CALIFORNIA WATER SOLUTIONS NOW

A Report
From Member Organizations of the
ENVIRONMENTAL WATER CAUCUS
August 2009

This report is dedicated to the memory of Dorothy Green (1929-2008), a tireless advocate for common-sense management of California's water supply.

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The following Table of Contents provides a convenient listing of the Strategic Goals of the Environmental Water Caucus, which are the main subjects of this report.

EXECUTIVE SUMMARY

California is in the grip of a water crisis of our own making. Like all problems that humans create, we have the potential to use the crisis as an opportunity to make positive and long-lasting changes in water management. The crisis is not a water shortage – California has already developed sufficient water supplies to take us well into this century – the real crisis is that this supply is not used efficiently or equitably for all Californians nor is it used wisely to sustain the ecosystems that support us.

The opportunity – and the basis for our positive vision – is that economically and technologically feasible measures are readily available to provide the water needed for our future. Our vision includes providing clean water for families to drink, providing water to improve the environmental health of our once-magnificent rivers, recovering our fisheries from the edges of extinction, fostering healthy commercial fisheries and a thriving agricultural industry, ensuring that all California communities have access to safe and affordable drinking water, and contributing significantly to the state's largest industries: recreation and tourism. [1] [2]

This report makes the case that California has already developed enough water supplies to satisfy our needs into the foreseeable future by utilizing existing infrastructure and existing cost effective technologies. The report documents numerous analyses of water efficient technologies and approaches that can save or reduce water consumption in urban areas by as much as 5 million acre feet a year by 2030 compared with current trends – enough water to support a population growth of 29,000,000 people. According to the California Water Plan Update 2009, the state's population can be expected to increase by 28,000,000 over the next 40 years if current population trends hold. Clearly, a well-managed future water supply to take us to 2050 is within reach with the current supplies and with an aggressive water conservation program. In addition, still larger savings can be expected from agricultural water efficiencies, and some of this saved water could be available for urban consumption. All of the water conservation strategies discussed in this report are much less expensive than the new surface storage and conveyance projects being contemplated by state and federal agencies.

We need to make significant changes in our water management practices in order to provide the favorable outcomes that we describe in this report. These changes are based on the following Principles for a Comprehensive California Water Policy, developed by the Planning and Conservation League and the Environmental Justice Coalition for Water to guide California water policy reform.[3] They instruct that:

1. California must respect and adjust to meet the natural limits of its waters and waterways, including the limits imposed by climate change.
2. Every Californian has a right to safe, sufficient, affordable and accessible drinking water.

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[1] 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

[2] 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.

[3] Aquafornia: the California Water News Blog of the Water Education Foundation. http://aquafornia.com/archives/8374.

3. 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.
4. California must maximize environmentally sustainable local water self-sufficiency in all areas of the State, especially in the face of climate change.
5. The quality and health of California's water must be protected and enhanced through full implementation and enforcement of existing water quality, environmental, and land use regulations and other actions and through new or more rigorous regulations and actions as needed.
6. All Californians must have immediate and ready access to information and the decision-making processes for water.
7. California must institute sustainable and equitable funding to ensure cost-effective water reliability and water quality solutions for the state where "cost-effective" includes environmental and social costs.
8. Groundwater and surface water management must be integrated, and water health and protection must be addressed on a watershed basis.
9. California's actions on water must respect the needs and interests of California Tribes, including those unrecognized Tribes in the State.
10. California must overhaul its existing, piecemeal water rights policies, which already over-allocate existing water and distribute rights without regard to equity.

There are many competing solutions being put forward by various interest groups to deal with these issues. The environmental community is frequently asked: ***"What does the environment really need?"*** Our responses to that question are the subjects of this report.

The Strategic Goals and Recommended Actions described in this report are advocated by individual member organizations of the Environmental Water Caucus (EWC), which are listed at the end of the report. These are the strategic and on-the-ground actions that we recommend to all Californians to assure an adequate and reliable water supply for the future and to simultaneously recover the health of our fisheries and aquatic systems.

The report is organized by our high priority Strategic Goals with a discussion of each Strategic Goal and its' supporting data, followed by a set of Recommended Actions associated with each Strategic Goal. The Strategic Goals are:

1. Implement ecologically sustainable and cost effective water supply efficiency targets that reduce demand or increase supply.
2. Reduce exports from the delta, minimize reverse flows in the Delta, and increase Delta outflow.
3. Restore instream flows, volumes and patterns for aquatic ecosystems.
4. Provide fish passage above and below dams for all at-risk salmonid species.
5. Retain cold water for fish in reservoirs for later downstream release.
6. Integrate floodplains with rivers and streams.
7. Eliminate State and Federal water deliveries to irrigate drainage-impaired lands in the western San Joaquin Valley.
8. Restore surface and groundwater quality.
9. Maximize regional water self-sufficiency to include water for the environment.

10. Fund sustainable environmental agencies, watershed restoration and science with end-user fees.

A sampling of the report's 65 recommendations include: aggressive state-wide water conservation targets that provide adequate water for all Californians and preclude the need for major new surface storage projects, a reduction of exports from the Bay Delta in order to protect this valuable resource and its fishes – including strong concerns about the potential for a Peripheral Canal around the Bay Delta to increase exports instead, significant improvements to our valuable river habitats, elimination of water supplies to irrigate impaired farmlands, improvements in water quality, regional self-sufficiency, and improved funding for environmental agencies.

The two recent federal Biological Opinions on Delta operations strongly reinforce the recommendations of this report, which point out the need to reduce Delta exports, to provide fish passage above dams, to provide increased stream flows and colder waters in order to protect the health of the Delta. These actions will provide safeguards against the extinction of iconic fish species and give them a better chance of surviving the increased severity of the droughts and floods that are expected to accompany climate change.

The Recommended Actions that we propose will provide many benefits, in addition to the environmental improvements. They will reduce the financial burden on taxpayers and ratepayers, reduce impacts on the state budget, provide for greater ratepayer equity by reducing subsidies for water and require all businesses, especially agriculture, to pay for the true cost of the public resources they utilize. In addition, the proposed actions will bring state and federal agencies into compliance with environmental laws that they now routinely violate; they will force hard questions and hard decisions. In the end, these actions promote a positive, higher-quality legacy for our children and grandchildren while providing for a thriving economic future.

PREFACE

There are several overarching issues that run through all our efforts to develop sustainable, effective, and equitable water policies. They are: environmental justice, the preservation of cultural traditions by Native Americans, climate change, periodic drought, the precautionary principle, and population pressures. They are covered in this preface to avoid repetition in each of the individual report goals.

Environmental Justice. It is imperative that water policies and practices are designed to avoid compounding existing or creating new disproportionately adverse effects on low income Californians and communities of color. Conversely, water policies and practices must anticipate and prepare for anticipated disproportionately adverse effects and to provide equitable benefits to these communities, particularly those afflicted by persistent poverty and which have been neglected historically. For example, the effects of Hurricane Katrina remain a vivid reminder that those who have the least suffer the most and are the slowest to recover from storm and flooding impacts. We know that under conditions of climate change and drought, catastrophic environmental changes will occur in California. Environmental justice requires that water policies and practices designed to account for climate change and drought include a special focus on preventing catastrophic environmental or economic impacts on environmental justice communities. Other, specific environmental justice water issues include:

- Access to safe, affordable water 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 environmental justice communities can safely feed their families the fish they catch in local waters to supplement their families' diet.
- Equitable access to water resources for recreation.
- Equitable access to statewide planning and funding to ensure that in addition to safe, affordable water and wastewater, environmental justice communities benefit equitably from improved conservation, water recycling and other future 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 water for 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 on farm workers, associated with land retirement.
- Ideally, mitigation will be based on a comprehensive plan to transition local rural economies to new industries such as solar farms and other clean energy business models and provide the necessary job training and policies necessary to enable environmental justice community members to achieve the transition.
- 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 Historical Tribes have a deep and intrinsic relationship with California's rivers, lakes, streams and springs. This relationship goes to the very core of their origin, cultural, and spiritual beliefs. Many of the Tribes consider the fish that reside in these waters as gifts from their creator, and the fish are necessary to the continued survival of their people, culture and spiritual beliefs. Historically, California's water policy has failed to recognize the importance of the needs of one of its greatest natural and cultural resources - its Historical Tribes - and has only sought to manage water for economic gain. 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 and access to those fisheries for its Native Peoples.

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

- More precipitation will fall as rain rather than snow and will result in earlier runoff than in the past.[4]
- 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* [5] predicts that the average Sacramento River flow will decrease by about 20 percent by the 2050s.
- Precipitation patterns are expected to become more erratic including both prolonged periods of drought and greater risks of flooding.
- Sea level rise will impact flows and operations within the Delta, endanger fragile Delta levees, and increase the salinity concentration of Suisun Bay and the Delta, as well as increase the 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 the water management systems. Specific recommendations are proposed as part of this document.

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.[6] In creating a statewide drought water "bank," there is a clear need for a long-term version of a drought water bank.

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[4] 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.

[5] 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.

[6] California Drought Update. May 29, 2009. P.5. http://www.water.ca.gov/drought/docs/drought_update.pdf.

California's experience of multiple-year droughts should force state and local water and land use authorities to recognize the recurrence of drought periods and to put in place permanently more effective uses of water. The Governor's current policy on water conservation[7] should be mandatory for all water districts and become a permanent part of water policy, rather than a response to current dry conditions. Only by educating the public, recognizing limits, and learning to use the water we do have more efficiently can Californians expect to reasonably handle future drought conditions.

The Precautionary Principle. The Precautionary Principle states that: "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 and the precautionary principle is therefore applied throughout the report recommendations.

Population Pressures. California's human population is expected to continue to increase from the current population of more than 37 million to 49 million by 2030 and 59 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.[10] In each of the data sources utilized in this report, population increases have been factored into the conclusions, unless otherwise noted.

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[7] 20x2020 Water Conservation Plan DRAFT, April 30, 2009. Executive Summary. http://www.swrcb.ca.gov/water_issues/hot_topics/20x2020/index.shtml.

[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. 2009. Table 1. http://www.dof.ca.gov/research/demographic/reports/#projections.

[10] The Free Library by Farlex. From the Public Record, December 30, 2008. Bob Marra. http://www.thefreelibrary.com/New+report%3a+California+population+surpasses+38+million+while...-a01611779295.

STRATEGIC GOAL # 1: IMPLEMENT ECOLOGICALLY SUSTAINABLE AND COST EFFECTIVE WATER SUPPLY EFFICIENCY TARGETS THAT REDUCE DEMAND OR INCREASE SUPPLY.

California has developed huge amounts of water for our cities and farms. Urban users consume 8.7 million acre feet of water, and agriculture uses 34 million acre feet in a typical year. (An acre foot of water is the volume of water required to cover one acre of surface area to a depth of one foot which is 325,900 gallons.) California has 1,400 major reservoirs with a combined storage capacity of 40 million acre feet, thousands of miles of canals and enormous energy-consuming pumps to move the water around the state.

Despite all this abundance, there are fears of monumental water shortages, amplified by periodic drought conditions and climate change. One-third of 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, the increased frequency probably reflecting effects of 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 major 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 have already been diverted for our use and publicly subsidized farm water has created an insatiable appetite for more. In view of the critical nature of water supply, irrigating water-intensive crops with huge amounts of water hardly fits a 21st century definition of the "beneficial and reasonable use" criteria called for in state law. How did we get so far out of balance? The fault lies in our wasteful and unsustainable uses of this valuable and limited public resource.

Overwhelming evidence shows that a suite of aggressive conservation and water efficiency actions will reduce overall demand and provide cost effective increases in available and reliable water supply. These measures will handle California's water needs well into the foreseeable future and will do so at far less financial and environmental cost than constructing more storage dams and reservoirs. This conclusion is reinforced by the current State Water Plan (Bulletin 160-09), recent research, and actual experience in urban areas and farms.

These water efficiency and water use reduction actions are:

- Urban Water Conservation – including installing low-flow toilets and showerheads, high-efficiency clothes washers, retrofit on resale programs, rainwater harvest, weather-based irrigation controllers, reducing water for landscaping via drip and xeriscape, more efficient commercial and industrial cooling equipment, and tiered price structures.[12] Under a

[11] California Data Exchange Center "WSIHIST," Department of Water Resources. http://cdec.water.ca.gov/cgi-progs/iodir/wsihist

[12] A detailed treatment of urban water conservation is contained in *Waste Not, Want Not: The Potential for Urban Water Conservation in California,* by the Pacific Institute. http://www.pacinst.org/reports/urban_usage/waste_not_want_not_full_report.pdf.

high efficiency scenario, urban demand reduction by 2030 can be greater than 5 million acre feet per year.[13] A 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).[14] The same LAEDC report shows that urban conservation is by far the most economical approach, at $210 per acre-foot, and especially compared with new surface storage at $760 to $1,400 per acre-foot.

- Urban Conservation Rate Structures –including the establishment of 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 pricing policies are included in the 5 million acre feet cited above.
- Agricultural Water Conservation – including the continuing trend towards use of drip, micro sprinklers and similar higher technology irrigation, reduced deficit irrigation, transition to less water-intensive crops, reduced overall farmland acreage, elimination of the irrigation of polluted farmland, and tiered price structures. Conservation measures also include the elimination of indirect water subsidies provided to agriculture for Central Valley Project water, as called for in the Central Valley Project Improvement Act. More equitable water pricing will drive some of the efficiencies shown in Figure 1. Demand reduction of as much as 8 million acre-feet per year could be achieved by 2030, according to the previously referenced Pacific Institute Report**.**
- Recycled Water – including the treatment and reuse of urban wastewater, gray water, and storm water, and achievement of the State Water Resources Board goal of increasing water recycling by at least an additional 2 million acre feet per year by 2030. The LAEDC report shows recycled water costing $1,000 per acre-foot.
- Groundwater Treatment, Demineralization and Desalination – including the treatment of contaminated groundwater and the use of groundwater desalination. The cost of groundwater desalination ranges from $750 to $1,200 per acre-foot.
- Conjunctive Use – including the planned release of surface stored water to recharge groundwater basins, although the impacts of storing and releasing water need to be more fully understood. "Conjunctive use" has numerous meanings; the main one is that groundwater aquifers are recharged

[13] Pacific Institute. 2005. California Water 2030: An Efficient Future. P. 34. http://www.pacinst.org/reports/california_water_2030/ca_water_2030.pdf.

[14] 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.

with surface water from reservoirs in order to provide future supply from the recharged aquifers as needed. While conjunctive use does not reduce water demand, it does reduce the need for costly new surface storage.

- 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 to supply 800,000 people for a year.[17]

Based on data from the State Water Plan (Bulletin 160-05),[18] the Planning and Conservation League (PCL)[19] and the Pacific Institute,[20] the savings that can be achieved from these efficiency scenarios ranges from a low estimate of 4.69 to 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 – given aggressive efforts to conserve and reduce usage with readily available technology and no decrease in economic activity.

[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.

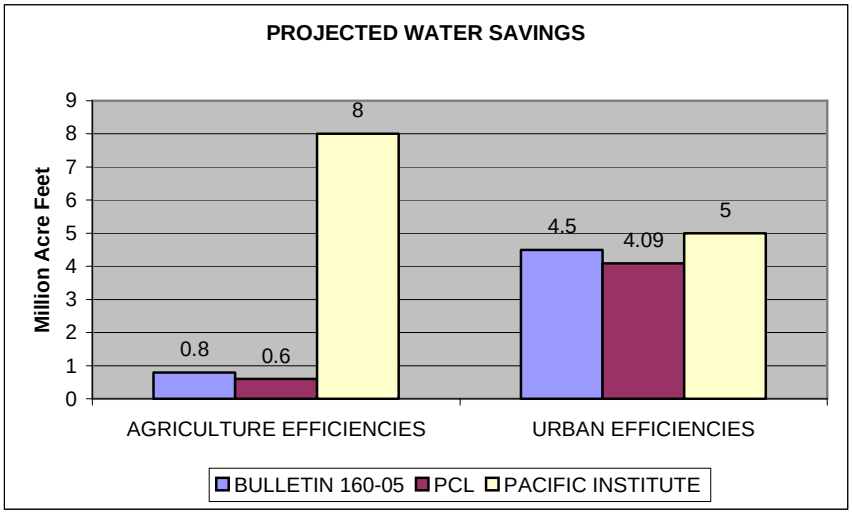
[17] California Department of Water Resources. Update 2005. California Water Plan Update. Bulletin 160-05. P..21-3. http://www.waterplan.water.ca.gov/previous/cwpu2005/index.cfm.

[18] California Department of Water Resources. Update 2005. California Water Plan Update. Bulletin 160-05. V2 1-5. http://www.waterplan.water.ca.gov/previous/cwpu2005/index.cfm.

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

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

Figure 1 Projected Water Savings from Efficiency Measures



The urban water savings of up to 5 million acre feet a year shown in Figure 1 is enough water to support a population growth of 29,000,000 people. According to the California Water Plan Update 2009, the state's population can be expected to increase by 28,000,000 over the next 40 years if current population trends hold. Clearly, a well-managed future water supply to take us to 2050 is within reach with the current supplies and with an aggressive water conservation program.

In order to translate these aggressive efficiency measures into actual demand reductions, we need heightened public awareness of these targets and focused state 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 a number of the references cited in this report. The Governor's recent 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 since most of the savings would occur in cities and farms south of the Delta. These water savings are necessary to reduce the exports called for in Strategic Goal #2 and to restore the stream flows called for in Strategic Goal #3.

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 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.[21] As applied to water policy, a Loading Order is a system that would require demand reductions through improved water efficiency to be the first priority in addressing water supply, that developing alternative sources including water recycling, groundwater clean up and conjunctive use programs would be second priority, and third 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 favorable impact on energy use, as pointed out by *Energy Down the Drain*, a report produced by the Natural Resources Defense Council and the Pacific Institute.[22] The report makes a strong case for the link between water and energy efficiencies.

All of these conservation and efficiency methods are known to produce available water at significantly less cost than constructing new storage dams and reservoirs—the third option in a Loading Order. According to the Los Angeles County Economic Development Corporation (LAEDC) report,[23] 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 examined by the Legislative Analysts Office (LAO) report *California Water: An LAO Primer*,[24] while providing less total annual yield than most alternatives. The LAO report showed that new surface storage costs are more than $10,000 per acre foot, while urban conservation costs ranged from $1,000 to $3,000 per acre foot. Statewide, the costs of all of these efficiency measures will in all probability not exceed the $20 billion estimate for the various Peripheral Canal and new surface storage proposals. For all of these reasons – as well as the historically ecosystem damaging impacts of major dams – EWC member organizations oppose the construction of Sites and Temperance Flat Reservoirs and the raising of Shasta Dam in favor of the more effective efficiency measures described above. Raising Shasta Dam on the Sacramento River may also be illegal because of its impact on the Wild River status of the McCloud River and the damaging impact on Winnemen Wintu sacred areas.

Groundwater supplies 30 percent of the state's water in a typical year, yet is not regulated or monitored at the state level, according to the Legislative Analyst's report. The same report recommends a state-administered water

[21] 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.

[22] Natural Resources Defense Council and Pacific Institute. 2004. Energy Down the Drain. ES-v. http://www.pacinst.org/reports/energy_and_water/index.htm.

[23] 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.

[24] 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.

rights system for groundwater and water quality permitting to the same extent as surface water. In many California locales, merely measuring and monitoring water usage has the effect of reducing water usage. The current State Water Plan points out that groundwater resources will be affected by climate change and that more efficient groundwater basin management will be necessary to avoid additional overdraft of groundwater supplies.

California's state water agencies cannot report on how much water is actually being used, where it is being used, where it is being diverted to, how much is being diverted, or how many diversions are illegal. Where it does have such data, the State Water Board estimates that the number of illegal diversions may be over 40 percent of the number of active permits and licenses, the use of which also fails to comply with the law in many cases. Enforcement authority and resources are extremely limited, and violations rarely if ever receive a meaningful state response. Water rights enforcement must increase if we are to police the illegal use of California's waters and ensure its beneficial use, in accordance with the state Constitution.

THE RECOMMENDED ACTIONS to achieve this Strategic Goal are:

- Establish a statewide oversight unit responsible for the coordination of the supply enhancements and demand reductions called for in this report, as well as the State Water Plan and the Governors "20/2020" mandate. This measure can be accomplished with little additional cost to the state by utilizing some of the existing Department of Water Resources (DWR) staff, supplemented with additional funding to coordinate the water efficiency program targets.
- Pass legislation and provide funding to establish a California water efficiency education and publicity program, similar to the 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.
- Adopt the Natural Resources Defense Council's recommendations to the Delta Vision Commission regarding a water efficiency Loading Order. The recommendations are summarized as follows:
  - Adopt a Loading Order policy through the State Water Control Resources Board, the State Public Utilities Commission and the Legislature that establishes water use efficiency as the top priority.
  - Establish a public goods surcharge on every acre-foot of water delivered in California, with the proceeds used to fund or subsidize efficiency programs.
  - Standardize and increase the evaluation and monitoring of water efficiency programs to ensure the delivery of savings and benefits.
- Support legislation to implement the Governor's call for a 20 percent per capita reduction in water use by 2020. Also require implementation of best management practices and water management planning by agricultural water users. The *California Water Plan Update 2005* as well as the draft *California Water Plan Update 2009* identifies urban

water conservation as the water management strategy that will be most effective at matching supply and demand.

- Oppose the construction of Sites and Temperance Flat Reservoirs and the raising of Shasta Dam.
- Implement statewide mandatory multiple tiered conservation rate structures as part of Urban Best Management Practices.
- Support legislative efforts to promote "Water Neutral" Development and increased water recycling.
- Revise Central Valley Project (CVP) contracts to reflect a repayment schedule for agricultural users that will meet legal requirements and reduce indirect water subsidies to CVP contractors
- Pass legislation to monitor groundwater usage throughout the state as a first step in improving the use of groundwater supplies.
- Take actions or pass legislation to reform the current water rights systems, to comply with state constitutional provisions related to unreasonable use of water, beneficial use of water, use-efficiency, and the public trust doctrine.[25] This realignment would free up a significant amount of water that could be made available for other water-efficient uses. This type of legislation is strongly recommended by the most recent LAO report on California water.[26]

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

[26] Legislative Analyst's Office. 2008. California's Water: An LAO Primer. http://www.lao.ca.gov/2008/rsrc/water_primer/water_primer_102208.aspx.

STRATEGIC GOAL # 2: REDUCE EXPORTS FROM THE DELTA, MINIMIZE REVERSE FLOWS IN THE DELTA, AND INCREASE DELTA OUTFLOW.

EXPORTS

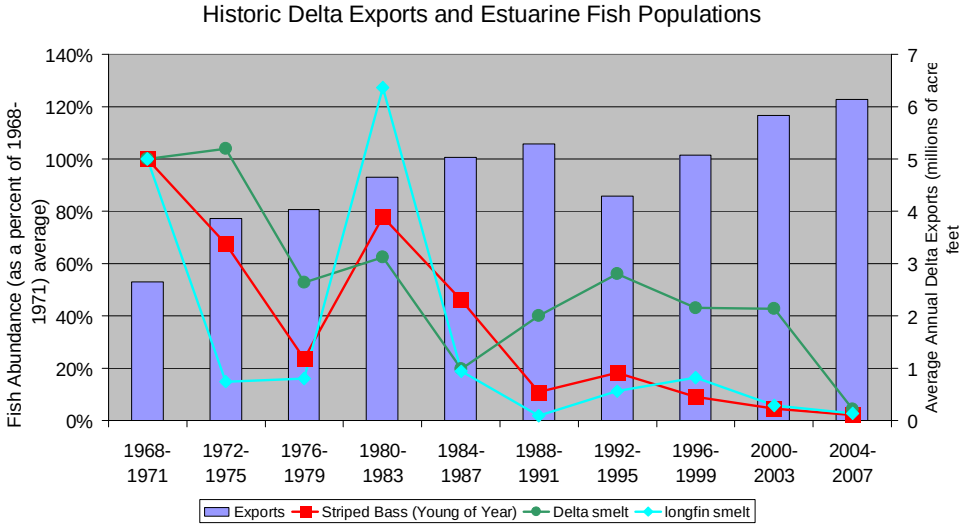
Numerous scientific and legal investigations have identified Delta export pumping by the state and federal projects as one of the primary causes of the decline of the health of the San Francisco Bay Delta estuary and its fish. They include the California Fish and Game Commission's 2009 listing of longfin 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 CVP and 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 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, (Figure2). 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."[27]

[27] CALFED Ecosystem Restoration Program. 2008. Stage 2 Implementation Draft. P. 23. http://www.delta.dfg.ca.gov/erp/reports_docs.asp

Central to the issues of managing the Delta is the lack of an independent, public domain, and science-based process for determining the accuracy for water supply and water demand forecasts. In contrast to the independent process for assessing electrical supply and demand used by the Energy Commission since the late 1980s, California's water selling agencies are still in charge of telling the public how much water there is, and who should have it. The Energy Commission found that the electrical utilities' estimates for energy demands were consistently higher and that the utilities' estimates of existing energy supplies were consistently lower than those developed by independent scientists. The public, the Delta smelt, and migratory salmon would be greatly assisted by a transparent and independent accounting of Delta water inflows and outflows.

Figure 2



Source: Environmental Defense Fund.[28] Original source is California Data Exchange Center and California Department of Fish & Game – Midwater Trawl Data

Delta smelt are an indicator of the health of the entire Delta ecosystem, and are representative of a much larger decline in native and non-native Delta fisheries, including salmon, steelhead trout, striped bass, longfin smelt, and threadfin shad. Prior to the operation of the State Water Project pumps in the 1970s, exports through the Central Valley Project pumping were at or below 2.5 million acre feet per year; the Delta was in good health at that level of exports. Beginning with the installation of the State Water Project, export pumping exceeded 2.5 million acre feet per year and the Delta smelt and other fish species began their declines that continue to this day as illustrated in

[28] Environmental Defense Fund. 2008. Finding the Balance. P. 3. http://www.edf.org/documents/8093_CA_Finding_Balance_2008.pdf

Figure 2. Both the federal Central Valley (CVP) Project and the State Water Project (SWP) are required by their permits and existing law to operate without harm to listed threatened and endangered species; the projects have been out of compliance for decades.

The SWP has never been able to develop or deliver all the water supplies on which its export program and original contracts were based. 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 the present claimants except in wet years, and climate change is expected to decrease flows in the future. The system cannot provide full delivery of water to the most junior holders in most years. Recent court-ordered water export restrictions that protect endangered fish species, the continuously deteriorating Delta earthen levees and the potential adverse effects of climate change on water supplies combine to make Delta water supply reliability a roll of the dice.

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 water supply each year.

Strategic alternatives to the recent high levels of Delta water exports should now be one of the highest priority considerations for the state's water planning – especially in tandem with aggressive water use efficiency measures. The two are closely linked.

Again, using the existing Energy Commission process as an example, once a range of reasonable supply and demand forecasts from various parties have been peer-reviewed and established, then the process of scenario development based upon the accepted range of supply and demand forecasts are initiated. The utilities present only one voice in this management scenario development and evaluation process. In contrast, in the water policy world, California water purveyors dominate the water management scenario development and evaluation process. Independent scientific peer reviews of the water purveyors' water management alternatives (and the merits of other alternatives such as replacing exports from the Delta with other regional and local water supplies) are routinely excluded or ignored.

When independent reviews become available, they usually provide important policy insights. For example, according to the recent Legislative Analyst's Office report, the Delta provides less than 15 percent of the state's overall water supply; the remaining 85 percent is provided by local groundwater, local projects, reuse and recycling, and the Colorado River. The Delta may provide a smaller percentage of water for central and southern California in the future due to these new Delta water supply realities:

- Reductions in Delta exports may become permanent due to the latest

[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.

requirements to sustain endangered fish species. The current reductions are aimed only at avoiding extinction, not for the necessary recovery of species under state and federal law.

- Southern California may become more locally reliant and less dependent on future export increases from the Delta – as indicated in the referenced Los Angeles County Economic Development Corporation report. A water portfolio that relies more heavily on local water self sufficiency will also be a cost-effective investment, especially in the near term.
- Drainage-impaired farmlands in the western San Joaquin Valley and Tulare Lake Basin could be taken out of production south of the Delta (See Goal # 7), freeing up significant supplies of water for other beneficial uses.

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 – a revised version of the Peripheral Canal – or "dual conveyance" to move water around the Delta should be constructed. 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,[31] 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 draft, the proposed Peripheral Canal would have the capacity to export up to 15,000 cubic feet of water per second (112,000 gallons per second) from an intake on 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 a Peripheral Canal while the health of the Delta will be a lower priority. With a future scenario that places less emphasis on the Delta as a water supplier (See Strategic Goal #9), more water can be left instream, and the environmental and water quality effects of exporting water – whether through or around the Delta – can be dramatically reduced. Diverting those Sacramento River inflows intended for export without significantly increasing the amount of fresh water flow dedicated to reaching San Francisco Bay will only degrade water quality and habitat conditions and aggravate the negative impact on Delta smelt, salmonid and other native fish populations.

The Environmental Water Caucus signatories to this report believe that it is premature to make any decisions or to allocate bond revenues to build a Peripheral Canal. There are numerous scientific, environmental, financial and governance issues that

[31] 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

need to be resolved prior to any decision related to a Peripheral Canal. Key questions and issues are:

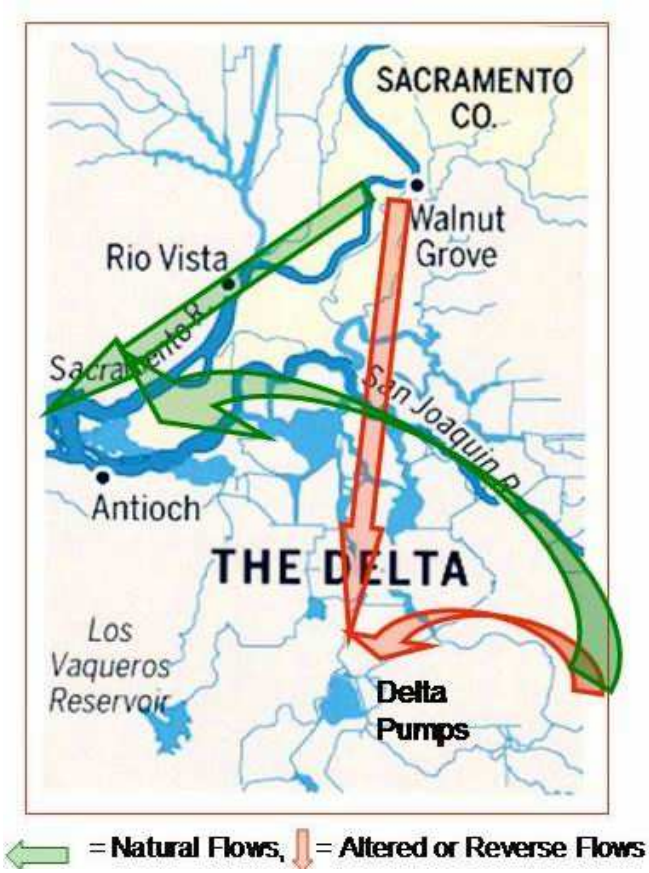
- What are we trying to accomplish with additional conveyance through or around the Delta?
  - If we are trying to resolve urban supply issues south of the Delta, what other solutions are available, either in conjunction with or as an alternative to new conveyance? This question is especially pertinent in view of Southern California's move toward self-reliance.
  - If we are trying to resolve agricultural water supply problems south of the Delta, what other solutions are available, either in conjunction with or as an alternative to new conveyance? Is future farming acreage going to be significantly reduced south of the Delta (See Strategic Goals 1 and 7)?
  - If we are trying to solve fishery and habitat problems, what other solutions are available, either in conjunction with or as an alternative to new conveyance? Will reduced exports alone be a key ecosystem contributor? Can the Delta ecosystem truly be a beneficiary of additional conveyance? Even if a new conveyance would benefit the ecosystem, would reducing exports and improving Delta flows still be necessary and assured? What flow regimes – quantity, direction, temperature, turbidity and other water quality parameters – are needed in various locations at different times of the year and in different types of water years to restore native aquatic species that spend all or part of their life stages in the Bay Delta estuary?
- Do the reduced export limitations of the recent Biological Opinions negate the need for additional conveyance?
  - Will water intake alternatives be operable and feasible in view of the impacts of climate change on sea level rise?
  - Will the beneficiaries of additional conveyance be clearly identified and be willing to pay in accordance with their benefits and the projected costs without shifting costs to "the environment."
  - The current system for governing the Bay Delta is clearly broken, as evidenced by the over allocation of water rights and contracts and by the role of water exporters as the key drivers of Delta export decisions. Water allocation decisions– which must be transparent-- must consider the Public Trust and must not be controlled by water exporters. Will an acceptable governance approach along these lines be agreed to *before* any decisions are made related to future export facilities?

In summary, scientifically supportable and reasonable financial and governance solutions must be thoroughly addressed and agreed to prior to any decision to go forward with a Peripheral Canal type of solution for the Delta.

REVERSE FLOWS

The powerful pumping plants in the southern Delta have a major detrimental effect on stream flow in the Delta, the San Joaquin River and on Delta smelt and other fish populations, including juvenile salmon. During periods of low water flow and high water export levels, the Delta pumps actually reverse the flow of the San Joaquin River, forcing it to flow south toward the pumps instead of west toward San Pablo Bay. The pumps also alter the outflow of the Sacramento River, forcing it south toward the pumps rather than west toward San Pablo Bay. These "reverse flows," diagrammed in Figure 3, have numerous negative effects on both resident and migratory fish. Reverse flows disrupt migration of salmon and steelhead, delaying their passage up or downstream, exposing them to less favorable habitat conditions, and causing them to be destroyed by the pumps.[32] Populations of resident species like Delta smelt can be virtually wiped out as they move into the zone of influence of the export pumps. Reverse flows also draw salty ocean water further into the Delta, contributing to degraded water quality and reducing the area of high quality estuarine habitat for aquatic organisms. According to US Fish and Wildlife Service, reducing or at times eliminating negative (reverse) flows in the Old and Middle River branches of the San Joaquin is an essential ingredient in preventing Delta smelt take at the CVP-SWP pumping facilities. Reducing export pumping is the single most important factor in reducing reverse flows.

Figure 3: Flows in the Delta



Source: Original Diagram from the Sacramento Bee. Flow arrows added.

DELTA OUTFLOWS

The vast majority of the research on the relationship between freshwater flow and fish and wildlife population abundance in the Bay Delta estuary points to a clear conclusion: freshwater flow has a powerful, significant, consistent, and widespread positive effect on productivity of many fish species and their prey. In particular, flows through the Delta to San Francisco Bay (Delta outflows) are highly correlated to the abundance of numerous estuarine fish and other aquatic organisms and strongly influence habitat and water quality conditions downstream of the Delta.

[32] National Marine Fisheries Service (NMFS). 1997. Proposed Recovery Plan for the Sacramento River Winter-run Chinook Salmon, Aug. 1997. SW Regional office. II-11. http://swr.nmfs.noaa.gov/hcd/recweb.htm

Over time, annual Delta outflows have been reduced on average by one half, [33] 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 the reduction in outflow. In fact, 31 per cent of upstream water is diverted annually before reaching the Delta.[34] In the 1990s, under the threat of federal intervention, California increased the required outflow to the Bay, but not enough to restore the Delta ecosystem or prevent further declines.

Because the science underlying the outflow-abundance relationships is so strong, new requirements that improve outflow should be a foundation of any new management regime for the Delta. These requirements should be met not only by Delta exporters; there are water management practices throughout the Sacramento and San Joaquin River regions that can be implemented to reduce water waste, eliminate unreasonable uses of water, improve public trust resources, and protect the watershed functions of rivers, floodplains and wetlands in the areas of water origin.

THE RECOMMENDED ACTIONS to achieve this Strategic Goal are:

- Support and defend the Delta export restrictions contained in the US Fish and Wildlife Service Biological Opinion for Delta smelt[35] and the export reductions called for in the National Marine Fisheries Service Biological Opinion on CVP and SWP operations.[36] The guidelines of the Fish and Wildlife Biological Opinion require reduced pumping in order to minimize reverse flows and the resultant fish kills during times of the year when Delta Smelt are spawning and the young larvae and juveniles are present. The guidelines of the National Marine Service Biological Opinion reduce Delta exports by 350,000 acre feet per year in order to assist in preventing extinction of Chinook salmon and steelhead.
- In keeping with the Precautionary Principle, the Department of Water Resources and the U.S. Bureau of Reclamation should reduce Delta pumping immediately, monitor the results, and feed that learning back into the decision making process.
- Using an approach similar to the one California has adopted to reduce carbon emissions, the Governor and the state legislature should set a policy goal of reducing north-to-south water transfers through or around the Delta by 20 percent by 2020 and 50 percent by 2050.
- The Department of Water Resources and the U.S. Bureau of Reclamation should reassess and modify all long-

[33] CALFED Ecosystem Restoration Program. 2008. Stage 2 Implementation Draft. P. 21. http://www.delta.dfg.ca.gov/erp/reports_docs.asp

[34] CALFED Ecosystem Restoration Program. 2008. Stage 2 Implementation Draft. P. 20. http://www.delta.dfg.ca.gov/erp/reports_docs.asp

[35] U.S. Fish and Wildlife Service (USFWS). 2008. Biological Opinion: Proposed Coordinated Operations of the Central Valley Project (CVP) and State Water Project (SWP) to the threatened delta smelt and its designated critical habitat. P. 279-285. http://www.fws.gov/sacramento/es/documents/SWP-CVP_OPs_BO_12-15_final_OCR.pdf.

[36] 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 570. http://swr.ucsd.edu/ocap/NMFS_Biological_and_Conference_Opinion_on_the_Long-Term_Operations_of_the_CVP_and_SWP.pdf.

term water service contracts to reflect sustainable levels of export through or around the Delta, to reflect the restrictions imposed by the recent Biological Opinions, and to incorporate independent scientific assessments of water supply reliability.

- The State Water Resources Control Board should revise the Bay-Delta Water Quality Control Plan to include more protective Delta outflow requirements and adopt other measures necessary to meet the nine scientifically designed targets recommended by The Bay Institute[37] for the Delta Vision process. These recommendations address:
  - Delta fish species abundance
  - Habitat improvements
  - Ecological processes (outflows)
  - Fish kill limits
  - Water quality
- The State Board should issue a new water rights decision requiring all inter-regional water projects (SWP, CVP, SFPUD, EBMUD) in the Bay-Delta watershed to contribute their fair share to meeting Delta outflow requirements based on the intersection of three key provisions of the State's Water Code and the State Constitution: the Public Trust doctrine, the Constitutional prohibitions against waste and unreasonable uses of water[38] and the "Area of Origin" protections for the Delta and the headwaters regions of the state.
- Before decisions are made by state or federal agencies and before any bond monies are allocated for construction of a Peripheral Canal or dual conveyance system, the questions raised in this report must be thoroughly and publicly addressed. The Precautionary Principle must be applied in this situation, and legislative attempts to pre-approve a Peripheral Canal prior to this kind of detailed analysis – including National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) analysis – must be vigorously opposed by the public and environmental organizations.
- New institutional arrangements that shift responsibility for water project operations from water suppliers and their contractors to an independent public trustee entity must be developed and adopted by the legislature and administration. Similarly, water project operations must be consistent with the master plan for the Delta recommended by the Delta Vision process, and likely to be mandated by the legislature, and subject to continuing oversight by any new Delta governance council.
- All future federal and state environmental impact reports related to the Delta should address a 2.5-million acre feet per year pumping limitation as one of the alternatives to be considered, per NEPA and CEQA requirements.
- Support litigation, such as the California Sportfishing Protection Alliance (CSPA) and California Water Impact Network's (C-WIN) "Seven Actions" lawsuit, or similar actions, against DWR, USBR and SWRCB. This is in keeping with the

[37] The Bay Institute. 2008. Key Elements Of A Strategic Plan To Implement The Delta Vision. P 9-15. http://www.bay.org/KeyElements.pdf.

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

above recommendations for reducing exports and reverse flows.

- Develop protections for the subsistence fishing community in the Bay Delta while cleanup efforts, particularly for mercury contamination, are under way.

STRATEGIC GOAL # 3: RESTORE INSTREAM FLOWS, VOLUMES AND PATTERNS FOR AQUATIC ECOSYSTEMS.

Healthy ecosystems require healthy river flows. A healthy river flow mimics, as closely as possible, the natural seasonal high and low flow patterns of a particular river, including periodic flooding and dry conditions. A more natural flow regime is able to support a variety of native plant, animal and fish species, and it also offers a time-tested recipe for river restoration and protection.

A reduction of instream flows always results from building dams and diverting water from streams. Particularly important from an ecological sense is the loss of peak flows that maintain river-forming processes such as channel maintenance and gravel distribution in rivers. In most cases, the amount of water released from storage or hydropower dams is so small that the rivers below dams become graveyards for fish, creating stagnant pools, altering water temperatures, degrading water quality and preventing fish migration. For example, downstream of Friant Dam on the San Joaquin River, the riverbed completely dries up each year for a sixty-three mile stretch in Fresno County. The effect of a dam on downstream ecosystems and species is always negative.

Peter Moyle, a nationally known UC Davis professor of conservation biology, recently authored a study warning that 20 of the 31 species of California native salmon, steelhead and trout will face extinction by the end of the century unless actions are taken to provide adequate cool freshwater and habitat.[39]

California law provides a framework to protect these resources. The California public trust doctrine protects navigable streams and their tributaries for a variety of uses including fishing and habitat for fish. California Fish and Game Code Section 5937 requires that the owner of any dam must allow sufficient water to pass over, around, or through the dam to keep fish in good condition at all times. Good condition has been clearly defined in modern ecological terms by Dr. Moyle in legal cases and testimony before the State Water Board.[40] Since 1959 the Water Code has expressly recognized that the use of water for recreation and for preservation and enhancement of fish and wildlife are beneficial uses of water (Water Code 1243 and 1257).

The federal and state agencies responsible for dam and water operations have belatedly recognized the importance of natural stream flows and the importance of determining the flows needed to protect beneficial uses. The state constitution, through the Public Resources Code (PRC), directs the Fish and Game Department (F&G) to identify

[39] Center for Watershed Sciences, University of California, Davis. 2008. Salmon, Steelhead, and Trout in California. P. 4. http://www.caltrout.org/SOS-Californias-Native-Fish-Crisis-Final-Report.pdf.

[40] Moyle, Peter. Written Testimony before the State Water Resources Control Board. October 14, 2003. P. 2-3. http://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/cachuma/.

streams throughout the state for which minimum flow levels should be established in order to assure the

continued viability of stream-related fish and wildlife resources.[41] The latest State Water Plan (Bulletin 160-09) carries similar recommendations, while also recognizing the paucity of information related to stream flows statewide.

As a result of a lawsuit by the California Coastkeeper Alliance, the Fish and Game Department was required to provide the Water Board with flows assessments to date, to create a prioritized list of streams or watercourses for which they planned to do flow assessments over the next several years, and to begin work on those flow assessments. This re-started a long-stalled but essential program. Progress by F&G on these requirements since the 1989 mandate has been minimal. In December 2008, F&G submitted a list of 21 streams that have had instream flow studies completed since 1983; some of the data are known to be outdated and unusable by the State Water Board. In some cases, only minimum flows are prescribed. Significant rivers that contain at-risk salmonid species are largely absent from the list.

At a minimum, all rivers in the state, including Delta waterways that formerly supported or now support at-risk salmonid species should have prescribed stream flows as well as the monitoring necessary to insure compliance by water management operators. The challenge for river management in California is to better balance human water demands with the water needs of rivers themselves.[42] The Anadromous Fish Restoration Program, which is charged with the doubling of fish populations in Central Valley rivers, has partially accomplished this goal; the rivers that remain to be studied include the Cottonwood, Calaveras, Tuolumne, Yuba and San Joaquin.

The California Hydropower Reform Coalition lists 125 hydropower projects that are to be relicensed over the next 15 years. The relicensing process provides the opportunity to establish improved stream flows and similar river improvements. That process, while slow moving, has yielded benefits for rivers and fish and should be supported by the public.

Assembly Bill 2121(2004)[43] directed the State Water Board to adopt guidelines for maintaining instream flows for certain Northern California coastal streams. That effort is now underway, and similar legislation is needed for other California streams with at-risk salmonid species.

Perhaps the most promising prospect for restoring a significant river with adequate stream flows is the San Joaquin River. Once an abundant

[41] California Public Resources Code, Sections 10000-10005. http://law.justia.com/california/codes/prc/10000-10005.html.

[42] Postel, Sandra. Richter, Brian. 2003. Rivers for Life. Island Press. P 4. http://islandpress.org/bookstore/details.php?sku=1-55963-444-8

[43] Assembly Bill 2121. North Coast Stream Flows. 2004.

salmon river and major tributary to the Delta, the salmon are gone, and the diminished river flow is polluted with agricultural return water, which flows into the Delta. Federal legislation to provide for the restoration of the San Joaquin River, spearheaded by the Natural Resources Defense Council, has recently been approved by Congress. Restoration of the San Joaquin will be a major step toward restoration of the Delta.

THE RECOMMENDED ACTIONS to achieve this Strategic Goal are:

- Develop legislation similar to AB 2121 (2004) which would direct and fund the State Water Board and F&G to develop, implement and monitor instream flows for California rivers that contain at-risk salmonid species.
- In the absence of legislation, the State Water Board should determine the priorities for statewide instream flow studies and the F&G Department should conduct those studies. At a minimum, the first priority list for the upcoming years should include all major rivers that contain at-risk species.
- In keeping with the "Beneficiary Pays" principle, the costs for conducting, implementing, and monitoring the prescribed stream flows should be financed by the entities receiving water diversions from a specific river, since they are the beneficiaries of the stored water.
- Where multiple competing beneficial uses exist in a watershed under consideration for water permit modification, higher priority should be assigned to instream beneficial uses where threatened or endangered species are listed, until such time as recovery efforts have successfully down-listed or delisted the species.
- Support the implementation of the San Joaquin River Restoration Settlement Act.
- Support local and regional organizations that are negotiating improved stream flows as part of the FERC or other relicencing or permitting processes.

STRATEGIC GOAL # 4: PROVIDE FISH PASSAGE ABOVE AND BELOW DAMS FOR ALL AT-RISK SALMONID SPECIES.

Dams have made California a well-watered paradise for most of its human inhabitants. Dams are also killers of 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 the next generation.[44] Every salmon and steelhead run in Central Valley rivers is either extinct, endangered, or in decline due to the overall habitat destruction and degradation caused by dams.[45]

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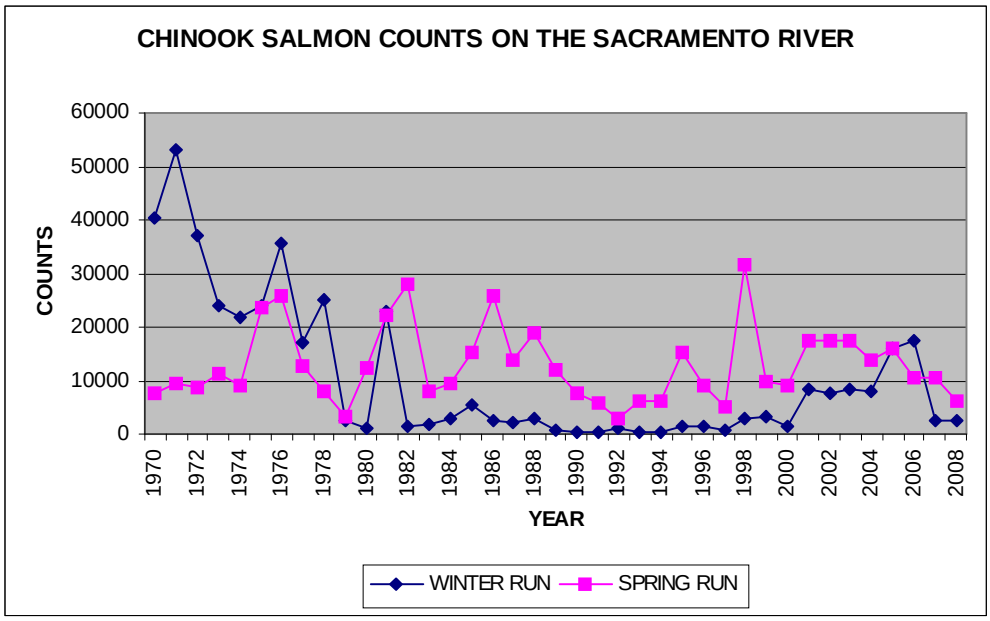
[44] National Marine Fisheries Service, Southwest Region. June 4, 2009. Biological Opinion And Conference Opinion On The Long-Term Operations Of The Central Valley Project And State Water Project. Page 660. http://swr.ucsd.edu/ocap/NMFS_Biological_and_Conference_Opinion_on_the_Long-Term_Operations_of_the_CVP_and_SWP.pdf.

[45] 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.

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 largely been 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 that were known to be the best of the Central Valley rivers. Figure 4 shows the long-term downward trend for Chinook salmon in the Central Valley.

There are numerous solutions available that can 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 of these techniques have been used at multiple locations with varying success rates. Some of the larger dams on the Columbia River system have been operating fish ladders for many years.

Figure 4: Central Valley Chinook Salmon Population



Source: California Fish & Game Department[46]

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

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 can 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. Tourism and recreation is now California's largest industry at more than $96 billion annually, and river recreation is a large part of that industry. Recreational fishing generates $1.5 billion annually in retail sales and provides up to 27,000 jobs.[47]

Removal of dams is an obvious solution for fish passage and it has applicability due to the age and obsolete nature of some California dams. Dam removal also has a hugely significant benefit of restoring the natural ability of rivers to transport gravel, sediment, and nutrients and to restore the natural flow and water temperature of formerly dammed rivers. The prospect of removing four dams on the Klamath River is a case in point; dam removal will restore approximately 300 miles of favorable habitat for salmonids and has turned out to be the most economical alternative for the Klamath dam owners. Additionally, removal of dams on the Klamath will restore an historic resource and ancestral land for the Karuk Tribe. Removal of dysfunctional dams on several smaller coastal streams likewise will provide historic spawning and rearing habitat above them (e.g., Matilija and Rindge Dams).

An important aspect of fish passage above dams is the benefits to Native American Tribes in gaining access to historic cultural resources and ancestral lands. These would include: the Winnemen Wintu on the Upper Sacramento, McCloud and Pit Rivers; the Karuk Tribe on the Klamath; and the California Valley Miwok and Maidu on the American and Feather Rivers.

THE RECOMMENDED ACTIONS to achieve this Strategic Goal are:

- Support and defend the National Marine Fisheries Service Biological Opinion on CVP and SWP operations that recommends fish passage pilot program plans and analysis for dams on the Sacramento, American and Stanislaus rivers.[48]

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

[48] 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 660. http://swr.ucsd.edu/ocap/NMFS_Biological_and_Conference_Opinion_on_the_Long-Term_Operations_of_the_CVP_and_SWP.pdf

- The State Water Board should direct the controlling agency of each Central Valley rim dam to study the feasibility of fish passage for each dam that blocks the passage of listed salmonid species, similar to the NMFS Biological Opinion. In keeping with the funding recommendations of this report (See Strategic Goal #10) the costs should be borne by the dam operators since they are the main beneficiaries.
- Support the current potential plans to remove four dams on the Klamath River.
- Support the removal of other dams that block the passage of at-risk species and which have outlived their usefulness. This list includes at least the Englebright, Daguerre, Rindge, Matilija, and San Clemente dams.

STRATEGIC GOAL # 5: RETAIN COLD WATER FOR FISH IN RESERVOIRS FOR LATER DOWNSTREAM RELEASE.

Salmon, steelhead and trout need cold water for their existence. 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 damaging 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. 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.

State and federal agencies know what water levels are necessary to provide for fish in the fall. They should use the Precautionary Principle when balancing water deliveries for the year, allowing releases of water, but retaining enough to provide adequate water to support migrating, spawning and rearing fish. Absent this equity, two thirds of California's salmonid are doomed to extinction by the end of this century

Because of continued declines in the population of winter run Chinook salmon on the Sacramento River (Figure 4), the federal agencies listed them as endangered in 1990. Following the release of the recovery plan a year later, mandatory recovery actions began. One of these was to reserve water in Shasta reservoir for release later in the year to support the returning fish. A temperature curtain was installed on the dam in 1996 to allow better control of the temperature of released water. US Fish and Wildlife Service required water of 67 degrees (F) or lower to be maintained downstream to Red Bluff to provide for holding and spawning habitat. Similar requirements are needed on other main river systems.

THE RECOMMENDED ACTIONS to achieve this Strategic Goal are:

- Support and defend the NMFS Biological Opinion recommendations[49] for cold water releases on the Sacramento, American, and Stanislaus rivers.
- Mandate through regulations and legislation the retention of sufficient water in other major reservoirs to support fish populations in rivers below dams.

STRATEGIC GOAL # 6: *INTEGRATE FLOODPLAINS WITH RIVERS AND STREAMS.*

Floodplains benefit the people of California in numerous ways. Floodplains are extremely productive ecosystems that support high levels of biodiversity and provide valuable ecosystem services.[50] Studies have shown that healthy floodplains can have an extremely high monetary value due to these ecosystem services, which include flood attenuation, fisheries habitat, groundwater recharge, water filtration and recreation. However, to function properly, floodplains must, by definition, periodically flood.

The extent of functional floodplains in California has 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.

The way water moves through floodplains has been extensively modified by poorly planned land development and by the construction of levees, concrete channels and dams. This unfortunate combination has caused widespread decreases in water quality, loss of rivers and floodplains and estuary species; in many places flood risks have been severely increased. We have created a false sense of security and encouraged high-risk floodplain development that is jeopardizing the sustainability of many communities, economies and ecosystems. Low-

Figure 5

During an experiment comparing the growth of juvenile Chinook in floodplain and river habitats of the Cosumnes River, fish reared in the floodplain (right) grew faster than those reared in the river (left). T.R. Sommer et al. 2001.

Photo by Jeff Opperman; from Cosumnes River field study by Carson Jeffres

[49] 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.

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

income and communities of color are particularly at risk, as they represent a disproportionate share or residents in floodplains. The impacts on these communities are magnified because many are not homeowners, so receive limited emergency or long-term assistance when their homes are flooded.

Levees disconnect rivers from their floodplains and prevent natural flooding. Interconnectedness and periodic floods are an essential part of insuring a healthy watershed system. 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. (See Figure 5.[51]) Healthy floodplains typically improve water quality by providing natural purification in their adjacent or abutting wetlands. Additionally, the periodic flooding supplies floodplains with rich nutrients important to maintain productive agriculture lands. Rivers and floodplains must be connected where practical and allowed to interact in order to provide these valuable ecosystem and economic benefits.

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

[51] 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

THE RECOMMENDED ACTIONS to achieve this Strategic Goal are:

- Where possible, remove or at least set levees back from riverbanks to allow for floodwaters to expand into the floodplain.
- Where it is not possible to remove levees, they should at least be vegetated with native riparian vegetation to provide the maximum achievable ecosystems functions.
- Make the purchase of floodplains or flowage easements a top priority for flood control agencies and prevent new levees from being constructed and development in floodplains.
- Ensure 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.

STRATEGIC GOAL # 7: ELIMINATE CVP AND SWP WATER DELIVERIES TO IRRIGATE THE MOST DRAINAGE-IMPAIRED LANDS IN THE WESTERN SAN JOAQUIN VALLEY (WSJV), IMPROVE DRAINAGE MANAGEMENT ON OTHER LANDS, AND USE THE SAVED WATER FOR PROTECTION OF ENDANGERED DELTA SPECIES AND HABITATS.

Since the late 1960s and late 1970s, the State Water Project and Central Valley Project have been supplying water to approximately 1.3 million acres of drainage-impaired land on the west side of the San Joaquin Valley; we believe this is a clear violation of the State Constitution's prohibition against unreasonable use of

the state's water. Eliminating or reducing the irrigation of this land would save up to 3.9 million acre feet of water annually, in addition to the 4.69 to 13 million acre feet in overall urban and agricultural efficiency savings discussed under Goal #1.[52]

The western San Joaquin Valley is an ancient ocean bed. As the ancient bay muds and wetlands of the time dried up, minerals, metals and salts concentrated in the soils. Selenium, boron, molybdenum, mercury, arsenic and various other salts and minerals are highly concentrated in the soils of the Delta-Mendota Service Area and the San Luis Units of the CVP, as well as in 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."[53]

Irrigation of this land with water from the Delta adds enormous amounts of salts to the soils in the western San Joaquin Valley. The area receives an average of 4,000 tons of salts daily from irrigation water (the equivalent of 40 railroad cars); yet only 1,700 tons of salts leave the basin daily in runoff to the San Joaquin River. Plants take up irrigation water through evapotranspiration, leaving salt behind in the soil. To continue farming, up to 0.5 acre foot of water per acre must be added to the land to leach salts and boron out of the root zone in a process called "pre-irrigation." This process also mobilizes selenium, molybdenum, arsenic and other toxins that naturally occur in the soil. This "pre-irrigation" causes downward and lateral percolation of salty water toward open waterways like wetlands, the San Joaquin River, and its tributaries. The percolating water also collects above subsurface clay barriers, which underlie the western San Joaquin Valley, causing the water table to rise. Left unmanaged, salty water reaches the root zone and the land turns alkali. Once this happens, the land is no longer suitable for farming. In some areas of the valley, the clay barrier does not exist and contaminated drainage water percolates into aquifers that provide drinking water to many valley residents.

The San Luis Act of 1960 requires a drain system as a condition of approval of the San Luis Unit CVP contracts, which includes the Westlands Water District. Initially, the State of California and the Bureau of Reclamation planned to build a San Luis Master Drain to the Bay-Delta from these lands, but construction of the drain to the Delta was stopped after 93 miles were completed to the Kesterson Reservoir near Los Banos. 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 Bay Delta, it would take 65 to 300 years to eliminate the selenium already built up in valley groundwater.[54]

Farmers and water districts throughout the Western San Joaquin

[52] 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.

[53] 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.owue.water.ca.gov/docs/RainbowReportIntro.pdf

[54] 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/

Valley try to reduce their drainage water. Recycling, blending, drip irrigation and reuse are successful in some cases in reducing selenium, salt and other discharges. However, retiring these lands from irrigated agriculture remains by far the most cost-effective and reliable method to eliminate harmful drainage discharges to water bodies and aquifers. The Westlands Water District has already retired 100,000 acres. Any long-term solution to the west side's drainage problem must be centered on larger-scale 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 retirement will ultimately continue to store and concentrate selenium and salts in the shallow aquifers, where they may be mobilized by flood events or groundwater transport.

Taking much of 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 should also provide for mitigation for impacts to the farm labor community. Even if irrigation deliveries continue, these lands will ultimately go out of production because of drainage impairment, as pointed out in the previously mentioned "Rainbow Report." Unfortunately, under that scenario, it will be too late to avoid and mitigate the harm done to the environment and farm workers.

THE RECOMMENDED ACTIONS to achieve this Strategic Goal are:

- Promote findings by legislators, regulators and the courts that irrigation of the most drainage-problem lands is not in the public interest, unacceptable as the basis for water service contracts, and a "Wasteful and Unreasonable Use of Water" under the California Constitution.[55]
- Retire the majority of drainage-problem lands on the west side of the San Joaquin Valley from irrigated agriculture and use the saved CVP and SWP water to secure the Delta environment and support other reasonable and beneficial uses of water.
- Collaborate with the Environmental Justice Community to develop mitigation programs reducing impacts to farm workers and farm communities in affected areas. The mitigation measures should include developing potential employment alternatives in trade occupations working on residential, commercial, agricultural, and industrial water conservation, improving local drinking water quality and community water self-sufficiency, and solar related, wind energy, and other 'green' jobs.

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

STRATEGIC GOAL # 8: RESTORE SURFACE AND GROUNDWATER QUALITY SUFFICIENT TO SUPPORT BENEFICIAL USES.

California's Porter-Cologne Act of 1969 and the 1972 federal Clean Water Act both were enacted with the goal of restoring the quality of our water resources. These resources have been seriously degraded by over a century of heavy industry and agriculture, the indiscriminate extraction of natural resources, and the continued discharge of minimally treated or untreated sewage. Progress in reversing this degradation has been slow. While upgrades to wastewater treatment and discharge requirements for industrial polluters have improved water quality in many areas, the fact remains that almost 700 reaches of California waterways are still unable to support beneficial uses, including providing potable water supply and supporting ecosystem health.

Current water quality impairments attributable to humans, and to naturally occurring contaminants such as arsenic, among others, fall into the following categories;

- Legacy contaminants – the most prevalent is mercury, which leaches from abandoned gold and mercury mines in both the Sierras and the Coastal Range. In many cases, the state cannot identify a specific polluter who can be held accountable for cleanup.
- Industrial pollutants, such as perchlorate, PCE (percloroethylene) and MTBE.
- Agricultural pollutants, such as nutrients, leached salts, sediment and pesticides.
- Bacteria, heavy metals, sediment, petroleum byproducts and trash that are swept into waterways from sewage treatment plants and from the land during rainstorms.
- High temperatures due to timing and volume of upstream reservoir releases.

All of these contaminants have serious potential impacts on both human and ecosystem health. Among the problems are:

- High levels of mercury in waterways running through and from the Sierra and the Coastal Range affect not only fish, but also the bird and humans that consume them. Mercury in its methylated form is a potent neurotoxin that can impair brain and physical development, particularly in developing fetuses, infants, and small children.
- Industrial pollutants have contaminated groundwater supplies serving millions of California residents, including urban consumers in Santa Monica and San Fernando Valley and suburban customers in Rialto, Rancho Cordova, and the communities of Morgan Hill, San Martin, and Gilroy in the Bay Area as examples. These pollutants include perchlorate and trichloroethylene (TCE). Perchlorate is an endocrine disruptor that can lead to impaired brain development in children and thyroid disorders. TCE causes cancer, reproductive and developmental harm, and impairs the nervous and immune systems.
- Agricultural runoff has poisoned surface and groundwater supplies with nitrates and pesticides in rural communities. The problems are particularly severe in the San Joaquin Valley and Central Coast, where alternative water supplies are often not available, and treatment

costs are generally not affordable to the low-income residents. Pesticides, even in legal quantities, have been shown in numerous studies to injure and kill salmon.[56] Nitrates are known to cause Blue Baby Syndrome, and pesticides are linked to a variety of problems, including liver and kidney damage, respiratory distress, and developmental disorders.

- Highly saline runoff from farms in the San Joaquin Valley causes degradation of water supplies, including dangerous levels of selenium, which can be fatal to wildlife and vegetation and cause cardiovascular, developmental, kidney, and liver damage in humans. It is also associated with neurotoxicity, reproductive harm, respiratory toxicity, and skin sensitivity.
- Municipal wastewater containing antibiotics, hormone replacement and other endocrine mimicking chemicals, as well as antibacterial agents are not currently treated by municipal, industrial and agricultural sources; they have been shown to affect behavior, reproduction and survival of salmonid and other fishes.

These problems have contributed to ecosystem crashes in San Joaquin Valley rivers and the Delta, severe groundwater contamination in the San Joaquin Valley and Central Coast that impacts low-income rural communities, and ocean water quality challenges. Though state and federal laws already give regulators ample powers to improve water quality, this authority has not been exercised sufficiently to protect the health of the state's waterways or its residents.

THE RECOMMENDED ACTIONS to achieve this Strategic Goal are:

- The State Water Board should exercise its full legal authority under the Porter-Cologne Act to implement and enforce requirements on municipal wastewater discharges and agricultural-related discharges to both surface water and groundwater, such that affected waters throughout the state meet all water quality objectives by 2030.

- The State Water Board should incorporate the Delta water quality improvements identified in its Delta strategic plan into all waste discharge requirements and enforceable waivers of waste discharge requirements on any and all discharges that may impact those improvements.
- The State Water Board should develop, implement and enforce numeric standards for storm water discharges, including municipal discharges, to ensure that storm water discharges around the state conform to standards for release of

[56] National Marine Fisheries Service. 2009. Endangered Species Act Section 7 Consultation Biological Opinion Environmental Protection Agency Registration of Pesticides Containing Carbaryl, Carbofuran, and Methomyl. P. 481-483. http://www.epa.gov/espp/litstatus/effects/comments-2nd-draft.pdf.

sediment, pathogens, trash and other contaminants to protect the uses of affected waterways.

- In evaluating water rights, the State Board should consider impacts to water quality as a reason for curtailing water rights, and bundle water rights and water quality permits as needed to ensure that water is as clean or cleaner when returned to public use as it was when diverted.
- The State Board should enforce water quality objectives for salinity in the San Joaquin Valley, requiring land retirement of impaired lands as needed to ensure that the objectives are met by 2020. See Strategic Goal #7.
- Research on antibiotics and endocrine disruptors should be funded, with focus on source reduction, remediation and/or extraction of these aquatic toxins prior to discharge in waterways.
- The State should assess fees on common water pollutants (such as nitrogen fertilizer) to pay for user education and treatment of contaminated water supplies, prioritizing communities that lack safe drinking water.
- Assess fees on identified dischargers in order to restore degraded habitat, and treat or replace contaminated surface or groundwater supplies used as drinking water sources.
- State Water Board and Department of Public health should develop a coordinated source water protection program that prioritizes protection of drinking water sources, and makes both point source and nonpoint source dischargers responsible for mitigating the impacts of their operations on drinking water sources and the environment.

STRATEGIC GOAL # 9: MAXIMIZE REGIONAL WATER SELF-SUFFICIENCY TO INCLUDE WATER FOR THE ENVIRONMENT.

The imperative for water conservation in California has been defined by the three droughts of 1977-78, 1986-1991 and 2007-2009. Each has given us a window into the future. Through these droughts we have proven that water can be saved across urban California using the basics of conservation and reclamation while maintaining a flat demand in the face of population increases. Another definition of conservation comes from the 14 Best Management Practices (BMPs) developed by the California Urban Water Conservation Council. While considered the floor and not the ceiling, there are now almost 400 municipal and business signatories to the BMP's.[57] Despite these efforts, the California Supreme Court's Mono Lake decision resulted in the only instance in California where water saved through conservation has directly offset the export of water.

Energy conservation, by comparison, has been mainstreamed into controlling demand (called "demand side programming") while many water agencies still consider water conservation merely a public relations program. Large wholesale organizations like the Metropolitan Water District of Southern California have budgets for conservation but the full amount of those

[57] California Urban Water Conservation Council
List of Signatories to the
Memorandum of Understanding as of 7/2009.
http://bmp.cuwcc.org/bmp/summaries/public/signatories.lasso

budgets often goes unused. The most successful conservation program in the state was accomplished by the Los Angeles Department of Water and Power; as a result of litigation by environmental organizations, was implemented in partnership with environmental groups, including the Mono Lake Committee and community based and environmental justice organizations. Almost two million high-flow old-fashioned toilets were replaced with ultra-low flow toilets with the assistance of these community based environmental justice groups. This is a pattern that can be replicated throughout the state.

Water agencies should invest in these programs on an ongoing basis. With questionable bond funding due to California's recurring budget problems, funding for approximately fifty water conservation programs across the state is currently stalled. A simple strategy would be to set aside 5 percent of the proceeds from water sales for conservation and community groups to achieve conservation goals and objectives. In the Mono Lake case, water taken from the eastern Sierra was reduced by 30 percent but was offset by aggressive conservation measures maintained over a long period of time even as population in southern California increased.[58] The potential for significant savings through urban water conservation with off-the-shelf cost-effective measures and returning that water to the environment for fish and recharge has never been more necessary and apparent (See Strategic Goal #1). The impact of more severe drought and flood cycles brought about by climate change will only increase the need for such programs.

Although guidelines for the use of recycled water have been developed recently by the State Water Board, water agencies today dump more than 4 million acre feet of wastewater into the ocean while recycling only a tiny percentage. And in major cities like Sacramento and Fresno, where per capita water use is well above statewide urban averages, the use of water meters – which has been proven to reduce demand by approximately 30 percent – will not be required until the year 2025. The time period for this requirement needs to be expedited.

Conservation to promote regional self-sufficiency can include a portfolio of local untapped water resources. This portfolio includes capturing and treating storm water and urban runoff, water reclamation, and maximizing conservation, as described in Strategic Goal #1.

Rainwater catchment (cisterns) and accessible graywater systems are common in the rest of the world and the equipment is readily obtainable in local hardware stores in Arizona. During the long drought of 1986-1992, such systems were used on an emergency basis in Santa Barbara and were tested in Los Angeles but are still not available statewide. Given opportunities, incentives, and clear rationales from state leaders for regional self-sufficiency, water conservation can take its place among the array of green economy initiatives that will save water and create jobs; there is no doubt Californians want that conserved water to be used to benefit the environment, to remain local, and not to be used to support new development.

[58] Dorothy Green, *Managing Water: Avoiding Crisis in California*, Berkeley, CA: University of California Press, 2007, Figures 37 and 38, pp. 168-169.

Finally, while water rights are an effective way to allocate water for human use, there are no parallel water rights for ecosystems. This means that ecosystems do not have a seat at the table when adjudications or other water rights evaluations take place. The ecosystems' needs are addressed only indirectly, through such methods as conditions in permits, requirements to prevent "waste and unreasonable use," and the Public Trust doctrine. None of these otherwise important tools have been enforced in any meaningful way, in part because they are not on par with actual water rights. As a result, ecosystem water needs are consistently relegated to a secondary role in state water planning. The price of this lowly status is that ecosystems and their non-human inhabitants are at the brink of collapse. Water rights for ecosystems, with water supplied by conservation and other measures, will better ensure long-term ecosystem health.

THE RECOMMENDED ACTIONS to achieve this Strategic Goal are:

- The use of urban water meters and strongly tiered water rates should to be mandated statewide and within a reasonably expedited time frame.
- Water districts should be required to invest at least 5 percent of proceeds from water sales toward conservation programs.
- Water budgets and their associated portfolio of conservation goals should be legislatively mandated for all water districts, to take effect within 5 years. These portfolios must include requirements for equipment retrofit on resale, water neutral development, recycling, local storm water capture and groundwater cleanup.
- Water budgets for all water districts must include provisions for providing green jobs for community and environmental justice groups and for economic development as a part of their conservation programs.
- A standard method for establishing how conserved and recycled water will offset water diversions and extractions and will benefit the environment should be developed, either through the State Water Board or the Department of Water Resources.
- Designate formal water rights to the environment to ensure the health of ecosystems before they become endangered, starting with water rights necessary for healthy fish populations.

STRATEGIC GOAL # 10: FUND SUSTAINABLE ENVIRONMENTAL AGENCIES, WATERSHED RESTORATION, AND SCIENCE WITH END-USER FEES.

There seems to be near unanimity among Californians that significant investments in water projects will be required for the future and that the identification of sufficient sources of funding is likely to be a critical hurdle. Without adequate financing, no major new projects will proceed, and ongoing operations will continue to struggle with unfunded mandates and inadequate enforcement budgets.

There are numerous funding sources for both regional and local infrastructure and for water management projects. The funding sources typically include:

- General obligation bonds – which are voter approved bonds paid for from the state budget.
- Revenue bonds – which are paid for from a designated revenue stream and do not require voter approval.
- User fees – usually used at local levels to cover water district operations. They are frequently used to repay bonds issued at the local level.
- Property taxes – frequently used by flood control districts or local water district operators.

The costs of operating state and federal agencies involved in water management, such as the Department of Water Resources and the Department of Fish and Game, are usually derived from a combination of general budget funds and user fees. Examples of these fees are the contract payments of water districts for the use of water from the Central Valley Project or the State Water Project and fishing license revenue provided to the Department of Fish and Game.

Two important trends have been occurring during the last decade:

- Most of the recent voter approved general obligation bonds have been for water management projects such as water quality and drinking water, habitat restoration and land conservation, instead of major infrastructure projects. Since 2000, state voters have approved general obligation water bonds totaling $19.6 billion.
- Legislators and water managers have begun to adopt a "Beneficiary Pays" principle, where those who directly benefit from them pay the costs of water programs. The principle, besides assigning the costs of a project to the appropriate entity, also encourages the efficient use of water supplies and practical, cost beneficial implementations.

Different geographic areas and different economic sectors of California will benefit to different degrees from water supplies derived from restored rivers or a restored Delta. To the maximum extent feasible, all costs of projects should be borne by project beneficiaries, and costs should not be shifted to groups that do not benefit. History is clear: most of the environmental conflicts in the U.S. have occurred when the costs and benefits of projects are geographically or socially separate. There are certain types of investments likely to be required for which the benefits are public in nature, and these can justifiably be financed with public funds. However, any new costs required to offset impacts from existing facilities (e.g. fish ladders, salinity barriers, etc.) should be borne by the beneficiaries of the original facilities.

The Delta deserves special mention. We believe that the costs of fixing the Delta that are related to existing water delivery systems, including related costs of environmental mitigation and restoration, should be financed by the agencies that deliver water and ultimately should be passed on to their retail customers. There is an obvious distinction between water agencies whose supplies are derived from Delta diversions and agencies whose supplies are diverted upstream of the Delta. In the actions recommended below we refer to "water export agencies" and a "broad-based water use fee" to distinguish the different recommended funding responsibilities for these categories. In both cases, we recommend that fees collected be proportional to the volume of water diverted.

THE RECOMMENDED ACTIONS to achieve this Strategic Goal are**:**

- Funding for both the State Water Resources Control Board and the Department of Fish and Game should be significantly enhanced in order for them to accomplish adequate research, monitoring and compliance activities. In its budget analysis in 2008, the Legislative Analyst's Office recommended a new fee for all water users to pay for water board programs, suggesting that a fee of less than $10 on every water utility hookup in the state would raise nearly $20 million for the boards. We concur with this recommendation as well as a similar fee based approach for the Department of Fish and Game.
- Cost responsibilities for land acquisition and restoration of river and Delta floodplains should be distributed 75 percent through a broad-based water use fee (applied to all agencies whose supplies are diverted from a river or the Delta watershed.) and 25 percent through public funds. This split is based on the fact that most habitat and floodplain loss has occurred as a result of water supply development.
- Agencies that divert water from the Delta should pay their fair share of maintaining and replacing the Delta levees on which they depend and for protecting 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 to ensuring uninterrupted diversions.
- Local agencies should pay the full cost of any programs or projects that provide water supply to their customers. This principle applies to water conservation programs and reclamation projects, as well as any storage and conveyance projects. Mitigation costs, on-going monitoring, and adaptive management must be included in the cost of the project and paid by the beneficiary.

- Operating and staffing costs for water management operations within the Delta should be financed by a combination of those who divert water before it gets to the Delta and those who divert water from the Delta.
- Scientific research and analysis costs related to river and in-Delta water quality, hydrodynamics and fisheries should be financed by agencies that divert water. A broad-based water use fee should finance studies related to environmental performance upstream of the Delta. It may be appropriate to use public funds to finance some aspects of Delta-related research, such as the potential to sequester carbon on Delta islands to offset the effects of global warming.
- Water diversion and export agencies will be the chief beneficiaries of emergency actions taken to manage a catastrophic river flood or failure of the Delta and should therefore pay the majority of costs associated with emergency responses. We recommend that water export agencies provide 75 percent of the associated cost, with public funds providing the remaining 25 percent of the cost**.**
- Agencies that benefit from any new conveyance facility should pay the full cost of the facility, including mitigation costs.
- The Delta Blue Ribbon Task Force has recommended the development of new storage facilities. While we disagree with the need for many of the currently proposed facilities, we believe that new storage for water supply should be pursued only if the water agencies that would benefit are willing to pay the full cost, including environmental mitigation, and if net new water supply can be demonstrated without causing more harm to the Delta.
- Some recent proposals have suggested that new storage might be developed and managed to enhance environmental flows when they are needed most. While we are skeptical that storage would indeed be built and operated for such environmental benefits, we believe that the purpose of any such project would be to mitigate for already-developed projects that are presently diverting more natural flow from the watershed than is sustainable. Accordingly, we recommend that if such projects are to be considered, a broad-based water use fee should finance them.

WATER TRANSFERS.

In general, a water transfer is the sale of a specific amount of water from a user who has more water than they plan to use to a buyer who wants to use more water than they have entitlement to. The sale of water from a willing seller to a willing buyer can be for a short term – usually one year – or for a period of time longer than a year. Water sales, or "water transfers" as they are referred to by water agencies, can be between users within a single water district or between users in different parts of the state, depending on the ability to move the water between locations.

As the water transfer market has developed, numerous concerns have been raised, especially in counties north of the Delta that traditionally have generous water entitlements. These concerns include the need to protect communities of origin from excessive diversion and the desire to avoid the

degradation of groundwater basins that support fisheries, family farms and communities. Concerns also arise when transferring agencies attempt to circumvent environmental regulations and bypass CEQA and NEPA requirements that clearly apply in some transfers. Significant North-to-South water transfers through the Bay Delta can increase Delta pumping pressures, which have been shown to have detrimental effects. In addition, it is essential in all cases to protect the public trust and reasonable use doctrines of the State Constitution when planning water transfers.

On the more favorable side, water transfers have been shown in some cases to have significant environmental benefits. Transfers can increase the efficiency with which water supplies are used on both farms and in cities. Transfers have particular utility in droughts as they can move water to areas that are experiencing water shortages and can be available to the user as long as it is economically sustainable. Appropriately used, water transfers provide access to water for businesses that can effectively use additional supplies even though transfers do not increase the overall amount of water supply available for consumptive uses. While both short and long-term transfer activities have increased in recent years, there remains significant untapped potential for transfers to play a larger role in meeting water supply needs statewide. Appropriately used, water transfers can lessen the pressure to construct more surface storage facilities.

Another consideration is the potential impact that northern California Indian Tribes' water and fishing rights, when recognized, could have on north-south water transfers. For example, fishing rights held by the Hoopa Valley Tribe were an important consideration in the Trinity River Record of Decision. These kinds of Indian rights have played a significant role in water policy decisions in other parts of the country - primarily in the West. In California several Tribes with well-established fishing rights, such as the Hoopa and Yurok Tribes continue to affect water policy decisions as the federal government has a trust obligation to protect their fisheries resources. Many other Tribes are yet to assert aboriginal fishing and water rights. As these Tribes develop the infrastructure and expertise necessary to exert their rights and demand that the federal government fulfill Tribal Trust obligations by protecting fisheries, water transfers could be dramatically affected.

Environmental Water Caucus organizations are in agreement on the following points:

- The Public Trust and reasonable use doctrines, as covered in the State Constitution, must be upheld as well as protection of communities of origin from excessive diversion and to prevent the permanent conversion of farmland. Transfer activity must not prevent any California resident from receiving a reasonable supply of high quality water for indoor household use at an affordable price.
- Transfers from the agricultural sector should prioritize increased irrigation efficiency over permanent fallowing so that the agricultural economy will continue to thrive and farmland will be preserved.
- Independent third parties must monitor surface water transfers so that groundwater is not substituted, causing inappropriate draw down of aquifers. The risk of depleted groundwater aquifers as a result of water sales is too great.
- All third party impacts must be considered, compensated and weighed

against the third party benefits. These include: business declines as a result of farmland fallowing; potential degradation to local streams, overall economic impact to the area; and impact on urban supplies.

- Significant water transfers, especially North-to-South, must comply with CEQA and NEPA requirements. These environmental requirements cannot be bypassed for “emergencies.”

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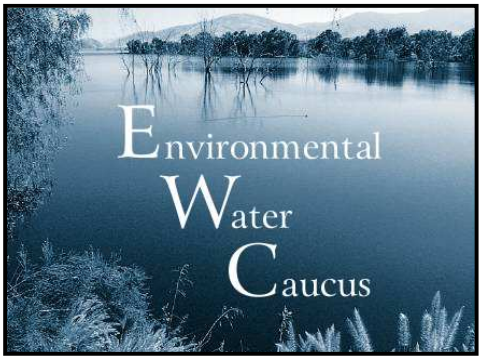
ENVIRONMENTAL WATER CAUCUS (EWC)

The mission of the Environmental Water Caucus is to facilitate the involvement of environmental, civic, recreational, and commercial fishing organizations in the restoration of the Bay-Delta ecosystem and its fisheries and in the implementation of environmentally and economically sound water policies throughout California.

These listed EWC organizations support the concepts and directions recommended in this report.

Butte Environmental Council
California Coastkeeper Alliance
California Save Our Streams Council
California Sportfishing Protection Alliance
California Striped Bass Association
California Trout
California Water Impact Network (C-WIN)
Clean Water Action
Desal Response Group
Environmental Justice Coalition for Water
Foothill Conservancy
Friends of the River
Friends of Trinity River
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
Santa Clara County Creeks Coalition
Sierra Club California
Southern California Watershed Alliance
The Bay Institute
Winnemem Wintu Tribe



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