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

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

PART 2 TESTIMONY OF BILL
JENNINGS

I Bill Jennings, do hereby declare:

I. INTRODUCTION

I am the Executive Director of the California Sportfishing Protection Alliance (CSPA). I served as CSPA's Chairman from 1987 to 2005, when I became CSPA's Executive Director. Between 1995 and 2005, I served as Deltakeeper, a project of San Francisco Baykeeper. I have more than thirty years experience in water quality, water rights and fishery issues in the Delta and tributary waterways. My responsibilities include reviewing and commenting on water right petitions and changes; CEQA/NEPA documents; WDRs and NPDES permits; and State and Regional Board plans and policies. I also oversee a compliance program that has resulted in more than five hundred enforcement actions against violators of environmental laws established to protect habitat

and water quality. A copy of my statement of qualifications has been previously submitted as Exhibit CSPA-1.

CSPA is a non-profit public benefit conservation and research organization established in 1983 for the purpose of conserving, restoring and enhancing the state's water quality, wildlife and fishery resources and their aquatic ecosystems and associated riparian habitats. CSPA's membership fishes, boats, swims and aesthetically enjoys the public trust resources of the Delta and tributary waterways.

II. OVERVIEW OF TESTIMONY

My testimony focuses on the persistent precipitous decline of fisheries over the last fifty years and the failure of the State Water Resources Control Board (SWRCB), fishery agencies and numerous adaptive management processes to slow or reverse the decline. An understanding this lengthy track record is essential to any analysis of impacts and likely consequences of the proposed California WaterFix Project (WaterFix) and any consideration of possible conditions of approval. Despite the inexplicable absence of the fishery agencies from this proceeding, the SWRCB has sufficient information to establish instream flow requirements protective of the public trust/public interest and to require that any approved adaptive management program be predicated on the achievement of explicit biological performance targets. I discuss the SWRCB's failure to establish a methodology for balancing the public trust describing the framework containing the components and information that must be compiled, analyzed and compared that are critical to any defensible balancing of competing beneficial uses. I then briefly discuss inevitable impacts to water quality and the inadequacies and uselessness of the Final

Environmental Impact Report (FEIR) to the SWRCB's responsibilities. My testimony generally follows the order of the Part II Key Issues and the questions posed by the SWRCB in the 30 October 2015 Notice of Petition and Public Hearing and I provide my opinion regarding answers to those questions. Those Part II questions include:

3. Will the changes proposed in the Petition unreasonably affect fish and wildlife or recreational uses of water, or other public trust resources?
 - a. Will the proposed changes in points of diversion alter water flows in a manner that unreasonably affects fish, wildlife, or recreational uses of water?
 - b. Will the proposed changes in points of diversion alter water quality in a manner that unreasonably affects fish, wildlife, or recreational uses of water?
 - c. If so, 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?
 - 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, competing beneficial uses of water, and the relative responsibility of the Projects and other water right holders for meeting water quality objectives?
4. Are the proposed changes requested in the Petition in the public interest? If so, what specific conditions, if any, should be included in any approval of the Petition to ensure that the changes are in the public interest?
5. Should the Final Environmental Impact Report be entered into the administrative record for the Petition?

I confess that in preparing this testimony my thoughts occasionally revisited William Burroughs observation that "a paranoid schizophrenic is simply someone who's discovered what's going on."

III. FISHERIES HAVE COLLAPSED SINCE THE STATE WATER BOARD WAS ESTABLISHED

The precipitous collapse of pelagic and salmonid fisheries in the Central Valley since creation of the SWRCB is a scathing indictment of the Board's failure to protect the remaining remnant of public trust fisheries. Between 1967 and 2016, the California Department of Fish and Wildlife's (CDFW) Fall Midwater Trawl (FMWT) abundance indices (combined September, October, November and December surveys) for striped bass, Delta smelt, longfin smelt, American shad, splittail and threadfin shad have declined by 99.4, 98.0, 99.9, 90.9, 100.0 and 94.8 percent, respectively. (CSPA-231) Taken as five-year averages (1967-1971 vs. 2012-2016), the declines for striped bass, Delta smelt, longfin smelt, American shad, splittail and threadfin shad are 99.2, 98.1, 99.8, 86.3, 98.0 and 94.5 percent, respectively. (Ibid.) Other surveys have revealed similar declines. For example, the Summer Towntnet Survey shows that between 1969-1973 and 2013-2017 (no survey in 1967 & 1969) Delta smelt and striped bass indices declined 98.3 and 97.3 percent, respectively. (CSPA-231 & CSPA-233) As we discuss, testimony in various SWRCB proceedings have shown that numerous other Delta species, like catfish and shrimp, have experienced dramatic declines. And native lower trophic levels have declined by 1 to 2 magnitudes.

Anadromous fisheries have experienced similar declines. Historically, salmon existed in vast numbers in the Central Valley. Conservative estimates of Chinook salmon in the Central Valley have ranged from one to two million spawners annually. (CSPA-234, page 10) Visual estimates of young salmon in the Upper Sacramento River in 1898

were 10,000 young salmon per-mile, totaling half to three-quarters of a million in the headwaters of the river. (CSPA-235, page 142) A U.S. Fish Commission egg-collecting crew caught and examined nearly 200,000 spring-run salmon over 40 days in September and early October on the McCloud River in 1878 and elder Wintu described salmon abundance in the 1980s and early 1900s as “so thick on the McCloud it looked like you could walk across them.” (Ibid, page 148) The now extinct spring-run of salmon on the San Joaquin River was once “one of the largest Chinook salmon runs anywhere on the Pacific Coast” and numbering “possibly in the range of 200,000 to 500,000 spawners annually.” (Ibid, page 91) More recently fall-run spawning escapements in the mainstem Sacramento River below Keswick Dam averaged 217,100 fish annually during 1952–1959; 136,600 fish in the 1960s; 77,300 in the 1970s; 72,200 in the 1980s; and 48,000 fish from 1990 to 1997. (Ibid, page 145) NMFS estimates that there were 1 to 2 million Central Valley steelhead prior to 1850 that declined to approximately 40,000 in the 1960s and further declined to about 3,600 during 1998-2000. CSPA-236, p. 20)

The Central Valley Project Improvement Act (CVPIA) made fish and wildlife protection a coequal goal of the Central Valley Project (CVP) and required the Secretary of the Interior to develop and implement a program which makes all reasonable efforts to ensure that, by the year 2002, natural production of anadromous fish in Central Valley rivers and streams will be sustainable, on a long-term basis, at levels not less than twice the average levels attained during the period of 1967-1991. (CSPA-237, p. 12) This fish doubling requirement is also incorporated into the California Fish and Game Code (§ 6900 et seq.), both the 1995 and 2006 Water Quality Control Plan for the San Francisco

Bay/Sacramento-San Joaquin Delta Estuary and U.S. Environmental Protection Agency's promulgated Water Quality Standards for Sacramento and San Joaquin Rivers and Bay-Delta (40 CFR §131.37). Pursuant to CVPIA requirements, the U.S. Fish & Wildlife Service (USFWS) established the Anadromous Fisheries Restoration Program (AFRP). (SWRCB-99, pp. 1-2 & 5) USFWS serves as the lead agency for the AFRP and the Core Group includes the California Department of Water Resources (DWR), National Marine Fisheries Service (NMFS), U.S. Environmental Protection Agency (USEPA), U.S. Bureau of Reclamation (USBR) and CDFW. The AFRP developed a plan to achieve the doubling requirement, including: a 1967-1991 Baseline Period Average of natural production of Chinook salmon, a Doubling Period average that now extends from 1992-2015 and a Production Target that represents a doubling of Chinook salmon. The target production levels for anadromous fish in the Central Valley include: Chinook salmon (all races (990,000), fall-run (750,000), late-fall-run (68,000), winter-run (110,000), spring-run (68,000), steelhead (68,000), striped bass (2,500,000), American shad (4,300), white sturgeon (11,000) and green sturgeon (2,000). (Ibid, pp. 1, 8 & 9)

The natural production of all races of adult Chinook Salmon in the Central Valley during the 1992-2015 Doubling Period Average has declined by 23.3% from the 1967-1991 Baseline Period Average and is only 38.5% of the Production Target. (CSPA-239, Figure 1) For natural production of Central Valley fall-run, late-fall-run, winter-run and spring-run Chinook salmon: the 1992-2015 Doubling Period Average has declined from the 1967-1991 Baseline Period Average by 7.6, 52.6, 88.8 and 61.1 percent, respectively; and are only at 46.1, 23.8, 5.5 and 19.7 percent, respectively, of the doubling levels

mandated by the CVPIA, Bay-Delta Plan and Fish and Game Code. (Ibid, Figures 2-5) For natural production of Sacramento River fall-run, late-fall-run, winter-run and spring-run Chinook salmon: the 1992-2015 Doubling Period Average has declined from the 1967-1991 Baseline Period Average by 43, 52.3, 88.8 and 98 percent, respectively; and are only 28.6, 23.8, 5.5 and 1.0 percent, respectively, of the mandated doubling levels. (Ibid, Figures 6-9) For natural production of fall-run Chinook salmon in the Stanislaus, Tuolumne and Merced rivers: the 1992-2015 Doubling Period Average has declined from the 1967-1991 Baseline Period Average by 51.2, 68.5 and 54.5 percent, respectively; and are only 24.1, 15.7 and 34.3 percent, respectively, of mandated doubling levels. (Ibid, Figures 32- 34) Not only did average Doubling Period natural production of Chinook salmon decline on these rivers from Baseline Period average production, the average production during the last 10 years of the Doubling Period has significantly declined from production in the first ten years. (Ibid, Figures 1-3, 5-7, 32-35) The downward spiral has been relentless, trending toward extinction.

IV. THE STATE WATER BOARD HAS FAILED TO PROTECT PUBLIC TRUST RESOURCES

The issues in this proceeding, assessment of WaterFix's impacts and measures necessary to protect public trust resources cannot be adequately considered without consideration of the SWRCB's historical role in the biological decline of the estuary.

The SWRCB was established by statute in 1967 and combined the functions of the old State Water Quality Control Board and the State Water Rights Board. In 1971, the SWRCB issued Decision 1379 that established new water quality requirements for the

Delta and Suisun Marsh. However, D-1379 was immediately stayed by the courts and, consequently, D-1291 issued by the old Water Rights Board remained in effect. Because of the stay, the SWRCB initiated a new proceeding in 1976 that resulted in D-1485 in 1978. The new proceeding was a consolidated hearing combining the water quality and water right authority of the Board. It consisted of a Delta water quality control plan, accompanied by an EIR, and a water right order amending the terms and conditions of DWR and USBR's water rights permits. (SWRCB-23, pp. 4-6) D-1485 acknowledged that it would not be fully protective of Suisun Marsh, excluded new salinity standards to protect south Delta agriculture, and did not include full mitigation for impacts to salmon, shad, catfish and other species. It admitted that, "full mitigation of project impacts on all fishery species now would require the virtual shutting down of the project export pumps." (Ibid, p. 11-13) The next major Bay-Delta water rights decision adopted by the SWRCB was D-1641 in 2000, 22 years following adoption of D-1485. The five-year average FMWT abundance indices following the two adopted decisions (1978-1982 vs. 2000-2004) reveal that populations of striped bass, Delta smelt, longfin smelt, American shad and splittail declined 91.6, 51.4, 96.1, 16.0, and 79.4 percent, respectively. (CSPA-231)

Decision 1485 was immediately challenged in court. The trial court rejected the D-1485 standards as inadequate and ordered the Board to set aside the plan and decision. Appeals followed. In 1986, the appellate court issued an extensive complex decision, generally referred to as the Racanelli Decision. (CSPA-240, pp. 1-2)

In pertinent part, the Racanelli essentially found the Board erred in establishing water quality standards based solely upon the state and federal projects' operations and

permits but was first required to establish water quality standards protective of all identified beneficial uses and then subsequently incorporate those standards into relevant water rights permits. It also emphasized the California Supreme Court's Audubon Decision that the state has an affirmative duty to take the public trust into account in the planning and allocation of water resources and the Board may reconsider past water allocation decisions, and amend water rights if necessary to protect fish and wildlife. (Ibid and CSPA-241, pp. 2, 18-23, 35-36)

Racanelli lifted the trial court's stay of D-1485 because the SWRCB had indicated it intended to quickly begin a proceeding to develop new water quality standards. USEPA notified the state in 1987 that the D-1485 Plan standards were inadequate to protect the estuary. A new SWRCB water quality proceeding was launched in 1987 leading to a 1988 Draft Water Quality Control Plan for Salinity. (CSPA-242) The USFWS testified that Chinook salmon abundance had decreased by over 50% since the early 1950s and that Delta smelt had experienced a "precipitous decline since the early 1970s." (Ibid, p. 4-19 & 4-41) CDFG testified that striped bass populations had declined since the early 1950s and estimated that the adult population "declined from about three million in the early 1960s to less than one million fish currently." (Ibid. p. 4-30) The Draft Plan recommended that Delta outflow and inflows on the Sacramento and San Joaquin Rivers be increased and exports reduced between April and July. However, annual inflows, outflow and exports would remain the same, based upon 1985 level exports of 5.47 MAF, which were the highest recorded and 12% above the average between 1978 and 1988. (Ibid, pp. 1-10 and 1-16) Governor George Deukmejian, at the

behest of state and federal project contractors, directed the SWRCB to withdraw the Draft Plan.

The SWRCB issued a new Draft Water Quality Control Plan for Salinity in January 1991, held a hearing in March and adopted the Plan in May. (CSPA-243, p. 5) The 1991 Water Quality Plan postponed consideration of flows until a subsequent proceeding and established numerical salinity and chloride water quality criteria for Municipal, Industrial and Agricultural beneficial uses and numerical fish and wildlife criteria for temperature in the Sacramento and San Joaquin Rivers, dissolved oxygen in the Stockton Deep-Water Channel and salinity at Chipps Island, Antioch and Jersey Point. Suisun Marsh standards remained unchanged from 1978. (Ibid, Table 1-1, p. 20)

USEPA, in a 3 September 1991 letter to the SWRCB approved the salinity objectives for municipal/industrial and agricultural beneficial uses and the dissolved oxygen standard in the Stockton Ship Channel and disapproved the remaining fish and wildlife objectives and salinity standards because they failed to comply with regulatory requirement and/or protect beneficial uses. The letter informed the SWRCB that it had 90-days to adopt necessary revision or USEPA was required to promulgate revised standards. (CSPA-244, pp. 1-2)

In April of 1992, Governor Pete Wilson directed the SWRCB to adopt “interim” standards by the end of 1992. The SWRCB released Water Rights Decision D-1630 in December 1992 following an intense evidentiary proceeding. (CSPA-245, p. 6-7) Based upon testimony from the CDFW and USFWS, the draft decision graphically described the decline of public trust resources of the Estuary. By 1991, adult fall-run Sacramento

River salmon escapement had been halved since the late 1960s, spring-run Sacramento river salmon abundance was about 0.5% of historic runs, San Joaquin River fall-run salmon escapement dropped from 70,000 in 1985 to 430 in 1991, the 1985 level of Delta smelt abundance was 80% lower than the 1967-1982 average population, adult striped bass declined from about 3 million in the early 1960s to 1.7 million in the late 1960s to an estimate of 590,000 in 1990, abundances of shrimp and rotifers declined between 67% and 90% in the 1970s and 1980s, white catfish populations have severely declined since the mid-1970s and overall fish abundance in Suisun Marsh has been reduced by 90% since 1980. (Ibid, p. 29-30)

Among other requirements, D-1630 prohibited: reverse flow in the western Delta from 1 February through 30 June, reverse flows exceeding a negative 1,000 cubic feet per second (cfs) between July 1-31 and reverse flows exceeding a negative 2,000 cfs from 1 August to 31 January. It required springtime pulse flows in the Sacramento and San Joaquin Rivers to help transport salmon and striped bass into Suisun Bay and a fall pulse from the San Joaquin River. New export requirements were mandated on export pumping during April-June in dry and critically dry years and during April in wet, above normal and below normal years and during the spring pulse flow from the San Joaquin River. It also established new restrictions and real time management for the Delta Cross Channel between 1 February and 30 June. (Ibid, pp. 1-2) The impact of these requirements was estimated to potentially reduce exports by 0.8 to 1.9 million acre-feet (MAF) of water. (Ibid, p. 3) In April 1993, Governor Wilson directed the SWRCB to abandon efforts to establish interim standards.

In December 1993, the USEPA released a Draft Regulatory Impact Assessment of proposed federal Bay-Delta standards. Subsequently it published a Final Rule on Water Quality Standards for Surface Waters of the Sacramento River, San Joaquin River, and San Francisco Bay and Delta of the State of California in the Federal Register on 24 January 1995 to become effective on 23 February. (CSPA-246) The standards at 40 CFR 131.37 established a fish migration criteria to double salmon populations based on salmon smolt survival index of number of tagged fall-run smolts released upstream on the Sacramento and San Joaquin Rivers and recaptured at Chipps Island in the western Delta. An estuarine habitat criterion was included to protect fish and wildlife in the Suisun, San Pablo and San Francisco Bays and Suisun Marsh and stringent specific salinity requirements were set to protect striped bass spawning in the San Joaquin River. (CSPA-247) While these more protective federally promulgated water quality standards remain current, the SWRCB has never acknowledged, complied with or enforced them.

Aware that USEPA was developing federal standards for the Bay-Delta, the SWRCB again launched a proceeding to establish a new Bay-Delta plan and released a draft water quality control plan for public review in December 1994. A draft environmental impact report was released in February 1995. A public hearing was held in February and the 1995 Water Quality Control Plan for the San Francisco Bay-San Joaquin Delta Estuary was adopted in May. (SWRCB-30) These quickly developed standards comprise the standards in place today, twenty-two years later despite federal requirements to reconsider and revise water quality standards every three years. The adequacy of the 1995 Bay-Delta Plan standards is best characterized by the fact that the

CDFW FMWT five-year abundance indices for pelagic species (1995-1999) as compared with the recent five-year abundance indices (2012-2016) reveal declines of striped bass, Delta smelt, longfin smelt, American shad, splittail and threadfin shad over the last two decades of 86.7, 96.8, 98.7, 92.5, 99.3 and 94.4 percent, respectively. (CSPA-231)

The 1995 water quality standards were implemented into water rights permits in Water Right Decision 1641 adopted in December 1999 and revised in March 2000. (SWRCB-21) The 1995 Water Quality Plan for the Bay-Delta was reviewed in 2006 and retained the 1995 standards. (SWRCB-27) Fisheries have continued to decline since the 1995 standards were implemented. The five-year FMWT abundance indices following adoption of D-1641 (2000-2004), as compared with the recent five-year abundance indices (2012-2016), reveal declines of striped bass, Delta smelt, longfin smelt, American shad, splittail and threadfin shad of 68.5, 95.3, 95.0, 89.9, 93.9 and 93.6 percent, respectively. (CSPA-231) The natural production of anadromous fisheries has also decline since implementation of the standards. Average populations of natural Central Valley and Sacramento and San Joaquin River fall-run, spring-run, winter-run, fall-run and late-fall-run Chinook salmon during the last eight years of the AFRP Doubling Period (2007-2015) have significantly declined from average population during the first 12 years of the Doubling Period (1995-2004). (CSPA-239)

While a number of factors can affect fishery abundances, the one consistent element spanning the decline of fisheries, from the late 1960s, when State Water Project (SWP) exports began and the SWRCB was established, is the relentless increase in Delta exports and corresponding decrease in Delta outflow, as a percentage of unimpaired

Delta inflow. (CSPA-248) Over that span, the SWRCB has been unable or unwilling to reverse that trend throughout its water right and water quality proceedings.

Another glaring example of the SWRCB's failure to protect public trust resources is its acquiescence of instream temperatures that exceed water quality standards below Shasta Reservoir, the primary storage facility of the CVP. CSPA filed an August 2015 Complaint against the SWRCB and USBR for numerous violations of the Central Valley Basin Plan, WR Order 90-05, Clean Water Act, Endangered Species Act, Public Trust Doctrine and California Constitution. (CSPA-249) However, the SWRCB never acknowledged nor responded to the complaint. Any consideration of conditions for WaterFix approval must recognize the imperative need for biologically protective temperature requirements on the Sacramento River.

Construction of Shasta Dam eliminated approximately 201 miles of historical habitat and more than 90,000 Chinook salmon spawning sites. Following construction of Red Bluff Diversion Dam (River Mile [RM] 243) in 1964, about 60% of fall-run salmon spawned below Red Bluff and, between 1987 and 1992, 19% of winter-run salmon spawned below Red Bluff. (Ibid, pp. 4-6) CDFW annual spawning surveys reveal that between 2005 and 2012, salmon spawning has been increasingly compressed into the upper few miles below Keswick Dam. Between 2005 and 2012, 78 to 99 percent of winter-run salmon, 51 to 88 percent of late-fall-run salmon, 30 to 43 percent of spring-run salmon and 7 to 34 percent of fall-run salmon have spawned in the upper 5.5 miles between the Highway 44 Bridge (RM 296.5) and Keswick Dam (RM 302). (Ibid, p. 6-7)

As previously noted, this period corresponds with a dramatic decline of Sacramento River Chinook salmon.

The Central Valley Regional Water Quality Control Board's (CVRWQCB) Water Quality Control Plan for the Central Valley Region (Basin Plan), covering the Sacramento River Basin and the San Joaquin River Basins, has long included water quality standards for temperature. (SWRCB-34, p. III-8) For the lower Sacramento River between Shasta Dam and the I Street Bridge, the specific temperature standards are "the temperature shall not be elevated above 56°F in the reach from Keswick Dam (RM 302) to Hamilton City (RM 199) nor above 68°F in the reach from Hamilton City to the I Street Bridge during periods when temperature increases will be detrimental to the fishery." (Ibid, Table III-4, p. III-8) Temperature standards are dependent upon controllable factors, i.e., resulting from and controllable by human activity. (Ibid, p. III-1.00) Obviously, constructing dams and storing, releasing and diverting water is a human activity. In 1990, the SWRCB issued WR Order 90-05 that implemented the Basin Plan with respect to USBR's water rights in the Sacramento River at Red Bluff Diversion Dam. (SWRCB-24) Order 90-05 requires USBR to meet a daily average of 56°F at Red Bluff Diversion Dam when higher temperatures will detrimental to the fishery, subject to controllable factors. An upstream compliance point may be approved by the SWRCB, subject to uncontrollable factors. (Ibid, pp. 54-55) SWRCB WR Order 90-05 ignored and failed to protect the 44 miles of river between Hamilton City and Red Bluff that comprises almost 43% of identified salmon spawning habitat protected by the CVRWQCB Basin Plan.

The SWRCB addressed controllable factors in WR Order 92-02 when it advised USBR that water deliveries are not available for delivery if needed as carryover storage to protect the fishery. (CSPA-250, footnote 1, p. 9) Excessive water deliveries are the principle cause of the failure to maintain adequate carryover storage in Shasta Reservoir to meet Basin Plan temperature standards. NMFS has repeatedly made clear to the SWRCB that it is prohibited by court decisions from reducing contract deliveries to maintain storage and that only the SWRCB has that authority.

The NMFS OCAP BiOp does not require compliance with Basin Plan standards or even WR Order 90-05. (SWRCB-84, p. 592) The BiOp's Reasonable and Prudent Actions require specific end-of-season storage requirements for Shasta Reservoir for a specific percentage of years and requires a running ten-year temperature compliance at Clear Creek (RM 292), Balls Ferry (RM 276), Jellys Ferry (RM 266) and Bend Bridge (RM 258) of 95, 85, 40, 15 percent of the time, respectively. (Ibid) A review of Shasta Reservoir storage records and daily average temperature instream data over the recent 10-year period, reveals that USBR has frequently failed to meet storage requirements and temperature standards have been exceeded at Red Bluff, Bend Bridge and Jellys Ferry in all years and more than half the years at Balls Ferry and Clear Creek. (CSPA-249, pp. 9-11)

The SWRCB and fishery agencies, among others, comprise the Sacramento River Temperature Task Group (SRTTG). The SRTTG is an adaptive management group that advises USBR on courses of action regarding temperature compliance, based upon fish surveys, real-time temperature data and modeling within the limits of the quantity of

water USBR is willing to provide. The SWRCB's Executive Officer routinely authorizes SRTTG recommendations on relocating the temperature compliance point upstream, often multiple times during a single year, and has even allowed the temperature standard of 56°F to be increased to 58°F. (Ibid, pp. 10-28) Reductions in cold-water storage in Shasta Reservoir because of excessive water deliveries, coupled with importation of high temperature water from the Trinity River via Whiskeytown Reservoir to the Sacramento River, inevitably lead to violations of temperature requirements contained in the CVRWQCB Basin Plan, SWRCB Order 90-05 and the NMFS OCAP BiOp. As noted, water deliveries and reservoir operations are controllable factors.

The SWRCB has also ignored the scientific literature, USEPA water quality standards and recommendations by NMFS that daily average temperature standards are not protective and standards predicated on a seven-day average of daily average maximum temperature are more scientifically and biologically defensible. (Ibid, pp. 19-22)

The SWRCB's failure to adopt protective water quality standards for temperature coupled with a failure to ensure compliance with existing standards has greatly contributed to spawning mortality and the decline of Sacramento River Chinook salmon. USBR's water rights permits must be modified to include explicit requirements to comply with adopted water quality standards for temperature.

Yet another example of the SWRCB's failure to protect public trust resources is its pattern and practice in failing to enforce or ensure compliance with formally promulgated Delta water quality standards. Drought sequences are a normal occurrence in California.

Over the last 100 years, there have been 10 multi-year droughts of large-scale extent spanning 41 years or more than 40% of the time. These include the 1918-1920, 1923-1926, 1928-1935, 1947-1950, 1959-1962, 1976-1977, 1981-1992, 2000-2002, 2007-2009 and 2012-2015 droughts. (CSPA-251, p. 4) No one, including the SWRCB, DWR or USBR, can be surprised and unprepared for something that occurs more than 40% of the time.

The old Basin 5B Water Quality Plan was violated during the 1976-1977 drought, with no record of enforcement. (SWRCB-23, p. 14) D-1485 water quality standards were violated 246 times between 1988 and 1991, with no enforcement action taken. (CSPA-251, pp. 2&4) In 1992, the SWRCB relaxed D-1485 Suisun Marsh salinity standards for the interior of the Marsh. (CSPA-252, p. 29) In February 2009 the SWRCB conducted a hearing on a DWR/USBR petition to relax Delta water quality standards but the miracle March rains made any relaxation unnecessary.

CSPA filed a July 2015 Complaint against the SWRCB, USBR and DWR for numerous violations of the D-1641 Bay-Delta Plan, Clean Water Act, Endangered Species Act, Public Trust Doctrine and California Constitution. (CSPA-253) However, the SWRCB never acknowledged nor responded to the complaint. Among other things, CSPA alleged that the SWRCB's serial weakening of adopted D-1641 water quality standards represents a defacto change in the standards themselves, that the SWRCB failed to enforce the Cease & Desist Orders against USBR and DWR for violations of southern Delta salinity standards and that USBR and DWR were currently violating the relaxed water quality standards allowed by the SWRCB's Executive Officer.

The complaint pointed out that in 2013 the Executive Director allowed USBR and DWR to operate to critical year criteria, instead of the prevailing dry year criteria. In 2014, the Executive Officer issued eight separate Temporary Urgency Change Petition (TUCP) Orders substantially weakening and extending modification of water quality objectives, without benefit of formal public hearings to discuss public trust and unreasonable impacts. At the time of the 21 July 2015 complaint, the Executive Officer had had issued another four TUCP Orders without benefit of hearing. (Ibid, p. 3) Hundreds of days of violations of D-1641 water quality standards protecting agricultural and fish and wildlife beneficial uses were documented, along with numerous days where the relaxed standards were also exceeded. (Ibid, pp. 4-6)

CSPA has frequently testified before the SWRCB concerning the CVP and SWP historical pattern of delivering near-normal supplies of water in the initial years of a drought, which prevent sufficient carryover reservoir storage to provide a margin-of-safety to ensure compliance with standards in the event of another dry year. For example, a June 2015 CSPA, CWIN and AquAlliance Protest/Objection/Petition for Hearing regarding a proposed USBR/DWR TUCP, presented graphs of Shasta and Reservoir storage and drawdowns during the 1976-1977, 1987-1992, 2007-2008 and 2011-2015 droughts, which led to insufficient storage to comply with water quality standards. (CSPA-254, pp. 16-20) We also showed how fish responded to recent droughts and that fish experience super critical conditions 50% of the time by comparing February- June Delta outflow as a percentage of unimpaired flow. (Ibid, pp. 3-11) We quoted SWRCB staff reports demonstrating that the 2014 and 2015 TUCPs resulted in a

reduction in regulatory outflow for fish and Delta agriculture and increased Delta exports. And we reported data from the California Department of Agriculture and Economic Development Department revealing that California agricultural production and farm employment had shown consistent increases between 2001 and 2014. (Ibid, pp. 22-23)

Water quality standards are developed for wet, above normal, below normal, dry and critical dry years. Dry/critical year standards are developed based upon dry/critical years. There can be no justification of relaxing adopted standards whenever the CVP and SWP have mismanaged reservoir storage by excessive deliveries of water. As previously noted, reservoir operations and water deliveries are “controllable factors” within the power of project operators.

The July 2016 Biological Assessment for the California WaterFix identified future drought procedures as including creation of a drought management team composed of DWR, USBR, USFWS, NMFW, SWRCB and CDFW to prepare a drought contingency plan. While the drought contingency plan could propose adhering to the existing regulatory authorizations, it could also include “changes to project operations, contract deliveries and **regulatory requirements.**” (Emphasis added) (SWRCB-104, p. 3-241) USBR and DWR envision employing future TUCPs under WaterFix whenever excessive deliveries of water have reduced or eliminated storage margins-of-safety and water quality standards cannot be met.

Based upon more than 30 years experience in water quality and water rights issues in the Bay-Delta, my opinion is that the change in the point of diversion will exacerbate existing impacts that unreasonably affect fish, wildlife and recreational uses of water.

Conditions of approval for WaterFix cannot be based on the seriously inadequate Bay-Delta Plan and D-1641 standards that have demonstratively failed to protect public trust resources. They must include new protective water quality standards for the Delta and scientifically defensible new reservoir storage and instream temperature requirements for the Sacramento River. New water quality standards must be clearly tied to biological performance targets and there must be explicit consequences for failing to comply with standards or meet performance targets. Any new criteria must make clear that USBR and DWR cannot continue to rely on TUCPs to weaken promulgated standards.

V. THE FISHERY AGENCIES HAVE FAILED TO PROTECT PUBLIC TRUST RESOURCES

The fishery agencies, comprising CDFW, USFWS and NMFS have decided or been directed to not participate in the WaterFix hearing, despite their active presence in virtually every significant water quality or water rights hearing conducted by the SWRCB over the last fifty years. As previously discussed, during that period, populations of pelagic and anadromous fisheries have collapsed. (CDFW FMWT and AFRP Doubling Graphs)

The continuing decline of Central Valley pelagic and anadromous fish species has led to an increasing number being listed as endangered, threatened or special concern pursuant to state and federal endangered species statues since the early 1990s. These include: Southern DPS green sturgeon (*Acipenser medirostris*), federal threatened, candidate for federal endangered; Delta smelt (*Hypomesus transpacificus*), state endangered, federal threatened; Longfin smelt (*Spirinchus thaleichthys*), state threatened,

federal candidate; Central Valley steelhead (*Oncorhynchus mykiss*), federal threatened; Sacramento winter-run Chinook salmon (*Oncorhynchus tshawytscha*), state endangered, federal endangered; Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*), state threatened, federal threatened; Central Valley fall/late-fall-run Chinook salmon (*Oncorhynchus tshawytscha*), federal species of concern, state species of special concern; Sacramento splittail (*Pogonichthys macrolepedotus*), state species of special concern; Pacific lamprey (*Entosphenus tridentate*), federal species of concern and river lamprey (*Lampetra ayresi*), state species of special concern. The state and federal project also have potential to adversely affect Killer whales or Orcas (Southern Resident DPS) (*Orcinus orca*), federal listed as endangered because they are dependent upon Chinook salmon for 70% of diet and reduced quantity and quality of diet is one of the major identified causes of their decline.

California leads the nation in fish species listed as endangered or threatened. Delta smelt were listed as threatened in 1993 and endangered in 2009. Longfin smelt were listed as threatened in 2009. Central Valley winter-run Chinook salmon was listed threatened in 1989 and endangered in 1994, spring-run listed as threatened in 1999 and Central Valley steelhead listed as threatened in 2006. Green sturgeon was listed as threatened in 2006. The extensive array of listing decisions, critical habitat designations, recovery plans and biological opinions (BiOps), with their reasonable and prudent requirements, by CDFW, USFWS and NMFS have failed to halt or reverse the continuing decline of these species.

For example, the 3-year FMWT abundance indices for Delta smelt following their listing in 1993 (1993-1995) compared with the most recent 3-year abundance indices (2014-2016) reveal a decline of 98.9%. Similarly, the 3-year FMWT abundance indices for longfin smelt following their listing in 2009 (2009-2011) compared with the most recent 3-year abundance indices (2014-2016) reveal a decline of 96.3%. (CSPA-231) The AFRP Doubling Goal graphs for winter-run and spring-run Chinook salmon demonstrate no increase or decreases in natural production for those species following their listing under the federal ESA. (CSPA-228) And, as noted above, populations of numerous other yet-to-be-listed species have plummeted by similar magnitude.

The USFWS 2017 programmatic BiOp is graphic example of the failure to protect fish. The components of WaterFix addressed programmatically, which will require subsequent consultations include: (1) construction of the NDD and associated structures; (2) construction of the HORG; (3) construction of the CCWD settlement agreement facilities; (4) operations of new and existing CVP and SWP water facilities under dual conveyance; (5) future maintenance; (5) future monitoring; (6) compensatory mitigation associated with construction of the NDD, HORG, and CCWD settlement agreement facilities; and (7) the CWF Adaptive Management Program. (SWRCB-105, p. 1-2) Despite the programmatic nature of the BiOp, the USFWS concludes that WaterFix will not jeopardize the continued existence of Delta smelt. (Ibid, p. 341) The USFWS was required to develop a new BiOp after the court invalidated its 2005 BiOp. The new 2008 BiOp found that the project was likely to jeopardize the continue existence of Delta smelt. (SWRCB-87, p. 276) Comparing of the average population abundance of Delta

smelt over the four years following the 2008 jeopardy opinion (2008-2011) with the most recent four-year average abundance of Delta smelt 2013-2016) reveals that the most recent Delta smelt population average is less than one tenth the average population following the jeopardy opinion. (CSPA-231) Although longfin smelt is only a federal candidate species (state threatened), the average population of longfin smelt has declined by more than three-quarters. (Ibid) Despite the fact that Delta smelt have declined since the last jeopardy decision and population are at record lows and hovering on the brink of extinction, USFWS claims that a massive hydrologic project that will literally re-plumb the Delta will pose no threat to the existence of Delta smelt.

The recent 2017 NMFS BiOp is equally egregious. Like the USFWS' BiOp, the NMFS BiOp is programmatic because mitigation/restoration, monitoring and adaptive will be developed in the future. It found that WaterFix is not likely to jeopardize the continued existence of winter-run, spring-run, steelhead and green sturgeon or destroy or adversely modify their designated critical habitat. (SWRCB-106, p. 1) This contrasts with the NMFS 2009 BiOp that CVP/SWP operations are likely to jeopardize the continued of these species and destroy or adversely modify the designated critical habitats. (SWRCB-84, pp. 1-2) However, examination of recent trends in abundance shows no statistically significant increase to justify the assumption that a massive re-plumbing of the Delta and D-1641 warrants a no-jeopardy opinion. (CSPA-239)

It is the undeniable collapse in species' populations spanning decades that bluntly speaks to the failure of the fishery agencies to protect public trust resources. This long dismal track record coupled with their recent release of partial programmatic non-

jeopardy BiOps and the CDFW Consistency Determination for WaterFix, despite not knowing if the new fish screens are technically feasible or having final adaptive management and operations plans or protective water quality standards, plus their inexplicable absence from this pivotal proceeding at this critical period in history provides little basis for believing the future will be different.

It should be remembered that endangered species acts only protect listed species from extinction. There are numerous fish species whose populations have experienced magnitude declines that are not yet protected or not eligible for protection under the acts. Yet, they are part of the public trust, which includes the vast universe of lower trophic levels and aquatic and riparian plants that make up a vibrant sustainable ecosystem. The fishery agencies have tended to focus on listed or candidate species, the SWRCB must not.

My opinion, based upon a three-decade career endeavoring to protect fish, is that I do not believe WaterFix can be conditioned on the 2017 BiOps or the fishery agencies participation in adaptive management programs. The SWRCB should establish protective water quality standards and require explicit biological performance targets, with consequences for failing to achieve them.

VI. ADAPTIVE MANAGEMENT HAS FAILED TO PROTECT PUBLIC TRUST RESOURCES

In Part 1 of this proceeding, DWR and USBR (Petitioners) proposed Alternative H3+ as the initial operating criteria of WaterFix. H3+ falls within the range of Alternative 4A scenarios H3 and H4. The respective BiOps will determine the specific

operating requirements of H3+. These requirements may change based on adaptive management. Proponents established a broad analytical framework comprised of Boundary 1 and Boundary 2. Based upon Figure 11 of DWR exhibit 514, the median difference in combined Delta exports between the two boundaries is approximately 2.8 MAF. Boundary 1 represents an increase in exports of approximately 1.3 MAF (6.1 MAF exports), while Boundary 2 represents a decrease in exports of approximately 1.5 MAF (3.3 MAF exports).

Petitioners responded to the 31 August 2017 letter from the SWRCB seeking clarification on proposed operating criteria on 8 September 2017. Petitioners proposed that WaterFix be conditioned upon terms in D-1641 and that the modeling analysis of the boundary analysis of B1 to B2 demonstrated compliance with D-1641, the 2008/2009 BiOps and no injury to legal users of water within the range of foreseeable outcomes of the adaptive management process. New information developed through the adaptive management process can be, if appropriate, incorporated in the ESA/CESA permits. The Petitioners are not requesting the modeling assumptions be included as conditions but are specifically requesting that the adaptive management process be incorporated into the water rights permits. They are explicitly not proposing that the operational criteria contained within the BiOps and 2081(b) Incidental Take Permit be included as conditions. (CSPA-256, pages 1-2)

In other words, Petitioners are requesting that WaterFix be initially conditioned upon requirements in D-1641 and subsequently, through the adaptive management process, to somewhere within the range of Boundary 1 to Boundary 2; a difference in

Delta exports of approximately 2.8 MAF. As discussed above, D-1641 and BiOps have failed to protect public trust fisheries. As we discuss below, neither has adaptive management. There has been no commitment or plan to tie adaptive management decisions to the achievement of explicit biological performance targets. Nor has a final comprehensive agreed-upon and signed adaptive management plan been presented with a commitment to fully fund what will become, if meaningful, an extremely expensive monitoring program. Adaptive management appears to be a concept to operate in the backroom by Proponents, water contractors, fishery agencies and the SWRCB, plus possibly a few invited guests. There are no sunlight provision or opportunities for the public to be involved, even though adaptive management will have real-world consequences for public trust fisheries or potential harm to legal users of water.

The history of adaptive management in the Delta has been one of unrelenting failure. The National Research Council reviewed BDCP and prepared a report titled, “*A Review of the Use of Science and Adaptive Management in California’s Draft Bay Delta Conservation Plan.*” It observed:

Despite numerous attempts to develop and implement adaptive environmental management strategies, many of them have not been successful (Gregory et al., 2006; Walters, 2007). Walters (2007) concluded that most of more than 100 adaptive management efforts worldwide have failed primarily because of institutional problems that include lack of resources necessary for expanded monitoring; unwillingness of decision makers to admit and embrace uncertainties in making policy choices; and lack of leadership in implementation. Thus many issues affecting the successful implementation of adaptive management programs are attributable to the context of how they are applied and not necessarily to the approach itself (Gregory et al., 2006). In addition, the aims of adaptive management often conflict with institutional and political preferences for known and predictable outcomes (e.g., Richardson, 2010) and the uncertain

and variable nature of natural systems (e.g. Pine et al., 2009). The high cost of adaptive management, and the large number of factors involved also often hinder its application and success (Lee, 1999; NRC, 2003). Thus, adaptive management, although often recommended, is not a silver bullet and it is not easy, quick, or inexpensive to implement. (CSPA-257, p. 38) (Note: CSPA was informed that this exhibit, which was submitted in part 1 should instead be submitted in part 2)

Adaptive management in large, highly complex ecosystems is extremely difficult, time-consuming and expensive. In highly stressed and over-appropriated watersheds where high-value resources and sharp political conflict over management choices are involved, the difficulty increases substantially. Mix in a high degree of risk and uncertainty and the difficulty increases exponentially. Despite the fact that adaptive management has been a core component of BDCP and WaterFix from the beginning, it remains essentially a concept. As the Delta Independent Science Board, in its 30 September 2015 review of the RDEIR/SDEIS, observed:

The lack of a substantive treatment of adaptive management in the Current Draft indicates that it is not considered a high priority or the proposers have been unable to develop a substantive idea of how adaptive management would work for the project. (SWRCB-49, p. 5)

We did not find examples of how adaptive management would be applied to assessing - and finding ways to reduce - the environmental impacts of project construction and operations. (Ibid, p. 5)

The protracted development of the BDCP and its successors has provided ample time for an adaptive-management plan to be fleshed out. The Current Draft does little more than promise that collaborations will occur and that adaptive management will be implemented. This level of assurance contrasts with the central role of adaptive management in the Delta Plan and with the need to manage adaptively as climate continues to change and new contingencies arise. (Ibid, p. 6)

In its review of the final FEIR/FEIS, the Delta Independent Science Board observed:

This version improves on its predecessors but retains some persistent shortcomings. Improved content on adaptive management is still short on detail about how adaptive management would be implemented under changing and uncertain conditions. Summaries and comparisons, more abundant than before, lack insightful syntheses and graphics that ease comprehension of the vast amount of material presented. Expanded discussion of Delta levees stops short of evaluating interactions with water supply reliability and neglects changing views of earthquake hazards. Long-term effects are better addressed in several ways, but with insufficient attention to uncertainties in defining the No Action Alternative and to the interplay between California groundwater sustainability and Delta water supplies. Other content missing includes evaluation of environmental effects of water use south of the Delta. Evaluation of ecosystem impacts, though extensive, retains gaps on using restoration as mitigation. (CSPA-258, p. 1)

With respect to adaptive management, the Delta Independent Science Board
found:

The Final version, like those before it, proposes an Adaptive Management and Monitoring Team that would oversee a comprehensive program, building on the model of CSAMP. Few details are offered about how this team would be formed, how its responsibilities would mesh with those of multiple agencies working in the Delta, or how it would function, although it would be responsible for developing monitoring protocols (p. 3-226) and would oversee funding (p. 3-204). Overall, the Final version provides a satisfactory explanation of why adaptive management is important and how it will be used, but not details of how it will actually be done. (Ibid, p. 3)

We are assured that an adaptive management and monitoring plan will be developed “during early years of project implementation” (Responses to comments on Draft EIR/EIS 2546-79). As we have noted previously, developing such a plan at the outset is essential if adaptive-management is to be used effectively. A plan and structure for adaptive management and monitoring should be in place *before* actions are initiated. A compelling case of adaptive management implementation to mitigate environmental impacts of the projects over the long term is lacking. (Ibid, p. 3)

There also remains no mention of potential impediments or constraints on conducting adaptive management; many of these can be anticipated (as discussed in the Delta Plan and the Delta ISB review of adaptive management, Delta ISB, 2016). (Ibid, p. 3-4)

As previously noted, there is still no final funding plan or agreement to fully fund the WaterFix adaptive management plan. Virtually every technical analysis of adaptive management we've reviewed discusses the crucial need for ample and consistent funding over the long-term and that adaptive management is always significantly more expensive than anticipated.

The Delta has been adaptively managed for the last thirty years. Taken together, the vast suite of water quality control plans and water rights decisions by the SWRCB over the last decades essentially constitutes an adaptive management process. CalFed was an elaborately structured water planning and adaptive management program. The CalFed Record of Decision mentions adaptive management 132 times. The array of BiOps issued over the years by USFWS and NMFS and CESA permits issued by CDFW of the past two decades comprise a broad adaptive management scheme. Indeed, the Reasonable and Prudent Alternatives (RPAs) of the BiOps are implemented through adaptive management: the Water Operations Management Team, Smelt Working Group, Delta Operations for Salmonids and Sturgeon Work Group, Sacramento River Temperature Task Group and other groups are adaptive management. The Recovery Plan for Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead is based upon adaptive management, as is the Final Restoration Plan for the Anadromous Fish Restoration Program. The Vernalis Adaptive Management Program is self-explanatory. The Interagency Ecological Program and its fifteen Project Work Teams is an adaptive management program, as is the Collaborative

Science and Adaptive Management Program. A broad adaptive management program was an essential component in the Blue Ribbon Task Forces' Delta Vision Report and was mentioned forty-one times in the Delta Vision Strategic Plan. From its inception, BDCP envisioned an extensive adaptive management program. More than a decade later, there is still no final recommended adaptive management program that has been approved by participating agencies and no agreement to extensively fund such a program.

All of the deficiencies and failures of adaptive management identified by the National Research Council are present in this estuary, on steroids. Managers and decision makers have routinely rejected the "adaptive" recommendations made by technical-team scientists. Resource and regulatory agencies have failed to adopt and implement recommended criteria and failed to enforce existing criteria. Financial resources have been lacking and monitoring is woefully insufficient. Adaptive management has not only failed to reverse the downward spiral of native species, it has chaperoned them to the brink of extinction. As adaptive management programs have been stacked on top of each other, native fisheries and lower trophic orders have declined by one to two magnitude and are now faced with extirpation.

To be effective, adaptive management, including decisions on instream flow, must be expressly tied to the achievement of biological performance targets. For adaptive management to play a meaningful role in the Delta, scientists must have the authority to "adapt." Unfortunately, decision-makers and water agencies have not been willing to open their pocketbooks or hand over operational authority to scientists. We can find nothing in the thousands upon thousands of pages of BDCP/WaterFix plans or

environmental review documents that provide any assurance or evidence that adaptive management is likely to succeed. As practiced in the Delta, adaptive management has served as a shibboleth, a panacea, an excuse to delay and a subterfuge to avoid having to make difficult, unpleasant or politically untenable decisions. That's not merely an opinion: it's the historical track record of adaptive management in this estuary.

I note, that in Part 1 of this proceeding, Ed Whitelaw testified that, based upon the ECONorthwest report titled *Analysis of Proposed Change Point of Diversion and the No Injury Rule*, the proposed adaptive management plan suffered from fatal errors, including failure to; consider other legal users of water, fully incorporate uncertainty and risk, include the state of science on adaptive management and develop a sufficient long-term funding plan. (CWIN-6, pp. 7-13)

My opinion is that adaptive management in the Delta has been subject to political pressure, woefully inadequate funding, poor planning and a lack of performance criteria. Given the almost 30-year track record of adaptive management, WaterFix conditions cannot be based upon an adaptive management process.

VII. THE STATE WATER BOARD HAS SUFFICIENT INFORMATION REGARDING NECESSARY FLOWS AND THE NEEDS OF FISHERIES

Increasing degradation of the Delta's water quality and fisheries led the California Legislature to adopt the 2009 Delta Reform Act. (CSPA-26) The Act established the state goal of achieving "coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem." The Legislature established a Delta Policy to, among other things, "restore the Delta

ecosystem, including its fisheries and wildlife, as the heart of a healthy estuary and wetland ecosystem” and “improve water quality to protect human health and the environment consistent with achieving water quality objectives in the Delta.” (CSPA-26, §85020(c) & (e)) It established a state policy to “reduce reliance on the Delta in meeting California’s future water supply needs.” (*Ibid.* §85021) It found and declared that Delta is a “delicately balanced estuary and wetland ecosystem of hemispheric importance” (*Ibid.* §85022(c)(1)) and “the permanent protection of the Delta’s natural and scenic resources is the paramount concern to present and future residents of the state and nation” (*Ibid.* §85022(c)(2)). And it declared, “the longstanding constitutional principle of reasonable use and the public trust doctrine shall be the foundation of state water management policy and are particularly important and applicable to the Delta.” (*Ibid.* §85023)

The California Water Code, Division 35 (Sacramento-San Joaquin Delta Reform Act of 2009, Part 2, (Early Actions), Section 85084.5 required, “the Department of Fish and Game, in consultation with the United States Fish and Wildlife Service and the National Marine Fisheries Service and based on the best available science, shall develop and recommend to the board Delta flow criteria and quantifiable biological objectives for aquatic and terrestrial species of concern dependent on the Delta.” In November 2010, following a peer-review process, CDFW issued a report titled *Quantifiable Biological Objectives and Flow Criteria for Aquatic and Terrestrial Species of Concern Dependent on the Delta*. (SWRCB-66) The report found that “recent Delta flows are insufficient to support native Delta fishes in habitats that now exist in the Delta (*Ibid.*, p. 94),

recommended numerous biological and goals and objectives (Ibid, pp. 97-104) and specific recommendations for instream flow necessary to protect public trust fisheries (Ibid, pp. 105-107). It also included the specific flow recommendations by the expert panel, fishery agencies and NGOs in the SWRCB's 2010 flow hearing. (Ibid. pp. 131-155)

The California Water Code, Division 35 (Sacramento-San Joaquin Delta Reform Act of 2009, Part 2, (Early Actions), Section 85086(c)(1), required the SWRCB to, “pursuant to its public trust obligations, develop new flow criteria for the Delta ecosystem necessary to protect public trust resources. In carrying out this section, the board shall review existing water quality objectives and use the best available scientific information. The flow criteria for the Delta ecosystem shall include the volume, quality, and timing of water necessary for the Delta ecosystem under different conditions.” Section 85086(c)(2) also required that, “Any order approving a change in the point of diversion of the State Water Project or the federal Central Valley Project from the southern Delta to a point on the Sacramento River shall include appropriate Delta flow criteria and shall be informed by the analysis conducted pursuant to this section.)” (SWRCB-25, Appendix A)

Pursuant to direction in the Delta Reform Act, the SWRCB conducted an extensive public proceeding to determine flow criteria for the Delta necessary to public trust resources, using best available scientific information. The SWRCB's proceeding to develop instream flows protective of public trust resources was the most intense and comprehensive effort to determine necessary flows to protect public trust fish and

wildlife resources in the 50-year history of the Board. The Board appointed an illustrious group of recognized experts to serve as an expert panel that included: William Bennett, UC Davis; Jon Burau, USGS; Cliff Dahm, CalFed Science Program; Chris Enright, DWR; Fred Feyrer, USBR; William Fleenor, UC Davis; Bruce Herbold, USEPA; Wim Kimmerer, Romberg Tiburon Center, San Francisco State University; Jay Lund, UC Davis; Peter Moyle, UC Davis and Matt Nobriga, CDFW. It referenced 325 technical documents, including numerous peer-review papers by members of the expert panel. In testimony to the SWRCB, CDFW provided six expert witnesses and 16 exhibits plus 34 exhibits from the 1988 water quality plan proceeding and 27 exhibits from the 1992 water rights proceeding. The US Department of Interior presented testimony from 11 experts, including 9 USFWS experts and 66 exhibits plus exhibits from the 1988 and 1992 hearings. NMFS presented 2 experts and 9 exhibits. CSPA presented 6 experts and 28 exhibits plus 120 exhibits from 1988 and 1992. CWIN presented 1 expert and 25 exhibits. The Environmental Defense Fund presented 9 experts and 4 exhibits. The NRDC and the Bay Institute presented 2 experts and 4 exhibits. DWR presented 2 experts and 35 exhibits. The State Water Contractors presented 15 experts and 109 exhibits. In all, beyond the expert panel and its 325 referenced documents, 24 parties to the proceeding provided 81 expert witnesses and 488 exhibits plus the exhibits from the 1988 and 1992 hearings.

(We reference the record of the 2010 flow proceeding, which can be found at:

https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/exhibits/dfg/dfg_summary.pdf)

The resulting SWRCB report, titled *Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem*, found that “the best available science suggests that current flows are insufficient to protect public trust resources” (SWRCB-25, p.2) and that “recent Delta flows are insufficient to support native Delta fishes for today’s habitats” (Ibid, p. 5). It recommended flow criteria, crafted as percentages of unimpaired flows, of “75% of unimpaired Delta outflow from January through June, 75% of unimpaired Sacramento River inflow from November through June and 60% of unimpaired San Joaquin River inflow from February through June.” (Ibid, p. 5) It also included the specific flow recommendations by the expert panel, fishery agencies and NGOs in the hearing. (Ibid. pp. 153-177)

Only a single member of the current SWRCB was present during the flow proceedings. The SWRCB and CDFW 2010 proceedings likely represent the most comprehensive and scientifically robust effort to determine necessary flows to protect public trust resources in a watershed in the nation’s history. Given the inexplicable absence of CDFW, USFWS and NMFS from this proceeding, they represent the most comprehensive, scientific and state-of-the-art information available to the SWRCB, especially as the California Legislature explicitly directed the Board to include appropriate flow criteria in any order changing the point of diversion of the state and federal water projects and to use the analyses from the 2010 proceedings to inform the establishment of those flows.

My opinion is that, given the absence of the fishery agencies in this hearing, the SWRCB should take the extensive record and final report developed during the

SWRCB's 2010 flow proceeding and integrate the findings and recommendations from CDFW's parallel proceeding to develop biological objectives and flow criteria for species dependent on the Delta and establish a flow regime fully protective of public trust resources. On behalf of CSPA, Tom Cannon and Chris Shutes provide testimony that is consistent with the findings and recommendations from the 2010 mandated flow proceedings. (CSPA-202 & 204) The selected flow regime should then be "balanced" with consumptive beneficial uses to arrive at a solution that is reasonably protective of all beneficial uses. Balancing is addressed below.

VIII. THE STATE WATER BOARD HAS FAILED TO IDENTIFY OR ESTABLISH A FRAMEWORK FOR EVALUATING PUBLIC TRUST OR PUBLIC INTEREST BALANCING

My opinion, based upon more than 30 years involvement in protecting public trust resources, is that while the public trust and the public interest require a reasonable balancing of competing beneficial uses, balancing does not entail the total sacrifice of one use for another. The instream flow regime for protection of the ecosystem that has existed over the last 30 years has led to the decline of fisheries that now are on the brink of extirpation. Extinction is not balance. Whatever is a reasonable balance for fisheries and the aquatic ecosystem, it is substantially greater than flows than have existed over the last three decades.

Balancing the public trust is not simply a moment to moment decision by the SWRCB on what constituents the public trust and public interest and what is a reasonable balance of competing beneficial uses. It requires an analytical framework, including the

scientific method or basis the Board will employ to secure the necessary information to arrive at an informed decision. Balancing the public trust cannot be a black box.

The SWRCB has never set forth a methodology for balancing the public trust and public interest. It has never described the structured framework containing the components and information that must be compiled, analyzed, evaluated and compared that is critical to any creditable balancing of the public trust and public interest. Such methodologies and tools exist and have routinely been used in California and across the nation for water projects.

ECONorthwest was requested to describe the issues relevant to the state's balancing of competing demands on behalf of CSPA and CWIN. ECONorthwest provided a 2013 report titled *Bay-Delta Water, Economics of Choice*. It described basic economic practices, the SWRCB's balancing of Mono Lake, the ecological use of public trust resources, an array of federal and state methods and guidebooks on evaluating water projects, the principles of benefit-cost analyses and other issues pertaining to the Bay-Delta. The guidelines and guidebooks discussed in the ECONorthwest report included the federal guideline titled *The Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*, which has recently been updated as *The Principles, Requirements and Guidelines* (PR&G, finalized in 2014), and helps federal agencies like the Corps of Engineers and USBR plan water-related projects. The PR&G modernized how the federal government analyzes federal investment that impact water resources in light of economic, environmental and social impacts. The ECONorthwest report discusses USEPA's *Guidelines for Preparing Economic Analyses*

(2010) and the guideline on valuing ecological services titled *Valuing the Protection of Ecological Systems and Services* (2009). It also discusses various guidelines by DWR including the *Economic Analysis Guidebook* (2008) and a series of four reports, including *Ecosystem Valuation Methods*, *Natural Floodplain Functions and Societal Values*, *Middle Creek Restoration Project Case Study: Benefit and Cost Analysis*, and *Floodplain Management Benefit and Cost Framework*. CSPA introduced the ECONorthwest report as CSPA-27 but we understand the Board decided it was appropriate in Part 2. It has been reintroduced. (CWIN-205)

A creditable and defensible benefit/cost analysis of a project would consider all of the environmental consequences, social effects and costs and benefits of water management alternatives including both market and non-market effects, uncertainty and risk and follow rigorous professional standards and methods of analysis. It would consider benefits and costs to both agricultural and urban uses, as well as commercial fishing and recreational uses. It must analyze benefits and costs to ecosystem services and contingent valuation or the value Californians place on a healthy ecosystem. It must analyze benefits and costs of alternatives to current water use like conservation, reuse and reclamation.

Balancing must consider the Constitutional mandate to put water to the fullest beneficial use and prevent the waste and unreasonable use of water. This is especially important in a state with huge disparity between demand and supply that has deprived its public trust resources of sufficient water to keep its public trust ecosystems in good health. California agriculture comprises 2% of the state's GDP, uses an estimated 29

MAF of water and creates 336,788 direct jobs. However, the top revenue producing and job creating commodities use the least water. Vegetables, horticulture, non-tree fruits, deciduous fruits, cucurbits (melons, squash, cucumbers, watermelon, zucchini, etc.), tomatoes, vine (wine and table grapes), onions, potatoes, etc. produce 81.8% of the jobs and 62.7% of the revenue but only use 21.5% of the water. By comparison, irrigated pasture, alfalfa, corn, almonds, pistachios and cotton use 53.7% of water but only provide 19.6% of the revenue and 13.9% of the jobs. (CSPA-259, pp. 16-18) Between 2001 and 2013 crop production in California and Sacramento and San Joaquin Valleys showed consistent increases over two droughts and the first two years of a third. Agricultural employment reached new highs in during the first three years of the 2012-2015 drought. (Ibid, pp. 11-15) In addition, the vast wastes from Westside agriculture in the San Joaquin Valley to the San Joaquin River result in enormous redirected external costs to others, as do the greenhouse gases produced by raising cattle. These relative benefits and costs of applied water must be factored into any balancing of beneficial uses.

The SWRCB should also describe how declared state policy is considered in arriving at a balancing decision. California Water Code, Division 35 (Sacramento-San Joaquin Delta Reform Act of 2009), General Provisions, Sections 85000-85067 establishes a state water policy for the Delta. The Legislature found and declared that:

The Sacramento-San Joaquin Delta, referred to as the Delta in this division, is a critically important natural resource for California and the nation. It serves Californians concurrently as both the hub of the California water system and the most valuable estuary and wetland ecosystem on the west coast of North and South America. (§ 85002)

It established a policy of the State of California to:

Restore the Delta ecosystem, including its fisheries and wildlife, as the heart of a healthy estuary and wetland ecosystem. (§ 85020(c)) Promote water conservation, water use efficiency, and sustainable water use. (§ 85020(d)) Improve water quality to protect human health and the environment consistent with achieving water quality objectives in the Delta. (§85020(e))

It further found and declared:

The policy of the State of California is to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. (c)

The Delta is a distinct and valuable natural resource of vital and enduring interest to all the people and exists as a delicately balanced estuary and wetland ecosystem of hemispheric importance. (§ 85022(c)(1)) The permanent protection of the Delta's natural and scenic resources is the paramount concern to present and future residents of the state and nation. (§ 85022(c)(2))

The longstanding constitutional principle of reasonable use and the public trust doctrine shall be the foundation of state water management policy and are particularly important and applicable to the Delta. (§ 85023)

The SWRCB must describe how its balancing decision conforms with the express legislative intent and findings that: the Delta is a valuable and enduring resource of state, national and hemispheric importance; the permanent protection of the Delta's natural and scenic resources is the paramount concern to present and future residents; the Delta ecosystem and its water quality, fisheries and wildlife must be restored; the state policy is to reduce reliance on the Delta in meeting future water needs through regional water supplies, conservation and water use efficiency and the constitutional principle of reasonable use and the public trust doctrine is the foundation of state water management policy. And any balancing decision must be in conformance with state law.

To reiterate: the SWRCB must set forth a methodology that it intends to use for balancing the public trust and public interest, including the framework containing the components and information that must be compiled, analyzed, evaluated and compared that is critical to any creditable balancing of the public trust and public interest.

X. WATERFIX WILL CAUSE UNREASONABLE IMPACTS TO WATER QUALITY

Analytical methods are only available for a small subset of the universe of chemicals found in our waterways and water quality standards have been promulgated for even fewer. Moreover, promulgated water quality standards fail to address additive or synergistic effects of interacting chemical constituents or the sublethal impacts of these constituents on beneficial uses. The Delta is formally identified on the 2014 and 2016 California Integrated Report (Clean Water Act Section 303(d) List and 305(b) Report) as impaired and exceeding water quality criteria for a number of pollutants that are harmful to aquatic life. It is also listed as impaired by unknown toxicity.

Sacramento River, comprising the vast majority of inflow entering the Delta, is of far better quality than inflow from the San Joaquin River. Presently, the export of water the southern Delta draws Sacramento River water into the western Delta via Three-Mile Slough and from around the western end of Sherman Island. Sacramento River water is drawn into the central to the southern Delta via the Delta Cross Channel. The better quality Sacramento River water dilutes the more polluted water from the San Joaquin River in the northern, central, southern and western Delta.

WaterFix proposes to divert millions of acre-feet of better quality Sacramento River water around the Delta and this diversion will increase the concentration of pollutants that flow from the San Joaquin River or that are discharged within the Delta. It will also increase the residence time for those pollutants to interact with aquatic life. Pollutants that are presently identified at levels just below water quality standards will potentially exceed standards without being diluted by Sacramento River water. The increase in pollutant concentration and residence time is, by itself, an unreasonable impact to water quality and aquatic life, especially considering the number of fish species that are at or approaching historical lows and/or formally listed, pursuant to state and federal endangered species acts, as endangered, threatened or of special concern. And, given the presence of drinking water intakes and the extent of contact recreation and subsistence fishing that occurs in the Delta, increases in pollutant concentration and residence time pose a threat to human health.

Dr. G. Fred Lee and Dr. Susan Paulsen have testified eloquently on the increased pollutant concentration, residence time and water quality impacts that will occur if WaterFix is approved. (STKN-25, Antioch-200, Antioch-300, CSPA-6-Revised and CSPA-206)

Based upon three decades of monitoring water quality and reviewing proposed WDRs and NPDES permits, water quality standards and water quality control plan amendments, as well as directing the largest independent Clean Water Act enforcement campaign in the state, my opinion is that WaterFix and the proposed change in point of

diversion will cause unreasonable impacts to water quality, fish/wildlife and other beneficial uses and cannot be in the public interest.

XI. THE FINAL EIR IS USELESS IN THIS PROCEEDING

The question is not whether the FEIR is adequate for the purposes of CEQA but whether the document provides the SWRCB with sufficient information necessary for the board to reach an informed decision about what the board is required to do under its own regulations and statutes to protect public trust resources. In my opinion the FEIR fails to provide the essential information the board needs to make decisions regarding unreasonable effects on the public trust and public interest.

The SWRCB has no authority regarding certification of the FEIR, as the project proponents are the lead agencies. Under CEQA, project impacts can be mitigated and if they can't, a statement of overriding consideration can be made. The FEIR addressed the public trust as a mitigation issue. The FEIR doesn't analyze "balancing beneficial uses," injury to fisheries or a multitude of responsibilities facing the Board in this hearing. The SWRCB has very different responsibilities under the California Water Code (CWC). The baselines are different, fisheries are legal users of water under the CWC and the Board must analyze the balancing of beneficial uses.

In this hearing the SWRCB is not merely a responsible agency required to accept the petitioners approval and certification of their own EIR. Here the Board is a lead agency and as such needs to prepare their own EIR that addresses whether or not the project will cause unreasonable effects on fish and wildlife or on the public interest. Here

the Board must conduct a formal balancing of competing beneficial uses. That is the reason the SWRCB prepared its own EIR in the Mono Lake proceedings to address the issues of public trust, public interest and unreasonable effects on fish and wildlife for which the Board has responsibility. At Mono Lake, the Board did its own modeling and hired experts in balancing beneficial uses.

In its review of the Bay Delta Conservation Plan/California WaterFix RDEIR/SDEIS, the Delta Independent Science Board observed:

These reasonable expectations go largely unmet in the Bay Delta Conservation Plan/California WaterFix Partially Recirculated Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement Draft (herein, “the Current Draft”). “We do not attempt to determine whether this report fulfills the letter of the law. But we find the Current Draft sufficiently incomplete and opaque to deter its evaluation and use by decision- makers, resource managers, scientists, and the broader public.” (SWRCB-49, p. 1)

In reviewing the final FEIR/FEIS, the Delta Independent Science Board noted that it had conducted reviews on three previous drafts of the environmental document and still found persistent shortcomings in the FEIR/EIS. These include inadequacies regarding adaptive management (which we addressed above), informative summaries and comparisons, levee risks, seismic risks, long-term effects, San Joaquin water reliability, economic effects, restoration and mitigation. There is an extensive section addressing the difficulty in assessing the scientific adequacy of a massive document. CSPA-258, pp. 2-12)

The Science Board pointed out:

We repeatedly requested intelligible summaries of chapters and summary evaluation tables to help us – as well as decision-makers and stakeholders –

better understand how the information might support thoughtful evaluation of proposed actions and decisions. Most chapter summaries were deferred to the Final California WaterFix EIR/EIS, and most of those provided fall short, as elaborated in persistent concerns above. The absence of coherent and useful summaries in such massive documents diminishes the value, and perhaps credibility of this important document as a comparative guide to the expected environmental effects of the alternatives considered. (Ibid, p. 12)

We also expressed concern that important recent scientific work was not included in the massive compilations. In an instance regarding climate-change science, we were told that the information used in the EIR/EIS was current enough, and that an EIR/EIS kept up to date would “never get finished.” (Ibid)

When we asked about information we considered important for rational decision-making, we were frequently told that the law does not require such information and that lead agencies “avoid speculation.” (Ibid)

In its review of the SDEIS of the Bay Delta Conservation Plan/California

WaterFix, USEPA evaluated the document and wrote:

“The unusual circumstances of this project mean that the information is not yet available for a complete evaluation of environmental impacts – and for that reason a rating of “3” (*Inadequate*) for the SDEIS is required – but EPA expects that the project will continue to move forward, with those necessary additional pieces to be supplied as the later regulatory process proceed. (CSPA-25, p. 4)

In reviewing the FEIS, USEPA observed:

In our October 30, 2015 review of the SDEIS, we noted that the proposed WaterFix project continued to predict significant adverse impacts to the Delta and its resources. As we reiterated in that letter, the most essential decision for achieving the desired balance of water reliability and restoration of the Bay Delta ecosystem is how freshwater flows through the Delta will be managed. We noted that decisions regarding appropriate flow management are being deferred, pending future regulatory actions by multiple state and federal agencies that will determine operational parameters important to the evaluation of the project's impacts. Because information was not available for a complete evaluation of environmental impacts, we found the SDEIS to be inadequate. (CSPA-260, p. 1)

To date, none of the regulatory processes mentioned in our SDEIS letter have been completed. The impact analysis in the FEIS is based on updated modeling that more accurately reflects the proposed project operations to the limited extent that they can be predicted at this time, and an appendix to the document includes information from the Biological Assessment. Nevertheless, the FEIS continues to predict that water quality for municipal, agricultural, and aquatic life beneficial uses will be degraded and exceed standards as the western Delta becomes more saline. Significantly, the FEIS' conclusions regarding impacts to aquatic life remain unchanged from those in the SDEIS, predicting substantial declines in quantity and quality of aquatic habitat for 15 of 18 fishes evaluated under WaterFix preferred operations. (Ibid, p. 2)

The authors of the FEIR/EIS confused volume with substance. The vast size of the document and the lack of reasonable, consistent and informative summaries and comparisons rendered it virtually incomprehensible to the general public, stakeholders and decision-makers. Even sophisticated commenters found it difficult, if not impossible, to make intelligent assessments of a technical document the size of several Encyclopedia Britannica or more than fifty Bibles. The Attorney General's Office, representing DWR in litigation over the certification of the FEIR says that the record is around three million pages. The very length and complexity of the FEIR/EIS fails to comport with the intent or letter of CEQA.

BDCP/WaterFix proponents sabotaged preparation of a defensible EIR/EIS from the beginning by failing to include a reasonable range of alternatives. For example, an alternative proposed by the Environmental Water Caucus (EWC), a coalition of 35 environmental, fishing, environmental justice and tribal organizations including most of the major state-wide environmental groups, that would better ensure water supply reliability and protect the public trust resources of the Delta and its tributaries was

rejected early in the process. That alternative, based upon the EWC report titled *A Responsible Exports Plan* (CSPA-261), which was based upon an earlier edition of EWC's *A Sustainable Water Plan for California* (CSPA-262) was rejected after project proponents added to the alternative an array of questionable projects like restoring Tulare Lake to its historical condition to the alternative. That is a difference between the SWRCB's responsibilities under the CWC and petitioners responsibilities pursuant to CEQA. An EIR by the Board would not summarily reject an alternative that offered improved water supply reliability while providing far greater protection of public trust resources. Those reports are included as exhibits to illustrate conditions we recommend be included in any conditions-of-approval for WaterFix.

South of Delta water users have an array of viable alternatives to their present reliance on water exported from the Delta. Inclusion of requirements based upon those alternatives in any WaterFix approval would further state policy of reducing reliance on the Delta (CWC § 85021), promoting water conservation, water use efficiency, and sustainable water use (§ 85020(d)) and meeting and the co-equal goal of water supply reliability, while complying with the constitutional principle of reasonable use and the public trust doctrine that is the foundation of state water management policy (CWC § 85203).

Throughout the various iterations of the EIR/EIS, a multitude of cities, counties, water districts and environmental, fishing and tribal groups, as well as hundreds of individual citizens, labored countless hours in reviewing and analyzing the document. They submitted many thousands of pages of informative and substantive comments only

to encounter responses that were dismissive and nonresponsive. Seventy-eight organizations representing cities, counties, water districts and environmental, fishing and tribal interests banded together and filed twelve separate lawsuits contesting certification of the FEIR.

My opinion, based upon 30-years reviewing and litigating environmental documents, is that the FEIR is conceptually and substantively gravely deficient and fails to provide the SWRCB with the analysis and information necessary for the Board to reach an informed decision about WaterFix under its explicit CWC and public trust responsibilities..

XI. A FINAL THOUGHT

In the WaterFix proceeding, the SWRCB has indicated it intends to establish interim requirements (i.e., “conditions”) for the Project before it has revised the Water Quality Control Plan, which is years behind schedule and likely years before completion. The Board has implied that following an approval of the petition, proponents are at risk of facing more restrictive requirements in an updated Bay-Delta Plan.

Based upon more than 30-years experience in California water quality and water rights issues and having participated in most of the major water rights/water quality proceedings in the Central Valley during that time, I’m skeptical. It brings to mind a quote from Mark Twain, “Truth is stranger than fiction, but it is because fiction is obliged to stick to possibilities, truth isn’t.” There is a reality in California water politics. And that reality leads me to doubt that the SWRCB can approve a massive multi-billion dollar project and several years later, after the project is launched and billions of dollars have

been committed, adopt new protective water quality standards that would effectively kill the project. And, given the dire state of California's public trust fisheries, new standards that are protective of fisheries and water quality would do just that.

"Conditions-of-approval" included by the SWRCB to protect the water quality, public trust and public interests are essentially defacto water quality standards applicable only to the SWP/CVP. That is opposite of Racanelli's explicit direction to the SWRCB to first adopt water quality standards to protect all beneficial uses of the Delta and then apply those standards to water users. The SWRCB should postpone consideration of the petition until it has completed the updated Water Quality Control Plan for the Bay-Delta.

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



Bill Jennings