CALIFORNIA WATER SOLUTIONS NOW

A Report
From Member Organizations of the
ENVIRONMENTAL WATER CAUCUS

Third Edition, 2011

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, 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 and recreational 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 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 population growth of almost 30,000,000 people. According to the California Water Plan Update 2009 and Department of Finance projections, the state's population can be expected to increase by 22,000,000 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 quality and quantity 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.

Perhaps the major influencing factor in future California water solutions will be the impact of global climate change. Based on the scientific information available, the natural limits of our water supply will become more obvious, the economics of water policies will change significantly, and our ability to provide sustainable water solutions for all Californians will become more challenging. Unless we manage our water more efficiently and account for the current and future effects of global climate change, the costs of providing reliable water to all users will overwhelm our ability to provide it.

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 including supporting data, followed by a set of Recommended Actions. 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. Reorient water transfers to be more sustainable and logical.
4. Restore instream flows, volumes and patterns for aquatic ecosystems.

5. Provide fish passage above and below dams for all at-risk salmonid species.
6. Retain cold water for fish in reservoirs for later downstream release.
7. Integrate floodplains with rivers and streams.
8. Eliminate State and Federal water deliveries that irrigate drainage-impaired farmlands in the western San Joaquin Valley.
9. Restore surface and groundwater quality.
10. Maximize regional water self-sufficiency to include water for the environment.
11. Fund sustainable environmental agencies, watershed restoration and science with end-user fees.

A sampling of the report's recommendations include implementing:

- Aggressive statewide water conservation targets that are more comprehensive than the Governor's current 20 percent urban reduction mandate;
- Measures that provide adequate water for all Californians and preclude the need for major new surface storage projects or the currently proposed Peripheral Canal;
- A significant reduction of water exports from the Sacramento-San Joaquin Delta to no more than 3 million acre-feet annually in all types of water years in order to protect this valuable resource and its ecosystems;
- Significant improvements to our valuable river habitats;
- Elimination of water supplies to irrigate impaired farmlands;
- Improvements in water quality;
- Regional self-reliance, and;
- Improved funding for state environmental agencies.

We have adopted four key drivers that frame the recommendations and arguments in this report. They are: Sustainability, Economics, Natural Limits and the Human Right to Water. Each of the Strategic Goals addresses one or more of these drivers.

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 and river ecosystems. 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: climate change, periodic drought, environmental justice, the preservation of cultural traditions by Native Americans, the precautionary principle, and population pressures. They are covered in this preface to avoid repetition in each of the individual report goals.

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. 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 more effective uses of water in place permanently. The Governor's

[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.

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 handle future drought conditions reasonably.

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, water moving south through the California Aqueduct and the Delta Mendota Canal flow past small valley towns that lack adequate or healthy water supplies. We know that 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' diets.
- 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 services, 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 conversion.
- 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.

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

- 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 and their cultural 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.

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 implicit 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. In each of the data sources utilized in this report, population increases have been factored into the conclusions, unless otherwise noted.

[8] A. I. Schafer, S. Beder. Role of the precautionary principle in water recycling. University of Wollongong. 2006. 1.1.

[9] California Department of Finance, Demographic Research Unit. 2009. Table 1. http://www.dof.ca.gov/research/demographic/reports/#projections.

CALIFORNIA WATER SOLUTIONS NOW

STRATEGIC GOALS AND RECOMMENDED ACTIONS

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

BACKGROUND

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.[10] 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 and drainage-impaired lands 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.

CONSERVATION AND WATER EFFICIENCY

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), by recent research, and by actual experience in urban areas and farms.

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

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.[11] According to the 2009 State Water Plan, total urban water demand can be reduced by 2.1 million acre-feet with these measures.[12] 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).[13] 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 (discussed in Strategic Goal #10) 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 2.1 million acre-feet reduction 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 (CVP) water, which will drive some of the efficiencies shown in Figure 1. Demand reduction of as much as 5 million acre-feet per year could be achieved by 2030, according to Pacific Institute's *California Water 2030: An Efficient Future* report.[19]
- 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 2009 State Water Plan indicates a figure of 2.25 million acre-feet that could be recovered. The LAEDC report shows recycled water costs $1,000 per acre-foot.

[11] 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.

[12] California Department of Water Resources. Update 2009. California Water Plan Update. Bulletin 160-09. V-2, P3-23. http://www.waterplan.water.ca.gov/docs/cwpu2009/0310final/v2c03_urbwtruse_cwp2009.pdf.

[13] 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.

- 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 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.[14] 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.[15] 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.[16]

Based on data from the State Water Plan (Bulletins 160-05 and 160-09),[17] the Planning and Conservation League (PCL)[18] and the Pacific Institute,[19] the savings that can be achieved from these efficiency scenarios are estimated to be 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.

The urban water savings of approximately 5 million acre-feet a year (when including recycled municipal water and part of the groundwater storage) shown in Figure 1 is enough water to support a population growth of almost 30,000,000 people. According to the California Water Plan Update 2009, the state's population can be expected to increase

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[14] 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.

[15] 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.

[16] 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

[17] 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

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

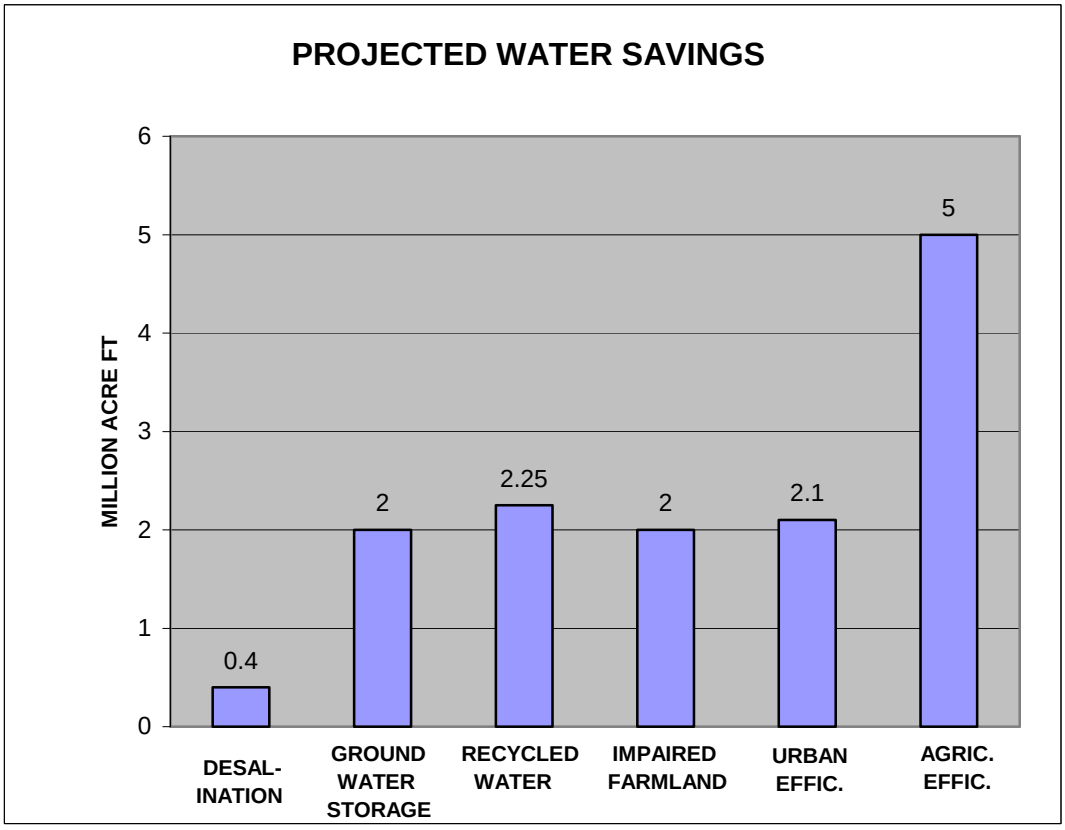
[19] Pacific Institute. 2005. California Water 2030: An Efficient Future. ES-2.
http://www.pacinst.org/reports/california_water_2030/ca_water_2030.pdf

by 22,000,000 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 current supplies and with an aggressive water conservation program.

IMPLEMENTATION

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 #4.

Figure 1



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.[20] As applied to water policy, a Loading Order system would require demand reductions through improved water efficiency to be the first priority in addressing water supply, the second priority would be developing alternative sources including water recycling, groundwater clean up and conjunctive use programs, 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.[21] 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 the Loading Order. According to the Los Angeles County Economic Development Corporation (LAEDC) report,[22] 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*,[23] while providing less total annual yield than most alternatives. Statewide, the costs of all of these efficiency measures will in all probability not exceed the potential $78 billion price tag for the various Peripheral Canal and new surface storage proposals.[24] For all of these reasons – as well as the historically ecosystem damaging impacts of major dams (see Strategic Goals #4 and #5) – 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 would also be illegal because of its impact on the Wild River status of the McCloud River and its damaging impact on Winnemen Wintu sacred areas.

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[20] 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.

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

[22] 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.

[23] 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.

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

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 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 level of supply enhancements and demand reductions called for in this report. This measure can be accomplished with little additional cost to the state by utilizing some of the existing 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 other health and safety programs that are sponsored and publicized by the state. The program must ensure the equitable distribution of conservation investments among rural and low income communities.
- Adopt the Natural Resources Defense Council's recommendations to the Delta Vision Commission regarding 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. In addition, such a charge should be used to establish a statewide lifeline rate for water, in line with lifeline rates developed by the California Public Utilities Commission for energy and telephone services.
    - Standardize and increase the evaluation and monitoring of water efficiency programs to ensure the delivery of savings and benefits.
- Reduce average per capita urban water use to 150 gallons per day, with steeply tiered rates beyond that rate of consumption. Increase urban water conservation goals from a 20 percent per capita reduction in water use to a figure that is closer

to the 40 percent shown in Figure 1. Require that this level of reduction be built into the water budgets of all state urban water districts. 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, although the plans do not call for the level of reductions called for in this report.

- Require implementation of specific water use reduction targets by agricultural water users rather than merely the "best management practices" contained in recent water policy legislation (SB7).
- Oppose the construction of Sites and Temperance Flat Reservoirs and the raising of Shasta Dam, as well as the funding for these and other dams as well as any bond funding that includes major surface reservoirs.
- 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 contracts to reflect a repayment schedule for agricultural users that will meet legal requirements and reduce indirect water subsidies to CVP contractors.
- Improve the groundwater monitoring program recently enacted by the Legislature by providing DWR with fee authority to properly collect and assess data and to assist county-mandated enforcement efforts. Fees should be assessed on groundwater extractions by volume, with exemptions or fee reductions for small volume extractions (small water systems) or for adjudicated or other aquifers that already provide the required information to the state.
- 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]

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 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

[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.

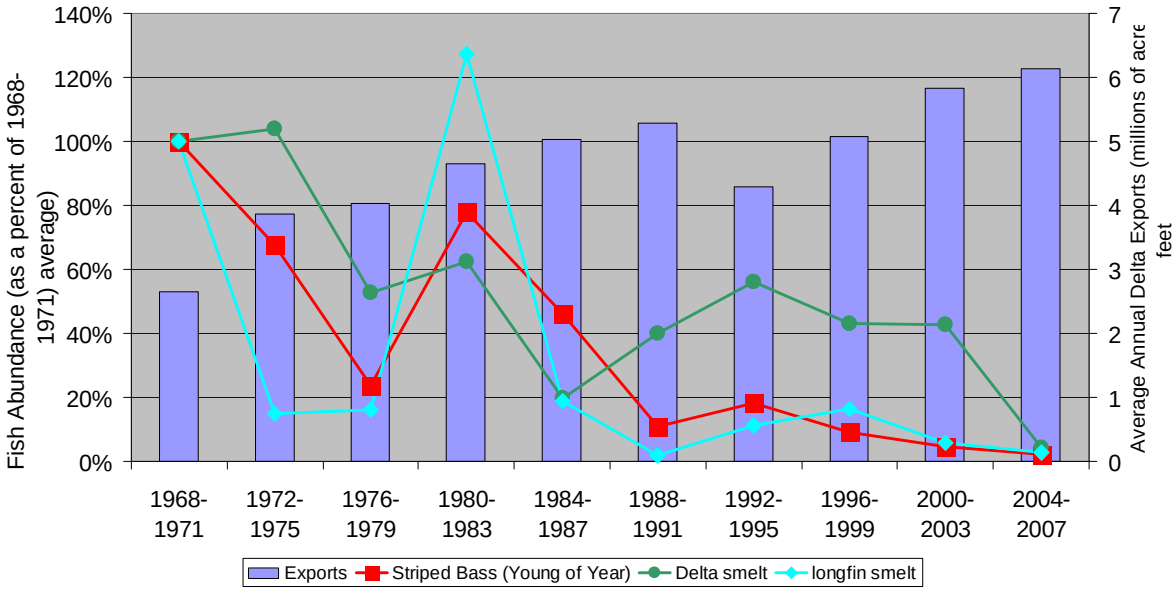
Service June 4, 2009 Biological Opinion on Central Valley Project (CVP) and State Water Project (SWP) Operations, the State Water Resources Control Board's Bay-Delta Water Quality Control Plan and Water Rights Decision 1641; the CALFED Bay-Delta Program's 2000 Ecosystem Restoration Program Plan; and the Central Valley Project Improvement Act's Anadromous Fish Restoration Program.

The guidelines of the Fish and Wildlife Service's Biological Opinion require reduced pumping 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 long-term decline of the Delta smelt coincides with large increases in freshwater exports out of the Delta by the state and federally operated water projects, (Figure 2). CALFED's Ecosystem Restoration Program reminds us that "the more water left in the system (i.e., that which flows through the Delta into Suisun Bay and eventually the ocean), the greater the health of the estuary overall; there is no such thing as 'too much water' for the environment." [27]

Figure 2

Historic Delta Exports and Estuarine Fish Populations



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

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

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

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

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.

Delta smelt are an indicator of the health of the entire Delta ecosystem, and they 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. Permits issed to both the federal CVP and the SWP and existing law requires those projects to operate without harm to listed threatened and endangered species. Figure 2 shows that fisheries were in good health when pumping for these projects was between 2 and 3 million acre-feet per year and demonstrates that the projects have been out of compliance for decades. Figure 7 (shown in Strategic Goal #5) shows the same kinds of declines for Sacramento River Chinook salmon.

The SWP has never been able to develop or deliver all the water supplies on which its export programs and original contracts were based. The contracts overstate the amount of water that can be delivered by a factor of at least four times. Basing deliveries on these unsustainable contract commitments not only results in consistently high levels of export pumping but also creates unrealistic expectations in the water user community that inevitability fuel attacks on environmental and water quality protections.

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 CVP and SWP contract holders in most years. Recent court-ordered water export limits 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 contracted water supply each year, especially in view of the collapse of the Delta's fisheries and the impacts of climate change.

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

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[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.

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 is initiated. The utilities present only one voice in this 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 new Delta water supply realities, which include: permanent reductions in Delta exports; more self reliance by southern California urban areas; and reduced pumping for drainage-impaired lands in the San Joaquin and Tulare Lake Basin (See Goal #8).

Changing the infrastructure will not solve the problem of a shrinking Delta water supply. A vigorous debate is now underway over whether a new isolated conveyance facility to move water around the Delta should be constructed – a revised version of the Peripheral Canal. Even those who support a new facility (and dual conveyance) as a solution to improve environmental conditions and water supply reliability, including the Public Policy Institute,[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,[32] the version of the Peripheral Canal now under consideration would have the capacity to export up to 15,000 cubic feet of water per second (112,000 gallons per second) from a series of five massive intake structures 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.

Diverting Sacramento River flows for export without significantly increasing the amount of fresh water flow dedicated to reaching San Francisco Bay will only degrade

[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

[32] Bay Development Conservation Plan. http://www.baydeltaconservationplan.com/CurrentDocumentsLibrary/Chapter_3_Conservation_Strategy_Combined_v2.pdf

water quality and habitat conditions and aggravate the negative impact on Delta smelt, salmonid and other native fish populations. On the other hand, a future scenario that places less emphasis on the Delta as a water supplier (See Strategic Goals #3 and #10) and allows more water to be left instream, can dramatically reduce the environmental and water quality effects of exporting water – whether through or around the Delta.

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

REVERSE FLOWS

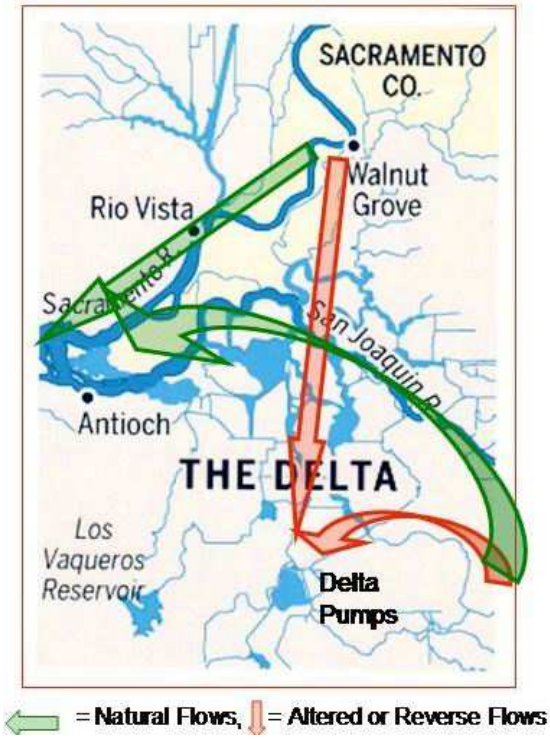
The powerful pumping plants in the southern Delta have a major detrimental effect on stream flow in the Delta, the San Joaquin River and on Delta smelt and other fish populations, including juvenile salmon. During the December-through-Spring time period in most years, the Delta pumps actually reverse 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 those fish trying to pass up or downstream, exposing them to less favorable habitat conditions, and causing many of them to be destroyed by the pumps.[33] 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 and the significant impacts these flows have on the estuary's fisheries.

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 beneficial habitat and water quality conditions downstream of the Delta.

[33] 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

Figure 3 Flows in the Delta



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

Over time, annual Delta outflows have been reduced on average by one half,[34] 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 percent of upstream water is diverted annually before reaching the Delta.[35] 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.

Over the years, a number of processes have identified the need to dramatically improve outflows in order to recover listed species to a sustainable level and restore ecosystems in the Bay-Delta. From 1988, when the State Water Resources Control Board (SWRCB) proposed – but withdrew without public discussion – standards that would have required an average increase in outflow of 1.5 million acre-feet over the lower diversion levels of the period before the late 1980s, to 2009, when the California Legislature adopted a new policy of reducing reliance on the Delta for water supply uses, the need for greater outflow and reduced exports has been acknowledged – but not

[34] CALFED Ecosystem Restoration Program. 2008. Stage 2 Implementation Draft. P. 21. http://www.delta.dfg.ca.gov/erp/reports_docs.asp
[35] CALFED Ecosystem Restoration Program. 2008. Stage 2 Implementation Draft. P. 20. http://www.delta.dfg.ca.gov/erp/reports_docs.asp

achieved. In 2010, the State Board is required to develop flow criteria that will fully protect public trust resources in the Delta. In all these years, no information has been developed that would contradict the Board's 1992 draft finding that maximum Delta pumping in wet years should not exceed 2.65 million acre-feet in order to provide the necessary outflows to protect fish and the Bay-Delta ecosystems.[36] The rebuttable presumption, consistent with the evidence of the last two decades and with the new state policy to reduce Delta water supply reliance, is that a total export number of no more than 3 million acre-feet in all water year types is prudent. The EWC organizations believe that a number at or near this level should now used by the state and federal governments in planning and permitting future Delta export operations – with or without a Peripheral Canal – in order to promote the recovery of the Delta's ecology and its fishery resources and to provide healthy Delta outflows to San Pablo and San Francisco Bays.

THE RECOMMENDED ACTIONS to achieve this Strategic Goal are:

- Using an approach similar to the one California has adopted to reduce carbon emissions, the Governor and the state legislature should set a long-term policy goal of reducing north-to-south water transfers through the Delta by 50 percent. This goal would require the State Water Project and the Central Valley Project to put in place a joint long-range strategy to reduce total annual Delta pumping to a combined maximum limit of no more than 3 million acre-feet in all types of water years. In the interim, all federal and state environmental impact reports related to Delta water usage should address a 2.65 to 3 million acre-feet per year pumping maximum as one of the alternatives to be considered, per National Environmental Protection Act (NEPA) and California Environmental Quality Act (CEQA) requirements.
- The State of California and the federal government should prioritize their efforts on actions that would reduce Delta exports to the level recommended in this report, as a precursor to and prerequisite for considering any changes to Delta infrastructure, including but not limited to a Delta Peripheral Canal
- The state should withdraw its support for challenges to the Delta export restrictions contained in the US Fish and Wildlife Service Biological Opinion for Delta smelt[37] and the export reductions called for in the National Marine Fisheries Service Biological Opinion on CVP and SWP operations, and instead defend these essential protections.[38]
- The Department of Water Resources and the U.S. Bureau of Reclamation should reassess and modify all long-term water service contracts to reflect reduced levels

[36] California Department of Fish and Game. 1992. Testimony on the Sacramento-San Joaquin Estuary to SWRCB Hearings on Bay Delta Water Quality Hearings. Page 11.

[37] 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.

[38] 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.

of export through the Delta, in keeping with the pumping levels prescribed by the recent Biological Opinions and the recommendations of this report.

- The State Water Resources Control Board should revise the Bay-Delta Water Quality Control Plan to increase inflows and outflows and improve in-Delta hydrodynamics to better reflect the flow amounts and patterns of the decades prior to the late 1980s, when export pumping began to hit record highs. These revisions should incorporate the recommendations submitted in the current public trust flow criteria proceedings from the Bay Institute et al., CSPA, C-WIN, and other EWC members regarding flows necessary to address:
    - Delta fish species abundance
    - Habitat improvements
    - Ecological processes (outflows)
    - Fish kill limits
    - Water quality
- The State Water Resources Control Board should subsequently and expeditiously issue a new water rights decision requiring all inter-regional water projects (SWP, CVP, SFPUC, 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[39] and the "Area of Origin" protections for the Delta and the headwaters regions of the state.
- 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.

STRATEGIC GOAL #3: REORIENT STATE WATER TRANSFERS INTO A MORE LOGICAL AND SUSTAINABLE APPROACH.

Water transfers through the Sacramento-San Joaquin Delta – which include individual water sales transactions, Article 21 State Water Project pumping and the pumping of the Central Valley and the State Water Projects' contracts – play a significant role in the movement and transfer of water throughout the state and have significant impacts on the ecology of the Delta. The two latter projects provide the largest percentage of transfers through the Delta while water sales and Article 21 pumping in some years is significant. Figure 2 shows the combined annual totals all of these categories of pumping. While enabling the growth of the agricultural industry in the San Joaquin Valley and the development of urban areas south of the Delta, water transfers are not without serious downsides.

As can be seen in Figure 2, since the inception of the Central Valley Project pumping in the 1940s and the State Water Project pumping in 1968, the rate of water transferred from northern California rivers to south-of-Delta water users has continued to

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

escalate and exceeded 6 million acre-feet annually during 2003 to 2006 – a rate which has contributed to the Bay-Delta's current state of ecosystem and species crisis. The two previously referenced federal biological opinions verified that hydrological changes caused by the combined operations of CVP and SWP pumping through the Delta are a major cause of habitat degradation and species decline. Pumping levels have been decreased as a partial solution for the stressed ecosystems and fisheries. In the drought years of 2007-09, water export reductions due to Endangered Species Act protections have represented about 15 percent of the total reductions.

It is obvious that a new paradigm is required that would simultaneously reduce the transfer pumping through the Delta to a level that maintains a healthy ecosystem while providing more logical and reliable sources of water for south-of-Delta water users. Instead of continuing to move extraordinary amounts of water through the Delta – with its impacts on fish and wildlife species, water quality, ecosystem conditions, and flow volumes and directions – south-of-Delta water users could obtain significant amounts of water from localized south-of-Delta sources in the San Joaquin Valley region. This type of move toward regional self-sufficiency has been a large component of the two most recent State Water Plans (Bulletin 160).

A more favorable scenario than the present excessive north-to-south Delta pumping consists of the following changes in supply orientation:

1. San Joaquin Valley water users could be reoriented to providing southern Sierra water to south-of-Delta water users through new interties with existing infrastructure. This is especially true for the movement of agricultural water from the east side of the San Joaquin Valley – where agricultural water use is relatively inefficient – to west side agriculture where the water use is much more efficient. If east side agriculture could obtain the same levels of efficiency as west side farmers, the amounts of water saved and available for use on the west side would be significant. Although politically difficult, this is an elegantly simple and effective solution for south-of-Delta agriculture users and for all of California.
2. Supplies for the Metropolitan Water District and other south-of- Delta users could be sourced from the natural reservoir that is Tulare Lake by allowing flows from the Kern, Kings, Kaweah and Tule Rivers to flow into the Tulare basin. This option is being advocated by the San Joaquin Valley Leadership Forum,[40] which has determined that surface storage capacity in the Tulare Lake Basin could be more than 2.5 million acre-feet. This option may require a new Kern-San Joaquin intertie.

Reorienting water transfer policies to benefit south-of-Delta water users will require further detailed analysis to confirm its feasibility; however, the potential for these measures to reduce pumping through the Delta to the level recommended in Strategic Goal #2 deserves serious consideration. Reorientation would also provide the following advantages:

- Reduction in Delta reverse flows;
- Much higher quality water for urban southern California; and,

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

- Reduction in the current billion-dollar level of water treatment costs for urban southern California.

This water source reorientation would rely heavily on local water efficiency improvements and water sales between water districts within the region as well as storage expansion if reviving Lake Tulare proves feasible.

The previously referenced Los Angeles County Economic Development Council (LAEDC) report demonstrates that the Metropolitan Water District and other southern California water users must reduce their reliance on the Delta.[41] The LAEDC report recommendation for southern California is consistent with this supply source orientation change and the water use reductions called for in Strategic Goal #1 this report.

Reduced dependence on the Delta by south-of-Delta water users would also obviate the need for new conveyance around or through the Delta (a Peripheral Canal or tunnel) and new surface storage reservoirs, avoiding costs of perhaps tens of billions of dollars for taxpayers and the potential for stranded assets resulting from climate change and sea level rise in the Bay-Delta. This reorientation will undoubtedly require some south-of-Delta infrastructure enhancements, but not nearly to the magnitude of costs for a Peripheral Canal and a new reservoir north of the Delta.

While changing the supply orientation for south-of-Delta water users, the role of transfers throughout the state must simultaneously be examined and reoriented into this more logical plan. The obstacles to rationalizing south-of- Delta transfers are:

1. The contracted amounts of water for CVP and SWP Table A users are unrealistically high and must be brought in line with historic "firm yield" experience, as required in the contracts. The overall water supply reductions forecasted with global climate change adds to the urgency to bring these contracted amounts in line with current realities and for future planning.
2. The "urban preference," that was recently eliminated as a component of State Water Project contracts due to the Monterey Amendments, must be reinstated. California should return to its original plan of giving priority to the water needs of its bourgeoning population rather than giving farm water equal priority, per the Monterey Amendments changes.
3. The Kern Water Bank – initially a public asset – has been inappropriately turned over to private interests as a part of the Monterey Amendments and must be reestablished as a state entity under the ownership and operational control of the Department of Water Resources (DWR) for the benefit of all Californians, as it was when DWR purchased the land for the bank in the 1980s. When combined with the reinstatement of the urban preference in the State Water Project, this change would enhance water supply reliability for urban southern California users and would eliminate profiteering from the public's water by private corporate interests.
4. The pumping of what is referred to as "Article 21" water is unnecessary and has proven to be damaging to the fisheries and ecology of the estuary.

In reviewing the different types of water transfers that can occur throughout the state, some are more logical and favorable from an ecosystem and cost viewpoint, while

[41] Los Angeles Economic Development Council. *Where Will We Get the Water? Assessing Southern California's Future Water Strategies.* 2008.

others are clearly damaging by the same two criteria. The Water Transfers Matrix (Figure 4) differentiates what we regard as favorable water transfers versus damaging water transfers. The Water Transfer Matrix uses the criteria we would expect to be utilized in making these source orientation changes in California water policy and for staying within the maximum Delta pumping limits recommended in this report.

In the Water Transfers Matrix below:

- The "South-of-Delta to South-of-Delta" transfers under the "Type of Transfers" column would include transfers such as deliveries from the Kern Water bank to urban areas south of the Delta or sales of water from one irrigation district to another or to urban areas within the south-of-Delta region. Sales across hydrologic regions south of the Delta would be permitted in order to accommodate south-of-Delta farming and urban needs. Water pumped through the Delta from northern California would be required to stay within the annual overall Delta pumping limits.
- The "North-of-Delta" to "North-of-Delta" transfers includes sales between districts and willing sellers north of the Delta, but would not permit transfers out of a hydrologic region. These transfers are considered potentially favorable mainly because they do not require exports through the Delta.
- The "North to South through Delta" and "Trinity River to Sacramento Valley" transfers are considered damaging since they contribute to the excessive pumping through the Delta, with its attendant problems, and to the decline of the Trinity River system. Additionally, groundwater banking plans for the Sacramento Valley should be discouraged since they will aggravate the already excessive Delta pumping.
- "Colorado River" transfers and "East to West within the San Joaquin Valley" are considered "Conditional" since they would require no groundwater substitution and would not be approved if the water is intended for use on drainage impaired farmlands in the San Joaquin valley. In the case of the Colorado River water, an additional constraint would include full mitigation for the impacts on the Salton Sea.

According to the State Water Plan, the level of transfers was reported to be 1,200,000 acre-feet in 2001, with urban recipients comprising two percent of the total and agricultural districts accounting for half of all transfers.[42] (The remaining percentage is not explained.) More recent information published by the CALFED agencies and also included in the Delta smelt Biological Opinion published by the Fish and Wildlife Service is shown in Figure 5 below, which gives a clear idea of the magnitude of water transfers occurring in the Delta watershed.

A recent Finding of No Significant Impact (FONSI) issued by the Central Valley Project (CVP) estimates that CVP and non-CVP transfers planned for the water year 2010-2011 will be a maximum of 391,847 acre-feet.[43] The size of this planned water transfer is especially alarming to Sacramento Valley water users and may not even

[42] California Department of Water Resources. Update 2005. California Water Plan Update. Bulletin 160-05. V2 1-5. http://www.waterplan.water.ca.gov/docs/cwpu2009/1009prf/v2ch07-water_transfers_pf_09.pdf

[43] Bureau of Reclamation. Finding Of No Significant Impact, 2010-2011 Water Transfer Program. January 2010. http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=4857

include transfers from the 145 Sacramento Settlement Contractors who have rights to a total of 1.8 million acre-feet between Redding and Sacramento.

Building water banks in the Sacramento Valley has a number of negative consequences from the standpoint of sustainability and environmental protection. They are:

- Evacuation of presently full aquifers to create space for the storage of surface water threatens existing surface flows in streams like Mill, Deer, Battle, Big Chico and Butte Creeks. They are the last remaining locations for endangered winter and spring run salmon and steelhead in the Sacramento watershed.
    - Since the water projects and dams have restricted fish access to historical spawning and rearing habitat in the mountains surrounding the Sacramento Valley, these endangered fish species' survival are dependent upon full water aquifers to sustain cool surface stream flows on the Sacramento River and its tributaries.
- Lowering the water table as part of a water bank operation threatens the small amount of riparian hardwood forest remaining in the Sacramento watershed that is dependent upon high water tables to survive the long, hot summer and fall months.
- Water supplies would be threatened for the majority of people of the Sacramento Valley who live on the east side of the valley where the water table is shallow but generally in balance.

Figure 4
WATER TRANSFERS MATRIX

TYPE OF TRANSFER	PREFERENCE	CONDITIIONS & COMMENTS
South-of-Delta to South-of-Delta	Potentially Favorable	From southern Sierra rivers. No Groundwater Substitution. None for Drainage Impaired Farmland.
North-of-Delta to North-of-Delta	Potentially Favorable	Limited to same hydrological region. No Groundwater Substitution.
Colorado River to Southern California	Conditional	Full mitigation for the Salton Sea
East to West within San Joaquin Valley	Conditional	No Groundwater Substitution. None for Drainage Impaired Farmland.
North-to-South through Delta	Damaging	Limited to no more than 3 million acre-feet annual total. No Groundwater Substitution. None for Drainage Impaired Farmland.
Trinity River to Sacramento Valley	Damaging	Limited to Trinity Record of Decision. No Groundwater Substitution. None for Drainage Impaired Farmland.

A significant issue with water transfers is that public disclosure is not required, except for those where NEPA and/or CEQA analysis is required (which are often ignored by the lead agencies). Full public disclosure of planned and implemented water transfers of all kinds must be reported by the controlling agencies. This could be accomplished by state legislation.

As called for in the California Water Code,[44] transfers that alter the point of diversion, place of use, or purpose of use to a water right most often require the approval of the State Water Resources Control Board. Transfers that use State, regional or a local public agency's facilities require that the facility owner determine that the transfers not harm any other legal user of water, not unreasonably affect fish and wildlife, and not unreasonably affect the overall economy of the county from which the water is transferred. The State Water Plan points out that "some stakeholders worry that State laws and oversight of water transfers may not be adequate to protect the environment, third parties, public trust resources, and broader social interests that may be affected by water transfers. In particular, this concern applies to water transfers involving pre-1914 water rights, which are not subject to regulation by SWRCB, long-term transfers, and transfers that involve pumping groundwater, crop idling, or crop shifting."

Figure 5
WATER TRANSFERS BY CALFED AGENCIES BY SOURCE AREAS [45]
Acre-feet (1,000s)

WATER YEAR	NORTH OF DELTA	SOUTH OF DELTA	TOTAL TRANSFERS
2001-02	481.6	518.8	1,000.4
2002-03	251.9	479.4	731.3
2003-04	165.1	535.6	700.7
2004-05	104.9	746.4	851.3

The Drought Water Bank established by the Department of Water Resources (DWR) is a plan to line up willing sellers of water (usually north-of-the-Delta) with willing buyers (usually south-of-the-Delta) during anticipated drought conditions. DWR operated the Drought Water Bank in 1991 and 1992. For 2010, DWR has lined up approximately 368 thousand acre-feet of water; 275 thousand acre-feet will be pumped through the Delta.[46] While the concept of a "virtual" bank of water is logical for anticipated shortage conditions, experience with the water banks has highlighted the following environmental and economic concerns:

- Groundwater substitution for the loss of surface water is an integral part of the plan.
- The transfer of "banked" water usually involves pumping through the Delta, exacerbating the current excessive Delta pumping.

[44] California Water Code Section 1810 et seq.
[45] http://www.watertransfers.water.ca.gov/docs/CALFED_2001-02_Nov.30_04.pdf
[46] Department of Water Resources. Water Bank Transfers as of October 1, 2009. http://www.water.ca.gov/drought/docs/WaterBankTransferTable-091101.pdf

- The local economy in the source location suffers from crop idling resulting from the loss of water.

WATER TRANSFER PRINCIPLES.

The EWC has developed a set of principles that should govern all future water transfers, including CVP and SWP operations. These principles are shown in Figure 6

Figure 6
WATER TRANSFER PRINCIPLES

	Principle	**Rationale**
1	The total level of exports through the Bay-Delta, including all CVP and SWP pumping and all other water transfers, must be limited to an annual maximum of no more than 3 million acre-feet in all years, as recommended in Strategic Goal #2.	The total annual export level, which recently has exceeded 6 million acre-feet annually, is unsustainable and is the root cause of the current Delta crisis. The 600,000 acre-feet limitation on transfers referenced in the Delta smelt Biological Opinion must also fit within this overall limitation.[47]
2	Groundwater must not be used for or substituted for water transfers.	Experience in the Sacramento Valley has shown that in some cases water sales have resulted in overdrawn aquifers.
3	Where the transferring party to a water sale transfer is also a groundwater user, full characterization and sustainable yield of the sending party's groundwater must be established.	This condition would prevent unwarranted groundwater substitution and avoid groundwater overdraft.
4	No transfers or exports should be permitted for irrigating drainage-impaired farmlands.	Irrigating drainage-impaired farmlands is a violation of the prohibition of "waste and unreasonable use of water" of the California Constitution.
5	Transfers that result in flow reductions in rivers or main tributaries containing listed species should not be permitted.	It is counterproductive in the long run to work at cross purposes with the federal Endangered Species Act or California Endangered Species Act.
6	Enforceable Bay-Delta inflow and outflow standards must be established.	In years when there is difficulty in meeting the (future) established outflow standards, CVP and SWP pumping and water transfers through the Bay-Delta must be reduced in order to meet the outflow standards.
7	Limit North-to-North water transfers to districts or individuals within the same hydrological region.	This condition would protect local water sources and "areas of origin."
8	Groundwater banks should not be utilized in the Sacramento Valley.	This condition would help reduce overall pumping through the Delta.
9	All water transfer projects must be thoroughly analyzed through a federal Environmental Impact Statement or a state Environmental Impact Report	This condition would examine and fully disclose transfer impacts on all plant and animal species and provide mitigation for impacts, including third party impacts that might result from farmland fallowing.
10	All water transfer project EIRs and EISs must comply with CEQA and NEPA requirements.	Exemptions for critically important water transfer efforts is a dangerous precedent that should be avoided in the future.

[47] 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. 129. http://www.fws.gov/sacramento/es/documents/SWP-CVP_OPs_BO_12-15_final_OCR.pdf.

THE RECOMMENDED ACTIONS to achieve this Strategic Goal are:

- Limit North-to-South water transfers through the Delta to no more than 3 million acre-feet per year in all types of water years, as called for in Goal #2 of this report. The current potential Federal legislation that is intended to expedite North-to-South water transfers in the range of 250,000 to 300,000 acre-feet, the future Article 21 water (SWP "surplus"), and future Drought Water Bank transfers must stay within this overall limit. These kinds of water transfers must not be allowed to circumvent the current protective measures required for Delta pumping.
- Limit North-to-North water transfers to districts or individuals within the same hydrological region.
- Require independent third party monitoring of groundwater and stream levels in exporting areas to assure that sustainable groundwater levels are being maintained and that groundwater is not being substituted for exported surface supplies.
- Full public disclosure of planned and implemented water transfers of all kinds must be reported by the controlling agencies.
- Prohibit transferred water, including CVP water, from being applied to drainage-impaired farmlands in the San Joaquin Valley.
- Invalidate the secretly developed Monterey Amendments, including:
    - Transfer ownership of the Kern Water Bank back to the Department of Water Resources and operate it as a public trust benefit for California.
    - Realign Table A water allocations for State Water Project contractors to amounts that reflect firm yields of the State Water Project.
    - Reinstate the Urban Preference provisions of the State Water Project.
    - Discontinue the DWR practice of pumping Article 21 water.
- Prohibit groundwater banks from being operated in the Sacramento Valley.

STRATEGIC GOAL #4: 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 because these species have adapted to these flows over many thousands of years. 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 prior to the San Joaquin River Settlement, the riverbed completely dried 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, an internationally 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.[48]

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.[49] 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 development and 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 streams throughout the state for which minimum flow levels should be established in order to assure the continued viability of stream-related

[48] 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.

[49] 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/.

fish and wildlife resources.[50] 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.[51] The federal Anadromous Fish Restoration Program, which is charged with the doubling of fish populations in Central Valley rivers, has only partially accomplished this goal.

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 instream habitat improvements. That process, while slow moving, has yielded benefits for rivers and fish and should be supported by the public.

Assembly Bill 2121(2004)[52] 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 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.

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

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

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

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 #5: 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.[53] 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.[54] A 1985 California Department of Fish and Game study has indicated that the economic losses due to the declines of salmon, steelhead and striped bass which spawn in the Central Valley tributaries at $116,000,000 per year.[55]

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

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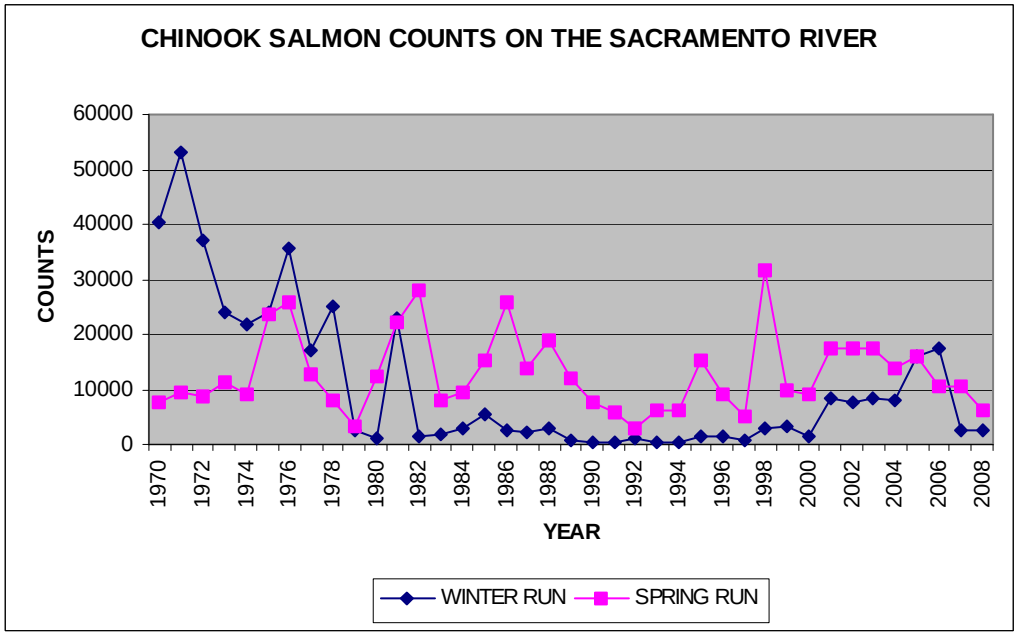
[53] National Marine Fisheries Service, Southwest Region. June 4, 2009. Biological Opinion And Conference Opinion On The Long-Term Operations Of The Central Valley Project And State Water Project. Page 660. http://swr.ucsd.edu/ocap/NMFS_Biological_and_Conference_Opinion_on_the_Long-Term_Operations_of_the_CVP_and_SWP.pdf.

[54] 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.

[55] California Department of Fish and Game. 1985. Administrative Report 85-03. http://deltavision.ca.gov/docs/externalvisions/EV8_Allied_Fishing_Group_Vision.pdf

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 7 shows the long-term downward trend for Chinook salmon in the Central Valley.

Figure 7 Central Valley Chinook Salmon Population



Source: California Fish & Game Department[56]

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.

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

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

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 thousands of jobs.[57]

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. 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.[58]
- 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 #11) 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.

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

[58] 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

STRATEGIC GOAL #6: 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[59] 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.

[59] 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.

STRATEGIC GOAL #7: 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.[60] 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-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 photo.[61]) Healthy floodplains typically improve water quality by providing natural purification in their

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

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

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

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.

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 #8: 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 2 million acre-feet of water in most years, in addition to the savings estimated in Goal #1.[62]

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 portions in the Kern and Tulare basins served by

[62] 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.

the SWP. Descriptions of these soils are presented in the 1990 joint federal and state report known as "The Rainbow Report."[63]

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 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 Delta, it would take 65 to 300 years to eliminate the selenium already built up in valley groundwater.[64]

Farmers and water districts throughout the Western San Joaquin Valley try to reduce their drainage water. 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; a recent federal report discusses an option to retire 300,000 acres of drainage-impaired lands.[65] 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.

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

[64] 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/

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

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.[66]
- 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.

STRATEGIC GOAL #9*: *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 inadequately treated 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;

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

- 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:

- 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.[67] 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.

[67] 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.

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 pollution. 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 sediment, pathogens, trash and other contaminants to protect the uses of affected waterways.
- In evaluating water rights, the State Water 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 Water 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 #8.
- 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.
- The State Water Board should adopt a fee program for groundwater users in order to maintain and expand their GAMA[68] program to serve as a resource and repository for groundwater quality information from current and new sources, including dairy and irrigated agriculture regulatory programs.

STRATEGIC GOAL #10: MAXIMIZE REGIONAL WATER SELF-SUFFICIENCY TO INCLUDE WATER FOR THE ENVIRONMENT.

Meeting the reduced export goals for the Delta (Strategic Goal #2) requires that urban areas of the state which are highly dependent on imported water, take steps to reduce overall water use and maximize their use of local water sources. The imperative to reduce water use 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.

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

Legal strategies to reduce water use have met with limited success. To date, 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.

Water quality considerations have played a key role in spurring greater efforts to capture and treat storm water and wastewater. The adoption of a zero trash goal for the Los Angeles River led directly to the passage of a half billion dollar bond measure and the adoption of a Los Angeles River Restoration Plan. In Santa Clara County, water quality requirements for San Francisco Bay have led to the most aggressive water recycling program in the Bay Area.

[68] Groundwater Ambient Monitoring and Assessment Program, established by AB 599, Liu, 2001. http://www.swrcb.ca.gov/gama/

WATER CONSERVATION

A framework for water 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 BMPs.[69]

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 very modest budgets for conservation and in many years even these funds are 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. It 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 since there are probably millions of older toilets that can be replaced with ultra-low flush toilets. The volume of water exported from the eastern Sierra was reduced by 30 percent and was offset by aggressive conservation measures maintained over a long period of time even as the population in southern California increased.[70] This early example of a "green jobs" program provides a pattern that can also be replicated throughout the state.

Water agencies must invest in these programs on an ongoing basis. California's endemic budget problems curtailed bond funding for approximately fifty water conservation programs across the state in 2009; clearly a more sustainable funding source is needed. A simple strategy would be to set aside a minimum of 5 percent of the proceeds from water sales to achieve conservation goals and objectives.

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.

RECYCLED WATER

Currently, more than 500,000 acre-feet of treated municipal wastewater is reused in California annually,[71] well below the goal of 1 million acre-feet established in 1991.[72] By contrast, water agencies today dump more than 4 million acre-feet of wastewater into the ocean while recycling only a tiny percentage.

Guidelines to protect water quality and encourage the development of recycled water were adopted by the State Water Board in 2009.[73] However the history of recycled

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[69] 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

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

[71] California Water Plan, 2009 Update

[72] California Water Code, Section 13577

water development shows that necessity and the threat of regulatory action are key drivers of new supply. A bill authored by Senator Pavley in 2009 would have required wastewater agencies discharging to the ocean to reduce their discharges by 50 percent by 2030. This or similar legislative drivers could help meet the goal of the California Water Plan to increase recycled water use by 1 million acre-feet by 2020, and by 2 million by 2030.

STORM WATER CAPTURE

The State Water Board's Recycled Water Policy also set a goal of increasing storm water use by a half-million acre-feet by 2020 and a million acre-feet by 2030. Storm water capture and reuse was given a boost by the extension of National Pollutant Discharge Elimination System (NPDES) requirements to nonpoint sources. Requirements to restrict storm water discharges have led to the adoption of ordinances around the state.

One difficulty with the development of storm water harvesting and treatment programs is funding. Storm water and flood control agencies often lack the resources to implement programs. The City of Los Angeles recently passed an ordinance requiring building owners to capture and reuse or infiltrate 100 percent of storm water on their sites. The ordinance also contains an option for payment of a mitigation fee of $13 per gallon of runoff in lieu of installing a system.

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. In August of 2009, the state adopted an emergency regulation allowing the installation of simple outdoor graywater systems for irrigation without a permit. However, indoor use is still complicated by stringent water quality requirements from the Department of Public Health, which requires significant treatment even for reuse in toilet flushing.

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 little doubt that Californians want the conserved water to be used to benefit the environment, to remain local, and not to be used to support new development.

THE RECOMMENDED ACTIONS to achieve this Strategic Goal are:

- The use of urban water meters and strongly tiered water rates should 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 should include requirements for equipment retrofit-on-resale, water-

[73] State Water Resource Control Board adopted recycled water policy, adopted 5/14/2009, http://www.swrcb.ca.gov/water_issues/programs/water_recycling_policy/docs/recycledwaterpolicy_approved.pdf

neutral development, recycling, local storm water capture and groundwater cleanup.

- Water budgets for all water districts should 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 should be developed for establishing how conserved and recycled water will offset water diversions and extractions and will benefit the environment.
- Proposition 218 should be revised to exempt storm water agencies.
- The Department of Water Resources, the State Department of Public Health, the State Water Board, and the Department of Housing and Community Development should work together to develop standards for indoor graywater use for laundry or toilet flushing.
- Designate formal water rights to the environment to ensure the health of ecosystems, starting with water rights necessary for healthy fish populations.

STRATEGIC GOAL #11: 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 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. In developing funding sources, special care should be taken first that low-income communities not be impacted by new fees and second, that appropriate set-asides be created to ensure that these communities can access funding needed to comply with new regulations and policies.

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.
- 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.
- Ensure that low-income communities not be disproportionately impacted by new fees, and that funding set asides be used to ensure that disadvantaged communities can compete for needed funding.

CONCLUDING SUMMARY

California is at an historic point in the evolution of our water usage. With the onset of global climate change, the natural limits of our water supply have become more obvious and the economics of our solutions are changing drastically. No longer will policy makers be able to advocate for multi-billion dollar bonds that saddle Californians with decades of tax burdens. And no longer will they be able to sell the public on monumental changes to our rivers and bays in the guise of restoring our ecosystems or providing subsidized water to corporate agriculture. The results of decades of those kinds of decisions are now in full view and we know that more effective solutions are available. Intergenerational equity demands better solutions than those of the last century.

Unless we manage our water more efficiently and account for the current and future effects of global climate change, the costs of water to all urban, agricultural and industrial water users will exceed our ability to provide Californians with reliable, affordable water. The needs of communities of color and the Native American Tribal claims will remain unmet.

The recently passed water policy and water bond legislation have been an overall disappointment in view of the needs pointed out in this report. The provisions for groundwater monitoring and preventing illegal diversions from the Delta were stripped of their more favorable provisions in the final negotiations to create legislative compromises and are too weak to be effective. The Delta Stewardship Council appears to many EWC organizations be a straight path to a delta-killing Peripheral Canal and moves California in the opposite direction of the stated objective of recovering the Delta despite the scientifically designed hurdles contained in the legislation. The potential $11.14 billion water bond – while containing numerous efficiency and ecosystem recovery actions advocated in this report – also contains a poison pill that allocates billions for new surface storage dams; it also moves in the wrong direction from the type of improvements recommended in this report.

The water efficiency and sustainability solutions that are proposed in this report have already proved to be more economical than overtaxing our rivers and bays with more dams and canals. The combination of water efficiency solutions and reduced reliance on the Delta that are recommended in this report obviate the need for increased surface storage and increased conveyance through the Delta. We have shown that water efficiency actions can provide California with the largest increment of future water supply that is currently available to us; the solutions will also provide ample water supplies for population growth, agricultural and industrial growth, and for improving the conditions of our natural landscapes.

As stated in the Executive Summary, our positive vision stems, ironically, from the potential opportunities that these recurring water “crises” present to make positive and long lasting changes in California’s water management.

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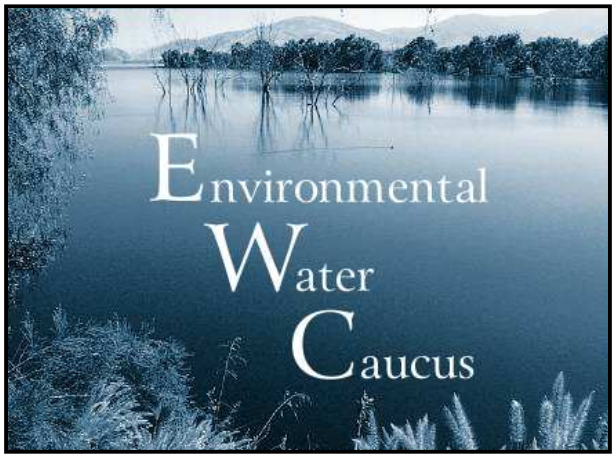
ENVIRONMENTAL WATER CAUCUS (EWC)

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.

AquAlliance
The Bay Institute
Butte Environmental Council
California Coastkeeper Alliance
California Save Our Streams Council
California Sportfishing Protection Alliance
California Striped Bass Association
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
Institute for Fisheries Resources
The Karuk Tribe
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
Sierra Nevada Alliance
Southern California Watershed Alliance
Water for California
Winnemen Wintu Tribe



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