



## **Testimony to the Joint Hearing of the California Senate and Assembly Committees**

### **The State of California's Environment: Obstacles and Opportunities**

#### **Water for Our Future**

#### **Testimony of Dr. Peter H. Gleick<sup>1</sup>**

**March 2, 2005**

Honorable Representatives, distinguished guests: Thank you for inviting me to address "Water for our Future" in this remarkable Joint Hearing.

Water is critical for all we do. It is vital for human and ecosystem health, the production of energy and food, industrial and commercial activities, and maintaining healthy and vibrant communities. Let me begin with some bad news, lay out California water myths and taboos, and close with the good news and recommendations.

So here is some of the bad news for California's water:

- We've always fought and argued over water in the western United States, and we continue to do so, pitting farmer against farmer, cities against agriculture, communities against communities, and environmental interests against development.
- There are fears that growing populations and a growing economy require more and more water be taken from our rivers, lakes, and groundwater. Yet it is very apparent to all that we can no longer afford to do so indiscriminately.

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- Major rivers and streams are already seriously affected by our use of water, including the San Joaquin River, the Trinity River, our vital Sacramento-San Joaquin Delta, and many southern California rivers.
- The famous pristine quality of the waters of Lake Tahoe is declining.
- Many fish species in the Delta and our rivers are threatened with extinction, or have gone extinct.
- Human health is threatened by new and growing forms of groundwater contamination.
- Land development in our floodplains – one of the most shortsighted activities we do – continues, putting thousands of new homes and residents at risks of death and vast property loss.
- Federal control and allocation of part of California’s water resources continues to be inefficient, heavily subsidized, and poorly coordinated with the State.
- And climate changes are coming, or indeed, already evident, with impacts on our water resources we have barely begun to understand and address.

In the water area, as in other areas, there are things that are rarely addressed directly: myths about water that go unchallenged; or taboos that are ignored or rarely discussed. I’d like to highlight some of these for your consideration.

- While California agriculture is a vital part of our economy, there are some areas that should never have been brought under irrigation because the soils are marginal or the land is inappropriate.
- There are some crops we should grow less of because they are low-valued and water-intensive. Please note, I say “less of,” not “none of.”
- We often don’t pay enough for the water we use and we subsidize many water uses we don’t need. Sometimes others impose these subsidies upon us, like the Federal Central Valley Project subsidies.
- Despite improvements over the last decade, we don’t use water as efficiently or effectively as we could, given existing technology and prices.
- Despite some comments to the contrary from people who should know better, it is not our God-given right to water lawns or to waste water. We should be free to use water how we wish, but we should understand and pay the full costs of doing so, and we must understand all of the options for using water more effectively and efficiently.

- We act as though groundwater and surface water are separate and unconnected. And for the most part we fail to monitor and manage groundwater use.
- Decisions about urban and suburban development must be made with a full understanding of where the water is going to come from to meet needs. We've taken small steps in that direction; but greater effort is needed.
- We've made great progress in cleaning up our wastewater, but we continue to throw most of that water away. We should greatly accelerate our use of reclaimed water.
- There is no such thing as a free market for water. Water markets and transfers may be part of the solution, but only if we are careful about how we do them. And the growing pressure to privatize water systems may also cause more problems than it solves.

A few facts for you to consider:

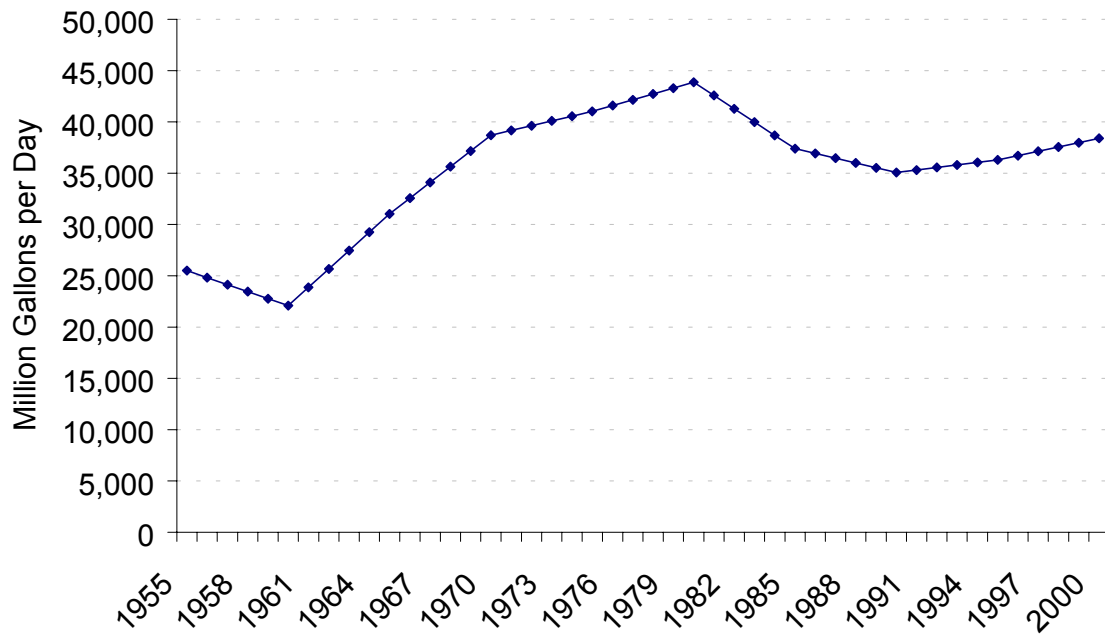
***Total Water Use In California is Less Than it was in 1970.***

As Figure 1 show, total water use in California (from 1955 to the present) today is less than it was in 1970, and far below the peak demand of 1980. This means that California is meeting the needs of a growing population and growing economy with the same or less water – our **productivity** of water use has grown enormously. This means we must not assume that we need new storage, or new supplies to meet our needs. Why is this? Because we are becoming more efficient with our use of water, and because our economy is changing from water-intensive to water-efficient industries.

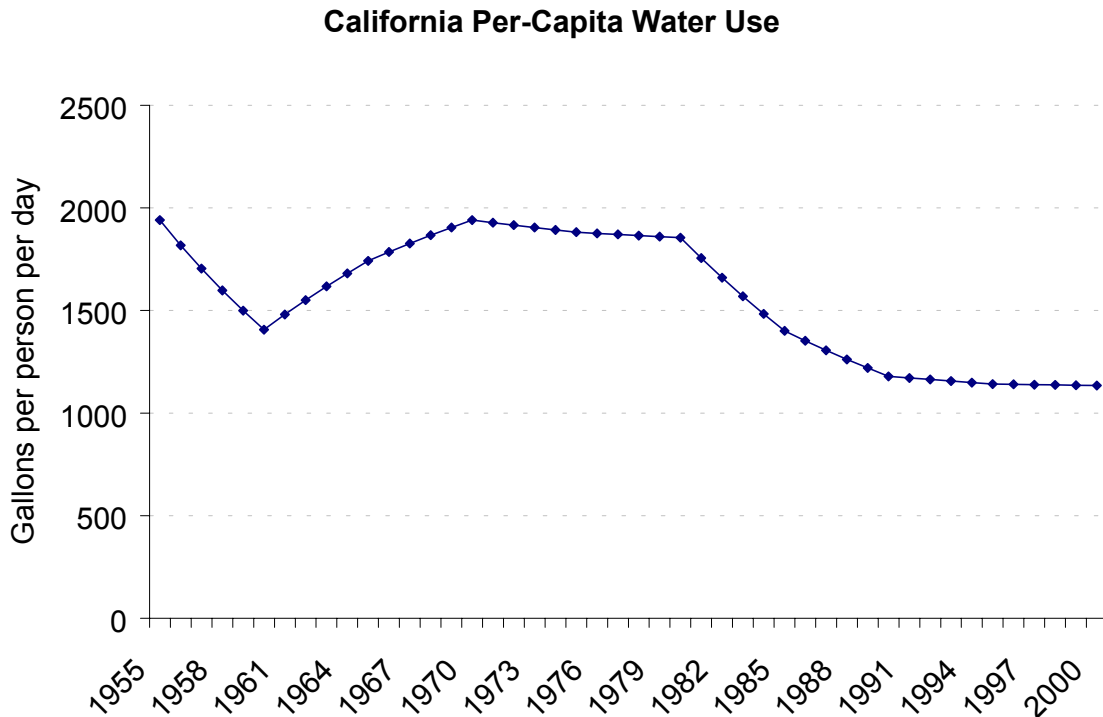
***Water Use Per Person in California is Less Than It Was 50 Years Ago!***

Figure 2 shows water use over this period, per person in California. As this graph shows, **water use per person in California (for all purposes) today is lower than it was 50 years ago!** Again, this is due to increases in efficiency and a changing economy.

### California Water Use 1955 to 2000



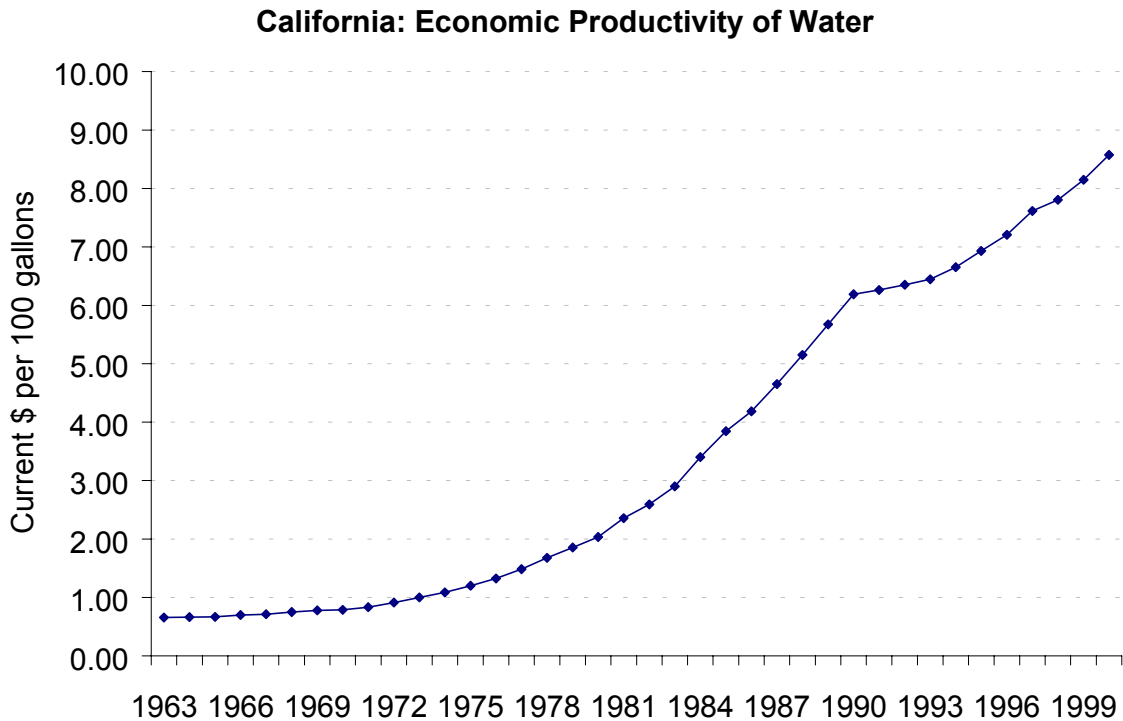
**Figure 1.** Total water use, as reported by the U.S. Geological Survey, in million gallons per day for California from 1955 to the present. Current water use is lower less than it was in 1970. Note, the same trend is true for the nation as a whole. Source: Gleick, P.H. 2004. "California's Past and Future Water Use: Future Increases in Demand are Not Inevitable." Pacific Institute Report, Oakland, California, October 22, 2004.



**Figure 2:** Per-capita water use (water use in gallons per person per day) for California also shows a declining trend, and we use less water per person today than we did in 1955, 50 years ago! This is due to improving efficiency and a changing economy. Source: Gleick, P.H. 2004. “California’s Past and Future Water Use: Future Increases in Demand are Not Inevitable.” Pacific Institute Report, Oakland, California, October 22, 2004.

***California’s Economy Produces Nine Times More per Gallon of Water Than It Did in the 1960s.***

Figure 3 shows California’s “economic productivity of water use” – the gross state product divided by total water use, which is a measure of how much we produce per unit water used. As this shows, the state continues to greatly increase our productive use of water. Today we generate \$9 per 100 gallons of water used; in the 1960s we produced less than one dollar per 100 gallons used.



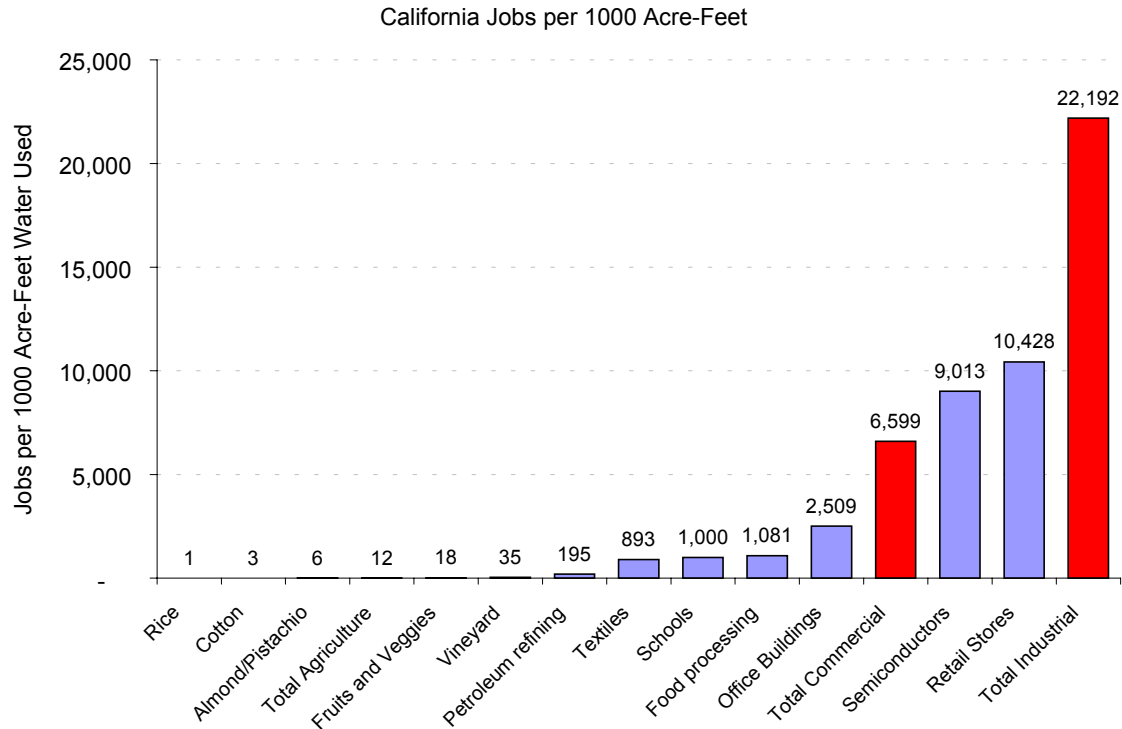
**Figure 3.** California's water productivity in dollars per 100 gallons. Note the continued increase over time. Source: State of California income data; water use from the U.S. Geological Survey. See: Gleick, P.H. 2004. "California's Past and Future Water Use: Future Increases in Demand are Not Inevitable." Pacific Institute Report, Oakland, California, October 22, 2004.

### ***Even Modest Reallocations of Water Can Improve Job Availability and State Revenue***

There are gross disparities in the "economic productivity" of water use. Even modest reallocations of water from one sector of our economy to another can produce significant changes in job availability and gross state product, but such reallocations must take account of regional economic priorities, job displacement and retraining issues, equity, and environmental side-effects. Carefully tailored water and business strategies can lead to substantial benefits for California's economy, job picture, and agricultural production.

### ***There Are Vast Differences in the Number of Jobs Water Can Produce***

As Figure 4 shows, there is great disparity in the number of jobs 1,000 acre-feet of water produces in different sectors of California's economy. The use of 1,000 acre-feet of water produces 9,000 jobs in the semiconductor industry, 2,500 jobs in commercial offices, 35 jobs in grape and wine production, and 3 jobs growing cotton. Overall, 1,000 acre-feet of water produces 22,000 jobs in California's industrial sector, 6,600 jobs in the commercial sector, and 12 jobs in the agricultural sector.



**Figure 4:** Jobs Produced per Thousand Acre-Feet of Water Used in Various Sectors of California's Economy. Source: Gleick, P.H. 2004. "California's 'Economic Productivity' of Water Use: Jobs, Income, and Water Use in California." Pacific Institute Report, Oakland, California, October 22, 2004.

***There Are Vast Differences in State Revenue Generated By Different Kinds of Water Use***

Figure 5 show a comparable huge disparity in the gross state revenue generated by the use of an acre-foot of water in different sectors of California's economy. The use of one acre-foot of water produces \$950,000 in the semiconductor industry, \$162,000 in the petroleum and refining sector, \$1,500 in grape and wine production, and around \$60 growing cotton and alfalfa. **Overall, an acre-foot of water produces \$575,000 in California's industrial sector, \$545,000 in the commercial sector, and \$900 in the agricultural sector.**

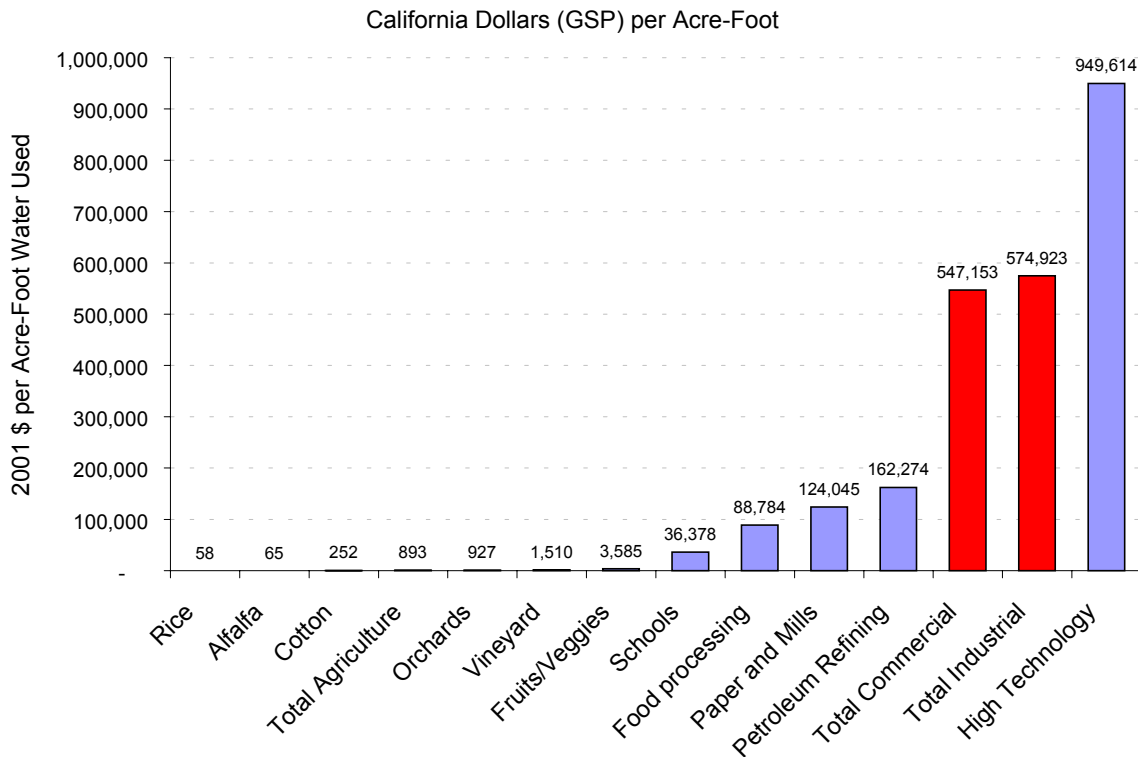


Figure 5: Gross State Product (2001) per Acre-Foot of Water Used in Various Sectors of California's Economy. Source: Gleick, P.H. 2004. "California's 'Economic Productivity' of Water Use: Jobs, Income, and Water Use in California." Pacific Institute Report, Oakland, California, October 22, 2004.

## Recommendations and Conclusion

Finally, let me offer some new suggestions that may help us move forward toward more effective water management and planning for California.

### ***Encourage and Support Water-Efficiency Improvements***

The potential for doing what we want to do, with less water, is enormous in every sector. This means that the prime focus of water managers, water planners, and water policymakers – you – should be figuring out how to encourage and accelerate improving water-use efficiency. Did you know that we could cut current urban uses (residential, commercial, industrial) by 30 percent with existing technology, and save money while doing so? That's more water than any new dam proposals could generate.

### ***Monitor Water Supply and Use Around the State***

You must support and encourage efforts to monitor water supply and use around the State. We must continue to measure rain, snow, runoff, and water quality. This is basic science, but it is critical for water policy. Budget problems are wreaking havoc with our ability to understand what is happening with our water.



You must support and encourage efforts to monitor water use, both urban and agricultural – including groundwater. All water use should be monitored, all the time. Those of you who may think you are protecting some individual or local interest by permitting continued unmetered water use are wrong. This is an instance where the public good vastly outweighs any possible individual benefit from being able to keep wasting water.

### ***Rethink “Water Supply” and Support New Initiatives***

Give up on the idea of new dams, perhaps with one or two exceptions, but don’t give up on the idea of new ways of thinking about storage and water supply. Water reclamation and reuse, smart “conjunctive” use of water (joint management of groundwater and surface water), transfers of water from one user to another are all worth exploring. They are all cheaper, faster, and cleaner than new dams.

### ***Do Not Rush to Desalination***

Don’t look to desalination as a “silver bullet.” It may have an important role to play in our future, but the wonderful promises of low-cost water are promises that have not been kept elsewhere. If industry thinks it can build low-cost desalination plants, and produce water at a price consumers will buy, let them do so without state or local subsidies and bear the risks. And we must require that they go through strict siting review and environmental assessments, and meet the rules we have put in place to protect our coasts.

### ***Support Smart Agriculture***

California deserves a healthy agricultural sector. This is a wonderful place to grow food, and vast quantities of it. Farmers are worried, and rightly so, about the availability of water in the future and about policies that currently fail to protect agricultural land. Let’s identify what lands deserve to be kept in production and implement efforts to protect them and the needed water from uncontrolled development. At the same time, encourage the smarter use of water in agriculture, as many farmers are beginning to do.

### ***Support Better Federal and State Integration of Water Management; Stop Harmful Federal Water Subsidies***

Integrating the Federal and State water projects is vital to long-term, effective water management in California. Don’t let the Federal government push through new 25 to 40-year long-term subsidies in Central Valley Project contract renewals. They are on the verge of doing so, and it is not in the interest of California taxpayers, the economy, or most of the state’s farmers. These contracts must include protections for the state, reasonable prices to encourage efficient water use, and be offered only after better proof that the water will be used beneficially. You must immediately ask the US Interior Department and the Bureau of Reclamation to wait to sign these contracts.

***Integrate Climate Change into all Long-Term Water Planning and Management***

Climate change is a real problem, and we must include real assessments of the risks of climate change for water supplies, demands, and quality in all future planning. This includes the California Water Plan, new floodplain regulations, coastal planning, and land use development. We are already seeing the evidence of climate change and we are not prepared for it.

Thank you for your consideration.

## Appendix

**Table 1: Jobs Produced per Thousand Acre-Feet of Water Used in California**

<b><u>Economic Sector</u></b>	<b><u>Jobs per 1000 Acre Feet</u></b>
Rice	1
Cotton	3
Almond/Pistachio	6
Total Agriculture	12
Fruits and Veggies	18
Vineyard	35
Petroleum refining	195
Textiles	893
Schools	1,000
Food processing	1,081
Office Buildings	2,509
Total Commercial	6,599
Semiconductors	9,013
Retail Stores	10,428
Total Industrial	22,192

Note: This is a representative subset of California's economic sectors, showing the range of jobs produced in each primary industry.

Source: Gleick, P.H. 2004. "California's 'Economic Productivity' of Water Use: Jobs, Income, and Water Use in California." Pacific Institute Report, Oakland, California, October 22, 2004.

**Table 2: Dollars of Gross State Product (2001) per Acre-Foot of Water Used**

<b><u>Economic Sector</u></b>	<b><u>Dollars (GSP 2001) per Acre-Feet</u></b>
Rice	58
Alfalfa	65
Cotton	252
Total Agriculture	893
Orchards	927
Vineyard	1,510
Fruits/Veggies	3,585
Schools	36,378
Food processing	88,784
Paper and Mills	124,045
Petroleum Refining	162,274
Total Commercial	547,153
Total Industrial	574,923

High Technology

949,614

Note: This is a representative subset of California's economic sectors, showing the range of jobs produced in each primary industry.

Source: Gleick, P.H. 2004. "California's 'Economic Productivity' of Water Use: Jobs, Income, and Water Use in California." Pacific Institute Report, Oakland, California, October 22, 2004.