Testimony before the Subcommittee on Water and Power of the Committee on Natural Resources of the U.S. House of Representatives

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Testimony of
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The Critical Role of Water Efficiency and Conservation in Solving California's Water Problems

Honorable Representatives, distinguished guests: Thank you for inviting me to discuss the key role that water efficiency and conservation has and will play in solving California's water problems. Notwithstanding the recent winter rains the state has received, California continues to face serious unresolved water challenges. Current proposals for meeting those challenges are inadequate and largely misdirected. But effective solutions are available.

Summary

Water is vital to the health of our economy and natural ecosystems. California's cities and agricultural communities rely on reliable supplies of clean and adequate fresh water. As California's population and economy grow, there is mounting concern about our ability to meet future water demand amidst pressure on our complex water systems. In the 20th century, our approach to meeting this demand has been to develop new supply. While this approach has brought tremendous benefits to this state, we have reached the limits of traditional supply options and continuing to rely on building new infrastructure will fail to solve our crisis. A broader and more integrated approach is needed.

There is no "silver bullet" solution to California's water problems, and everyone involved in state water debates will acknowledge the need for diverse answers or a "portfolio" of solutions. But the need to do many things does not mean we must do, or can afford to do, everything. We must do the most effective things first.

In particular, there is vast untapped potential for reducing our demand for water without affecting the benefits that water provides. Improving the efficiency of our water use is the cheapest, easiest, fastest, and least destructive way to meet California's current and future water supply needs. Indeed, without past efforts to improve water-use efficiency, our current crisis would be much worse. And we must expand our thinking about supply, away from costly and ineffective new dams and toward the other excellent options for expanding supply.

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My testimony today will address three issues:
1. The flaws of our traditional methods of water planning;
2. The massive untapped potential for improving water-use efficiency. Specifically, I will address the potential to quickly reduce demands in California by one million acre-feet at a cost far below that of any new supply option that has been proposed.
3. The potential for expanding water supplies through non-traditional approaches of water recycling and reuse, smart desalination, rainwater harvesting, and better conjunctive use of California's surface and groundwater.

1. Traditional Water Planning Assumptions are Incorrect

Traditional water planning is based on two premises. First, it assumes that as populations and the economy grow, water use must also grow. Second, it assumes that in order to meet growing demand, new dams must be built, new groundwater aquifers tapped, and new supplies brought from farther and farther away. This is what most of you believe; it is what most of the public believes; it is what most water managers believe.

Both of these assumptions are false.

Figure 1 shows California's gross state product, population, and water use between 1975 and 2001. **Total water use in California was less in 2001 than it was in 1975, yet population increased by 60% and gross state product increased 2.5 times.**

The same trend is true for the United States as a whole. The latest information from the U.S. Geological Survey shows that total water use in 2005 for the United States is now lower than it was in 1975. Figure 2 shows total U.S. water withdrawals from 1900 to 2005 along with Gross National Product. Per-capita water use has dropped even more dramatically over the past three decades. This suggests that we can and in fact we have broken the link between water use, population, and economic growth. This has been achieved in large part by improvements in conservation and efficiency. Figure 3 shows the "economic productivity" of water use in the United States over the past century. Improvements in efficiency of water use now permit us to produce nearly three times as many dollars of goods and services per gallon of water as just a few decades ago.

Absent a discussion about population policy, our goal in California must be to continue these trends toward higher economic productivity of water and decreasing per-capita water use.

2. Conservation and Efficiency Are the Most Important Options

It is important to realize that we do not want water; we want water services. We want to grow food and fiber, clean our clothes and dishes, get rid of our wastes, produce semiconductors and other goods and services. This realization lies at the heart of

conservation and efficiency. If we can continue to provide these goods and services with less water, we have increased the efficiency of our water use.

Californians have improved efficiency of our water use over the past 25 years as shown in Figure 1. But our current water use is still wasteful. The Pacific Institute has completed a series of independent reports on urban and agricultural water efficiency that provide a comprehensive statewide analysis.[2] Our findings have been adopted by the California Department of Water Resources in the California Water Plan. These studies finds that existing, cost-effective technologies and policies can readily reduce current state demand for water by six to eight million acre-feet, or around 20 percent. The Governor's recent call for a 20 percent reduction in water use by 2020 is thus based on sound science and economics, even if the policies to achieve such savings are not yet in place.

Widespread conservation and efficiency improvements are possible in every sector and these water savings can be found for much less than the cost of building new supply or expanding our current supply. These savings are real and represent a tremendous amount of untapped potential. Even today, after California's conservation efforts, over 60% of all toilet flushes are well above national standards, suggesting that many old inefficient fixtures remain. More than 65% of all crops in California are still grown with inefficient flood or sprinkler irrigation systems. Studies have shown that installing efficient irrigation technologies, such as drip system, can reduce water use and increase agricultural yield. Given that the agricultural sector uses 80% of California's water supply, or about 34 million acre-feet per year, even small efficiency improvements can produce tremendous water savings. Additional water savings are possible if farmers continue the trend of moving away from water-intensive crops like cotton, pasture, rice, and alfalfa in favor of more valuable low-water crops like vegetables, fruits, and nuts.

In a few weeks, the Pacific Institute will release a new assessment of how to save one million acre-feet of water, split 60/40 among agricultural and urban users, quickly and cost effectively. Let me offer an advanced look at some of our findings:

- 400,000 acre-feet of water can be quickly conserved by urban users by replacing only some of the many remaining inefficient toilets, showerheads, restaurant spray-rinse nozzles, washing machines. These savings would require an investment of under $2 billion and over the life of these fixtures, the energy, water, and wastewater savings will far exceed the initial investment.

- Another 600,000 acre-feet of water can be saved by applying smart irrigation scheduling to 20% of the state's vegetable and orchard acreage, practicing regulated deficit irrigation on 20% of current almonds and pistachios acreage in the Sacramento Valley, and converting 20% of Central Valley vegetables, and 10% of orchards and vineyards, to drip and sprinklers. These changes would save water at a cost of around $100 per acre-foot.

[2] See: Gleick et al. 2003, "Waste Not, Want Not: The Potential for Urban Water Conservation in California" and Cooley et al. "Sustaining California Agriculture in an Uncertain Future." Pacific Institute, Oakland, California.

These savings are just the tip of the iceberg: far more water could be saved at far less cost than any proposed new supply option. For example, the proposed Temperance Flat dam is grossly uneconomic and would, at a cost far exceeding $3 billion (or over $900 per acre-foot), only provide between 100,000 and 200,000 acre-feet of water, and even these figures are disputed.

Our research has shown that **California's total water use in 2030 could be 20% *below* current levels while still satisfying a growing population, maintaining a healthy agricultural sector, and supporting a vibrant economy**. Some of the water saved could be rededicated to agricultural production elsewhere in the state; support new urban and industrial activities and jobs; and restore California's stressed rivers, groundwater aquifers, and wetlands – including the Sacramento-San Joaquin Delta.

I note that water conservation and efficiency has the additional benefit of producing significant energy savings. Capturing, treating, transporting, and using water require a tremendous amount of energy. This is particularly true in Southern California, where water supplies and population centers are separated by hundreds of miles, requiring a tremendous amount of infrastructure to move water from where it is available to where it is needed. As a result, **California's water-related energy consumption accounts for roughly 19% of all electricity used in California, approximately 32% of all non-powerplant natural gas use, and 88 million gallons of diesel fuel**. Thus improving statewide water conservation and efficiency can achieve substantial energy savings.

3. Additional Water Supply Options Are Available

Current proposals to expand water supply in California by building a few new dams are seriously flawed. As mentioned above, the best ideas for new dams in California are grossly uneconomic and do nothing to solve the state's water problems. But there are other good water-supply options we must pursue. These options include:

- **Water recycling and reuse:** Water reclamation and reuse can augment water supplies, as well as provide a means to treat wastewater and reduce environmental discharges. Water agencies in California currently produce about 500,000 acre-feet of recycled water, the majority of which is used for agricultural and landscape irrigation. Expanding current efforts could produce a substantial amount of new water. For example, the Irvine Ranch Water District, in Southern California, meets nearly 20% of its total demand with recycled water. A new residential community in Ventura County, California is using recycled water for all of its landscaping needs at an estimated cost of $200 per acre-foot, far below the cost of new surface storage. Significant other opportunities exist to increase recycling and reuse throughout the state, effectively lessening the need to identify and develop new water supplies.
- **Conjunctive use:** Surface water and groundwater are hydrologically linked. Conjunctive use takes advantage of this connection by storing excess surface water, including stormwater, in groundwater basins for later use in drought periods. This option can improve supply reliability and flexibility, reduce land subsidence, and

minimize the impacts of urban runoff on local steams and the marine environment. But it requires fundamental changes in the way we monitor and manage groundwater. It is time for the state of California to enter the 21st century and require comprehensive groundwater management.

- **Desalination:** Appropriately designed and sustainably managed desalination (both seawater and groundwater) can provide a costly but reliable, high-quality water supply. But desalination must be done in an environmentally sound manner, and without inappropriate public subsidies. Current plans for desalination in southern California do not yet meet these conditions.

Summary and Recommendations

Better water conservation and efficiency can meet California's water needs for decades to come. Total state demands for water can drop by as much as 20 percent while still satisfying a growing population, maintaining a healthy agricultural sector, restoring the health of the Sacramento-San Joaquin Delta and other threatened ecosystems, and supporting a vibrant economy.

Can such an efficient water future be achieved? Yes, given appropriate attention and effort, California's water-use practices can be substantially modified over the next quarter century, just as they have over the past 25 years. Implementing these efficiency measures requires action on the part of legislators, water managers, water districts and agencies, farmers, corporations, and all individuals.

Finally, a quick comment on the recent political attempts to overturn or eliminate the requirement that the Federal government protect endangered and threatened species. **Species extinction is not a sustainable water policy.** And the collapsing ecosystem is not the cause of our water problems, it is a symptom. If the problem is falsely and ideologically defined as "people versus fish," our water policy will have failed. We must ensure that both people and fish can thrive with the water we have.

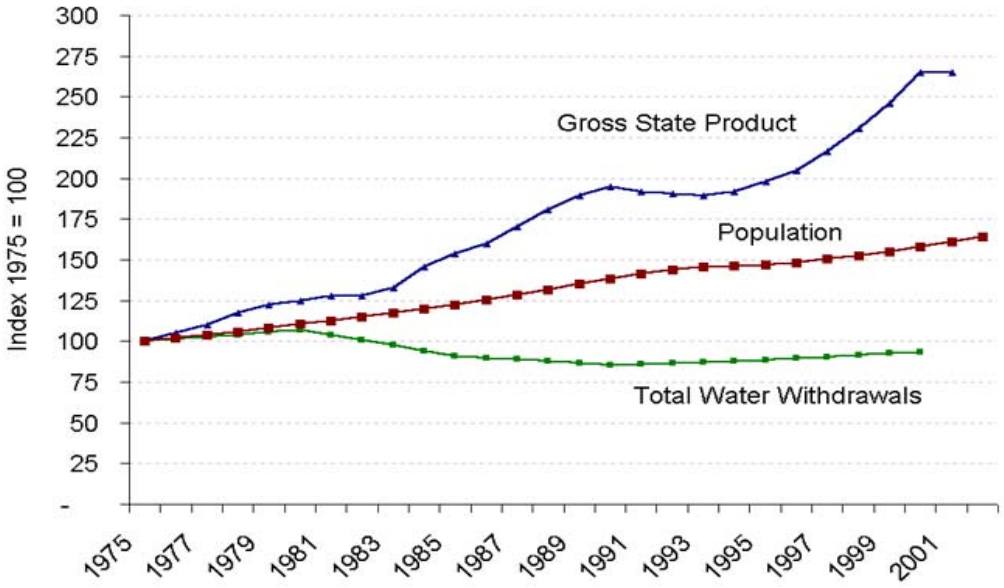

Figure 1. California's water use (green line), population (red line), and gross state product (blue line) between 1975 and 2001. Data is indexed to 1975. Water use from the U.S. Geological Survey. Analysis by the Pacific Institute.

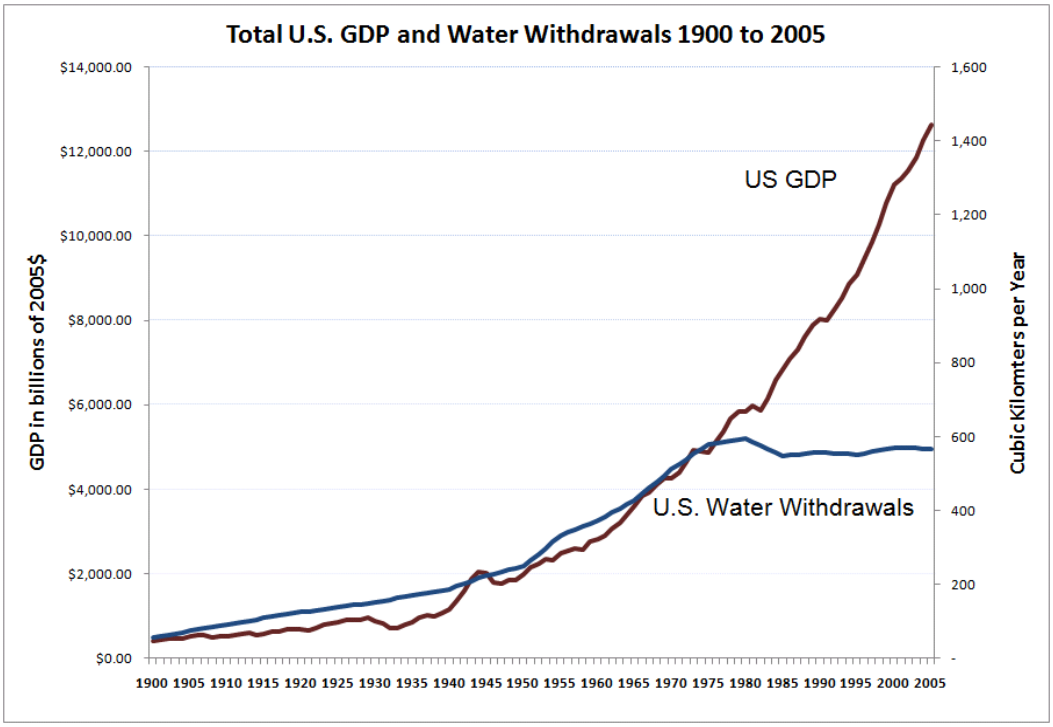

Figure 2. Total gross national product of the United States and total U.S. water withdrawals, from 1900 to 2005. Total water use in the U.S. peaked in 1980 and has leveled off since then. Water use data from the USGS. Analysis by the Pacific Institute.

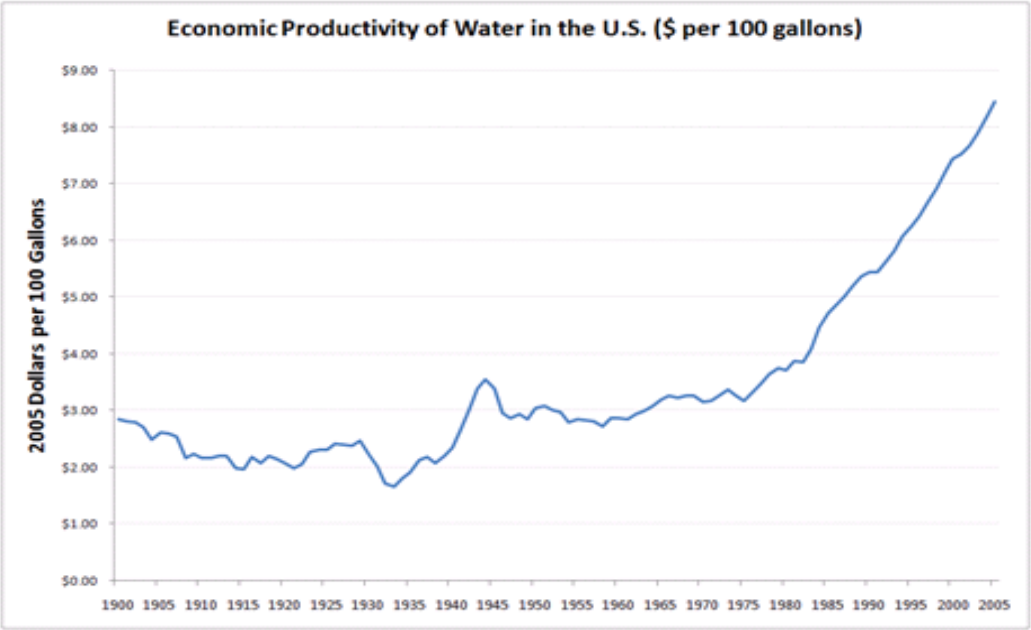

Figure 3. The "economic productivity" of water use in the United States over the past century in dollars per hundred gallons of water use (2005 dollars). Data on water use from the USGS, on the economy from the Dept. of Commerce. Analysis by the Pacific Institute.