities, although the authors note that the model can be modified to incorporate these effects (NMFS biop, Appendix H, at 30).~~ Regarding the NMFS Life Cycle Model, the NMFS biological opinion acknowledges that, "The potential implications of the PA scenario is that when active diversion of freshwater occurs, a number of salmon fry and smolt may become entrained in this flow, and abrade against the screens, thereby reducing their survivability significantly. The locations of the intakes may also become predator hotspots. Finally, the reduced freshwater flow may reduce the quality of the habitat, and intensify the effect of predation, and migratory confusion." This would result in a "sustained population level effect on a

large moderate proportion of the population," which would result in reduced survival for migrating juvenile winter-run Chinook salmon (NMFS biop at 905). As noted above, the CDFW ITP anticipates a 5% reduction in winter-run survival through this small stretch of river (although it provides no mechanism for preventing exceedance of this limit). These adverse effects are not considered in the NMFS Life Cycle Model, and thus the model significantly understates the adverse effect of WaterFix on migrating winter-run Chinook salmon.

3. The Reduction of Delta Outflows in the Winter and Spring Will Cause Significant Adverse Impacts to Salmon

Reductions in Delta outflow during the winter and spring will also harm salmon. In 2010, NMFS submitted evidence to the SWRCB that the survival of juvenile winter-run Chinook salmon through the Delta was strongly correlated with Delta outflow, with lower juvenile survival at lower outflows and higher juvenile survival at higher outflows. NMFS concluded that:

> The hydrology of the Sacramento River drives winter-run smolt abundance and emigration patterns in the Delta. The annual cumulative winter run smolt abundance is highly dependent on the amount of flows in the Sacramento River, such that higher volume of water flowing in the river during the winter run emigration period results in greater abundance of winter run smolts both entering the Delta at Knights Landing (multiple regression, R^2=0.76, F=12.6, p=0.003), and subsequently exiting the Delta at Chipps Island (multiple regression, R^2=0.93, F=53.7, p<0.0001; Figure 1).

NMFS 2010.

Similarly, the SWRCB's final scientific basis report for the Phase II update of the Bay Delta Water Quality Control Plan concluded that increased outflow between February and June would increase the survival of juvenile winter run Chinook salmon migrating through the Delta, and that reduced outflow results in lower survival (SWRCB 2017).

In contrast, WaterFix would reduce Delta outflow in the November to February period, and proposes to maintain the currently impaired Delta outflows from March to May below 44,500 cfs and reduce Delta outflows above this level. In fact, actual operations of WaterFix may prove more

damaging than the flow and diversion rates modeled for the NMFS biological opinion. The biological opinion assumes the implementation of operating criteria in the biological assessment, including less negative OMR values in wetter years. Even with implementation of less negative OMR flows as proposed, the biological opinion concludes that South Delta operations will result in a high magnitude adverse population level impact on fall-run and late fall-run Chinook salmon (NMFS biop at 1101), steelhead (NMFS biop at 1013), spring-run Chinook salmon (NMFS biop at 954), and winter-run Chinook salmon (NMFS biop at 906). However, language in the ITP and biological opinion suggests that these OMR restrictions might not be implemented during real time operations (*see* e.g., ITP Table 9.9.4-1), meaning there may be no reduction in the severity of reverse flows in the South Delta compared with the status quo. More negative OMR flows than modeled in the biological opinion would be expected to increase the adverse effects of WaterFix.

4. Other Adverse Effects of WaterFix on Salmon and Steelhead

The NMFS biological opinion fails to adequately consider several other adverse effects of WaterFix on Chinook Salmon and Steelhead, which leads the biological opinion to underestimate the adverse effects of north delta pumping on migrating juvenile salmonids.

a. *Inadequate flows in the Sacramento River and upstream tributaries:*

WaterFix proposes to maintain, and in some cases worsen, currently impaired flows in the Sacramento River and upstream tributaries controlled by SWP and CVP reservoir operations. Currently impaired flows significantly reduce salmon survival. (Michel et al 2015, Klimley et al 2017, SWRCB 2017).

b. *Temperature dependent mortality at Shasta Reservoir and other upstream reservoirs:*

NMFS admits that temperature modeling in its biological opinion likely underestimates adverse effects, in part because the models use weekly temperature model inputs, whereas fish are

responding to thermal conditions on a much shorter timestep (NMFS biop at 840). Although NMFS concluded that temperature mortality of juvenile winter run Chinook salmon below Shasta Dam would not be significantly worse under WaterFix than under the status quo, the biological opinion emphasizes that there is currently significant temperature-dependent mortality of winter-run Chinook salmon, particularly during critically dry years (NMFS biop at 282). Similarly, the biological opinion admits that adequate water temperatures for spawning, rearing, and fry development are not being met in drier years (NMFS biop at 840), and that "Temperature effects place a high magnitude stress on the species and accounts for a large amount of mortality" (NMFS biop at 904).

During the recent drought, the Bureau of Reclamation failed to maintain adequate temperature control at Shasta and Keswick dams, resulting in the near complete loss of two separate year classes of juvenile winter run. The NMFS biological opinion for WaterFix assumes implementation of the revised Shasta Reservoir RPA, which is intended to increase carryover storage, use more protective water temperature thresholds based on more recent scientific information, and set biological objectives for mortality and survival (NMFS Biop at 14). However, the Bureau of Reclamation has not committed to implement this revised RPA, nor has it been finalized. Moreover, in the coming decades, the effects of climate change will make it even more important to ensure adequate water temperatures below Shasta and Keswick dams, as well as on other rivers in the Central Valley. The NMFS biological opinion admits that it does not analyze the effects of climate change after the year 2030 (NMFS biop at 283). For spring-run Chinook salmon, the NMFS biological opinion indicates that WaterFix is likely to increased exceedances of temperature thresholds, and "substantial degradation to spawning PBFs in critically dry years" (NMFS biop at 841). For fall-run chinook salmon, the biological opinion likewise admits that "The combined effect of PA implementation when added to the environmental baseline and modeled

climate change impacts is expected to result in significant adverse effects to FR eggs and alevin" (NMFS biop at 1097).

c. *Redd dewatering below upstream reservoirs:*

In addition to increased temperature dependent mortality, the biological opinion also indicates that WaterFix will increase redd dewatering for many salmon runs and that in combination with baseline conditions, will result in significant Chinook salmon egg mortality. It concludes that the project will increase redd dewatering of winter-run Chinook salmon in *all water year types* (NMFS biop at 841). In addition, the biological opinion indicates a very significant increase in redd dewatering of spring-run Chinook salmon, including up to a 30% increase in wet, above normal and below normal water year types (NMFS biop at 842). For fall-run Chinook salmon, the biological opinion states that, "The percentage of dewatered redds under the PA ranges between 15% and 36% across all river segments" (NMFS biop at 1098).

d. *Increased predation, entrainment, and impingement at the North Delta intakes*:

As discussed above, the North Delta Diversion facilities are likely to increase predation of migrating juvenile winter-run Chinook salmon, by providing in-river structures where predators prefer to congregate and prey upon salmon migrating past the long fish screens. Other runs are likely to experience the same negative effects. Similarly, other runs will be exposed to entrainment and impingement mortality, though run-specific loss rates may vary based on seasonal flow and temperature conditions and juvenile body size/swimming competence differences among runs. Current modeling does not demonstrate that WaterFix operations will comply with existing relevant sweeping and approach velocity standards. If CDFW's and NMFS's standards are not achieved, mortality is likely to be significantly higher than estimated in the biological opinion. Even if those sweeping and approach velocity standards are achieved, NMFS estimates that impingement on the

fish screens will reduce survival below that estimated in the biological opinion. The NMFS biological opinion states that, "Impacts associated with impingement and entrainment and increased predation at NDD for fall run and late fall-run Chinook salmon described in Section 2.5.1.2 Operations Effects are expected as a result of PA operations. Mortality rates of 7% for fish passing the NDD screen (impingement), along with additional mortality resulting from increased predation around the new permanent structures, is expected to reduce survival and fitness of fall-run and late fall-run Chinook salmon (Table 2-265)" (NMFS biop at 812). Elsewhere the biological opinion estimates that combined injury and mortality from impingement would be less than 10% (fall run) and less than 17% (late fall run; NMFS biop at 1100).

e. *Adverse ecosystem effects:*

Proposed WaterFix operations will alter the Delta and larger San Francisco Estuary ecosystems in ways that harm juvenile salmonids. For example, juvenile Chinook Salmon prefer relatively high turbidity habitats, which provide cover from predators (Gregory 1993; Gregory and Levings 1998); yet WaterFix is very likely to reduce turbidity levels in the Delta. This effect combined with increased Delta residence times (the time it takes for a molecule of water to exit the Delta) are likely to contribute to increased frequency of harmful algal blooms like *Microcystis* spp., which may be toxic to Chinook Salmon, Steelhead, and their prey items. Furthermore, many of the same effects of WaterFix that are detrimental to Chinook Salmon (e.g., reduced turbidity, reduced Delta in-, through-, and outflow) will tend to suppress productivity of the estuarine food web that Steelhead, in particular, depend upon. Because they will affect multiple species, these ecosystem effect mechanisms are discussed separately below.

f. *Waiver of environmental protections during droughts*:

Finally, all estimates of Chinook Salmon and Steelhead through-Delta survival rates assume implementation of relevant flow requirements, including objectives in the Bay-Delta Water Quality

Control Plan. If these objectives are waived or not enforced (or both) during the relevant months for salmonid migration, then juvenile survival will be further reduced beyond the unacceptable levels identified in the biological opinion. During the most recent drought sequence (WY 2012-2016), the SWRCB waived water quality objectives numerous times. In addition, some objectives were not complied with at all, and the SWRCB did not remedy the situation through enforcement actions (TBI 2016). This undoubtedly reduced survival for juvenile salmonids (SWRCB 2015), pushing the endangered species closer to extinction and leading to a heavily restricted fishing season for fall run Chinook Salmon. WaterFix project documents and state and federal permits under CESA and ESA do not account for the likelihood and impacts of such actions; thus, to the extent that water quality objectives and other requirements modeled in the WaterFix documents may be waived or not enforced in the future, these documents seriously underestimate the population-level effects of WaterFix on Central Valley salmonids and other desirable fish and wildlife species.

II. WaterFix Would Cause Significant Adverse Impacts to Longfin Smelt

The best available science shows that planned WaterFix operations will negatively affect the San Francisco Bay Estuary's Longfin Smelt population because WaterFix will significantly reduce the productivity and abundance of this species in the Estuary. Longfin Smelt is listed as threatened in California under the California Endangered Species Act (CESA), and USFWS has determined that listing of Longfin Smelt is warranted under the federal ESA, though listing is precluded at this time. In addition, Longfin Smelt historically are believed to have be an important forage fish species —a major prey source for other fish and wildlife in the estuary, including commercial fisheries, such as Starry Flounder— thus, their continued decline would affect other estuarine fish and wildlife populations, including those in the nearshore ocean.

The strong, significant, and persistent influence of winter-spring Delta outflow on abundance of Longfin Smelt in the subsequent fall is one of the best documented relationships in this estuary

EXHIBIT 4

BEFORE THE

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD

CALIFORNIA WATERFIX WATER RIGHT CHANGE PETITION HEARING	)))

JOE SERNA, JR. BUILDING

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

COASTAL HEARING ROOM

1001 I STREET

SECOND FLOOR

SACRAMENTO CALIFORNIA

PART 2

Wednesday, April 11, 2018

9:30 A.M.

VOLUME 28

Pages 1 - 193

Reported By: Deborah Fuqua, CSR No. 12948
(A.M. Session)
Candace Yount, CSR No. 2737
(P.M. Session)

Computerized Transcription

habitat for a number of the pelagic species. It can affect turbidity in the sense that high outflows often carry turbidity, low outflows don't.

It can influence nutrient concentration, contaminant concentration, and may be correlated in some cases with temperature. You know, the lack of rainfall often is associated with sunny conditions and perhaps warmer temperatures.

MS. DES JARDINS: So why did the POD team identify outflow as the most important driver, hypothesize that it could be?

WITNESS BAXTER: Primarily because it's kind of an overarching driver, as my previous answer indicated that outflow influences a lot of the other -- the other drivers. You know, we've pointed out salinity gradient, temperature, and turbidity -- each of those can be influenced by outflow or conditions that are creating the outflow. And similarly, nutrients and contaminants are influenced by outflow.

MS. DES JARDINS: Thank you. So next I'd like to ask you about the salinity gradient. Does it state that, under old regime, the salinity gradient was to the west and variable?

WITNESS BAXTER: Yes.

MS. DES JARDINS: And under the new regime,

If we can have that up. It's the --

(Exhibit displayed on screen.)

MR. RUIZ: It was Page 7 of the testimony that -- or the questions that Miss Des Jardins presented, the chart.

MS. DES JARDINS: It's on Page 144.

MR. RUIZ: Thank you.

(Exhibit displayed on screen.)

MR. RUIZ: And just looking at that, I just had a couple questions I wanted to understand a little bit better.

So you've indicated this is a conceptual model or conceptual plan at this point with regard to the ordering of these environmental drivers; correct?

WITNESS BAXTER: Yeah. It was judgment at the time.

MR. RUIZ: All right. And you say that additional information is needed relative to potentially maybe reordering these drivers; is that correct?

WITNESS BAXTER: We felt at the time that we hadn't received every result that was expected from the Project and that there was a potential that some of the results might have influenced our ranking.

MR. RUIZ: Have you ever received any other

information since that time that influences your rankings?

WITNESS BAXTER: We never revisited this as a group, so I would just say no to that.

I mean, I -- Obviously, there's been new information but we never went through the process of reranking them.

MR. RUIZ: All right. So, at this time, since you haven't gone through the process, you stand by the ranking that outflow is the primary, the paramount, environmental driver at this point in time?

WITNESS BAXTER: I would agree that, as I mentioned earlier, that it's kind of an overarching driver, and that it influences a number of the other ones that we listed below.

MR. RUIZ: Can you conceive of any reason or any information, in your view, that would cause a reordering of the drivers such that outflow would, for some reason, not be ranked first?

MR. VANLIGTEN: Objection: That calls for speculation.

MR. RUIZ: It does.

CO-HEARING OFFICER DODUC: It does. Based on his experience.

Mr. Baxter?

of temperature, competition, you know, who knows exactly what, and Delta Smelt in 2011 tended to survive in those timeframes.

So there was a much broader reproductive period and much greater early survival of the fish in the circumstances of 2011.

MR. RUIZ: Which you indicated was a wet year.

WITNESS BAXTER: It was a wet year.

MR. RUIZ: Just a couple quick questions with regard to the 2010 Delta Flow Recommendations Report that I believe you -- you testified about earlier.

Do you recall that report?

WITNESS BAXTER: Yes.

MR. RUIZ: Do you still stand by the information that was provided in that report?

MR. VANLIGTEN: That's vague and ambiguous by what you mean by "stand by" --

MR. RUIZ: Sure.

MR. VANLIGTEN: -- "the information that was included in that report."

CO-HEARING OFFICER DODUC: Mr. VanLigten, you do need to get closer to the microphone.

MR. VANLIGTEN: Objection: It's vague and ambiguous as to the use of the term "standby the information provided in that report."

EXHIBIT 5

BEFORE THE

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD

CALIFORNIA WATERFIX WATER RIGHT CHANGE PETITION HEARING	)))

Staff note: Strikeouts made pursuant to Hearing Officers' Rulings

JOE SERNA, JR. BUILDING

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

SIERRA HEARING ROOM

1001 I STREET

SECOND FLOOR

SACRAMENTO CALIFORNIA

PART 2

Monday, April 16, 2018

9:30 A.M.

VOLUME 29

Pages 1 - 245

Reported By: Deborah Fuqua, CSR No. 12948
(A.M. Session)
Candace Yount, CSR No. 2737
(P.M. Session)

Computerized Transcription

monthly and annual reporting of raw salvage numbers and length-at-date information for salvage of Chinook salmon at all Delta diversions as a permit term.

Even with the assumptions that fall-run would mostly be larger, which we presume to be a flawed assumption, the National Marine Fisheries Service BiOp, which is Exhibit SWRCB-106, found reduced survival, and I'm going to quote, "The National Marine Fisheries Service BiOp states that the reduction in flows from the North Delta diversions would increase travel time and have an, 'adverse affect to a high proportion of rearing outmigrating fall-run Chinook juveniles." That's on Page 648.

And the National Marine Fisheries BiOp also states that reverse flows will be increased by the North Delta diversions and, "Reduce the survival probability of outmigrating smolts by moving them back upstream."

In addition, the idea that bypass flows are only required for passage of juvenile Chinook ignores the fact that juvenile Chinook salmon sometimes rear in the estuary.

Historically, this was in fact the dominant life history trait for juvenile Chinook salmon. It

may become more important if lethal thermal regimes become more prevalent upstream of the point of diversion and in Delta rearing habitats.

My testimony proposes a more holistic approach should the Board approve this petition and the project constructed and operated.

Mr. Hunt, could you please display the graph on the bottom of Page 3 of my testimony.

MR. VOLKER: That would be PCFFA-130.

WITNESS OPPENHEIM: This figure is a time series of the abundance of various lengths of salmon salvaged at diversion facilities over a long period of time, from 1995 to 2001.

This figure shows that, in years where salmon was abundant, they can be present in the Delta from January to June at high abundances and significant numbers starting November.

My testimony also shows that, when salmon are abundant, fall-run can migrate almost continuously starting in January. We're requesting that the Board require bypass and natural flows rather than having bypass flows triggered only by the presence of the two least abundant runs because we believe that these criteria would not be protective of the public trust resource that PCFFA members

This would also protect up-migrating fall-run adults and fall-run outmigrants that are outmigrating early as fry.

PCFFA proposes that the Board require that the projects bypass natural flows sufficient to provide 20,000 cfs inflow at Freeport and outflow at Rio Vista from November to March and 25,000 cfs from April to June. We are not proposing that the Board require releases of stored water to sustain these flows. However, we do propose that the Board require that, if there are sufficient flows from storm or snow melt, to provide at least 20,000 cfs at Freeport and 25,000 cfs at Rio Vista, that the Board require that the projects bypass the flows. This would help restore the natural hydrograph that is needed to protect out migration and rearing of all races of juvenile Chinook, including fall-run and late-fall-run.

In addition, the Sacramento River has been cut off from a great proportion of this floodplain in the Yolo Bypass by the Fremont Weir during many water years. Studies have shown that salmon grow better in floodplains. The lower part of the Yolo Bypass is in the legal Delta. PCFFA is proposing that, as part of enacting appropriate Delta flow criteria, the Board

sufficient flows to provide a minimum of 30 days of inundation of the old bypass with Fremont Weir notched past flows at 23,100 cfs.

In conclusion and for these reasons, PCFFA and IFR oppose the approval of the WaterFix project.

However, we do support amending the permits of the State Water Project and the Central Valley Project to provide flows sufficient to sustain salmon migration and rearing in the Delta. This is something that has been needed for decades to protect public trust resources on which our members depend.

PCFFA and IFR therefore request that the flow criteria described in my testimony for more protective criteria for other estuarine species be made a part of the permits for the State Water Project and Central Valley Project regardless of whether the Board approves this WaterFix project or this change petition. That concludes my summary.

CO-HEARING OFFICER DODUC: Okay.

MR. VOLKER: Thank you, Mr. Oppenheim.

If it please the Board, then, we'll move on to Ms. Des Jardins.

Ms. Des Jardins would you please summarize your testimony?

WITNESS DES JARDINS: Thank you.

EXHIBIT 6

BEFORE THE

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD

CALIFORNIA WATERFIX WATER RIGHT CHANGE PETITION HEARING)

JOE SERNA, JR. BUILDING

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

BYRON SHER AUDITORIUM

1001 I STREET

SECOND FLOOR

SACRAMENTO, CALIFORNIA

PART 2

Tuesday, April 24, 2018

9:30 a.m.

Volume 33

Pages 1 - 311

Reported By: Candace Yount, CSR No. 2737, RMR, CCRR
Certified Realtime Reporter

Computerized Transcription By Eclipse

WITNESS ROSENFIELD: It is, yes.

MR. HERRICK: And are you familiar with the State Board's development of flow criteria that recommends river flows in order to protect fishery populations?

WITNESS ROSENFIELD: Are you referring to the Phase 1 and Phase 2 of the Water Quality Control Plan update?

MR. HERRICK: No. I'm referring -- If we could pull up SWRCB-25, please. Just the cover page is fine.

Excuse me for being unclear on that.

(Exhibit displayed on screen.)

CO-HEARING OFFICER DODUC: This is the 2010 Flow Criteria Report.

MR. HERRICK: Yes. Isn't that 25? That's --

CO-HEARING OFFICER DODUC: Yes.

No, I'm just clarifying for Dr. Rosenfield.

MR. HERRICK: Sorry.

WITNESS ROSENFIELD: So, can you repeat the question?

MR. HERRICK: Yes.

Are you aware of the State Board's development of flow criteria document dated 2010?

WITNESS ROSENFIELD: Yes, I am.

MR. HERRICK: And what is the gist of that document?

WITNESS ROSENFIELD: That, given the current geometry of the Delta freshwater flows are inadequate to maintain public trust, fishery resources and other aquatic resources.

MR. HERRICK: And do the flows recommended in that report seek to improve the populations by increasing the flows over current numbers?

WITNESS ROSENFIELD: Yes, in general.

MR. HERRICK: Okay.

WITNESS ROSENFIELD: That was the recommendation.

MR. HERRICK: Are you familiar with SWRCB-103?

If we could pull that up real quickly. Again, just the cover page would be fine.

And this is the Scientific Basis Report that the SWRCB produced in support of the recommended changes in the Bay-Delta program.

(Exhibit displayed on screen.)

MR. HERRICK: Are you familiar --

WITNESS ROSENFIELD: Yes, I'm familiar with that report.

MR. HERRICK: -- with this document?

Pardon me?

WITNESS ROSENFIELD: Yes, I'm familiar it.

MR. HERRICK: And do you understand that that's an analysis of the science behind proposed changes to fishery flow conditions and other things?

WITNESS ROSENFIELD: Yes.

MR. HERRICK: And do you have any position on whether or not you agree with those recommend -- that analysis of the science behind those conclusions?

WITNESS ROSENFIELD: We thought the analysis was --

CO-HEARING OFFICER DODUC: Hold on.

Mr. Bezerra.

MR. BEZERRA: Objection: It's a vague and ambiguous question.

This document is multiple hundreds of pages long with multiple recommendations.

The question wants to go to specific recommendations. That's fine. But to ask whether the witness agrees or not with the report is vague and ambiguous.

MR. HERRICK: I'll rephrase it. I thought I limited it to fishery flows and I said "other stuff" but --

CO-HEARING OFFICER DODUC: So let's do that, Mr. Herrick.

MR. HERRICK: Let's go to Page 5-32, please.
(Exhibit displayed on screen.)
MR. HERRICK: I'd better put on my glasses here. Sorry.
Dr. Rosenfield, do you see the section marked 5.3.4?
WITNESS ROSENFIELD: Yes.
MR. HERRICK: And it talks -- It's headed -- the heading is "Conclusion and Proposed Requirements."
WITNESS ROSENFIELD: Yes.
MR. HERRICK: And in the middle of the first paragraph, do you see the sentence that says (reading):
"Populations of several estuarian-dependent species of fish and shrimp very positively with flow as do other measures of the health of the estuarian ecosystem."
WITNESS ROSENFIELD: Yes, I see that.
MR. HERRICK: Do you agree with that statement?
WITNESS ROSENFIELD: Yes.
MR. HERRICK: In your opinion, does this document provide an analysis of the science behind that conclusion?
WITNESS ROSENFIELD: Yes, it does.

MR. HERRICK: And do you agree with that analysis?

WITNESS ROSENFIELD: In general, I agree that the analysis was thorough and reflected the best-available science.

There were details in our comments that suggested additional science or different ways of viewing the data or interpreting the data.

But, in general, I thought it was a fairly accurate and comprehensive report.

MR. HERRICK: Would you agree that there are varying opinions with regard to the degree to which flow is beneficial to fish populations in the Delta?

WITNESS ROSENFIELD: Yes. I would agree that they're varying --

MR. BEZERRA: Objection: The term "fish populations in the Delta."

I went through in great detail various abundance indices. There's different indices for different trawl. There's different indices for different fishes.

And, again, saying -- lumping them all together makes it a vague and ambiguous question.

CO-HEARING OFFICER DODUC: I believe that was a general question.

Wasn't it, Mr. Herrick?

MR. HERRICK: It was.

CO-HEARING OFFICER DODUC: Overruled.

MR. HERRICK: Dr. Rosenfield, do you understand that the -- Excuse me.

Let me -- Let me go down to the next paragraph.

And if you could just read that paragraph real quick, I'm going to ask you about the last sentence in that.

WITNESS ROSENFIELD: The last paragraph on the page?

MR. HERRICK: The last paragraph on the page -- excuse me -- yes.

WITNESS ROSENFIELD: (Examining document.)

Okay. I've read it.

MR. HERRICK: And the last sentence talks about (reading):

"It" --

Being the narrative flow objective.

-- "requires maintenance of Delta outflows sufficient to support and maintain the natural production of viable native fish and aquatic species populations rearing in or migrating

EXHIBIT 7

STEPHAN C. VOLKER (CSB #63093)
ALEXIS E. KRIEG (CSB #254548)
STEPHANIE L. CLARKE (CSB #257961)
DANIEL P. GARRETT-STEINMAN (CSB #269146)
JAMEY M.B. VOLKER (CSB #273544)
LAW OFFICES OF STEPHAN C. VOLKER
1633 University Ave
Berkeley, California 94703
Tel: 510/496-0600
Fax: 510/845-1255

Attorneys for PCFFA and IFR

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	**TESTIMONY OF DEIRDRE DES JARDINS**

I, Deirdre Des Jardins, do hereby declare:

I. SUMMARY

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

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

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

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

> A certification is issued when the State Water Board determines that an application for certification is complete and there is reasonable assurance the operation of the Project will comply with water quality standards and other appropriate requirements. The State Water Board must analyze potential Project-related environmental impacts to Project affected water bodies prior to making a determination that continued operation of the Project will be protective of the designated beneficial uses of the watershed.
>
> (p. 5, underlining added.)

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

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[5] State Water Resources Control Board, 2012 Supplemental Notice of Preparation and Notice of Scoping Meeting for Environmental Documentation for the Update and Implementation of the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary: Comprehensive Review. Obtained from https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/environmental_review/docs/notice_baydeltaplancompreview.pdf

[6] State Water Resources Control Board, Comments on the Second Administrative Draft Environmental Impact Report / Environmental Impact Statement for the Bay-Delta Conservation Plan, July 5, 2013. Available at http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/State_Water_Resources_Control_Board_Comments_on_BDCP_EIR-EIS_7-5-2013.sflb.ashx

STATEMENT OF SERVICE

I hereby certify that I have this day, August 15, 2018, submitted to the State Water Resources Control Board and caused a true and correct copy of the following document:

MOTION TO STRIKE THE PART 2 REBUTTAL TESTIMONY OF DR. CHARLES HANSON AND DR. PAUL HUTTON

to be served **by Electronic Mail** (email) upon the parties listed in Table 1 of the **Current Service List** for the California WaterFix Petition Hearing, dated August 14, 2018, posted by the State Water Resources Control Board at https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/service_list.shtml

I certify that the foregoing is true and correct and that this document was executed on August 15, 2018.

Signature: _____

Name: Mae Ryan Empleo

Title: Legal Assistant for Osha R. Meserve
Soluri Meserve, A Law Corporation

Party/Affiliation:
Local Agencies of the North Delta

Address:
Soluri Meserve, A Law Corporation
510 8th Street, Sacramento, CA 95814