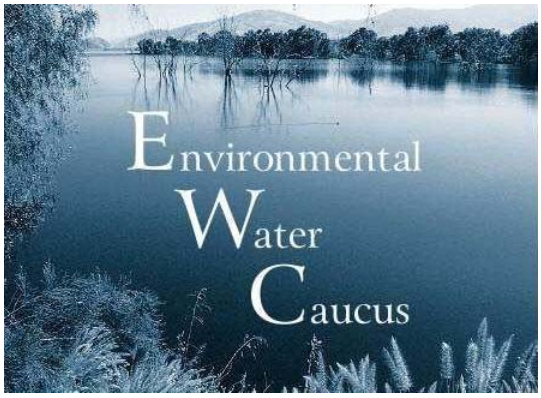


A SUSTAINABLE WATER PLAN FOR CALIFORNIA

DEVELOPED BY THE ENVIRONMENTAL WATER CAUCUS
SEPTEMBER, 2015

CONTENTS

THE EWC SUSTAINABLE WATER PLAN FOR CALIFORNIA

INTRODUCTION

"The supply of water is the primary resource battleground for the twenty-first century[1]*"*

California's drought is dire, and has focused legislative and public attention on the enormity of the state's water problems. As noted in earlier Environmental Water Caucus (EWC) reports, California already was in a state of crisis prior to the current drought. Four years of minimal precipitation have only worsened our situation. Our most pressing problems include: the over allocation of surface water by a factor of at least five, leading to supply unreliability for many users and what is referred to as "paper water;" degraded ecosystems and fisheries; and overexploitation of groundwater supplies. All these issues are exacerbated by ongoing climate change and population growth.

The current drought has caused significant new legislation and rules for the state's water supplies. These are positive developments, and could lead to new approaches for water use; however, too many of these "solutions" are predicated on the false assumption that current drought conditions are temporary. Thirty percent of recent years can be classified as drought years, and multiple drought years are common. According to DWR, 40 of the last 100 years have been drought or multiple drought years. We must consider our water in new ways. We must acknowledge that California is a drought-prone state, that water is and will be limited, and that every citizen, farmer and commercial enterprise must consume water responsibly, rationally, and in line with available supplies. Unfortunately, many of the plans and actions proposed by our public agencies are based on a fantasy of ever-increasing supply. They demonstrate a bizarre and potentially catastrophic unwillingness to align demand and water contracts with actual supplies and a total disregard for economically disadvantaged communities, fish, and wildlife. Further, state officials are exploiting the current drought to justify a tired and bankrupt ideology that promotes more dams, tunnels, and infrastructure as a solution to water shortfalls. Most egregiously, they avoid any objective analysis of the true costs and benefits of additional surface storage or the proposed "Twin Tunnels" trans-Delta project. The Governor's *Water Action Plan* and the recently authorized *Water Bond* continue the destructive and ultimately unsustainable momentum toward more surface storage and delivery infrastructure while not creating any new water supplies.

We must recognize that the state's largest water user – irrigated agriculture – uses 80% of the state's developed water supply and contributes less than 2% to the states' economy and payroll, and adjust water practices and priorities accordingly. The continuous planting of permanent crops south of the Delta, where water supply is not reliable and water rights are junior, does not meet the "reasonable use" criteria called for in the California Constitution.

[1] From the *Heart of Dryness* by James G. Workman

Most of the state's plans will not reduce water demand or increase supplies. Rather, they pointedly ignore two practices that *will* augment supplies dramatically: water conservation and recycling. Further, following any brief respite to the drought, there is the omnipresent danger that the state will revert to the "endless supply" mindset that has characterized California water policy for decades.

Since 2009 the Environmental Water Caucus has proposed an approach to our limited water supplies that is efficient, cost-effective and equitable. It will carry us sustainably into the future, and it addresses the deficiencies described above. Unlike our state bureaucracies, we are not simply trying to squeak through the drought; we are advocating for a wholly different management regime. The EWC plan was proposed prior to the current drought, but it addresses the extant crisis and any future period characterized by water shortages. As stressful as it is for ratepayers, farmers and businesses, the current drought enables reform. More to the point, it demands it. Our public officials must recognize this opportunity, and seize it.

The EWC plan puts particular emphasis on actions related to the Sacramento-San Joaquin Delta/San Francisco Bay estuary. The consensus diagnosis for the Delta estuary is dire. The EWC plan prescribes greater river flows and reduced fresh water exports to speed Delta recovery. Further, the plan specifies the ways water supply reliability can be improved while reducing exports from the Bay Delta estuary. Many of our recommendations have been presented to the Delta Stewardship Council as an alternative for the Delta Plan. We have now packaged these recommendations into a single plan for consideration in any future NEPA or CEQA evaluations, or by any action by the State Water Resources Control Board. (These proposals actions are largely based on the EWC report *California Water Solutions Now*, which can be referenced at www.ewccalifornia.org.) EWC's Sustainable Water Supply Plan presents the partner organizations' alternatives to the Bay Delta Conservation Plan (BDCP). (Previous versions of the EWC plan were entitled the *Reduced Exports Plan (RX Plan)* and *The Responsible Exports Plan.* The current version's title has been changed to reflect the statewide applicability of the plan, and has been revised to include information on the recently passed Proposition 1 and recent statewide Groundwater legislation, as well as updates to earlier recommendations and implementation actions.

This plan will accomplish goals central to any rational state water policy. First, it will reduce water exports from the Bay Delta estuary, increasing flows and outflows and creating the extensive brackish "lens" needed to sustain fisheries and wildlife habitat. It will also reduce demand for Delta water, emphasizing more resilient and cost-effective approaches to water supply. It is the only extant plan that will modernize existing facilities in the Bay Delta, including improved fish screens at the South Delta and levees reinforced above the PL84-99 standard; these reinforced levees will increase water supply reliability throughout the Delta. The EWC plan will increase flows through the Delta to improve habitat and fish stocks, avoiding the huge infrastructure costs of the subterranean Twin Tunnels (BDCP). It will also provide increased self-reliance for south-of-Delta water users through inter-regional water transfers and higher priority for south of Delta groundwater storage projects (so long as groundwater storage basins in other parts of the state are not depleted). And it will accomplish the legislated goals of estuary restoration and water reliability for billions of dollars less than currently contemplated plans.

Our position is based on economically and technologically feasible measures that are readily available to satisfy all future water needs. Our program includes providing clean drinking water and water to restore the environmental health of our once-magnificent rivers, recovering our fisheries from the edge of extinction, fostering healthy commercial and recreational fisheries, maintaining our essential recreation and tourism [2] [3] industries, and supporting a thriving agricultural sector. We will thus ensure that all stakeholders have access to sufficient, safe and affordable water.

A major influencing factor in California's water solutions is the impact of global climate change. Based on current research, the natural limits of our water supply and the economic deficiencies of our current water policy will become increasingly obvious; our ability to provide sustainable water solutions for all Californians will become more challenging. Unless we manage our water more efficiently and account for the current and future effects of global climate change, the availability and costs of providing reliable water to all users will overwhelm our ability to provide it.

In addition to the commonly accepted NEPA and CEQA requirements for any Delta Estuary plan, there are other fundamental criteria for recovering the health of the Bay Delta estuary and its fish that any plan must meet. These include:

1. A statewide water availability analysis to align water needs with availability.
2. A statewide benefit/cost analysis to determine the economic desirability of any plan or major project, considering environmental benefits and costs.
3. A policy to ensure that water exports are consistent with full implementation of the public trust and Clean Water Act, as well as protection of sociological values
4. The enforcement of existing water quality regulations to speed recovery of the Estuary.
5. Satisfying the NCCP *recovery* standard for fish species.

All current and past plans for the Bay/Delta estuary have failed in large part because the above criteria were not applied to plan projects by the responsible state and federal authorities.

[2] California's Rivers A Public Trust Report. Prepared for the State Lands Commission. 1993. P. 47. http://www.slc.ca.gov/Reports/CA_Rivers_Rpt.html

[3] California Travel and Tourism Commission. California Travel Impacts by County. 2008 Preliminary State Estimates. Total direct travel spending alone was $96.7 billion in 2008. ES-2. http://tourism.visitcalifornia.com/media/uploads/files/editor/Research/CAImp08pfinal.pdf.

VISION

Once again, California is challenged by serious water shortages where water is most needed. It is time to stop being surprised by this. California climate not only naturally cycles with drier and wetter periods, but climate change will most certainly exacerbate the challenges that already vex us, through disappearing snow packs, longer droughts, more severe floods, and similar changes.

We developed our modern water infrastructure based on overly-optimistic assumptions about our water supplies at the time and on insupportably hopeful projections about the ability of this infrastructure to meet our future desires. Further, we adopted water allocation laws and practices that have reinforced inequitable diversions, which prevent water from reaching its highest needs.

At the beginning of the 20th century, excessive claims to water "rights" and escalating inequities in water use prompted Californians to embrace significant legal changes in water management. In 1913 the Legislature created the first regulatory system to administer new surface water rights, through the Water Commission Act. Fifteen years later, the electorate amended California's Constitution in large part due to a state Supreme Court holding that prioritized uses by one set of rights holders regardless of the reasonableness of their use (*Herminghaus v. Southern Calif. Edison*, 200 Cal. 81 (1926).) This landmark California Constitution amendment required that all water use in California be "reasonable" and "beneficial."

Once again we face inequitable and unwise water management and use practices, requiring similarly significant changes in how we view and manage water in the state. For example, the public understandably wonders why "senior" users have priority over "junior" users regardless of the relative societal benefits of their uses, and why groundwater is essentially unregulated. Green lawns and alfalfa grown in desert climates, a lack of clean drinking water in many California communities, and collapsing (both metaphorically and physically) groundwater tables raise questions about the state's commitment to wise water use in the face of escalating shortages. Mounting extinction threats, particularly to the iconic California salmon, trigger a growing lack of confidence over the state's ability and intent to protect the most vulnerable among us.

It is time for us to come back once again to first principles. We must call up a shared sense of wisdom, equity and gratitude in re-envisioning how we will manage our use of the waters of the state. Wisdom means that we must recognize the climate we live in now, accept the current limits of waterways (including in light of their own needs), and respect the likely future scenario of additional water limits in the face of climate change. Equity means that survival needs must be met first – both human survival, as reflected in AB 685 (the Human Right to Water Act) and the survival of California waterways, fish and other aquatic species. Finally, we must integrate gratitude into our decision making – gratitude for the advances we make in sharing water wisely and equitably for our needs, and most importantly gratitude for the gifts that California's natural world continues to bestow on us. This Report attempts to reflect a vision of "policy driven by wisdom, equity and gratitude," and calls on water decision makers to do the same.

Our Vision includes the following:

- California must respect and adjust to meet the natural limits of its waters and waterways, including the limits imposed by climate change.
- California must overhaul its existing piecemeal water rights policies, which already over-allocate existing water and distribute rights without regard to equity.
- California's ecosystems and the life they support have a right to clean water and to exist and thrive for their own benefit and the benefit of future generations.

OVERARCHING ISSUES

Several overarching issues characterize all efforts to develop sustainable, effective, and equitable water policies. They include periodic drought, climate change, environmental justice, the preservation of Native American cultural traditions, the precautionary principle, and population pressures. They are covered in this preface to avoid repetition in each of the individual actions described below.

Periodic Drought

Drought is a consistent and recurrent part of California's climate. Multiple-year droughts have occurred three times during the last four decades[4] , and California currently is in the dealing with one of these events. California's long history of multiple-year droughts should force state and local water and land use authorities to recognize the recurrence of drought periods and permanently put more effective water use policies in place. We cannot solve the problems of ongoing drought by continuously modifying water quality standards and water export quantities in ways that favor Delta exporters at the expense of urban ratepayers, the environment and fisheries. The Governor's current policy on water conservation[5] should be mandatory for all water districts (including agriculture); it should become a permanent part of water policy, rather than a response to current dry conditions. We can negotiate future droughts satisfactorily only by educating the public, recognizing limits, and learning to efficiently use the water we have.

Climate Change

Climate models indicate that climate change already is affecting our ability to meet the goals enumerated in this report. This data *must* be integrated into the implementation of our recommendations. The main considerations are:

- More precipitation will fall as rain rather than snow, resulting in earlier runoff than in the past.[6]
- Less snow will mean that the current springtime melt and runoff will be reduced in volume.
- Overall, average precipitation and river flow are expected to decrease. A recent paper in *Frontiers in Ecology and the Environment* [7] predicts that the average Sacramento River flow will decrease by about 20 percent by mid-century.
- Precipitation patterns are expected to become more erratic, resulting in both prolonged periods of drought and greater flood risk.
- Sea level rise will affect flows and operations within the Delta, endanger fragile Delta levees, and increase the salinity of Suisun Bay and Delta surface waters, and increase the

[4] California Drought Update. May 29, 2009. P.5. http://www.water.ca.gov/drought/docs/drought_update.pdf.
[5] 20x2020 Water Conservation Plan DRAFT, April 30, 2009. Executive Summary. http://www.swrcb.ca.gov/water_issues/hot_topics/20x2020/index.shtml.
[6] National Wildlife Federation and the Planning and Conservation League Foundation. On the Edge: Protecting California's Fish and Waterfowl from Global Warming. 10-11. www.pcl.org/projects/globalwarming.html.
[7] Margaret A Palmer, Catherine A Reidy Liermann, Christer Nilsson, Martina Flörke, Joseph Alcamo, P Sam Lake, Nick Bond (2008) Climate change and the world's river basins: anticipating management options. Frontiers in Ecology and the Environment: Vol. 6, No. 2, pp. 81-89.

salinity concentrations of some coastal groundwater aquifers.

These changing conditions could affect all aspects of water resource management, including design and operational assumptions about resource supplies, system demands, performance requirements, and operational constraints. To address these challenges, we must enhance the resiliency of natural systems and improve the reliability and flexibility of water management systems. Specific recommendations are proposed as part of this document.

Environmental Justice

It is imperative that water policies and practices do not compound existing inequities or create new difficulties for economically disadvantaged Californians and communities of color. Further, our water policies and practices must anticipate any potential adverse effect and provide equitable benefits to these communities. An example of situation needing immediate rectification: Water moving south through the California Aqueduct and the Delta Mendota Canal flow past small valley towns that lack adequate or healthy water supplies.

We know that climate change and drought will create catastrophic environmental change in California. Environmental justice requires that water policies and practices addressing climate change and drought provide special accommodations for vulnerable, underserved and disadvantaged communities. .

Other environmental justice water issues include:

- Universal access to safe, affordable water sufficient for basic human needs.
- Access to sufficient wastewater infrastructure that protects water quality and prevents overflows and other public health threats.
- Restoration of water quality so that members of underserved communities can safely use the fish they catch in local waters to supplement their families' diets.
- Equitable access to waterways for recreation.
- Providing statewide access to underserved communities to ensure they benefit from improved conservation, water recycling and other water innovations that improve efficiency and water quality.
- Mitigation of negative impacts from the inevitable reallocation of a portion of the water currently used in agriculture – the state's biggest water use sector – to cities and the environment. Reallocation will reduce irrigated acreage, the number of farm-related jobs, and local tax revenues.
- Mitigation of third party impacts-- including impacts to farm workers-- associated with land conversion.
- A comprehensive mitigation plan to help local rural economies transition to new industries such as solar farms and other clean energy enterprises; this will include new policies and job training to enable underserved community members to make the necessary transition to these new economic models.
- Protection from the impacts of floods and levee breaks, including provisions for emergency and long-term assistance to renters displaced by floodwaters.

Native American Traditions

Many of California's tribes have a deep and intrinsic relationship with California's rivers, lakes, streams and springs. This relationship goes to the very core of their culture and their spiritual beliefs. Many of the tribes consider the fish that reside in these waters as gifts from their creator, necessary for the continued survival of their people. California's water policy has failed to recognize the importance of the needs of its historic tribes, seeking to manage water only for the economic gain of its largest agricultural contractors. California water policies and practices must change to provide sufficient water to support fisheries and their habitats for both cultural and economic sustainability, and provide for the restoration of those fisheries essential for its native peoples.

The Precautionary Principle

The Precautionary Principle states: "Where there is scientific evidence that serious harm might result from a proposed action but there is no certainty that it will, the precautionary principle requires that in such situations action be taken to avoid or mitigate the potential harm, even *before* there is scientific proof that it will occur."[8]

Numerous actions recommended in this report fit that criteria; the precautionary principle is therefore implicit throughout the report's recommendations.

Population Pressures

California's human population is expected to increase from the current figure of more than 37 million to 44 million by 2030, and 49 million by 2050.[9] In 2008, 75 percent of the population growth came from natural growth (births), and 25 percent came from immigration, both foreign and interstate. In each of the data sources utilized in this EWC report, population increases have been factored into the conclusions, unless otherwise noted.

[8] A. I. Schafer, S. Beder. Role of the precautionary principle in water recycling. University of Wollongong. 2006. 1.1.
[9] California Department of Finance, Demographic Research Unit. 2014. http://www.dof.ca.gov/research/demographic/reports/#projections.

SUMMARY OF RECOMMENDATIONS

Below is a sampling of key recommendations contained in this plan:

- Establish a statewide oversight unit within the State Water Resources Control Board responsible for developing the permanent supply enhancements and demand reduction levels called for in this report.
- Require mandatory water rationing by all three water sectors identified in this plan.
- Establish a California water efficiency education and publicity program, similar to health and safety programs that are sponsored by the state.
- Facilitate the movement away from high water-demand permanent crops in accordance with the "waste and unreasonable" use of water doctrine established in California state law.
- Reduce Delta exports to no more than 3 million acre feet of water in all years.
- Implement the EWC Sustainable Water Plan as an alternative to the BDCP twin tunnels.
- Require the State Water Board to enforce the Delta Reform Act's reduced Delta reliance mandate with the resulting reduced Delta exports.
- Reduce the implementation dates for achievement of groundwater sustainability in priority basins.
- Direct Proposition 1 funding to groundwater options and oppose funding for major surface storage options.
- Eliminate providing CVP irrigation water to impaired farmlands on the west side of the San Joaquin Valley and the Tulare Basin.
- Keep water transfers within the revised (above) delta export limits.
- Reverse the harmful changes that were made as a part of the Monterey Amendments.
- Ensure healthy headwaters and meadowlands to reduce fire risks and enhance water supply.

THE EWC SUSTAINABLE WATER PLAN FOR CALIFORNIA

The actions specified in the EWC Plan are underlined and described below:

EXPAND STATEWIDE WATER EFFICIENCY AND DEMAND REDUCTION PROGRAMS BEYOND THE CURRENT 20/20 PROGRAM.

California has developed vast water supplies for our cities and farms. In a typical year, agriculture uses 34 million acre-feet of water, urban users consume 7.1 million acre-feet and commercial, institutional and industrial users consume 1.7 million acre-feet. This translates into 79% of the developed water supply for agriculture, 17% for urban use and 4% for commercial, institutional and industrial uses.[10] (An acre-foot of water is the volume of water required to cover one acre of surface area to a depth of one foot, or 325,900 gallons; an acre foot of water is the annual amount typically used by two California households.) To move water around, California has built 1,400 major reservoirs with a combined storage capacity of 40 million acre-feet, thousands of miles of canals, and a multitude of enormous energy-intensive pumps.

Despite all this abundance, fears of monumental water shortages are growing. These are justified, as witnessed by current drought conditions and the obvious impacts of climate change. One-third of the water years in California since 1906 are considered "dry or critical" by the California Department of Water Resources; since 1960, dry or critical years have occurred 37 percent of the time. Reliable our warming climate.[11] The worst and longest modern droughts have occurred since 1976. Farmers are concerned that they will be driven out of business for lack of water. In response, politicians want to build more dams and canals to store and move more water at a time when climate change will most likely make less water available. More than 90 percent of our rivers already have been diverted; meanwhile, the lavish public subsidizing of agricultural water has created an insatiable demand for ever greater supplies – supplies which cannot be provided under any possible scenario. Indeed, irrigating water-intensive crops on drainage-impaired lands with massive amounts of water *does not* fit a 21st century definition of the "beneficial and reasonable use" criteria called for in state law.

Recommendations made by the Environmental Water Caucus to the Delta Stewardship Council included an aggressive urban water conservation and efficiency program – more aggressive and of *longer duration* than the 20/20 program. These recommendations identified both urban and agricultural users as necessary components for reducing reliance on the Delta and achieving the water supply reliability goals for south-of-Delta users. A more aggressive conservation program also supports the goal of the reduced exports level of this EWC alternative. We intend to continue our advocacy for this program with regional, state, and federal agencies.

Overwhelming evidence shows that a suite of aggressive conservation and water efficiency actions will reduce overall demand and provide reliable and cost-effective increases in available water supplies. These measures will satisfy California's water needs well into the future

[10] Department of Water Resources. California Water Plan, Update 2013. Pages 2-7 and 3-10.
[11] California Data Exchange Center "WSIHIST," Department of Water Resources.http://cdec.water.ca.gov/cgi-progs/iodir/wsihist

and at far less financial and environmental cost than the construction of additional storage dams, reservoirs, canals, and tunnels. This conclusion is reinforced by the current State Water Plan (Bulletin 160-13), by the Bay Institute's "Collateral Damage" report, by the Pacific Institute, and by actual experience in urban areas and farms.

Southern California, with its huge urban population, can provide the major urban conservation impetus for water savings and demand reduction, as highlighted by the report released by the Los Angeles Economic Development Corporation, *Where Will We Get the Water?*[12] This study shows a combined potential savings and demand reduction of approximately 1.7 million acre feet. These savings can be achieved through three main measures: urban conservation, recycling, and storm water capture. The potential recycling savings are larger with more investment in recycling facilities and regulations related to outdoor urban usage.

These urban statewide water efficiency and water use reduction actions are:

- **<u>Urban Water Conservation</u>**

  This includes the installation of low-flow toilets and showerheads, high-efficiency clothes washers, retrofit-on-resale programs, rainwater harvest, weather-based irrigation controllers, water reduction for landscaping via drip and xeriscape, more efficient commercial and industrial cooling equipment, and tiered price structures.[13] According to the current State Water Plan, total urban water demand can be reduced by as much as 3.1 million acre-feet with these measures.[14] The Los Angeles Economic Development Corporation report found that in Los Angeles, Orange, San Bernardino, San Diego, Riverside and Ventura counties, "urban water conservation could have an impact equivalent to adding more than 1 million acre-feet of water to the regional supply" (about 25 percent of current annual use). At $210 per acre-foot, the LAEDC report shows that urban conservation is by far the most economical approach available especially compared to new surface storage at $760 to $1,400 per acre-foot.

- <u>Urban Conservation Rate Structures</u>

  Great savings can be achieved by establishing mandatory rate structures within the Urban Best Management Practices that strongly penalize excessive use and reward low water usage customers with lower rates (with the lowest being a lifeline rate to provide water for low income and low-water-using ratepayers). The savings that result from such pricing policies are included in the 3.1 million acre-feet demand reduction cited above.

- <u>Recycled Water</u>

[12] Los Angeles County Economic Development Corporation (LAEDC). 2008. Where Will We Get the Water? Assessing Southern California's Future Water Strategies. P 6. http://www.laedc.org/consulting/projects/2008_SoCalWaterStrategies.pdf.
[13] A detailed treatment of urban water conservation is contained in *Waste Not, Want Not: The Potential for Urban WaterConservation in California*, by the Pacific Institute. http://www.pacinst.org/reports/urban_usage/waste_not_want_not_full_report.pdf.
[14] California Department of Water Resources. California Water Plan Update 2013, V-3 Resource Management Strategies, Page 1-9. http://www.waterplan.water.ca.gov/docs/cwpu2013/Final/Vol3-full2.pdf

We must treat and reuse urban wastewater, gray water, and storm water, achieving the State Water Resources Board goal of increasing water recycling by at least an additional 2 million acre-feet per year by 2030. The 2013 State Water Plan indicates a figure of 2.3 million acre-feet that could be recovered. The LAEDC report shows recycled water costs $1,000 per acre-foot.

- Groundwater Treatment, Demineralization and Desalination

  This incorporates treatment of contaminated groundwater and groundwater desalination. The cost of groundwater desalination ranges from $750 to $1,200 per acre-foot.

- Storm Water Recapture and Reuse

  The 2008 Scoping Plan for California's Global Warming Solutions Act of 2006 promotes storm water collection and reuse. The plan finds that up to 333,000 acre-feet of storm water could be captured annually for reuse in urban southern California alone.[15] The LAEDC report also found the potential for "hundreds of thousands of acre-feet" of water from storm water capture and reuse in southern California counties.[16] The Los Angeles and San Gabriel Watershed Council has estimated that if 80 percent of the rainfall that falls on just a quarter of the urban area within the watershed (15 percent of the total watershed) were captured and reused, total runoff would be reduced by about 30 percent. That translates into a new supply of 132,000 acre-feet of water per year, or enough water to supply 800,000 people.

- **Agricultural Water Conservation**

  Reform of agricultural irrigation practices will result in huge water savings. Necessary measures include the continuing trend of drip, micro sprinklers and similar higher technology irrigation, reduced deficit irrigation, transition to less water-intensive crops, ongoing farmland acreage reduction, elimination of the irrigation of polluted farmland, and tiered price structures. Related conservation measures include the elimination of water subsidies provided to agriculture for Central Valley Project (CVP) water, which will drive some of the efficiencies shown in Figure 1. Demand reduction of as much as 5 million acre-feet per year could be achieved by 2030, according to Pacific Institute's *California Water 2030: An Efficient Future* report**.**[17]

  A representative list of agricultural water efficiency techniques[18] would include:
    - Improved irrigation scheduling
    - Improved irrigation technology (e.g., sprinkler and drip irrigation systems)

[15] Climate Change Scoping Plan Appendices Volume I. December 2008. Pursuant to AB 32 The California Global Warming Solutions Act of 2006. C-135.http://www.arb.ca.gov/cc/scopingplan/document/appendices_volume1.pdf.
[16] Los Angeles County Economic Development Corporation (LAEDC). 2008. Where Will We Get the Water? Assessing Southern California's Future Water Strategies. P 32-33.http://www.laedc.org/consulting/projects/2008_SoCalWaterStrategies.pdf.
[17] Pacific Institute. California Water 2030: An Efficient Future. September 2005. http://www.pacinst.org/reports/california_water_2030/ca_water_2030.pdf
[18] Peter H. Gleick, et al. The World's Water. 2014.http://islandpress.org/worlds-water-volume-8. Table 3.9

- Lining canals and employing other seepage control options
- Recycling tailwater on-site
- Increasing pump efficiency
- Constructing spill reservoirs and conducting district reoperation to reduce waste water
- Utilizing mulching and other techniques to increase soil water-holding capacity
- Capturing stormwater flows for later use (e.g., on-farm ponds for frost and heat control and irrigation)

Agricultural water quality improvement techniques that can contribute to water efficiency or conservation include:

- Planting cover crops
- Constructing fencing around water bodies and streams
- Utilizing conservation tillage or no-till
- Restoring riparian zones or constructing buffer zones
- Improving irrigation scheduling and using technology that reduces runoff

In addition to the practices listed above in *The World's Water,* the following features should also be part of the agricultural water efficiency portfolio:

- Targets should be established for water use as a part of the Efficient Water Management Practices (EWMP's). This was not included as a part of the 2009 Delta Reform Act, but should now be added to the mix.
- Districts that fail to use the defined critical EWMP's,[19] including the above mentioned targets, should be declared in violation of the "waste and unreasonable" use of water and penalized accordingly by the SWRCB.
- The volume of water delivered to customers must comply with the California Water Code Section 531.10 and the EWMP's requirements.
- A tiered pricing structure or other incentives based on the quantity of water delivered should be implemented; this would promote more efficient water use at the farm level.
- The use of recycled water should be promoted so long as it meets all health and safety criteria and does not harm crops or soils.

In summary: Since agriculture accounts for such a large percentage of developed water usage, the importance of agricultural water conservation and water use efficiency cannot be stressed enough. The efficiencies achieved by agriculture are magnified due to the high water usage rates and are equally as important, if not more so, than the rules governing urban water usage.

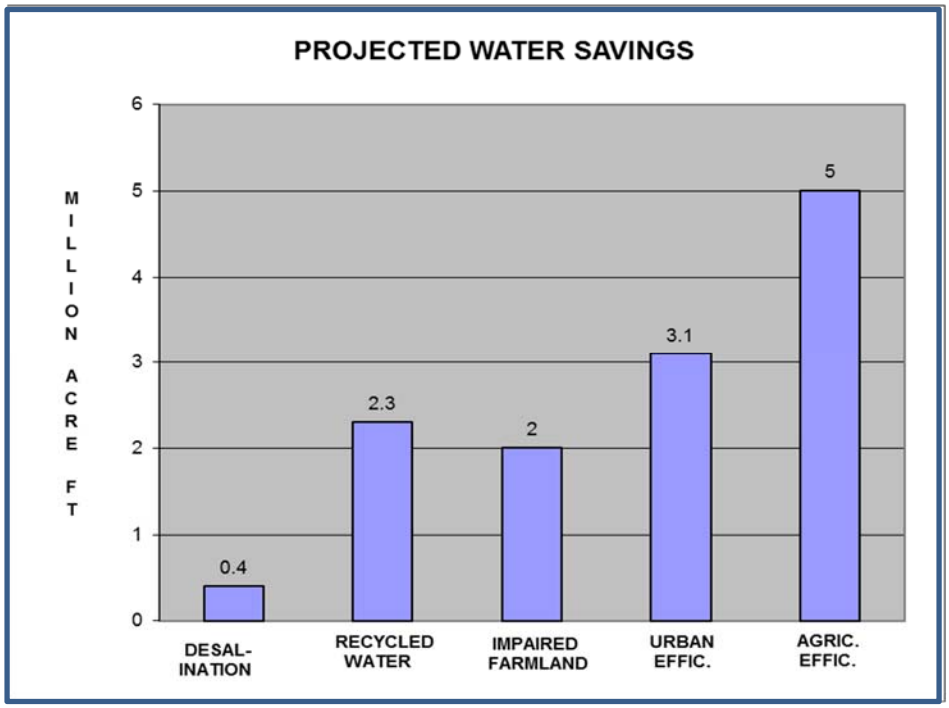
Based on data from the most recent State Water Plans (Bulletins 160-05, Bulletin160-09,

[19] California Department of Water Resources, California Water Plan Update 2013, V-3 Resources Management Strategies, Page 2-9

and Bulletin 160-2013),[20] the Planning and Conservation League (PCL)[21] and the Pacific Institute, [22] the savings that can be achieved from these efficiency scenarios are estimated at almost 13 million acre-feet per year (Figure 1). Perhaps the most authoritative report on the subject, the Pacific Institute's *California Water 2030: An Efficient Future,* shows that overall statewide water usage can be reduced by 20 percent below 2000 levels, assuming the implementation of aggressive efforts to conserve and reduce usage with readily available technology and no decrease in economic activity. The urban water savings of approximately 5 million acre-feet a year (including recycled municipal water and urban efficiencies) shown in Figure 1 is enough water to support a population growth of almost 30,000,000 people. According to the California Department of Finance (previously footnoted), the state's population can be expected to increase by 12 million over the next 35 years if current population trends hold. Clearly, a well-managed future water supply to take us to 2050 is within reach with current supplies and with an aggressive water conservation programs.

A recent report published by a coalition of environmental organizations, *Wetter or Not*,[23] confirms the 13 million AF savings and demand reduction potential cited above.

FIGURE 1



[20] California Department of Water Resources. California Water Plan Update 2013, V-3 Resource Management Strategies, Page 1-9. http://www.waterplan.water.ca.gov/docs/cwpu2013/Final/Vol3-full2.pdf

[21] Planning and Conservation League. 2004. Investment Strategy for California Water. P. 8-11.http://www.pcl.org/projects/investmentstrategy.html

[22] Pacific Institute. 2005. California Water 2030: An Efficient Future. ES-2.http://www.pacinst.org/reports/california_water_2030/ca_water_2030.pdf

[23] National Resources Defense Council, et al. Wetter or Not. November 2014. http://docs.nrdc.org/water/wat_14111701.asp

In order to translate these efficiency measures into actual demand reductions, we need heightened public awareness of these targets and focused oversight and coordination of local and statewide actions. Existing success stories from urban communities and on-farm operations reinforce the savings potentials and the need for efficiency-driven policies; they are described in detail in the references cited in this report. The Governor's current mandate for a 20 percent reduction in per capita urban water use by 2020 is the kind of action that will help this effort, although it may prove insufficient in view of projected population growth. Under the Governor's plan, per capita urban use would be reduced from the current 192 gallons per capita daily to 154 gallons, resulting in an annual savings of 1.74 million acre-feet. The projected water savings shown in Figure 1 are more aggressive than the Governor's plan. A similar mandate should be extended to agriculture, since agriculture uses more than three quarters of the state's developed water supplies. Water savings through efficiency measures can result in direct reductions in the volume of Delta exports because most of the savings would occur in cities and farms south of the Delta. These water savings are necessary to reduce the exports and to restore the stream flows called for in this plan.

The Natural Resources Defense Council's report *Transforming Water Use: A California Water Efficiency Agenda for the 21st Century*, cites the state's successes in energy efficiency as a model for water efficiency, while also noting that the state lags far behind in water efficiency policies, programs, and funding. A key component of the success in energy efficiency has been the development of a priority system called a Loading Order.[24] As applied to water policy, a Loading Order system would require demand reductions through improved water efficiency as the first priority in addressing water supply. The second priority would be developing alternative sources including water recycling, groundwater clean-up and storm water capture. The third priority would be the use of more traditional supply options. A Loading Order approach, if applied to statewide, regional, and local water plans, would shift the emphasis to the more efficient and cost effective approaches advocated in this report. Reducing water use through conservation efficiencies or water recycling also has a positive impact on energy use, as pointed out by *Energy Down the Drain*, a report produced by the Pacific Institute and the Natural Resources Defense Council. The report makes a strong case for the link between water and energy efficiencies. All these conservation and efficiency methods are known to produce available water at significantly less cost than constructing new storage dams, reservoirs, and conveyance projects such as those promoted by the BDCP. According to the Los Angeles County Economic Development Corporation (LAEDC) report,[25] water produced from the proposed Sites and Temperance Flat Reservoirs would cost $760 to $1,400 per acre-foot, while conserved or recycled water typically costs between $210 and $1,000 per acre-foot.

New surface storage is by far the highest cost alternative per acre-foot of water for all the alternatives covered by the Legislative Analyst's Office (LAO) report *California Water: An LAO Primer*,[26] while providing less total annual yield than most alternatives. Statewide, the costs of all

[24] Pacific Institute and Natural Resources Defense Council. 2007. Transforming Water Use: A California Water Efficiency Agenda for the 21st Century. P. 2. www.deltavision.ca.gov/BlueRibbonTaskForce/Feb28_29/Handouts/BRTF_Item_5A_HO2.pdf.
[25] Los Angeles County Economic Development Corporation (LAEDC). 2008. Where Will We Get the Water? Assessing Southern California's Future Water Strategies. P 32-33. http://www.laedc.org/consulting/projects/2008_SoCalWaterStrategies.pdf.
[26] Legislative Analyst's Office. 2008. California's Water: An LAO Primer. P.67.http://www.lao.ca.gov/2008/rsrc/water_primer/water_primer_102208.aspx.

of these efficiency measures are unlikely to exceed the $68 billion estimated price tag for the proposed BDCP twin tunnels, and various surface storage schemes.[27] For all of these reasons – as well as the environmentally destructive impacts of major dams – EWC member organizations oppose the construction of Sites and Temperance Flat Reservoirs and the raising of Shasta Dam and support the more effective measures cited here. Further, raising Shasta Dam on the Sacramento River would be illegal because of its impact on the Wild River status of the McCloud River and its damaging impact on Winnemen Wintu sacred areas.

Implementation of the above actions by EWC organizations will include:

- Advocacy in the legislature to establish a statewide oversight unit within the State Water Resources Control Board responsible for developing the permanent supply enhancements and demand reduction targets called for in this report. This can be accomplished by utilizing unspent conservation funds from previous bonds.

    - Prioritizing Southern California water districts for the development of these conservation targets, ensuring that the required California Urban Water Conservation Council reports submitted by the Metropolitan Water District agencies, the Los Angeles Department of Water and Power, and the San Diego Water Authority targets are in accordance with the targets established in this plan. Failure to accomplish those goals in the future should be met with fines imposed by the State Water Resources Control Board.
    - Ensuring that the Southern California water agencies' targets will facilitate a direct reduction of Delta exports in accordance with the Delta Reform Act of 2009. These direct links to export reduction should be incorporated into the existing CUWCC reports.

- EWC will continue collaborating with Green California (Southern California) and the Metropolitan Water District of Southern California to assure the continued implementation of an adequate conservation budget and the conservation, water efficiency, and demand reduction actions described in this report.
- Advocate at the state legislature and the State Water Resources Control Board for mandatory water rationing by all three water sectors identified in this plan.
- Advocate with the state legislature and the State Water Resources Control Board for measures facilitating movement away from high water-demand permanent crops, such as almonds and pistachios, thus lowering water usage in accordance with the "waste and unreasonable" use of water doctrine established in California state law.
- Facilitation of legislation to provide funding to establish a California water efficiency education and publicity program, similar to other health and safety programs that are sponsored and publicized by the state. The program must ensure the equitable distribution of conservation investments among rural and low income communities.
- Participation with the Delta Vision Commission in adopting the Natural Resources

[27] Strategic Economic Applications Company. 2009. The Sacramento San Joaquin Delta – 2 0 0 9, An Exploration of Costs,Examination of Assumptions, and Identification of Benefits, Draft.

Defense Council's recommendations regarding the water efficiency Loading Order. This would include implementation of a a Loading Order policy through the State Water Resources Control Board, the State Public Utilities Commission and the Legislature that establishes water use efficiency as a top state priority; it would also include a public goods surcharge on every acre-foot of water delivered in California, with the proceeds used to fund or subsidize efficiency programs.

- Encouraging broad advocacy group participation in the conservation activities of local urban and agricultural water districts and continued advocacy for conservation and water efficiency programs with regional, state, and federal agencies.
- Inclusion of at least one EWC organization staffer to the Public Advisory Committee prior to the next iteration of the State Water Plan.

Funding for the above actions can come from existing or future bond funds, from Title 16 funding, through the recommended public goods charges, or through regulatory changes. Additionally, since rate payers will bear the ultimate costs of these and other types of measures, rate payers must be given a voice in determining choices. Based on the LAEDC report, estimated costs for a statewide program along the lines shown in Figure 1 might range to $2.7 billion (through 2025), with most of the costs occurring in Southern California urban areas.

REDUCE EXPORTS TO NO MORE THAN 3 MILLION ACRE FEET IN ALL YEARS IN ACCORDANCE WITH SWRCB FLOWS CRITERIA.

Numerous scientific and legal investigations have identified Delta export pumping by the state and federal projects as a primary cause of the decline of the health of the Bay/Delta estuary and its fish. These studies and reports include the California Fish and Game Commission's 2009 listing of longfin smelt under the Endangered Species Act; the US Fish and Wildlife Service's 2008 Biological Opinion for Delta smelt; the National Marine Service June 4, 2009 Biological Opinion on Central Valley Project (CVP) and State Water Project (SWP) Operations; the State Water Resources Control Board's Bay-Delta Water Quality Control Plan and Water Rights Decision 1641; the CALFED Bay-Delta Program's 2000 Ecosystem Restoration Program Plan; and the Central Valley Project Improvement Act's Anadromous Fish Restoration Program.

The guidelines of the Fish and Wildlife Service's Biological Opinion require reduced pumping to minimize reverse flows and resultant fish kills during times of the year when Delta smelt are spawning and the young larvae and juveniles are present.

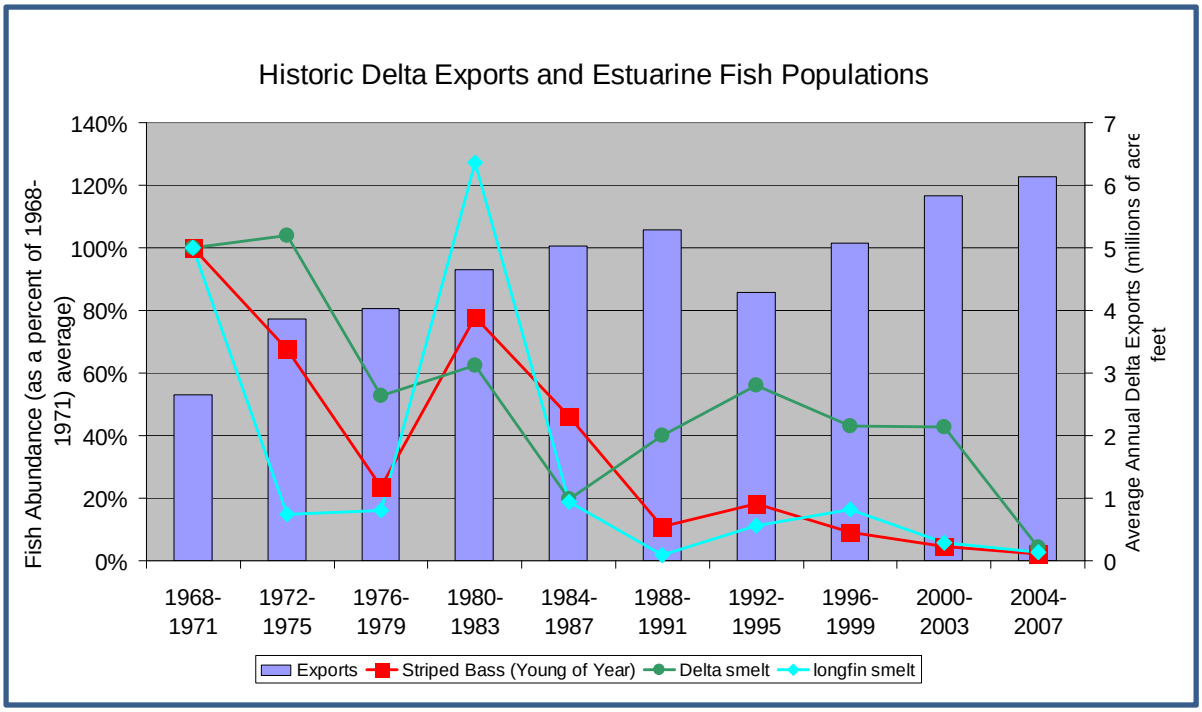
The long-term decline of the Delta smelt coincides with large increases in freshwater exports out of the Delta by the state and federally operated water projects, (Figure 2). CALFED's Ecosystem Restoration Program reminds us that "the more water left in the system (i.e., that which flows through the Delta into Suisun Bay and eventually the ocean), the greater the health of the estuary overall; there is no such thing as 'too much water' for the environment." [28]

The main input to the Delta – the Sacramento River, which provides 70 percent of Delta inflow in average years[29] – does not provide sufficient water for all existing claimants in most years; moreover, climate change is expected to decrease flows in the future. The system cannot provide full delivery of water to CVP and SWP contract holders in most years. Recent court-ordered water export limits that protect endangered fish species, the continuously deteriorating earthen levees of the Delta, and the potential adverse effects of climate change on water supplies combine to make Delta water supply reliability highly uncertain.

According to the recent National Marine Services Biological Opinion, the proposed actions by the CVP and SWP to increase export levels will exacerbate problems in the Delta.[30] We do not believe that the water exporters' goals of maintaining or increasing Delta exports are attainable; neither are the junior water rights holders' expectations that they should have a full contracted water supply each year, especially in view of the collapse of the Delta's fisheries and the impacts of climate change.

[28] CALFED Ecosystem Restoration Program. 2008. Stage 2 Implementation Draft. P. 23.http://www.delta.dfg.ca.gov/erp/reports_docs.asp
[29] Delta Vision Final Report. 2008. State of California Resources Agency. P. 41. http://deltavision.ca.gov/BlueRibbonTaskForce/FinalVision/Delta_Vision_Final.pdf .
[30] National Marine Fisheries Service, Southwest Region. June 4, 2009. Biological Opinion And Conference Opinion On The Long-Term Operations Of The Central Valley Project And State Water Project. Page 629.http://swr.ucsd.edu/ocap/NMFS_Biological_and_Conference_Opinion_on_the_Long-Term_Operations_of_the_CVP_and_SWP.pdf.

Figure 2



Source: Environmental Defense Fund.[31] Original source is California Data Exchange Center and California Department of Fish & Game - Midwater Trawl Data

Over time, annual Delta outflows have been reduced on average by one half,[32] with associated declines in native fish abundance. Export pumping from the Delta is a major cause of reduced outflows, but not the only one. Diversions for CVP contractors upstream of the Delta, combined with "non-project" (that is, non-federal, non-state) diversions, account for a significant portion of outflow reduction. In fact, 31 percent of upstream water is diverted annually before reaching the Delta.[33] In the 1990s, under the threat of federal intervention, California increased the required outflow to the Bay, but not enough to restore the Delta's ecosystem or prevent further declines.

Over the years, a number of processes have identified the need to dramatically improve outflows in order to recover listed species to a sustainable level and restore ecosystems in the Bay-Delta. From 1988, when the State Water Resources Control Board (SWRCB) proposed – but withdrew without public discussion – standards that would have required an average increase in outflow of 1.5 million acre-feet over the lower diversion levels of the period before the late 1980s, to 2009, when the California Legislature adopted a new policy of reducing reliance on the Delta for water supply uses, the need for greater outflow and reduced exports has been

[31] Environmental Defense Fund. 2008. Finding the Balance. P. 3. http://www.edf.org/documents/8093_CA_Finding_Balance_2008.pdf
[32] CALFED Ecosystem Restoration Program. 2008. Stage 2 Implementation Draft. P. 21.http://www.delta.dfg.ca.gov/erp/reports_docs.asp
[33] CALFED Ecosystem Restoration Program. 2008. Stage 2 Implementation Draft. P. 20.http://www.delta.dfg.ca.gov/erp/reports_docs.asp

acknowledged but not achieved. In 2010, the State Board developed and approved flow criteria (as directed by the 2009 Delta Reform Act) intended to protect public trust waterways and fish in the Delta. Those criteria have not been implemented.

The SWRCB report[34] noted the necessity of preserving the attributes "…of a natural variable system to which native fish species are adapted." Thus, many of the criteria developed by the State Water Board are crafted as percentages of natural or unimpaired flows. These criteria include:

- 75% of unimpaired Delta outflow from January through June;
- 75% of unimpaired Sacramento River inflow from November through June;
- 60% of unimpaired San Joaquin River inflow from February through June.

This compares with the historic flows over the last 18 to 22 years, which have been:

- About 50% on average from April through June for Sacramento River inflows
- Approximately 30% in drier years to almost 100% of unimpaired flows in wetter years for Delta outflows
- Approximately 20% in drier years to almost 50% in wetter years for San Joaquin River inflows

As far back as 1960, the Department of Water Resources knew that without the North Coast Rivers, they would not be able to get more than approximately 3.2 million acre-feet from the Delta[35].[36] The rebuttable presumption, consistent with the evidence of the last two decades and with the new state policy to reduce Delta water supply reliance, is that a total export of no more than 3 million acre-feet in all water year types is prudent. EWC's members believe that a number at or near this level should now be used by the state and federal governments in planning and permitting future Delta export operations – with or without the BDCP tunnels – in order to promote the recovery of the Delta's ecology and its fish populations, and to provide healthy Delta outflows to San Pablo and San Francisco Bays.

The Delta Flows Criteria promulgated by the State Water Resources Control Board (SWRCB) clearly indicates that the state has exceeded the amount of water that can be diverted responsibly from the Bay/Delta estuary. As a result, the EWC plan anticipates future limitations on Delta exports below the level of the 2000-2007 time periods in order to meet Delta ecosystem restoration goals. The recent PPIC report reinforces this: "…Given the extreme environmental degradation of this region, water users must be prepared to take less water from the Delta, at least until endangered fish populations recover." Information presented to the State Water Resources Control Board during hearings related to their Water Quality Control Plan has shown that water allocations exceed the normal year's water availability by a factor of five, putting further pressure to reduce exports.[37]

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[34] State Water Resources Control Board and California Environmental Protection Agency. DRAFT Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem. July 2010. Pp. 5.

[35]

[36] California Department of Water Resources. 1960. Bulletin 76 Delta Water Facilities. Water Sources and Uses Table, Page 11. http://www.water.ca.gov/waterdatalibrary/docs/historic/Bulletins/Bulletin_76/Bulletin_76__1960.pdf

[37] Testimony on Water Availability Analysis submitted by Tim Stroshane (C-WIN) before the State Water Resources Control Board, October 26, 2012. P. 11 http://c-win.org/webfm_send/265

The current approach of managing the Delta for water supply will lead to intense pressures to make increased exports the major goal of the BDCP with the health of the Bay/Delta estuary presented as a lower priority. One of the main objectives of this EWC plan is to decrease the physical vulnerability and increase the predictability of Delta supplies; EWC members oppose an increase in average annual Delta exports. The BDCP promotes a fallacy that it is possible to increase exports while somehow recovering fish species and ecosystems. This has led to a warped scientific program, as pointed out by The Bay Institute in their recent Briefing Paper on the BDCP Effects Analysis[38] and by the U.S. EPA in their formal comments pointing out the potential for the BDCP to contribute to the demise of Salmon.

Recent letters from the EPA and the Bureau of Reclamation indicate that the EPA believes that the (BDCP) EIS/EIR will need to include a significant analysis of alternatives reflecting reduced Delta inflow and reduced exports,[39] and that a significant increase in exports out of the Delta is inconsistent with recent state legislation (to reduce reliance on the Delta). [40]

Changing the infrastructure will not solve the problem of a shrinking Delta water supply. A vigorous debate is now underway over whether a new isolated conveyance facility to move water around or under the Delta should be constructed – a revised version of the Peripheral Canal. Even those who support a new facility (and dual conveyance) as a solution to improve environmental conditions and water supply reliability, including the Public Policy Institute,[41] the Delta Vision Blue Ribbon Task Force, and some environmental groups, do not believe that constructing this new facility will generate any new water. Whether or not a new conveyance facility is approved and built, the inexorable trend will be for the reliability of north-to-south water transfers through or around the Delta to decline, and for water users who currently rely on Delta exports to seek alternative sources of supply and to increase their conservation and reuse of that supply.

According to the Bay Delta Conservation Plan,[42] the version of the BDCP twin tunnels now under consideration would have the capacity to export 9,000 cubic feet of water per second from a series of two massive 40’ unlined intake tunnels, 35 miles long, buried 150’ under the Sacramento River north of the Delta. This almost exactly matches the existing capacity of the combined state and federal pumps. The current approach of managing the Delta for water supply will almost certainly lead to intense pressures to make increased exports the major goal of the BDCP while the health of the Delta will be a lower priority.

Reduced dependence on the Delta by south-of-Delta water users would also obviate the need for new conveyance around or under the Delta and new surface storage reservoirs, avoiding costs of perhaps tens of billions of dollars for taxpayers and the potential for stranded assets

[38] The Bay Institute and Defenders of Wildlife. The BDCP Effects Analysis, Briefing Paper. February 2012. http://www.bay.org/assets/BDCP%20EA%20Briefing%20Paper%2022912.pdf
[39] http://www.epa.gov/region9/water/watershed/sfbaydelta/pdf/EPA_Comments_BDCP_3rdNO_051409.pdf
[40] http://www.epa.gov/region9/water/watershed/sfbay-delta/pdf/EpaR9CommentsBdcpPurpStmt6-10-2010.pdf
[41] Public Policy Institute of California. 2008. Comparing Futures for the Sacramento-San Joaquin Delta. P. 123-124.http://www.ppic.org/content/pubs/report/R_708EHR.pdf
[42] Bay Development Conservation Plan.http://www.baydeltaconservationplan.com/CurrentDocumentsLibrary/Chapter_3_Conservation_Strategy_Combined_v2.pdf

resulting from climate change and sea level rise in the Bay-Delta estuary. This reorientation will undoubtedly require some south-of-Delta infrastructure enhancements, but the costs will be far below those needed for a trans-Delta canal or tunnel system and a new reservoir north of the Delta.

Climate change projections indicate that over the longer term, global warming will reduce the total amount of precipitation, resulting in significant reductions in Sacramento River flows. There is no indication that this has been factored into present plans, and it is possible that new conveyance for Sacramento River water may become a stranded asset.

Implementation of the above actions by EWC organizations will include:

- Continued legal actions against implementation of the proposed Final Delta Plan and advocacy for the implementation of the EWC Sustainable Water Plan as an alternative to the Delta Plan.
- Continued opposition to the implementation of the Bay Delta Conservation Plan and advocacy for the implementation of the EWC Sustainable Water Plan as an alternative to the BDCP.
- Continued presentation of relevant data supporting the EWC Sustainable Water Supply Plan at the ongoing State Water Board Water Quality Control Plan hearings and meetings.

Funding will depend on the results of State Water Resources Control Board hearings on Delta flows, which are scheduled for conclusion in 2015 or later. Subsequent to those hearings, implementation and funding plans will most likely fall within the purview of the state legislature.

ENFORCE WATER QUALITY STANDARDS IN THE ESTUARY AND IN IMPAIRED RIVERS.

The federal Clean Water Act and the state Porter-Cologne Water Quality Control Act state that the state's water quality control plans are intended to improve water quality, not merely to maintain it.

The process of updating the Water Quality Control Plan for the Delta is ongoing; the current iteration began in 2009 with a Staff Report that identified issues for further examination in the water quality control planning process. The update is planned to proceed in four phases. Phase 1 would set flow standards for the San Joaquin River and major tributaries and consider the standards for South Delta salinity. Phase 2 would set standards for Sacramento River inflow, Delta flow, Delta outflow and Delta/Suisun Marsh water quality. Phase 3 would incorporate the revised standards into the water rights permits through evidentiary hearings. Phase 4 would establish instream flows for major tributaries of the Sacramento River.

As with many planning processes, real life intervened. In 2009, the Legislature directed the State Water Board to prepare public trust-protective flow criteria for the Delta in early 2010, and the Board completed and approved a seminal study in August of the same year.

The Board's Delta Flow Criteria Report announced that flows indeed were too low and exports probably too high to sustain declining fish populations, other water quality and ecological stressors affected the recovery of listed Delta fish species, "flow and physical habitat interact in many ways, but they are not interchangeable," and that "scientific certainty is not the standard for agency decision making."[43]

Drought response has also consumed a great deal of the State Water Board's staff time and attention. This has forced lengthy delays in its planning processes as well. The update is planned to proceed in four phases. Phase 1 would set flow for the San Joaquin River and its major tributaries (the Merced, Tuolumne, and Stanislaus) and relax interior south Delta salinity objectives. Phase 2 would revisit water quality and flow objectives for Sacramento River tributaries, Delta inflow, Delta outflow and Suisun Marsh water quality. Phase 3 would implement the revised standards into all post-1914 water rights permits through evidentiary hearings (i.e., using sworn testimony and cross-examination). Phase 4 would establish instream flow criteria for major tributaries of the Sacramento River.

The Board's 2013 proposed Water Quality Control Plan sought to relax salinity objectives in the south Delta. This action would harm Delta ecosystems and water quality for Delta farmers, both already struggling with poor water quality and low water levels due to the massive state and federal pumping plants near Tracy. The Board essentially proposed relaxing salinity objectives to levels the water projects could meet more regularly—a case of moving the goal line closer so touchdowns would be easier to score. But their proposal ran up against federal and state water

[43] http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/final_rpt.shtml. See pages 4 and 5.

quality regulations that require objectives to protect the most sensitive beneficial uses, and to prevent degradation of water quality below that which now exists.

The Board's 2013 plan puts maintenance of water supply yield for the federal Central Valley Project and the State Water Project over all other beneficial uses and over the more senior rights of diverters on the three tributary rivers – the Merced, Tuolumne, and Stanislaus. In essence, the Board constructed its flow criteria and water quality control planning for the implicit outcome of "no net loss to exports," per the failed CALFED mantra, and has ignored its responsibilities to evaluate the competing needs of all beneficial uses in the process of developing flow and water quality objectives.

This arbitrary decision to favor one user group over other public trust values also violates the Delta Reform Act. Passed in 2009, this act unequivocally states that importers of water from the Delta (principally the State Water Project and the federal Central Valley Project, and their water service contractors) must reduce their reliance on Delta supplies as they plan to meet their future water needs.
The failure of the SWRCB to discharge its responsibilities can be illustrated by the criticisms of environmental groups during the recent Water Quality Control Plan hearings related to the San Joaquin basin.[44] Those criticisms included:

- Failure to comply with the Delta Reform Act policies requiring Delta importers to reduce their reliance on the Delta for future water supplies.
- Failure to develop protective water quality objectives
- Failure to follow State and Federal Anti-degradation policies
- Failure to include the Upper San Joaquin River above the Merced River confluence from the Water Quality Control Plan

The State Water Board will be unable to legitimize its next water quality control plan for the Bay-Delta estuary and watershed until it deals with the problem of paper water: the practical reality that far more water rights are claimed for Central Valley rivers and streams than there is water to satisfy them. The drought and the Board's actions to curtail junior water rights during 2014 demonstrated this, -- most importantly to staff and appointed Board members. In 2012, EWC member groups, including the California Water Impact Network, the California Sportfishing Protection Alliance, and AquAlliance, demonstrated there are 5.5 acre-feet of water right claims to every acre-foot flowing in an *average* year.[45] This ratio increases during drought years; if river flows decrease by half amid drought, the ratio of water right claims chasing scarcer water *doubles*.

The torrent of criticism in 2013 and the searing experience of drought in 2014 and again this year have sent the Board back to the drawing board. They intend to issue a revised Substitute Environmental Document (SED) in the near future, but a specific date has not been announced. The fates of Phases 2, 3 and 4 have yet to be determined. Unfortunately, delay is not kind to either

[44] http://ewccalifornia.org/reports/commentlettersjflows.pdf and http://ewccalifornia.org/reports/attachmentsjflows.pdf.
[45] California Water Impact Network. Testimony on Water Availability Analysis for Trinity, Sacramento, and San Joaquin River Basins Tributary to the Bay-Delta Estuary. October 26, 2012. Page 11. http://c-win.org/webfm_send/265

fisheries or water quality.

For the first time in 45 years of water quality planning history, the State Water Resources Control Board has decided in Phase 1 to stop treating the Bay-Delta Estuary as a whole for planning purposes. It has instead chopped up the Delta and severed the upper San Joaquin River above the Merced River confluence from its planning considerations, and separated planning considerations on these matters from the rest of the Delta. The real Bay-Delta estuary does not operate this way. The Environmental Water Caucus believes that the State Water Board has done this in violation of its planning obligations, and is piecemealing water quality control planning in violation of the California Environmental Quality Act.

An August 2014 letter from the U.S. Environmental Protection Agency to DWR has indicated that the BDCP will degrade water quality for in-Delta water users, would violate the federal Clean Water Act, and increase harm to endangered fish species.[46] Although increasing flows, as described in this EWC Sustainable Water Supply plan, will improve many aspects of Delta water quality, we must also continue to pursue specific and targeted water quality actions in order to restore the health of the Delta.

Implementation of the above actions by EWC organizations will include:

- Continue to present data and advocate for the applicable features of the EWC Sustainable Water Supply Plan at the ongoing State Water Board's Water Quality Control Plan hearings and meetings.
- Continue to advocate with the SWRCB for the following three policies and actions: a meaningful water supply availability analysis; a benefit-cost analysis which includes a valuation of exports versus the value of restored ecosystems; a public trust evaluation of water quality actions for the Delta.
- Advocate at the SWRCB that Delta water quality objectives must protect the most sensitive beneficial uses, such as Delta smelt and drinking water supplies, and prevent degradation of water quality throughout the Delta, including the south Delta.
- Insist that the State Water Board adhere to and enforce Delta Reform Act policies and priorities, which include reduced Delta reliance by importers; using the best available science in its decision making; improving water quality to protect human health and the environment, and restoring Delta ecosystems, including those supporting fisheries and wildlife.

Funding. No estimates available.

[46] : http://www.sacbee.com/news/state/california/water-and-drought/delta/article2608060.html#storylink=cpy

GROUNDWATER MANAGEMENT.

Environmental organizations were generally disappointed with the groundwater monitoring features that were included in the Delta Reform Act of 2009. Earlier drafts of the original 2009 legislation required groundwater monitoring and reporting throughout the state, but the final legislation was weakened to make groundwater reporting a voluntary effort. Since groundwater represents 30% of California's water supply in most years, we must face this politically difficult situation by requiring mandatory groundwater reporting throughout the state.

For too long this huge resource has been over-used, over-drafted, and over-subscribed. The amount of water used has largely remained a mystery, and numerous once-healthy groundwater basins have been drained and contaminated. Of all the states, only California and Texas have been so negligent in managing groundwater. We cannot manage what we do not measure.

For reasons explained in other sections of this plan, the EWC long has expressed support for public groundwater storage over the construction or expansion of additional surface storage. We have advocated for the mandatory reporting of groundwater pumping and for the implementation of sustainable practices for groundwater management and utilization.

During the past year, with the passage of the Sustainable Groundwater Management Act of 2014, the California legislature took a step toward the mandatory reporting and sustainable management of our groundwater basins. The Act authorizes the establishment of "groundwater sustainability agencies" that will manage local groundwater basins. The Legislature has granted broad discretionary powers to these agencies, including authority to allocate groundwater supplies between users within their boundaries and regulate, limit, or suspend groundwater extractions. An agency may adopt rules, regulations, ordinances, and resolutions related to groundwater management, and have broad powers regarding groundwater monitoring and the construction and operation of new and existing wells. A sustainability agency may impose fees to fund the cost of a sustainability program, including permit fees, groundwater extraction fees, and fees imposed as ad valorem property taxes.

The Act applies to groundwater found within 515 basins delineated by the DWR throughout the state. DWR has categorized each of these basins as high, medium, low or very low priority; the 127 basins designated as high or medium priority are the source of approximately 90 percent of all groundwater produced in the state.[47] The Act does not apply to 26 basins that have been subject to prior court adjudication, mostly in Southern California.

A sustainability agency must adopt a groundwater sustainability plan for each high and medium priority basin by January 31, 2022. If DWR has designated a basin as subject to critical conditions of overdraft, the sustainability plan must be adopted by the earlier date of January 31, 2020. All plans must be submitted to DWR, which will review them for adequacy. If a sustainability agency is not established for the entire area of a high or medium priority basin by

[47] California Department of Water Resources, California Water Plan Update 2013, V-1 The Strategic Plan, 3-90

July 1, 2017, or if a sustainability plan has not been adopted by the deadlines above, or if DWR has determined that a sustainability plan is inadequate, the State Water Resources Control Board may declare the basin a "probationary basin" and adopt an interim plan of the SWRCB's own creation.[48] Implementation dates of 2020 and 2022 seem unnecessarily long in view of the conditions of the medium and high priority and critical overdraft areas.

The EWC position on the Groundwater Sustainable Management Act is circumspect. While we applaud the Act as a step in the right direction (local control), we are concerned about the ability of new local agencies to improve the California groundwater management practices; we are also concerned about a state takeover of groundwater management. The current situation for surface water -- where there are far more rights than available water -- is not a good recommendation for statewide groundwater management. The deadlines for implementation of the Act are sufficiently far in the future to allow oversight of the process, with comment based on the ultimate actions of local and state agencies.

Implementation of the above actions by EWC organizations will include:

- Participation in the legislative and agency meetings that review the results of the Sustainable Groundwater Management Act and that designate additional components for inclusion in the Act.
- Possible changes to the Sustainable Groundwater Management Act that we support are:
    - Shorter implementation sustainability plan deadlines for the high and medium priority basins and for areas in critical overdraft.
    - Shorter implementation dates for achievement of sustainability in such basins.
    - Metering and reporting of groundwater withdrawals for wells (including agricultural wells) in high and medium priority basins and in areas of critical overdraft.

Funding. No estimates available.

[48] The preceding three paragraph are taken from *Dark Clouds Over California*, a blog by Wes Strickland http://privatewaterlaw.com/2014/11/19/dark-clouds-over-california/

PROPOSITION 1

Officially entitled the Water Quality, Supply and Infrastructure Improvement Act of 2014, this legislation is a $7.54 billion general obligation bond measure approved by California voters on the Nov. 4, 2014 ballot. Proposition 1 would allow the state to redirect $425 million in unsold bonds and sell $7.1 billion in additional bonds, for a total of $7.5 billion in general obligation bonds. The funds would be used to manage water supplies, protect and restore wetlands, improve water quality, and increase flood protection. Of the total $7.54 billion, $5.7 billion is available for water supply and water quality projects only if recipients provide a local match: in most cases 50% of the total cost.

Specific spending proposals in the proposition include:

- $2.7 billion for water storage projects, dams and reservoirs.
- $1.5 billion or competitive grants for ecosystem and watershed protection and restoration projects.
- $900 million for competitive grants and loans for projects to prevent or clean up the contamination of groundwater that serves as a source of drinking water.
- $810 million for expenditures on integrated regional water management plan projects.
- $725 million for water recycling and advanced water treatment technology projects.
- $520 million to improve water quality, including reducing and preventing drinking water contaminants and providing assistance to disadvantaged communities.
- $395 million for statewide flood management projects and activities.

The EWC could support many of the projects funded by Proposition 1, such as the cleanup and prevention of polluted groundwater; drinking and wastewater treatment projects; and water recycling, rainwater capture, conservation, and water-use efficiencies; these measures will help reduce demand on surface water and groundwater over the long term. However, we have serious concerns that the proposition generally favors large surface water storage projects and hands spending control to a commission composed of political appointees with no budgetary oversight and a predisposition to favor new or expanded surface storage. This is the wrong direction for the state's long-term water sustainability and for recovery of our degraded aquatic ecosystems. EWC's position on Proposition 1 is best expressed by comments taken directly from the web site of one of our member organizations:[49]

> "The California Sportfishing Protection Alliance (CSPA) has carefully reviewed the provisions of Assembly Bill 1471, *Water Quality, Supply and Infrastructure Improvement Act of 2014*, and concludes that it represents a grave and insidious threat to core environmental values and principles buttressing protection for fisheries and the environment. Proposition 1 undermines the public trust doctrine and the crucial principles that beneficiaries of projects should pay for them and that projects should be responsible for mitigating their adverse impacts. Furthermore, it paves the way for

[49] California Sportfishing Protection Alliance. Statement of Opposition to Proposition 1. http://calsport.org/news/wp-content/uploads/CSPA-14-Point-Opposition-Prop-1.pdf

> a new era of big dam building; is a pork-filled barrel of subsidies to special interests, including BDCP; provides little near-term drought relief; eliminates public oversight; crowds out other critically needed investments; is fiscally irresponsible, and it sabotages, delays and diverts funding from meaningful efforts to address California's continuing water crisis."

After listing 14 reasons for opposing Proposition 1, the CSPA statement concludes that it "…***shamefully holds a few worthy projects hostage to fiscally irresponsible and environmentally damaging projects.*** In other words, the bond contains a surface storage "poison pill" that precludes our support.

Obviously we did not prevail in our opposition to Proposition 1. It would have been difficult under the circumstances, given bond supporters spent more than $21 million while those opposing the bond spent about $100,000.[50]

Our current and future position focuses on support of those measures in the bond that are in line with the EWC plan (such as water efficiency, demand reduction, water recycling and ecosystem restoration) and strong opposition to funding for surface storage projects. EWC will also advocate for increased funding for groundwater solutions for water storage.

Implementation of the above actions by EWC organizations will include:

- Tracking California Water Commission proceedings related to storage option funding; we will work to direct funding to groundwater options and oppose funding for surface storage options.
- Tracking and influencing the distribution of funds for the water conservation-related options of Proposition 1 in accordance with the EWC Sustainable Water Supply Plan.
- Continued EWC/EJCW responses as necessary in support of the Winnemen Wintu tribe's opposition to potential federal plans to raise Shasta Dam

Funding. No current estimates available.

[50] http://ballotpedia.org/California_Proposition_1,_Water_Bond_(2014) Note: part of the support totals include funds for the "Rainy Day" initiative that was also on the ballot.

ELIMINATE IRRIGATION WATER ON DRAINAGE-IMPAIRED FARMLANDS SOUTH OF THE BAY DELTA.

Selenium, arsenic, boron, molybdenum, mercury, and various other salts and minerals are highly concentrated in the soils of the Delta-Mendota Service Area, the San Luis Units of the CVP and portions of the Kern and Tulare basins served by the SWP. Descriptions of these soils are presented in the 1990 joint federal and state report known as "The Rainbow Report."[51]

The San Luis Act of 1960 requires a drain system as a condition of approval of the San Luis Unit CVP contracts, including the Westlands Water District. Initially, the Bureau of Reclamation planned to build a San Luis Master Drain to the Bay-Delta from these lands, but the drain to the Delta was stopped after 93 miles were completed; the terminus was Kesterson Reservoir near Los Banos, where thousands of migratory birds died from selenium poisoning due to toxic drainwater. The US Geological Survey recently estimated that even if the San Luis Drain were completed, irrigation of the San Luis Unit of the CVP were halted, and 42,500 pounds of selenium a year were discharged into the Delta from ongoing agricultural drainage, it would take 65 to 300 years to eliminate the selenium already deposited in valley groundwater.[52]

Since the late 1960s and 1970s, the Central Valley Project has been supplying water to approximately 1.3 million acres of drainage-impaired land on the west side of the San Joaquin Valley. This is a clear violation of the California constitution's prohibition against waste and unreasonable use of the state's water.[53] Eliminating or reducing the irrigation of this land would save up to 2 million acre-feet of water in most years. [54]

Farmers and water districts throughout the western San Joaquin Valley have been trying to reduce their drainage water. Much, however, remains to be done. Retiring these lands from irrigated agriculture remains by far the most cost-effective and reliable method of eliminating harmful discharges to water bodies and aquifers. The Westlands Water District already has retired approximately 100,000 acres of impaired land; a 2007 federal report considered but dismissed an option to retire 300,000 acres of drainage-impaired lands in the San Luis unit of the CVP, instead recommending the retirement of 194,000 acres.[55] Unfortunately, the federal government is now considering a litigation settlement with Westlands that would not retire *any* additional lands and would forgive more than $300 million in debt to U.S. taxpayers.

Any long-term solution to the west side's drainage problem must focus on additional land retirement complemented by selective groundwater pumping, improved irrigation practices, and application of new technologies where appropriate. Any approach that is not founded on land

[51] U.S. Department of the Interior, California Resources Agency. September 1990. A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley. P. 2-3.http://www.water.ca.gov/pubs/groundwater/a_management_plan_for_agricultural_subsurface_drainage_and_related_problems_on_the_westside_san_joaquin_valley/rainbowreportintro.pdf

[52] Presser, Theresa S. and Samuel N. Luoma. 2007. Forecasting selenium discharges to the San Francisco Bay-Delta Estuary: Ecological effects of a proposed San Luis Drain Extension.The US Geological Survey,Professional Paper 1646. Abstract P. 1.http://pubs.usgs.gov/pp/p1646/

[53] California Constitution. Article 10, Section 2. http://www.leginfo.ca.gov/.const/.article_10.

[54] Pacific Institute. 2008. More with Less: Agricultural Water Conservation and Efficiency in California. P.7.http://www.pacinst.org/reports/more_with_less_delta/index.htm

[55] U.S. Geological Survey. 2008. Technical Analysis of In-Valley Drainage Management Strategies for the Western San Joaquin Valley, California

retirement ultimately will result in the increased concentration of selenium and salts in the shallow aquifers of the San Joaquin Valley, where they will be mobilized by flood events or groundwater transport.

Taking these "badlands" out of production would reduce demand for Delta water diversions and significantly improve water quality in the San Joaquin River. A planned program of land retirement and other drainage volume reduction actions also would mitigate impacts to the farm labor community. As noted in the Rainbow Report, these lands ultimately will go out of production even if irrigation continues; ongoing irrigation simply will accelerate drainage impairment. A far better use of these impaired farmlands would be to provide state or federal incentives for the production of solar energy farms.

Implementation of the above actions by EWC organizations will include:

- Opposition to providing CVP irrigation water to approximately 1.3 million acres of impaired farmlands in the west side of the San Joaquin Valley and in the Tulare Basin.
- Support of the permanent retirement of all drainage-impaired farmlands.
- Opposition to the proposed litigation settlement between the United States and Westlands Water District. (This proposal would *not* require additional land retirement and would forgive hundreds of millions of dollars in debt incurred by Westlands.)
- Opposition to extending Grassland Bypass Project discharges that exceed selenium water quality objectives beyond the current deadline of 2019.

Funding. No current estimates are available, but the Bureau of Reclamation's own economic analysis shows that maximum land retirement provides positive economic benefits while keeping the land in production results in a net economic loss.

KEEP WATER TRANSFERS WITHIN THE REVISED DELTA EXPORT LIMITS.

Since the early 1990s, water transfers via market transactions have been used to overcome what some economists and water managers feel is the inflexibility of California water rights priorities—first in time, first in right. Such transfers typically become most visible to the public during drought years, when junior water rights holders like the federal Central Valley Project and the State Water Project face cutbacks as more senior water right holders exert their priority to the water that remains. Junior water rights holders attempt to obtain more surface water supplies by offering to purchase water directly from willing sellers, who are usually holders of senior water rights. There are three ways this is done: 1) crop-shifting, 2) fallowing, and 3) groundwater substitution. Fallowing and groundwater substitution transfers have been the methods of choice for water sellers in the past.

The U.S. Bureau of Reclamation and the California Department of Water Resources oversee the fallowing and groundwater substitution transfers, but there is an inadequate monitoring, mitigation, and reporting process, so the environmental and economic consequences from transfers are not readily apparent. [56] The agencies are aware that fallowing creates impacts to other downstream users that are dependent on the tail water, avian and terrestrial species, and local economies, [57] but monitoring and reporting are inadequate to non-existent. Groundwater substitution occurs when river water is sold and groundwater is pumped to continue crop production (usually rice). The agencies know that the most significant and immediate impacts from these transfers is to other well users, streams and rivers, and terrestrial and aquatic species. *Id.* The monitoring, analysis, and public reporting of the immediate and long-term impacts of these two forms of water transfers are inadequate.

The Sacramento Valley's groundwater already is in a depleted state (see Tables 1 and 2). Further excessive pumping likely will result in ecological and economic disaster for the Delta and the Sacramento Valley. Water transfers are intended to overcome water rights priorities, but as noted above, they also have the potential to cause, among other things, falling groundwater elevations, overdraft (pumped supplies outpacing the rate of recharge to the aquifer), land subsidence (where the elevation of the land surface actually falls as emptied aquifers collapse and lose storage capacity), and increased stream flow losses (chasing a falling groundwater table). This has been the experience of agricultural regions in the Santa Clara Valley (before it urbanized into Silicon Valley) and the San Joaquin Valley, as well as in urban groundwater basins of the Los Angeles region. These conditions (falling groundwater elevations, overdraft, land subsidence, and stream flow losses) combined to destabilize once healthy hydrologic systems, which created the exploited conditions that make "conjunctive use" water strategies possible. This must not be repeated in the Sacramento Valley.

[56] DWR and USBR, 2014. *DRAFT Technical Information for Preparing Water Transfer Proposals (Water Transfer White Paper) Information for Parties Preparing Proposals for Water Transfers Requiring Department of Water Resources or Bureau of Reclamation Approval.*

[57] USBR and San Luis Delta Mendota Water Authority 2014. Final Environmental Assessment/Mitigated Negative Declaration for the *2014 San Luis/Delta Mendota Water Authority Water Transfers.*

Table 1: Maximum and average groundwater elevation decreases for Butte, Colusa, Glenn, and Tehama counties at three aquifer levels in the Sacramento Valley between the fall of 2004 and 2013. [58]

County Fall '04 - '13	Deep Wells (Max decrease gwe)	Deep Wells (Avg. decrease gwe)
Butte	-11.4	-8.8
Colusa	-31.2	-20.4
Glenn	-60.7	-37.7
Tehama	-19.5	-6.6

County Fall '04 - '13	Intermediate Wells (Max decrease gwe)	Intermediate Wells (Avg. decrease gwe)
Butte	-21.8	-6.5
Colusa	-39.1	-16.0
Glenn	-40.2	-14.5
Tehama	-20.1	-7.9

County Fall '04 - '13	Shallow Wells (Max decrease gwe)	Shallow Wells (Avg. decrease gwe)
Butte	-13.3	-3.2
Colusa	-20.9	-3.8
Glenn	-44.4	-8.1
Tehama	-15.7	-6.6

[58] DWR, ongoing. http://www.water.ca.gov/groundwater/data_and_monitoring/northern_region/GroundwaterLevel/gw_level_monitoring.cfm#Well%20Depth%20Summary%20Maps

Table 2: Results from DWR's spring monitoring for Sacramento Valley groundwater basin from 2004 to 2014. *Id.*

County Spring '04 - '14	Deep Wells (Max decrease gwe)	Deep Wells (Avg. decrease gwe)
Butte	-20.8	-14.6
Colusa	-26.9	-12.6
Glenn	-49.4	-29.2
Tehama	-6.1	-5.3

County Spring '04 - '14	Intermediate Wells (Max decrease gwe)	Intermediate Wells (Avg. decrease gwe)
Butte	-25.6	-12.8
Colusa	-49.9	-15.4
Glenn	-54.5	-21.7
Tehama	-16.2	-7.9

County Spring '04 - '14	Shallow Wells (Max decrease gwe)	Shallow Wells (Avg. decrease gwe)
Butte	-23.8	-7.6
Colusa	-25.3	-12.9
Glenn	-46.5	-12.6
Tehama	-38.6	-10.8

The annual transfers (frequently called "temporary" or "one-year" transfers) are in addition to the State of California's "drought water bank" program, which is sometimes used during drought years. All these sales of Sacramento Valley surface waters to buyers south of the Delta result in two significant hydrologic problems:

First, the water that is sold must be transported through the Delta to the dangerous export pumps of the CVP and SWP. Second, landowners selling their surface water may then pump groundwater to irrigate their crops; this causes groundwater elevations to fall for all users and water bodies. If these conjunctive use programs continue in the Sacramento Valley, its aquifers are in dire jeopardy. This Valley's economy, ecology, and surface waters are highly

dependent on its natural groundwater abundance.

No net new water should be exported from north of the Delta beyond meeting the contracts of the most senior water rights of the San Joaquin River Exchange Contractors in the San Joaquin Valley. Their supplies are already imported to the San Joaquin Valley as part of export operations of the Central Valley Project from the Delta. This policy protects the Delta from new export pumping impacts, but it also meets a goal of the State Water Resources Control Board: long-term protection of the groundwater supplies of the Sacramento Valley. [59] Implementation of such a policy is the only way the Sacramento Valley's aquifers can avoid the fate of the once abundant groundwater reserves of the San Joaquin Valley.

Water exports through the Sacramento-San Joaquin Delta /San Francisco Bay estuary – which include individual water sales transactions, Article 21 State Water Project pumping and pumping under the contracts of the Central Valley Project and the State Water Project – play a significant role in the movement of water throughout the state. They also exert major impacts on the ecology of the estuary. The two latter projects provide the largest percentage of exports through the Delta, while water sales and Article 21 pumping are also significant in some years.

A new paradigm is needed in California water policy, one that would simultaneously reduce export pumping through the Delta to a level that maintains a healthy ecosystem, is consistent with the most senior water rights of the Exchange Contractors, and provides reliable sources of water for south-of-Delta water users. Instead of continuing to export extraordinary amounts of water from the Delta, south-of-Delta water users could obtain significant amounts of water from localized south-of-Delta sources in the San Joaquin Valley region. Such "south-to-south-of-Delta" trades would avoid the impacts on fish and wildlife species, water quality, ecosystem conditions, flow volumes and directions, and groundwater in the Sacramento Valley that come with excessive Delta export pumping. It would also avoid the groundwater substitution transfers that could ruin the economy of the Sacramento Valley and the vital streams necessary for already struggling aquatic and terrestrial species. Indeed, a move toward regional water self-sufficiency is now state law due to passage of the Delta Reform Act of 2009.

A more favorable scenario than present and future maximum north-to-south Delta pumping comprises the following changes:

- Encourage San Joaquin Valley water users to voluntarily share resources by providing southern Sierra water to south-of-Delta water users via new interties with existing infrastructure, or by moving agricultural water from the east side of the San Joaquin Valley, where water is more abundant, to west side agriculture, where the water supply is more limited. These changes can be facilitated by providing efficiency incentives for east side water users, resulting in up to 500,000 acre-feet of additional water for the west side. (These policies must be bolstered with safeguards to keep surface water and groundwater basins hydrologically healthy, and must accommodate required outflows to the Delta estuary from the San Joaquin River.)

[59] Howard, 2011. Letter to Gerald Meral of the Natural Resources Agency regarding the Bay Delta Conservation Plan.

This constitutes a simple and effective solution for regional self-dependency for south-of-Delta agriculture users -- indeed, for all of California. We recommend earmarking a portion of water transfer transactions to fund necessary additional oversight by local governments or qualified third- parties that are removed from the water transaction or movement process.

- Supplies for the Metropolitan Water District and other south-of- Delta users could be sourced by allowing flows from the Kern, Kings, Kaweah, and Tule Rivers to flow into the Tulare basin, re-charging the now-dry Tulare Lake. This option is advocated by the San Joaquin Valley Leadership Forum, which has determined that surface storage capacity in the Tulare Lake Basin could be more than 2.5 million acre-feet. This option may require a new Kern-San Joaquin intertie. Reorienting water transfer policies to benefit south-of-Delta water users will require detailed analysis to confirm feasibility; however, these measures merit serious consideration because they could meet the state requirement for reduced reliance on the Delta .

A Water Transfer Matrix and a set of Water Transfer Principles are included in the referenced EWC report, *California Water Solutions Now*.

As called for in the California Water Code, transfers that use State, regional or a local public agency's facilities require that the facility owner determine that the transfers would not harm any other legal user of water, not unreasonably affect fish and wildlife, and not unreasonably affect the overall economy of the county from which the water is transferred. Unfortunately, there is no enforcement mechanism except litigation, which is an onerous burden for the public. This is a particular concern in the Sacramento Valley, where existing healthy aquifers could be over-drafted by willing sellers in order to supply the same San Joaquin irrigators who caused the existing overdraft conditions in the San Joaquin Valley. In addition, the State Water Plan points out that "some stakeholders worry that State laws and oversight of water transfers may not be adequate to protect the environment, third parties, public trust waterways and fish, and broader social interests that may be affected by water transfers, and transfers that involve pumping groundwater, crop idling, or crop shifting." The EWC plan would come down on the side of county of origin protections and the "precautionary principle" in order to protect the health of groundwater aquifers north of the Delta Estuary.

Implementation of the above actions by EWC organizations will include:

- Opposition to net new water exports from north of the Delta other than those required to meet the contracts of the most senior water rights holders of the San Joaquin River Exchange Contractors.
- Continued advocacy for in-basin groundwater management due to the impacts of accelerating aquifer depletion. Timelines to meet the Sustainable Groundwater Management Act (2014) are too long, considering the escalating impacts from ever-expanding land conversions from grazing and annual crops to orchards, drought and climate change.

Funding. No estimates available.

RESTORE DELTA ESTUARY AND RIVERINE HABITATS AND INTEGRATE FLOODPLAINS WITH RIVERS.

In keeping with the Legislature's mandate – the *permanent protection* of the Delta's natural systems as the *paramount* concern to the state and nation – the first priority should be habitat restoration projects on public lands. To benefit from such efforts, habitat restoration projects must address connectivity between the areas to be restored and existing habitat areas needed for the full life cycle of targeted species. Where feasible, restoration should be accomplished simultaneously with levee reinforcement; and where possible, restoration projects should emphasize water quality improvement. Restoration projects should also incorporate input from affected Delta landowners.

Because they would meet most of the above criteria, the following areas should be given priority:

- Cache Slough Complex
- Cosumnes River – Mokelumne River Confluence
- Cosumnes River ground water basin depletion
- Lower San Joaquin River Floodplain
- Suisun Marsh
- Yolo Bypass

Although the EWC has not quantified the total acreage that would qualify as priority parcels, our estimates would include the 50,000 acres of public lands in these areas, well below the more than 100,000 acres called for in the BDCP plan. That plan is impractical due to costs and the opposition it will engender among residents and landowners in the Delta. Any ultimate plan must involve residents of the Delta, something that has not been addressed to date.

Floodplains benefit the people and ecology of California in numerous ways. Floodplains are extremely productive ecosystems that support high levels of biodiversity and provide valuable ecosystem services.[60] The floodplain of a river is a relatively level area on both sides of the stream channel that carries excess waters during flood events. During a flood, the floodplain becomes an additional part of the stream, doing "extra work" for the stream channel. The floodplain allows flood waters to spread out, reducing the potential energy of serious or catastrophic floods. As a result, less damage occurs downstream. If the flood plain is not allowed to work properly and the channel is narrowed, dredged, or riprapped, the stream cannot handle flows adequately, and damage occurs. Channelization and dredging also have caused the disappearance of the river's healthy sandbars and islands.

Further, floodplains contain wetlands that slow and filter flood water, thus improving water quality. Wetlands also provide habitat for a diversity of wildlife. Other benefits of floodplains include flood attenuation, fisheries habitat, groundwater recharge, water filtration, and

[60] Postel, Sandra. Richter, Brian. 2003. Rivers for Life. Island Press. P 20-21.http://islandpress.org/bookstore/details.php?sku=1-55963-444-8.

recreation. Floodplains therefore are extremely productive ecosystems that support high levels of biodiversity and provide valuable ecosystem services. Bottom line: studies have shown that healthy floodplains have an extremely high monetary value due to these services.

To function properly, floodplains must, by definition, periodically flood. Floodplains store floodwaters that recharge groundwater supplies, maintain proper instream flows, prevent bed-bank scour, are a source of organic carbon, and support a healthy population of aquatic species essential to both ecosystems and our economy.[61] Functional floodplains in California have been dramatically reduced from historical conditions because levees, dams, flood control projects, and development have reduced or eliminated connectivity between rivers and floodplains. To reverse these losses, numerous agencies and organizations have spent significant resources to restore floodplains while simultaneously minimizing future flood risk.

With climate change, we can expect less snowpack, quicker spring snow melts, and increased flood pressures. Connecting natural floodplains with our rivers and avoiding development in floodplains will become critical to community sustainability in the future.

The current restoration plans for the Yolo Bypass (including more frequent use) are encouraged as a part of this plan.

The following actions must be included with any planned floodplain restoration:

- Where possible, removing or setting back levees from riverbanks to allow floodwaters to expand into the floodplain.
- Where it is not possible to remove levees, they should be vegetated with native riparian flora to provide the maximum achievable ecosystem functions.
- Making the purchase of floodplains or flowage easements a top priority for flood control agencies; further, new levees should not be constructed in floodplains.
- Ensuring that low-income communities impacted by floodplain restoration are involved in the development of restoration plans, and that any impacts of restoration are fully mitigated.

Implementation of the above actions by EWC organizations will include:

- Continued advocacy for the habitat recovery actions of the EWC priority public lands in place of the more than 100,000 acres of undefined habitat called for in the BDCP EIR/EIS.

Funding. Costs might be approximately $1.6 billion, based on half of the comparable restoration costs of the BDCP per 2010 documentation.[62]

[61] Sommer T.R., Nobriga M. L., Harrell B., Batham W., Kimmerer W. J. 2001. Floodplain rearing of juvenile chinook salmon: evidence of enhanced growth and survival. Canadian Journal of Fisheries and Aquatic Sciences. P. 325-333.http://iep.water.ca.gov/AES/Sommer_et_al_2001.pdf

[62] Highlights of the BDCP, pamphlet published December 2010

ELIMINATE PAPER WATER, RETURN THE KERN WATER BANK TO STATE CONTROL, RESTORE THE ARTICLE 18 URBAN PREFERENCE, AND RESTORE THE ORIGINAL INTENT OF ARTICLE 21 SURPLUS WATER IN SWP CONTRACTS.

The Monterey Amendments changed major provisions of the original State Water Project, ultimately resulting in increased water exports from the Delta. This excessive pumping has adversely affected the ecological health and stability of the Delta, degrading water quality for the region's family farms and threatening commercial fisheries, sport fisheries and wildlife habitat. These changes were caused by four provisions: The elimination of Article 18a, also known as the "urban preference;" the elimination of Article 18b, the "paper water" safeguard; the change of orientation for Article 21, or "surplus water;" and the privatization of the Kern Water Bank.

To mitigate the damage caused by the Monterey Amendments, the following changes should be made; these adjustments will reduce reliance on the Delta, assure public trust protections for our most essential public resource, and provide greater water security for urban ratepayers.

- The "Paper Water" needs to be eliminated. The level of water exports for SWP Table A users are unrealistically high and must be brought in line with historic "firm yield" data, as required in the original contracts. The long-term water supply reductions forecasted with global climate change add to the urgency of bringing contracted amounts in line with current and future realities and eliminating this "Paper Water."
- The Kern Water Bank initially was a public asset. It underlies land purchased in the 1980s by the California Department of Water Resources (DWR) for the express purpose of creating a drought emergency water bank for the state's ratepayers. It was inappropriately transferred to private interests as a part of the Monterey Amendments. It must be returned to the ownership and operational control of DWR and managed per its original purpose: making water available to south of Delta urban water users during drought.
- The urban preference must be reinstated. California should return to its original doctrine of prioritizing water for rank-and-file ratepayers rather than corporate agriculture.
- The pumping of Article 21 (so-called surplus) water is both unnecessary for effective water policy and damaging to the fisheries and ecology of the Bay/Delta estuary. This is especially the case during dry years. Pumping of Article 21 water should *never* be permitted during drought.

The impacts of the additional capacity for Delta exports as provided by a public Kern Water Bank should be considered here. Given its location, size, and relative cost of development compared to surface storage, the Kern Water Bank is a facility that could greatly assist balanced export controls for the Delta and could be the single greatest improvement to overall state-wide water supply reliability. This plan strongly advocates for the return of the Kern Water Bank to state control as a water management measure.

Implementation of the above actions by EWC organizations will include:

- Eliminate paper water from SWP contracts and bring SWP contracts in line with firm yield.
- Continued legal actions to restore the Kern Water Bank as a public resource
- Restore the urban water preference
- Discontinue pumping Article 21 water

Funding. No cost estimates available.

REINFORCE CORE LEVEES ABOVE PL84-99 STANDARDS.

This plan accepts and supports the Delta Protection Commission's recommendation in their Economic Sustainability Plan to: "Improve many core Delta Levees beyond the PL 84-99 standard that addresses earthquake and sea-level rise risks, improve flood fighting and emergency response, and allow for vegetation on the water side of levees to improve habitat. Improvement of most core Delta levees to this higher standard would cost between $2 to $4 billion." [63]

There is a plausible public interest in providing public funds to Delta reclamation districts and other Delta interests for levee upgrades, given that the Delta serves as the water conveyance facility for much of California. Water exporters should be required to identify which levees, if any, ***they want to fund to a higher standard*** (e.g., greater earthquake resistance) to protect their water supplies. Recommendations should also include assisting Delta counties and communities in meeting FEMA/NFIP programs. The plan should also contain a recommendation to support and increase public funding for permanent continuation of the existing and highly successful statutory cost-share formula and funding for the Delta (Subventions) Levee Program. Public safety and flood protection must remain the top priority of the State Plan of Flood Control, including its levees and bypasses. The levees should be vegetated with native species to aid stabilization and support endangered species.

Because earthquake risks to the levees are one of the main justifications for a trans-Delta canal or tunnel, and there is evidence that the earthquake risks to the Delta levees may have been exaggerated in previous drafts of the Economic Sustainability Plan, the comparison of costs of the two alternatives ($2 to $4 billion for levee strengthening versus $15-$16 billion for new conveyance) is significant; this should provide sufficient incentive to state officials to initiate this levee reinforcement program immediately, making catastrophic levee failure a questionable justification for any new conveyance.

Implementation of the above actions by EWC organizations will include:

- Advocacy with the SWRCB and the DWR for the implementation of core levee reinforcement as the top priority for levee improvements.

Funding would be in line with the Delta Protection Commission's Economic Sustainability Plan: between $2 to $4 billion.

[63] Draft Executive Summary, Economic Sustainability Plan for the Sacramento-San Joaquin River Delta, March 10, 2011 http://www.delta.ca.gov/res/docs/ESP_ESUM.pdf

INSTALL IMPROVED FISH SCREENS AT EXISTING DELTA PUMPS.

A recent report by Larry Walker Associates indicates that a 1996 report by DWR and DFG concluded that for every salmon salvaged at the fish protection facilities, more than three are lost to predators or through fish screens.[64] The same report also indicated that over a 15 year period (1979-1993), 110 million fish were salvaged at the SWP's Skinner Fish Facility. In 2000, the CALFED Record of Decision highlighted the need to improve the fish screens at the South Delta pumps. According to a more recent DFG report, more than 130 million fish have been salvaged at the State and Federal Project water export facilities in the South Delta between 2000 and 2011. .[65] Actual losses, however, are far higher. For example, recent estimates indicate that 5-10 times more fish are lost than are salvaged, largely due to the high predation losses in and around water project facilities.[66] Additionally, the fish screens are unable to physically screen eggs and larval fish from the diversion pumps.[67] The losses of eggs and larval fish, as well as the enormous losses of zooplankton and phytoplankton that comprise the base of the aquatic food chain, go publically unacknowledged and uncounted.

As pointed out in the Walker Associates report, the fish protections at the South Delta pumps (including the fish screens and salvage facilities) remain largely unchanged since they were first engineered more than 40 years ago.[68] Currently only about 11-18% of salmon or steelhead entrained in Clifton Court Forebay survive. Based upon numerous studies by DFG, DWR and academic researchers, 75% of fish entering Clifton Court Forebay are lost to predation, 20-30% of survivors are lost at the salvage facility louvers, 1-12% of salvaged fish are lost during handling and trucking, and 12-32% are lost to post-release predation.[69] Losses of other species, such as Delta smelt or the egg and larval stages of pelagic species and salmon fry, are believed to be even higher. For example, some species (including Delta smelt) cannot survive salvage transport, and the losses approach 100%.

According to the draft *BDCP Effects Analysis' Summary of Effects of BDCP on Entrainment of Covered Fish Species,* South Delta export facilities could potentially increase entrainment of:

- Juvenile steelhead in dry and critical dry years,
- Juvenile winter-run Chinook salmon in above normal and below normal years,
- Juvenile fall-run Chinook salmon in all below normal and dry years and fall-run smolts in all years,
- Juvenile late fall-run Chinook salmon in dry and critical dry years,
- Juvenile longfin smelt in above normal, below normal, and dry years and adults in

[64] Larry Walker Associates. A Review of Delta Fish Population Losses from Pumping Operations in the Sacramento-San Joaquin River Delta. January 2010. http://www.srcsd.com/pdf/dd/fishlosses.pdf. Page

[65] California Department of Fish and Game annual salvage reports for the State Water Project and Central Valley Project's fish facilities, 2000-2011.

[66] Larry Walker Associates. A Review of Delta Fish Population Losses from Pumping Operations in the Sacramento-San Joaquin River Delta. January 2010. P. 2. http://www.srcsd.com/pdf/dd/fishlosses.pdf

[67] DWR. Delta Risk Management Strategy, final Phase 2 Report, Risk Report, Section 15, Building Block 3.3: Install Fish Screens. June 2011. P. 15-18.

[68] Ibid, Larry Walker Associates,

[69] Larry Walker Associates. A Review of Delta Fish Population Losses from Pumping Operations in the Sacramento-San Joaquin River Delta. January 2010. P. 2.

critical dry years, and
- Juvenile Sacramento splittail in all years.[70]

Because of flow requirements and biological constraints affecting diversions from the Sacramento River, exports from the South Delta pumps will constitute a significant percentage of total water exports under the BDCP. The BDCP currently stipulates that about 50% of State and Federal Project exports would come from the existing South Delta diversion facilities in average water years, and as much as 75-84% in dry and critical water years.[71] In fact, BDCP modeling suggests that exports and fish entrainment from South Delta diversions could potentially increase in certain water year types and for critical life stages of certain species.[72]

The *CALFED Bay-Delta Program Programmatic Record of Decision* and associated Biological Opinions required the construction of new state-of-the-art fish screens at existing South Delta export facilities in 2000.[73] A funding plan was to be completed by early 2003, facilities design completed by the middle of 2004, and operations and performance testing were to begin by the middle of 2006.[74] However, the explicit commitment to construct new screens was put on hold in 2003 after the State and Federal Project Contractors indicated that they would not pay for them. New South Delta screens are not included as part of the BDCP. As the BDCP will continue to rely on the South Delta pumps for a substantial percentage of project exports, new screens must be required to mitigate for project impacts.

DWR's *Delta Risk Management Strategy (DRMS) Phase 2 Report* found that the South Delta pumping facilities could be successfully screened by multiple in-canal vee-type screens of about 2,500 cfs capacity in each module. These new state-of-the-art South Delta screens, placed at the entrance to Clifton Court Forebay, would eliminate the existing 75% predation of fish species of concern in the Forebay and successfully protect fish longer than 25 mm in length.[75] While new screens would be expensive, still require transport of salvaged fish, not totally resolve debris removal issues, or eliminate all fish entrainment, they would dramatically reduce the appalling fish losses that occur at present.[76]

Modernizing the fish screens at the South Delta facilities is an integral part of the EWC's Plan in order to reduce fish killing at the pumps. The South Delta pumps will continue as the

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[70] ICF International. BDCP Effects Analysis, Entrainment, Appendix 5.B, Entrainment, Administrative Draft Bay Delta Conservation Plan. March 2012. PP. B.7-2 – B.7-4.
[71] NRDC. A Portfolio-Based BDCP Conceptual Alternative. February 2013. http://switchboard.nrdc.org/blogs/bnelson/Portfolio%20Based%20BDCP%20Conceptual%20Alternative%201-16-13%20V2.pdfICF International. BDCP Effects Analysis, Appendix 5.B, Entrainment, Administrative Draft Bay Delta Conservation Plan. March 2012. P. B.0-8. http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/BDCP_Effects_Analysis_-_Appendix_5_B_Entrainment_3-30-2012.sflb.ashx
[72] ICF International. BDCP Effect Analysis, Appendix 5.B, Entrainment, Administrative Draft Bay Delta Conservation Plan. March 2012. PP. B.0-4 – B.0-11.
[73] CalFed. Programmatic Record of Decision. August 2000. P. 49. Including Attachment 6A, U.S. Fish and Wildlife, Programmatic Endangered Species Act Section 7 Biological Opinion, P. 36 and Attachment 6B, National Marine Fisheries Service, Programmatic Endangered Species Act Section 7 Biological Opinion, P. 27. http://www.calwater.ca.gov/content/Documents/ROD.pdf
[74] Larry Walker Associates. A Review of Delta Fish Population Losses from Pumping Operations in the Sacramento-San Joaquin River Delta. January 2010. P. 18.
[75] DWR. Delta Risk Management Strategy, final Phase 2 Report, Risk Report, Section 15, Building Block 3.3: Install Fish Screens. June 2011. P. 15-18. http://www.water.ca.gov/floodsafe/fessro/levees/drms/docs/DRMS_Phase2_Report_Section15.pdf
[76] Id. 15.5.2.1 Conclusion at PP. 15-19 & 15-20.

primary diversion facilities under this Plan.

While experience with the existing fish screens at the South Delta have yielded much data on effective future fish screen design, modernizing fish screening systems would also require hydraulic and physical modeling, dimensional testing of dynamic baffling systems, and consideration of future hydrologic conditions associated with climate change.

In keeping with original CALFED plans, the EWC supports the development and implementation of modernized fish screening systems, using the best available technology, at the South Delta facilities and at other existing in-Delta diversions. This would include installation of positive barrier fish screens on all diversions greater than 250 cfs in both the Sacramento and San Joaquin River Basins as well as a significant percentage of smaller and unscreened diversions in these ecosystems.

An alternative possibility is the use of non-physical barriers to deter fish from entering the intake zones of the South Delta pumps. Non-physical barriers include the use of the following methods: electrical barriers; strobe lights; acoustic fish deterrents; bubble currents; velocity barriers; chemical toxicants; pheromones; and magnetic fields. In view of the criticality of recovering fish populations through reduced mortality at the pumps, the feasibility of these types of non-physical barriers should not be overlooked. The Bureau of Reclamation has recorded some research results of the use of non-physical barriers.[77]

Implementation of the above actions by EWC organizations will include:

- Advocacy with DWR and the CVP agencies for the construction of improved fish screens along the lines of the CALFED Record of Decision and the associated Biological Opinions.

Funding. Based on unpublished CALFED estimates, improved fish screen facilities at the Banks Pumps would cost than $1 billion in 2007 dollars; the cost estimate for Tracy would be $290 million.[78]

[77] Bureau of Reclamation. Non-Physical Barrier (NPB) for Fish Protection Evaluation: Can an Inexpensive Barrier Be Effective for Threatened Fish? http://www.usbr.gov/research/projects/detail.cfm?id=8740

[78] http://www.water.ca.gov/floodmgmt/dsmo/sab/drmsp/docs/DRMS_Phase2_Report_Section15.pdf

CONDUCT FEASIBILITY STUDY FOR TULARE BASIN WATER STORAGE.

By allowing flows from the Kern, Kings, Kaweah, and Tule Rivers to egress at the Tulare basin, south-of- Delta users and the Metropolitan Water District could obtain their water from a revitalized Tulare Lake. This option is advocated by the San Joaquin Valley Leadership Forum, which has determined that surface storage capacity in the Tulare Lake Basin could be more than 2.5 million acre-feet.[79] The concept would require bi-directional conveyance with both the Kern Canal and the California Aqueduct.

The restoration of Tulare Lake in the San Joaquin Valley is a unique opportunity to provide large volumes of high-quality water for agricultural, economic and environmental uses on a regional and self-sufficient basis. At one time, Tulare Lake was the largest freshwater body west of the Mississippi River, storing up to 25 million acre feet. The proposal promoted by the San Joaquin Valley Leadership Forum is based upon sound technical, financial, and environmental analysis that is far superior to the only other storage proposal currently under study within the San Joaquin Valley: Temperance Flat reservoir on the Upper San Joaquin River above Millerton Lake/Friant Dam. As an example, the restoration of just 10% of the historic Tulare Lake would provide nearly twice the surface storage capacity of Temperance Flat. Further, the Tulare Lake basin plan provides ancillary ground water storage capabilities, and Temperance Flat does not. Also, the Tulare Lake basin can accommodate flood waters from five south Sierra river systems – the Kings, Kaweah, Tule, Kern and the upper San Joaquin. Temperance Flat would only mitigate flood waters from the upper San Joaquin River.

There is a possibility that ground contaminants in the basin may exist at harmful levels. A feasibility study is required to examine this potential issue closely. California does not need more impaired lands similar to those that exist on the west side of the San Joaquin.

Implementation of the above actions by EWC organizations will include:

- Advocacy to require the SWP and the CVP project to evaluate the concept of restoring the Tulare Lake basin.

Funding. The preliminary concept described by the San Joaquin Valley Leadership Forum is estimated to cost $800 million. The beneficiaries would be South San Joaquin and Southern California water districts; they would be required to fund this alternative.

[79] San Joaquin Valley Leadership Forum, www.sjvwlf.org

PROVIDE FISH PASSAGE ABOVE AND BELOW CENTRAL VALLEY RIM DAMS FOR SPECIES OF CONCERN.

Dams have made California a well-watered paradise for most of its human inhabitants -- but dams also kill river habitats. Although California's vast system of water storage, hydropower and flood control dams has provided enormous economic benefits, it is not without downsides. Dams have been a major factor - in many cases *the* major factor - in the decline and extinction of numerous fish species, especially anadromous fishes that migrate to and from the ocean and must have access to the more favorable upper reaches of rivers to spawn and rear ensuing generations[80]. Every salmon and steelhead run in our Central Valley rivers is either extinct, endangered, or in decline due to the overall habitat destruction and degradation caused by dams.[81] A 1985 California Department of Fish and Game study indicated that the economic losses due to the declines of salmon, steelhead and striped bass that once spawned in Central Valley tributaries at $116,000,000 per year in 1985 dollars.[82]

The most serious fishery problem caused by major dams is the blockage of migratory fish passage. Over 95 percent of the historic salmon and steelhead spawning habitat in Central Valley river systems has been eliminated by the construction of large dams on every major river. Fish passage was not a serious consideration in the early part of the last century when most of the major dams were built; there were no Endangered Species Act or National Environmental Policy Act considerations at the time. California Fish and Game Code Section 5937, which mandates that dam operators keep fish in good condition below dams, has been largely ignored outside the Mono Basin. The construction of Friant Dam on the San Joaquin River resulted in the extinction of the largest spring-run Chinook population in the state. The dam blocked upstream spawning grounds, the best of any Central Valley river. Figure 3 shows the long-term downward trend for Chinook salmon in the Central Valley. It is obvious that unless we can get salmonids above major dams to spawn in their native habitats, they are doomed to extinction, regardless of any restorative measures taken below the dams (including hatcheries).

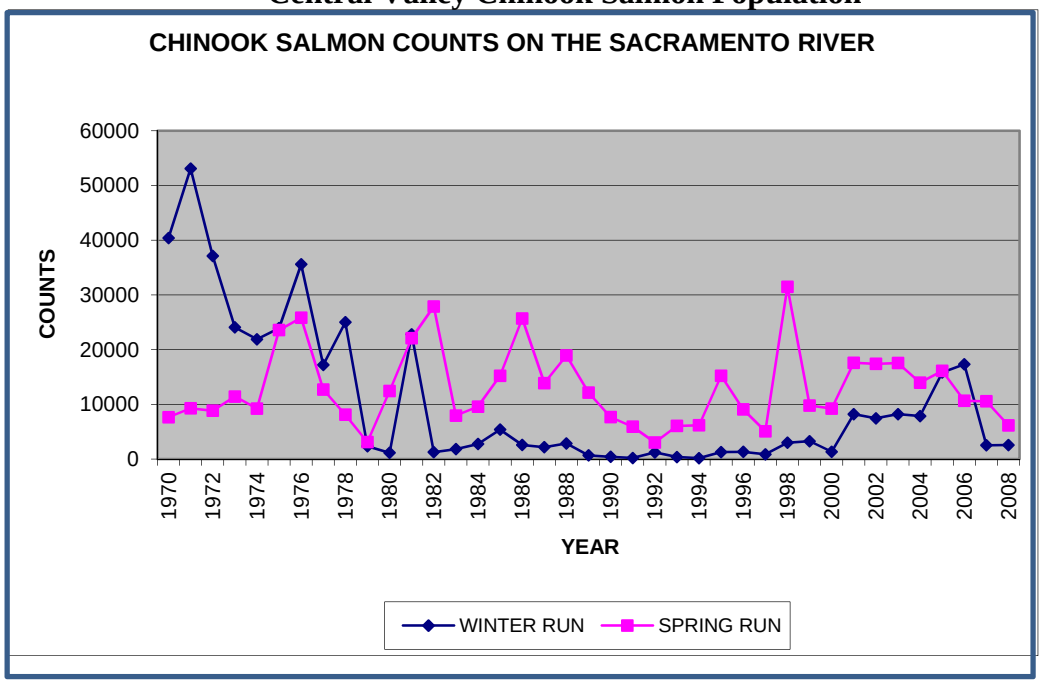
Numerous solutions are available to provide fish passage around dams. They include construction of fish ladders or upstream fish channels, fish elevators, trap and truck operations, downstream bypasses, removal of smaller fish barriers, and dam removal. All these techniques have been used at multiple locations with varying success. Some of the larger dams on the Columbia River system have been operating fish ladders for many years. While the costs of many of the techniques are substantial, the economics of industries and recreational activities that depend on healthy rivers and fish stocks justify the investment. The appropriate comparison by which to measure such costs is the sum of agricultural, industrial, and municipal benefits that accrue via the diversion of tens of millions of acre-feet of water annually. At more than $96

[80] National Marine Fisheries Service, Southwest Region. June 4, 2009. Biological Opinion And Conference Opinion On The Long-Term Operations Of The Central Valley Project And State Water Project. 660.http://swr.ucsd.edu/ocap/NMFS_Biological_and_Conference_Opinion_on_the_Long-Term_Operations_of_the_CVP_and_SWP.pdf.
[81] Friends of the River. 1999. Rivers Reborn: Removing Dams and Restoring Rivers. P 4-16.http://www.friendsoftheriver.org/site/DocServer/RiversReborn.pdf?docID=224&AddInterest=1004.
[82] California Department of Fish and Game. 1985. Administrative Report 85-03. http://deltavision.ca.gov/docs/externalvisions/EV8_Allied_Fishing_Group_Vision.pdf

billion annually, tourism and recreation now constitute California's largest industry; river recreation is a large part of this sector. Recreational fishing generates $1.5 billion annually in retail sales and provides thousands of jobs.[83]

Fish passage above the dams would also provide Native American tribes essential access to historic cultural resources. Native beneficiaries would include the Winnemen Wintu on the Upper Sacramento, McCloud, and Pit Rivers; the Karuk on the Klamath; and the California Valley Miwok and Maidu on the American and Feather Rivers.

Figure 3
Central Valley Chinook Salmon Population[84]



This plan supports the National Marine Fisheries Service Biological Opinion on CVP and SWP operations. The opinion recommends fish passage pilot programs and analyses for dams connected to the Delta (e.g., the Sacramento, American and Stanislaus rivers), and encourages the State Water Board to direct the controlling agency of each Delta-connected Central Valley rim dam to consider the feasibility of fish passage for every facility that blocks the passage of listed salmonid species. [85] Costs should be borne by the dam operators, given they are the main beneficiaries of the water storage operations.

[83] Restore the Delta. April 7, 2009. Press Release. http://archive.constantcontact.com/fs062/1102037578231/archive/1102546423830.html .

[84] California Department of Fish & Game, Native Anadromous Fish & Watershed Branch. GRANDTAB Data Sets. http://www.calfish.org/IndependentDatasets/CDFGFisheriesBranch/tabid/157/Default.aspx

[85] National Marine Fisheries Service, Southwest Region. June 4, 2009. Biological Opinion And Conference Opinion On The Long-Term Operations Of The Central Valley Project And State Water Project. 660.http://swr.ucsd.edu/ocap/NMFS_Biological_and_Conference_Opinion_on_the_Long-Term_Operations_of_the_CVP_and_SWP.pdf

Implementation of the above actions by EWC organizations will include:

- Coordination with DWR, DFW, and federal agencies on the option of providing fish passage for major dams connected to the Delta.

Funding. No estimates available.

RETAIN COLD WATER FOR FISH IN RESERVOIRS.

Salmon, steelhead, and trout need cold water to exist. As California has grown in size, the dams that have been built on virtually every major river have significantly changed both upstream and downstream river flows; high downstream water temperatures are one of the negative results. Temperatures of 57-67 degrees Fahrenheit (F) are typically ideal for upstream fish migration and 42-56 degrees (F) are ideal for spawning. Water temperatures over 70 degrees (F) can be lethal to anadromous fish, but are common on major rivers in the summer. Some fish populations have been able to adapt and carry on spawning and rearing below these major barriers, though in much smaller numbers than previously occurred. Because farms need the most water in the summer, water behind reservoirs is low by the fall, when many of the remaining populations of migrating fish return to the rivers. At that point, the lack of cold water is a clear threat to their survival. Many of these fish species are now listed under the federal Endangered Species Act (ESA), and maintaining water temperatures suitable for survival has become a critical part of the actions required under the ESA.

This plan supports, as a conservation measure, the NMFS Biological Opinion recommendations for cold water releases on rivers connected to the Delta, such as the Sacramento, American, and Stanislaus rivers, [86] as well as supporting regulations and legislation to retain sufficient water in other major reservoirs to support fish populations in Delta-connected rivers below dams. The latter would include the Trinity River, so long as compliance is maintained with the current management plan protections for the Trinity system.

Implementation of the above actions by EWC organizations will include:

- Advocacy for cold water releases with the SWRCB in accordance with NMFS Biological Opinions.

Funding. No estimates available.

[86] National Marine Fisheries Service, Southwest Region. June 4, 2009. Biological Opinion And Conference Opinion On The Long-Term Operations Of The Central Valley Project And State Water Project. Pages 590-620.http://swr.ucsd.edu/ocap/NMFS_Biological_and_Conference_Opinion_on_the_Long-Term_Operations_of_the_CVP_and_SWP.pdf.

PROVIDE PUBLIC TRUST PROTECTIONS AND THOROUGH ECONOMIC AND SOCIOLOGICAL ANALYSES OF REASONABLE ALTERNATIVES TO VARIOUS EXPORT LEVELS

The California Supreme Court, in the Mono Lake decision, explicitly set forth the state's"…affirmative duty to take the public trust into account in the planning and allocation of water resources and to protect public trust uses whenever feasible." Planning and allocation of limited and oversubscribed waterways imply analysis and balancing of competing demands. So far, we find little effort to balance the public trust obligations and competing demands within current planning processes, especially BDCP.

One of the significant flaws of previous and unsuccessful Bay-Delta proceedings has been the absence of a comprehensive economic evaluation of the benefits of protecting the estuary and in-Delta beneficial uses compared to the benefits of diverting and exporting water from the estuary. This absence has deprived decision makers and the public of critical information fundamental to reaching informed and difficult decisions on balancing competing demands.

Beyond protecting California's common property right in public trust waterways and fish, the balancing of limited water supplies must address the relative economic value of competing interests. For example, what is the societal value in providing Kern County, comprising a fraction of one percent of the state's population and economy, the same quantity of Delta water as the South Coast, with half the state's population and economy? What is the value to society of using public subsidies to irrigate impaired lands to benefit some 600 landowners, and that, by the nature of being irrigated, discharge harmful quantities of toxic waste that impairs other beneficial uses? What is the economic value of using twice the amount of water to irrigate an orchard in the desert than is required elsewhere? What are the costs and benefits of reclamation, reuse, conservation, and development of local sources? The preceding are only examples of the difficult questions that must be addressed in any allocation of limited resources and balancing of the public trust. As discussed in Sandra Postel's *Rivers for Life*,[87] water policy that incorporates the fundamental understanding that ecological health serves the common good presents a direct challenge to conventional modes of water governance. Economic analysis is crucial to providing the insight and guidance that will enable the Delta plan to meet its mandate. Without such analysis, we do not believe a Delta plan can successfully or legally comply with its legislative and constitutional obligations. An excellent description of the public trust type of issues caused by the current operations in the Delta and Estuary are contained in the Bay Institute report "Collateral Damage."[88]

[87] Postel, S and Richter, B. Rivers for Life. Island Press, 2003. P 182.
[88] The Bay Institute. Collateral Damage. March 2012. http://www.bay.org/publications/collateral-damage

Implementation of the above actions by EWC organizations will include:

- Continue the ongoing advocacy with the SWRCB to balance public trust and sociological values against the value of water exports.

Funding. The balancing of the public trust values will depend on the results of the State Water Resources Control Board hearings on Delta flows and Delta water quality.

HEALTHY HEADWATERS AND MEADOWS RESTORATION

As a result of the continuing impacts of drought on California, numerous organizations are highlighting the issues and benefits of healthy headwaters and meadows on our water supplies. Even the Association of California Water Agencies (ACWA) has joined with the Nature Conservancy and the Sierra Nevada Conservancy in emphasizing the importance of headwaters in water management. There is a clear recognition among organizations involved in water policies that we can and should do more to effectively manage our headwaters areas for multiple benefits, including healthy water supply, improved water quality and healthy ecosystems. Headwaters in California include watersheds in the northern Sierra, the Cascades, and parts of Central and Southern California mountain regions.

The combination of persistent drought and the effects of higher temperatures associated with climate change have already produced bigger and more destructive Sierra wildfires, magnifying the adverse effects on fish, wildlife habitat, and water supply. Investments in ecologically sound forest management can be cost effective for California. In addition to the quantified benefits of well-functioning watersheds, effective headwater management can also result in significant avoided costs, such as lessened fire and flood damage, erosion and sediment loss reduction, water quality maintenance, reduced illnesses and treatment costs, and control of agricultural pests.

To quote from the recent ACWA report, *Improving the Resiliency of California's Headwaters – A Framework*,[89] "The numbers from the 2014 fire season alone are sobering. More than 400,000 acres of state and federal lands burned, destroying homes, devastating watersheds, displacing residents and costing the state and federal government hundreds of millions of dollars. In 2013, the massive Rim Fire threatened San Francisco's main water supply source (Hetch Hetchy) and shattered records for the largest wildfire ever in the Sierra Nevada. Statistics suggest that wildfires are growing in size and intensity, and are becoming harder to extinguish. As drought conditions stretch into a fourth year, there is little reason to expect this pattern to improve."

Improved headwater and meadow management can provide a myriad of benefits, including improvements in the amount of naturally occurring water supply and protection of existing water supplies, increases in the natural water storage and percolation, improvements in the quality of water runoff from reductions in silt deposition and ash, protection of the fish and wildlife that inhabit our headwaters and upstream locations, improved availability of recreation areas for the public, reduced damage and reduced monetary loss to public and private property in headwaters areas, protecting the scenic values of our headwater habitats, and reduction of the amount of carbon dioxide in the atmosphere.

To estimate the costs of improving headwater management, we can borrow a page from the CALFED Watershed Program which estimated the approximate external costs to fully implement the watershed management strategy, an analysis developed by the CALFED Watershed Program was used. This analysis examined areas where communities have chosen to

[89] http://www.acwa.com/news/press-release/drought-deepens-groups-call-heightened-focus-healthy-headwaters

provide quantifiable financial support for watershed management, thus demonstrating "a willingness to pay" for the services provided by a well-managed watershed. The costs ranged from $480 million to $3,586 billion from the period 2004 to 2030 according to estimates from the California Water Plan 2005 and CALFED program estimates.[90] It should be pointed out that it is likely that significant portions of these costs are not an added cost, but existing expenditures applied differently. For instance, permits and stream alteration agreements issued by watershed boundary instead of jurisdictional boundary could result in considerable added benefit and positive effect without adding to the real cost of implementation. Also, land use planning done on the basis of watershed impact may yield higher beneficial results without increasing costs.

Analysis by two Wesleyan University Professors has shown clear cost benefit analysis by removing the bulk of small "trash trees" in forests, resulting in savings of water to a value of $1,500 for an investment of $1,000 per acre. In addition to the water savings, there are additional benefits of reducing fire risks, cutting carbon emissions, increasing water runoff to streams, and boosting job growth in poor regions.[91]

Although costly, the benefits from fire suppression, water quantity, and water quality provide a favorable return on the investment.

Implementation of the above actions by EWC organizations will include advocacy for:

- Forest thinning in order to preclude high intensity fires from moving easily across a landscape. Current research has shown that "the potential economic benefits from forest thinning, largely from the potential for increased hydropower production, are real, and in some cases may be sufficient to fully offset the cost of thinning in select watersheds."[92]
- Support the implementation of catastrophic wildfire reduction projects across the Sierra Cascade ranges, including the conservation and enhancement of summer base flows in forested streams, meadows, wetlands, and springs.
- Support the further documentation of the significant groundwater storage potential and surface water dry year supply benefits of catastrophic wildfire reduction and ecology enhancement projects implemented in forested watersheds that drain to existing surface storage facilities and to important water supply groundwater sources in the Delta watershed.
- Headwater and meadow management plans should be incorporated in local Integrated Regional Water Management Plans (IRWMP).
    - Collaboration with US Forest Service, Bureau of Reclamation, California Fish and Wildlife and other responsible agencies should be an integral part of an IRWMP.

[90] California State Water Plan. Bulletin 160-2005

[91] The Forestry Source. Commentary by James G. Workman and Helen M. Poulos. August 2013.

[92] http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/california/forest-restoration-northern-sierras.pdf

Funding. Department of Water Resources should coordinate the obtaining of up to $4 billion over the next 5 years to fund statewide headwater and meadow management. Funding sources include Proposition 1 bond money, unused previous bond funding for ecological restoration, recent federal drought funding, and future bonds for headwater and watershed management.

FUND AGENCIES WITH USER FEES.

Agencies that benefit from any new or existing conveyance facilities should pay the full cost of the facilities, including mitigation costs.

Costs of fixing existing and planned Bay/Delta estuary-associated water delivery systems, including related costs of environmental mitigation and restoration, should be financed by the agencies that deliver water; these costs ultimately would be passed along to their retail customers.
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Cost responsibilities for land acquisition and restoration of river and Delta floodplains should be distributed on a 75 percent pro rata basis through a broad-based water use fee (applied to all agencies whose supplies are diverted from a river or the Delta watershed); 25 percent of such projects would be supported by public funds.

Agencies that divert water from the Delta should pay their fair share of maintaining and replacing the Delta levees essential to their operations and the protection of water conveyance facilities. The share of Delta levee repair costs assigned to these agencies should reflect the extent to which the levee repairs are essential for ensuring uninterrupted diversions.

In developing funding sources, special care should be taken to ensure low-income communities are not burdened by new fees; also, appropriate set-asides should be created to allow these communities access to the funds needed to comply with new regulations and policies.

Implementation of the above actions by EWC organizations will include:

- Advocacy with state and federal agencies to promote the described funding mechanisms

Funding. No estimates available

IN CONCLUSION

California is at a tipping point in the evolution of our water usage. Faced with an ongoing drought of historic significance and accelerating global climate change, the natural limits of our water supply have become increasingly obvious. At the same time, the economic inequities of our current water polices have become too onerous to bear. Policy makers must recognize this. They cannot continue to advocate for multi-billion dollar bonds that saddle Californians with decades of crushing taxes for unnecessary infrastructure. The emphasis must be on water conservation and demand reduction actions. Nor should our representatives push for monumental changes to our rivers and bays in the guise of restoring our ecosystems – when the real purpose is continued delivery of subsidized water to corporate agriculture. The catastrophic results of decades of such mismanagement are now in full view. It is clear that better solutions are available. We must embrace them.

Unless we manage our water more efficiently and account for ongoing global climate change, the costs of water will exceed our ability to provide this most critical of public resources to the commonweal.

The solutions proposed in this report are demonstrably more efficient and economical than more dams and canals. The combination of water efficiency planning and reduced reliance on the Delta obviate the need for increased surface storage and increased conveyance through the Delta. We have shown that the EWC strategy will provide California with the largest possible supply of water. Moreover, it will be a *sustainable* supply, one that will provide future generations with adequate water for a growing population, agricultural and industrial growth, thriving fish and wildlife, while providing for drought protections.

THE EWC CONSISTS OF THE FOLLOWING MEMBER ORGANIZATIONS:

AquAlliance
Butte Environmental Council
California Coastkeeper Alliance
California Save Our Streams Council
California Sportfishing Protection Alliance
California Striped Bass Association
California Water Impact Network
California Water Research Associates
Center for Biological Diversity
Citizens Water Watch
Clean Water Action
Desal Response Group
Earth Law Center
Environmental Justice Coalition for Water
Environmental Protection Information Center
Environmental Working Group
Food & Water Watch
Foothill Conservancy
Friends of the River
Karuk Tribe
Klamath Riverkeeper
North Coast Stream Flow Coalition
Northern California Council Federation of Fly Fishers
Pacific Coast Federation of Fishermen's Associations
Planning and Conservation League
Restore the Delta
Sacramento River Preservation Trust
San Mateo County Democracy for America
Save the American River Association
Save the Bay Association
Sierra Club California
Sierra Nevada Alliance
Southern California Watershed Alliance
The Bay Institute
Winnemen Wintu Tribe