

California Sportfishing Protection Alliance

Hearing in the matter of Water Right Application 30358A filed by the City of Davis and the University of California, Davis and Application 30358B filed by the City of Woodland

Before the State Water Resources Control Board

Testimony of Bill Jennings

18 January 2011

The Key Issues of this proceeding before the State Water Resources Control Board (SWRCB) cannot be addressed without first considering the precipitous decline and perilous condition of the fisheries, aquatic ecosystem and water quality of the Sacramento-San Joaquin Delta estuary (Delta) and Sacramento River watershed and whether there is any remaining unappropriated water that can be assigned without further degrading public trust resources.

Precipitous Decline in Fisheries

Populations of Sacramento River and Delta native pelagic and salmonid fisheries and their associated food webs are collapsing. This should not be surprising. You cannot deprive an estuary of half of its flow, reduce critical habitat, eliminate variability and turn the hydrograph on its head and expect any other outcome; especially, for fisheries that slowly evolved over millennia.

Numerous species are listed pursuant to state and federal endangered species acts. Sacramento winter-run Chinook salmon (*Oncorhynchus tshawytscha*) are listed as endangered pursuant to the California Endangered Species Act (CESA) and federal Endangered Species Act (ESA). Central Valley springrun Chinook salmon (*O. tshawytscha*) are listed as threatened pursuant to CESA and ESA. Central Valley fall/late fall-run Chinook salmon (*O. tshawytscha*) are classified as a species of special concern under the ESA. Central Valley steelhead (*O. mykiss*) are listed as threatened under the ESA. North American green sturgeon (*Acipenser medirostris*) are listed as threatened under the ESA.¹ Many of these species are at risk of extirpation.

Longfin smelt (*Spirinchus thaleichthys*) are currently a candidate for threatened species status under the CESA and will shortly officially change to threatened. Delta smelt (*Hypomesus transpacificus*) are listed as endangered under CESA and threatened pursuant to ESA. The United States Fish and Wildlife Service (USFWS) has recently concluded that reclassifying delta smelt from threatened to endangered is warranted.²

Many of the species in decline are unique or endemic to this region. In testimony before the National Academy of Science's NRC Committee of Sustainable Water and Environmental Management in the California Bay-Delta, Dr. Peter Moyle pointed out "... 60% of the kinds of

¹ SWRCB. 2010. Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem. 3 August 2010. Pages 19-20. By reference. (Exhibit, cspa-es#1)

² Ibid.

fish are found only in California, while another 19% are shared with just one other state, mostly Oregon” and “[m]ost of the native fish in the Delta are endemic to the Central Valley, including the four distinct runs of Chinook salmon, but some are largely endemic to the Delta, such as delta smelt and splittail.” Putting things in perspective, Dr. Moyle observed, “[m]ost of these fish are in trouble or worse: 7% are extinct, 21% are listed, and 21% qualify for listing (by my analysis). If you count other fishes that are in decline...the number climbs to 75%.” He attributed the root cause of recent fish declined in the Delta to water diversions.³

The historical collapse of fisheries in the Central Valley is amply documented. In 1978, following a long formal evidentiary hearing and in a moment of remarkable candor, the State Water Board found that “full mitigation of project impacts on all fishery species now would require the virtual shutting down of the project export pumps.”⁴ In 1988, following another extensive evidentiary hearing, the State Water Board acknowledged, “a safe level of exports is not known.”⁵ Indeed, the Board’s 1988 draft order found that “optimal water quality objectives” for shad and striped bass larvae and salmon smolt survival in the Delta would require the prohibition of all exports between 1 April through 30 November, in all water years.⁶

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 1980.⁷ Draft Water Right Decision 1630, 1992, p 29.

Fisheries collapse over the last decade has accelerated. The Department of Fish and Game’s (DFG) Fall Midwater Trawl indices for 2009 reveal that young striped bass, Delta smelt, splittail and threadfin shad are at record historical lows and that longfin smelt and American shad are at the second and third lowest level of record, respectively.⁸ Salmonids have fared as poorly as pelagic species. Sacramento River fall-run Chinook salmon, numbering some 750,000 in 2002, dropped to 90,000 in 2007 to 66,264 in 2008 and to a dismal new low of 39,530 in 2009. In response, the Pacific Fisheries Management Council and the Fish and Game Commission closed the ocean and coastal fishery to commercial and recreational fishing for the 2008 fishing season and the Commission banned salmon fishing in all Central Valley Rivers, with the exception of limited fishing on a stretch of the Sacramento River. The ban on all salmon fishing was

³ Moyle, P. 2010. Remarks to NRC Committee of Sustainable Water and Environmental Management in the California Bay-Delta. 26 January 2010. Pages 1-3 and 6-7. (Exhibit, cspa-bj#3)

⁴ SWRCB. 1978. D-1485. Page 13. By reference. Exhibit, cspa-es#4)

⁵ SWRCB. 1988. Draft 1988 Water Quality Control Plan for Salinity, 7.3.2.5. Pages 7-32. By reference. (Exhibit, cspa-es#5)

⁶ Ibid. Table 5-4-1. Page 5-110.

⁷ SWRCB. 1992. Draft Water Right Decision 1630. Page 29. (Exhibit, cspa-es#3)

⁸ DFG. 2010. Fall Midwater Trawl. 3 pages. (Exhibit, cspa-bj#4)

extended through the 2009 season but eased somewhat for 2010.⁹

While the causes of fishery declines are numerous and include contaminants and invasive species; major factors are major reductions in Delta inflow and outflow that have resulted in loss and degradation of habitat, massive changes in the historic hydrograph and the effects of export operations. Central Valley Project and State Water Project pumps seasonally export up to 65% of inflow and in 10 of the last 20 years, more than 50% of total freshwater inflow has been diverted from tributary rivers or from the Delta. Sacramento Basin inflow has been reduced and the Delta's annual freshwater outflow has been reduced, especially in the critical fall and spring periods. Both exports and reverse Old and Middle River flows have increased over the last decade.¹⁰

The California Legislature, in SB-1 (Seventh Extraordinary Session) tasked the SWRCB to gather the best available science and develop flow criteria for the Delta ecosystem necessary to protect public trust resources, including the volume, quality, and timing of water needed under different conditions. The SWRCB conducted a proceeding in the matter on 22-24 March. An astonishing assemblage of biologists and scientists from resource and water agencies, academia and the NGO community testified and presented evidence in the hearing. A final report was issued on 3 August 2010. It observes, "[t]he combined effects of water exports and upstream diversions reduced average annual net outflow from the Delta from unimpaired conditions by 33% and 48% during the 1948 – 1968 and 1986 – 2005 periods, respectively¹¹ and that Sacramento River inflows over the last 18 to 22 years have been about 50% on average between April through June compared to unimpaired conditions. The report states, "[r]ecent Delta flows are insufficient to support native Delta fishes for today's habitats." The report's criteria for flows include, among many other measures, "75% of unimpaired Delta outflow from January through June and 75% of unimpaired Sacramento River inflow from November through June."¹²

It is inarguable that the various iterations of the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary have failed miserably to protect the fisheries and aquatic ecosystem of the Delta and its tributaries. It is also inarguable that the SWRCB's water rights decisions, especially Water Right Decision 1641 and its associated orders, have grievously failed to protect public trust resources.

Decline in Water Quality

⁹ SWRCB. 2010. Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem. 3 August 2010. Page 39. By reference. (Exhibit, cspa-es#1)

¹⁰ Swanson, C. 2010. Presentation to NRC Committee of Sustainable Water and Environmental Management in the California Bay-Delta. 26 January 2010. 18 slides. (Exhibit, cspa-bj#5)

¹¹ SWRCB. 2010. Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem. 3 August 2010. 3.3.2, page 28. By reference. (Exhibit, cspa-es#1)

¹² Ibid. 1.2 Summary Determinations, Flow Criteria and Conclusions, page 5.

All areas of Delta waterways are impaired and incapable of supporting identified beneficial uses. For example the 303(d) List¹³ identifies the:

1. Northern portion of the Delta as impaired because of chlordane, chlorpyrifos, DDT, diazinon, dieldrin, Group A pesticides, invasive species, mercury, PCBs and unknown toxicity.
2. Northwestern portion as impaired by chlorpyrifos, DDT, diazinon, electrical conductivity Group A pesticides, invasive species, mercury and unknown toxicity.
3. Western portion as impaired by chlorpyrifos, DDT, diazinon, electrical conductivity, Group A pesticides, invasive species, mercury and unknown toxicity.
4. Central portion as impaired by chlorpyrifos, DDT, diazinon, Group A pesticides, invasive species, mercury and unknown toxicity.
5. Southern portion of the Delta as impaired by DDT, diazinon, electrical conductivity, Group A pesticides, invasive species, mercury and unknown toxicity.
6. Export area is impaired by chlorpyrifos, DDT, diazinon, electrical conductivity, Group A pesticides, invasive species, mercury and unknown toxicity.
7. Eastern portion as impaired by chlorpyrifos, DDT, diazinon, Group A pesticides, invasive species, mercury and unknown toxicity.
8. Stockton Ship Channel as impaired by chlorpyrifos, DDT, diazinon, dioxin, furan compounds, Group A pesticides, invasive species, mercury, organic enrichment/low dissolved oxygen, PCBs, pathogens and unknown toxicity.

Immediately north of the Delta, the lower Sacramento River (Knights Landing to the Delta) is identified as impaired by chlordane, DDT, dieldrin, mercury, PCBs and unknown toxicity. Immediately west, Suisun Bay is identified as impaired because of chlordane, DDT, dieldrin, dioxin compounds, furan compounds, invasive species, mercury, PCBs and selenium.¹⁴

Of course, identified impairments on the 303(d) list are only the tip of the iceberg. There are impairments in the Delta that are “caused by total organic carbon, nutrients and other contaminants for which there are no federal or state water quality criteria. In addition to there being no water quality criteria for those common water pollutants, there are situations in which the current water quality criteria/standards are well-recognized as not being protective of aquatic life resources. For example, the water quality criterion for selenium in the SJR and Delta is not protective of some aquatic life.”¹⁵ Existing water criteria fails to address many issues that must be considered in considering impacts on aquatic life. For example, during the SWRCB’s Delta flow hearing, Dr. G. Fred Lee pointed out that:

“The current US EPA criteria development approach only considers some and in some cases a small part of the impacts of chemical contaminants on aquatic life. For example, the approach currently used to develop water quality criteria does not include additive/synergistic properties of regulated chemicals that occur in

¹³ SWRCB. 2010. 2010 Integrated Report, Clean Water Act Section 303(d) List/305(b) Report, “California 2010 303(d) combined list.” By reference. (Exhibit, cspa-es#7) Can also be found at: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml

¹⁴ Ibid.

¹⁵ Lee, G. Fred. 2010. Comments on Water Quality Issues Associated with SWRCB’s Developing Flow Criteria for Protection of the Public Trust Aquatic Life Resources of the Delta, 11 February 2010. Page 3. (Exhibit, cspa-bj#6)

concentration below the water quality criteria allowing unanticipated adverse impacts to aquatic life. Adverse impacts of chemicals to aquatic life that occur for especially sensitive species, such as zooplankton which serve as fish food organism were not included in the development of the water quality criteria. These criteria are only applicable to protecting about 90% of the species. Therefore there could readily be fish species in the Delta and its tributaries that are more sensitive to a chemical than those used to establish the water quality criterion value. There is also very limited information on chronic exposure to sublethal impacts of a chemical and mixtures of chemicals to fish populations. Another issue is that other stressor such as low DO, ammonia etc. that can impact the lethal and especially sublethal impacts of chemicals. It has been well know for over 40 years through biomarker studies that fish and other organisms show organism biochemical responses to chemical exposures at concentrations well below the water quality criterion. The significance of these biomarker responses to an organism or group of organisms is largely unknown. Chemicals can adversely impact the health of the fish and other aquatic life that weaken their ability to resist adverse impact of stressors such as low DO, elevated temperature and predation as well to disease. It's been known for over 40 years that very low levels of copper affect the "breathing" rate of some fish."¹⁶

Dr. Lee went on to point out, "many thousands of unregulated chemicals, including pharmaceuticals and personal care products, industrial chemicals, and other potentially hazardous chemicals, are discharged to waterways, including the Delta and its tributaries, in domestic wastewaters, agricultural runoff and waste waters."¹⁷

Of the approximately 100,000 chemicals registered for use in the United States, only about 200 are regulated with respect to water quality. The Priority Pollutant List is an artifact of a legal settlement several decades ago, has never been peer-reviewed and is an inadequate surrogate for the maelstrom of chemicals found in our waterways today. Further, degradants, a product of chemical breakdown in the environment, are little understood but are often highly toxic.

Water quality and water quantity are flip sides of the same coin; increases or decreases in flow alter assimilative capacity and change the fate and transport of contaminants. These changes modify constituent concentration and residence time, which in turn can adversely impact the aquatic ecosystem.

To summarize, the Delta and Sacramento River are formally identified as impaired by a broad suite of pollutants. Water quality criteria have been developed for only a very small subset of the chemicals found in these waters. These criteria fail to adequately consider additive/synergistic and chronic/sublethal effects or multiple stressors acting on an already weakened aquatic ecosystem. Water diversions resulting in decreased flow increase both the concentration and residence time of pollutants. Increased residence time exacerbates the effects of toxic and

¹⁶ Ibid. Page 4.

¹⁷ Ibid. Page 4.

bioaccumulative pollutants. Reduced diversion and increased streamflow enhances flushing of pollutants and decreases pollutant concentration.

It is undeniable that the SWRCB's Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary and the Board's numerous water quality decisions have failed to protect the water quality and public trust values of the Delta and its tributaries.

Over Appropriation of Water

Before discussing present water availability, it would be interesting to examine how we got here.

As early as 1934, discussions had occurred within the Department of the Interior regarding the need to resolve competing water rights in both the Sacramento and San Joaquin River Basins before construction of the Central Valley Project was undertaken. Some five years later, Frank W. Clark, Chairman of the Water Protect Authority of California wrote to Walker R. Young, Supervising Engineer of the U.S. Bureau of Reclamation in Sacramento, that he concurred with the state engineer that "a judicial determination of existing water rights on the Sacramento and San Joaquin Rivers is necessary in order to operate the Central Valley Project efficiently and successfully and such determination should be effected before the project is placed in operation."¹⁸

Henry Holsinger, an attorney in the California Division of Water Resources (and later Chairman of the old Water Rights Board) prepared a memorandum, dated 10 December 1942, titled Necessity For Comprehensive Adjudication Of Water Rights On The Sacramento And San Joaquin Rivers In Aid Of The Central Valley Project. Mr. Holsinger wrote:

"It has in fact long been widely recognized that full adjustment of water rights should precede not only project operation but also project construction."¹⁹

"In the absence of a comprehensive definition, interminable conflicts, disputes, and litigation will be necessarily ensue."²⁰

"If this is not accomplished, the result will necessarily be uncertainty, doubt and conflict."²¹

The disagreement over whether adjudication would take place in state or federal court was not resolved and Reclamation Commissioner John Page rejected any adjudication in a letter to Edward Hyatt, Executive Officer of the Water Project Authority.²²

¹⁸ Edmonston, A. D. Information submitted to Congressman Clair Engle by A.D. Edmonston, State Engineer, 27 October 1951. Page 758. (Exhibit, cspa-bj#7)

¹⁹ Ibid. Page 776.

²⁰ Ibid. Page 774.

²¹ Ibid. Page 772.

²² Ibid. Page 784.

In 1951 Congressman Clair Engle conducted hearings in Sacramento on Central Valley water. In that hearing, Governor Earl Warren testified:

“We have felt in State Government for many years that there should be a complete adjudication of the water rights on the Sacramento River, and we believed that it should be done before the Central Valley project was completed and in operation.”²³

As part of the 1960 consideration of the Burns-Porter Act (Brown Water Bill), the Chairman of the California Senate Interim Committee on Water Projects, Senator Stephen Teal, asked legendary water rights attorney Walter M. Gleason to prepared an opinion regarding a series of questions related to the proposed bill. Mr. Gleason responded with a lengthy opinion that highly criticized the proposed bill as containing:

“... numerous legal defects which could endanger the future fiscal fate of all California; as well as seriously involve and impair the presently ‘vested water rights’ of Northern California; and also imperil the ‘area of origin reservations’ which are the only substantial source of Northern California’s additional water needs in the future.”²⁴

Mr. Gleason observed that there had not been a judicial adjudication planned or provided for but there wasn’t even “any accurate or proper administrative determination by the State of the extent of the ‘surplus’ water which is or will be available in the Central Valley for export. In fact, the Department of Water Resources does not even know the identity (let alone the quantitative scope) of many of these multiple thousands of vested water rights in the North.” He quoted a DWR publication titled *Water Facts for Californians* (1958) as follows:

“Since some water rights have existed from early mining days and some were acquired before the laws requiring the posting of notices and recordation of evidence of the rights were codified in 1872, and since riparian rights attach without any legal record being required, it is virtually impossible to determine the total water rights which exist without inventorying them by walking each stream in the State and noting all the diversions of stream flows which are in operation.” (p. 7)²⁵

He also quoted Mr. Holsinger’s testimony before the Engle Committee as confirming the absence of any accurate knowledge by the Department of many of the Northern water rights, viz: “Only a small proportion of these rights on both rivers are of record anywhere.” (Engle 772) As previously mentioned, Mr. Holsinger was the Chair of the Water Rights Board. Mr. Gleason went on to say, “[t]he further truth is that the computations heretofore made by the State’s water experts as to the probable extent of the ‘surplus’ water which they hope will be available for

²³ Gleason, Walter M. 1960. Opinion of Attorney Walter M. Gleason Regarding Various Legal Aspects of Burns-Porter Act (SB 1106) (Proposition One), California Senate Interim Committee on Water Projects. 28 October 1960. Page 16. (Exhibit, cspa-bj#8)

²⁴ Ibid. Conclusion. Page 68.

²⁵ Ibid. Page 17.

export from the Delta Pool are, at best, rough estimates (i.e., little more than educated guesses).”²⁶

Addressing Senator Teal’s question about surplus water, Mr. Gleason said:

“even the present existence of any substantial ‘surplus’ water in the Sacramento River is questionable. In fact, the Engle Committee (after its exhaustive 1951 investigation of this very subject of ‘surplus’ in the Central Valley) was surprised to learn that this alleged ‘surplus’ was rapidly disappearing, if not actually non-existent, even then (i.e., as far back as 1951).”²⁷

He quoted the formal “findings” that the Committee concluded (inter alia):

“Only one answer can be obtained from the foregoing testimony... That one logical answer is: if diversions continue at the rate they were being made in 1951, and there is no reason to believe they will be reduced, then the developed waters of the Sacramento River are overcommitted and oversubscribed.”

“The obvious result is that much less water is available for transfer to the San Joaquin Valley than was originally contemplated.” (Engle 692)

“Findings – (a) That for all practical purposes, the developed water supplies of the Sacramento River are overcommitted and oversubscribed”²⁸

Of course, this was in 1951, before the development of the State Water Project, which bring us back full circle to the question of over appropriation. Delta export schemes were based, in Holsinger’s word, “wholly and entirely in assumptions.” DWR Bulletin No. 76 (Delta Water Facilities) states, after 1981, operation of the SWP and CVP “will necessitate importation of about 5,000,000 acre-feet of water annually to the Delta from north coastal streams...”²⁹ With the exception of the 52% of Trinity water that is now diverted, that never happened. And with the Trinity River Record of Decision, much of that will have to be committed to protection of the Trinity River in the future.

The answer to where the water to support the State Water Project came from lay in degraded rivers, a collapsing Delta ecosystem and plummeting fisheries, not to mention water embezzled from riparian diverters and counties-of-origin.

Statewide Water Rights

The Pie Chart at the end of the SWRCB’s Draft Strategic Plan Update 2008-2012, titled Distribution of Surface Water Rights by Authorized Diversion Amount, reveals that the SWRCB

²⁶ Ibid. Page 18.

²⁷ Ibid, Page 22.

²⁸ Ibid.

²⁹ DWR. 1960. Bulletin No. 76, Delta Water Facilities. December 1960. Excerpt, 5 pages. (Exhibit, cspa-bj#9)

has identified some 531,545,442 acre-feet of water rights in the state.³⁰ Of these, 7,352,605 acre-feet are pending. This amount does not include all riparian and pre-1914 water rights. The state's average unimpaired runoff ranges from an all-time low of 15 maf in 1977 to the all-time high of over 135 maf in 1983.³¹ These identified water rights are approximately 3.94 times the highest recorded unimpaired runoff of all time and 35.4 times the lowest on record. The state unimpaired runoff averages about 75-77 maf.

Bay-Delta Watershed Water Rights

Responding to a request from the Delta Vision Blue Ribbon Task Force, SWRCB staff submitted a document that briefly discussed water rights and water use in the Delta watershed.³² It stated, "[t]he mean annual unimpaired or full natural flow in the Delta Watershed between 1921 and 2001 was 29 million acre-feet per annum (AFA), with a maximum of 73 million AFA in 1983."³³ This flow assessment was based upon a DWR document titled California Central Valley Unimpaired Flow Data, Fourth Edition Draft, May 2007.

The staff document observed:³⁴

1. The "total face value of the approximately 6,300 active water right permits and licenses within the Delta managed by the State Water Board, including the already assigned portion of state filings, is approximately 345 million AFA."
2. Face value "does not include pre-1914 and riparian water rights."
3. The Central Valley Project and State Water Project hold "75 permits and licenses with the watershed that account for 53% of the total value of water rights within the watershed."
4. That "the total face value of the unassigned portion of state filings for consumptive use (excluding state filings for the beneficial use of power) within the Delta watershed is approximately 60 million AFA." However, this 60 million AFA is not necessarily available since, "[p]rior to assignment of a state filing, the State Water Board will require that an applicant provide evidence that water is available to support the assignment."

The document enumerated several reasons why the face value of water rights is greater than actual diversions, specifically:³⁵

1. The State Water Board has approved permits for agricultural projects under the condition that water cannot be diverted in years in which there is insufficient supply to satisfy prior vested rights.

³⁰ SWRCB. Distribution of Surface Water Rights by Authorized Diversion Amount. June 2007. A chart at the end of the Draft Strategic Plan Update 2008-2012. (Exhibit, cspa-bj#10)

³¹ DWR. 2009. California River Indices, CA Water Plan Update 2009, Vol. 4 Reference Guide, Page 1. (Exhibit, cspa-bj#11)

³² SWRCB. 2008. Water Rights Within The Bay/Delta Watershed. 26 September 2008. 4 Pages. (Exhibit, cspa-bj#12)

³³ Ibid. Pages 2-3.

³⁴ Ibid, Page 3.

³⁵ Ibid.

2. Most modern water rights include a bypass condition, which can limit diversion amounts below the face value amount, and some water rights include a condition that limits the amount of water that can be diverted in combination with other water rights.
3. Some projects are covered by multiple water rights; i.e. consumptive and non-consumptive uses of water and diverted water may be used several times by different water right holders if it is not consumptively used.

Staff concludes by admitting that, “[a]ctual use under existing water rights is clearly a better metric to compare with unimpaired flows than is the face value but the State Water Board has limited information on actual use. Comprehensive review and synthesis of the State Water Board’s paper files would however provide only a crude estimate of actual historic and current use because of gaps in reporting and unreliability of the data already collected.”³⁶

In other words, the SWRCB has no idea of how much water is actually being used. Even accounting for limits on usage because of availability, multiple rights covering the same water (i.e., consumptive and non-consumptive) or downstream reuse if the water is not consumed; it is indisputable that, over the years, the SWRCB has issued far more rights to water than will ever be available. This massive over appropriation exists without even addressing the fact that the SWRCB does not know the extent of senior riparian or pre-1914 water rights or the amount of consumptive water rights in permits that have not been exercised (for example, DWR and the Bureau’s pending petitions for extensions of time to put many of their water rights to beneficial use). It exists without considering the substantial quantities of water necessary for the protection of public trust resources.

The SWRCB has a legal affirmative duty to first protect the people’s common heritage in our rivers and streams before it issues appropriative water rights. The public trust has not been protected. Restoring the health of Central Valley waterways will inevitably reduce water available for consumptive purposes.

Exacerbating the existing over-appropriation of water is the likelihood that Sacramento River flows will be further reduced in the foreseeable future. Climate change will not only change the timing of runoff into the Sacramento Valley, it may also reduce the volume of runoff. For example, PG&E’s Chief Hydrologist, Gary Freeman, has been tracking the impact of climate change on Central and Northern California’s runoff. He has documented, not only the shift in runoff timing, but also an annual decrease of 85-100 TAF runoff from the springs surrounding Lake Almanor on the upper North Fork Feather River and a 179 TAF annual decline in recent years on the East Branch of the North Fork Feather.³⁷

Another issue that will place additional stress on water diversions is the need to maintain adequate cold-water pools in rim reservoirs. Numerous parties in the recent Delta flow hearing, including the National Marine Fisheries Service and U.S. Fish and Wildlife Service discussed the water temperature related impacts to anadromous fisheries below rim dams. Maintaining

³⁶ Ibid. Page 4.

³⁷ Freeman, Gary J. 2010. Tracking the Impact of Climate Change on Central and Northern California’s Spring Snowmelt SubBasin Runoff. Presented at the Western Snow Conference 2010. 12 Pages. (Exhibit, cspa-cs#13)

adequate water temperature and providing sufficient inflow and outflow in the Delta will likely place additional demands on consumptive water rights. Approval of new water rights applications will only place additional stress on existing water rights.

Given the vast over allocation of water, considering new appropriate water rights at this time is analogous to a man returning from filing bankruptcy telling his family he's purchasing a new car and taking everyone to Disneyland.

“All Models Are Wrong, But Some Are Useful.” Statistician E. P. Box

Models are complex simulations that, at their best, only represent an idealization of actual field conditions. They must be used with extreme caution to ensure that the underlying model assumptions hold for the site-specific situations being modeled. Subtle changes in coefficients, assumptions or input data can dramatically alter output. It is crucial that models be properly calibrated and verified. Since models only represent an idealization of reality, they're generally better at comparative analyses than absolute analysis: i.e., they're better able to produce a reasonably reliable estimate of relative change in outcome than generate a reliable absolute prediction. Unfortunately, defining where and when a particular constituent will comply with a numerical water quality standard requires reliable prediction. A critical problem arises when decision makers attribute more precision to modeling results than is warranted and where a model's output is misused to make definitive predictions.

CalSim II is a highly complex simulation model of a complex system that requires significant expertise to run and understand. Consequently, only a few individuals concentrated in DWR, USBR and several consulting firms understand the details and capabilities of CalSim II. State Water Board staff cannot run the model.

A formal peer-review of CalSim II was highly critical and detailed numerous inadequacies in the model. Among these was the opinion that CalSim II “has not yet been calibrated or validated for making absolute predictions values.”³⁸

The University of California at Davis conducted a comprehensive survey of members of California's technical and policy-oriented water management community regarding the use and development of CalSim II in California.³⁹ Detailed interviews were conducted with individuals from California's water community, including staff from both DWR and USBR (the agencies that created, own, and manage CalSim II) and individuals affiliated with consulting firms, water districts, environmental groups, and universities.

The results of the survey, which was funded by the CalFed Science Program and peer-reviewed, should serve as a cautionary note to those who make decisions based on CalSim II. Among numerous criticisms, the study found:

³⁸ Close, A, et al. 2003. A Strategic Review of CALSIM II and its Use for Water Planning, Management, and Operations in Central California, Submitted to the California Bay Delta Authority Science Program, Association of Bay Governments, Oakland, California. 4 December 2003. Page 9. (Exhibit, cspa-es#9).

³⁹ Ferreira, Ines C., et al. 2005. Musings on a Model: CalSim II in California's Water Community, published in San Francisco Estuary & Watershed Science. March 2005. 13 Pages. (Exhibit, cspa-bj#13)

1. “Many interviewees feel that using CalSim II in absolute mode is risky and/or inappropriate...” (7-PDF pagination)
2. “...only a few individuals concentrated in DWR, USBR, and several consulting firms understand the details and capabilities of CalSim II.” (7)
3. “All users agree that CalSim II needs better documentation of the model, data, inputs, and results. CalSim II is data-driven, and so it requires numerous input files, many of which lack documentation.” (7)
4. “There is considerable debate about the current and desirable state of CalSim II’s calibration and verification.” (7)
5. “Its representation of the SWP and CVP includes many simplifications that raise concerns regarding the accuracy of results.” (7)
6. “Many interviewees are concerned that CalSim II’s monthly time step cannot capture hydrologic variability adequately and thus does not compute water exports and export capacity accurately, both of which are significant factors in system operations.” (9)
7. “The model’s inability to capture within-month variations sometimes results in overestimates of the volume of water the projects can export from the Sacramento-San Joaquin Bay-Delta and makes it seem easier to meet environmental standards than it is in real operations.” (9)
8. “Interviewees cannot always determine the parameters to which CalSim II is highly sensitive or its overall stability and sensitivity. They feel that the linear programming formulation allows multiple solutions, which can differ considerably.”
9. “Many interviewees indicate that CalSim II represents demands simplistically using out-of-date values and calculations.” (9)
10. “Small changes in CalSim II input can result in large changes in model results, causing difficulties in impact analyses and the defensibility of model results. In addition, some users note that the multiple layers of regulations and operational agreements included in CalSim II may obscure the effects of the change to the system being modeled.” (9)
11. “Many claim that CalSim II’s hydrology uses data and methods that are decades out of date and rely on too coarse a geographic scale.” (9)
12. “Model users express general frustration with CalSim II’s commercial linear programming (LP) solver. They contend that it provides little information on the location of infeasibilities, so that even a knowledgeable individual may need many days to debug a run. In addition, the solver sometimes produces non-unique solutions and running identical scenarios on different computers seems to generate different results.” (9)

The study concluded by observing, “CalSim II is being used, and will continue to be used, for many other types of analyses for which it may be ill-suited, including in absolute mode.” (11)

Davis and Woodland Water Supply Project Analysis

With respect to the modeling employed for the Davis-Woodland Water Supply Project, four scenarios were defined and analyzed in the Environmental Impact Report (EIR): Existing Conditions, With-Project Conditions, Cumulative Conditions without Project, and Cumulative

Conditions with Project. The major CalSim II modeling assumptions were based upon the June 2004 OCAP Biological Opinion studies.⁴⁰ We note:

1. Both the U.S. Fish and Wildlife (February 2005) and National Marine Fisheries Service (October 2004) Biological Opinions have been discredited and discarded.
2. The CalSim II studies that buttressed those Biological Opinions are out of date and should not be used in late 2010 – early 2011 to predict and/or justify project impacts.
3. Project modeling failed to consider the effects of climate change because climate change was, “not considered in the 2004 OCAP CALSIM II studies.”⁴¹
4. The analysis failed to evaluate water diversions that the SWRCB has authorized but are not presently being used but could be exercised during the life of the project.
5. The analysis could not have evaluated the impacts of riparian and/or pre-1914 diversions that the SWRCB acknowledges exist but have not been identified or quantified.
6. Modeling failed to consider and analyze the potential impacts related to increased inflow and outflow necessary to protect fisheries and other public trust resources.

Astonishingly, the Davis/Woodland Project EIR concluded that there were no significant impacts to water quality from removing tens-of-thousands-of-acre-feet from impaired waterways that lack assimilative capacity and from depriving sensitive life stages of listed species of water identified as necessary to their survival. In contrast to virtually all of the scientific testimony and evidence presented in the recent Delta flow hearing, the EIR found that moving X-2 upstream 1.1 kilometers was an insignificant impact to Delta smelt and other pelagic species that are hovering on the brink of extirpation. Where the EIR identified potential significant and unavoidable cumulative impacts to special-status fish species and their habitat in conjunction with other potential future projects, the Davis City Council simply adopted a Statement of Overriding Considerations.

However, the SWRCB has the affirmative duty to protect statewide public trust values even where local authorities ignore them. It is the SWRCB that has the legal responsibility to ensure that sufficient flows are provided to protect water quality and fisheries. It is the SWRCB that has the obligation to protect senior water rights holders. And, it is the SWRCB that has the onus to make certain that water is actually available for diversion.

Is there water available for appropriation by each of the applicants? If so, when is water available and under what circumstances?

The Delta Watershed is over-appropriated. The Bay/Delta’s biological tapestry is hemorrhaging and aquatic communities are collapsing. The Board’s own report to the State Legislature on flow necessary to recover the Bay/Delta indicates that, in order to protect the public trust, outflow needs to increase from 50% to 75% of watershed unimpaired flow. The only source for that water is from water rights holders in the priority of their rights. In such a situation, the Board cannot give new water rights to new applicants.

⁴⁰ City of Davis, et al. 2007. Davis-Woodland Water Supply Project, Draft Environmental Impact Report, Volume 2 – Appendices, Appendix B, Modeling Results and Water Demand. April 2007. Pages 2-1 – 2-3. (Exhibit, cspa-es#8)

⁴¹ Ibid. Page 2.2.

Will approval of any of the applications result in any significant adverse impacts to water quality, the environment or public trust resources? If so, what adverse impact or impacts would result from the project or projects? Can these impacts be avoided or mitigated to a level of non-significance? If so, how? What conditions, if any, should the State Water Board adopt to avoid or mitigate any potential adverse impacts on fish, wildlife, or other public trust resources that would otherwise occur as a result of approval of the applications?

The issuance of new water rights from an over-appropriated watershed (Sacramento River) will only place additional stress on an already seriously degraded watershed environment. Numerous public trust resources are presently being lost, primarily from over-appropriation of water regulated by the SWRCB. The cumulative impact from new water rights and increased diversion only adds to the already existing impacts in this over-appropriated watershed and are unlawful. The public trust is not politically elastic. Incremental impacts could be avoided and potential future adverse impacts to fish, wildlife, water quality, and senior water rights could be avoided and mitigated by denying the applications.

Is each of the proposed projects in the public interest? If so, what conditions, if any, should the State Water Board adopt in any permits that may be issued on the pending applications, to best serve the public interest?

Approval of the projects is not in the public interest. California law requires water to be available to protect the public trust of the Bay/Delta watershed. There is no "real" water remaining to be appropriated in this watershed. The Board has an affirmative duty to take the trust into account before approving new water diversions like this one that have as their source a grossly over-appropriated watershed. Certainly, we believe the public interest could be better met if Term 91 were not part of this application and the SWRCB deducted any water allocated to these applicants from the permits of the most junior out-of-basin users.

Will adoption of certain terms in draft Permits for Applications 30358A and 30358B (attached at the end of this Notice) be sufficient to dismiss the outstanding protest?

Because there is no water available for these Applications, and the Applications would incrementally increase the harm to fish, wildlife and water quality on the Sacramento River and in the Bay/Delta, there are no terms short of denying the Applications that would be sufficient for us to dismiss our protest.