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Can California's Water Problems Be Solved?

Peter H. Gleick[*]

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INTRODUCTION

The title of the speech is from a presentation titled "Can California's Water Problems Be Solved?" but, in retrospect, this rhetorical question seems a bit ridiculous.[1] Of course California's water problems ***can*** be solved. The important questions to ask here are not about the possibility of finding a solution, but rather the probability of and strategy by which to do so: a more accurate title may have been "***Will*** California's Water Problems be Solved?" or "***How to Solve*** California's Water Problems" or "Does California ***Have*** a Water Problem?" or "A Sustainable Vision for California's Water" This short article will touch on all of these permutations.

First of all, the original title accepts as a given that California ***has*** water problems. I think that's fair, but it also implies that we're all on the same page—that we all understand and agree what those problems are, and just have to figure out how to solve them. I think this is wrong.

There are many different ways to look at water problems at both the local and the global level. What is the worst water crisis facing humanity in general? While this is subjective, high on the list must be the complete failure to provide safe water and sanitation to all the world's people. There are a billion people worldwide without safe drinking water; there are more than 2.5 billion without access to adequate sanitation, and this failure leads to between two and five million deaths a year, mostly of small children, from preventable water-related diseases.[2] That is a real water crisis, but it is very different from what we face in California.

I. PUBLIC INTERESTS

Different groups, people, organizations, communities, and interests dealing with California water have different perceptions of problems or priorities to tackle. The reality is, California is a huge state: We have a large absolute number of people, vast land area, many diverse kinds of people with different backgrounds, interests, and priorities. It should be no surprise that our interests around water differ based on our individual contexts. Let me offer some examples based on my discussions with Californians around the state over the past several decades:

A. Agricultural Community

The agricultural community feels that their use of water is the most important, because it produces food; not just our food, but food for the

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[1] Paper adapted from Dr. Peter H. Gleick, Keynote Address at the University of California, Berkeley, California Center for Environmental Policy and Law Conference: California and the Future of Environmental Law and Policy (Apr. 10, 2008).

[2] WHO/UNICEF, Joint Monitoring Programme for Water Supply and Sanitation; Meeting the MDG drinking water and sanitation target: a mid-term assessment of progress 6 (2004). http://www.who.int/entity/water_sanitation_health/monitoring/jmp04.pdf.

world. Changes to existing water rights and allocations changes the status quo and risks overturning the entire water rights structure developed over 150 years. They also fear losing agricultural water to urban development and losing a critical sense of community, a way of life.

B. Environmentalists

Many environmentalists maintain the perception that humans use too much water, which leads to threats to environmental values from human use or contamination of water, disappearing wetlands and aquatic ecosystems, and threatened and endangered fisheries. They also fear we risk losing a big part of what makes California such a wonderful place.

C. Urban Water Users

Urban users believe they produce far more value with water—more dollars of revenue or income per gallon of water used, or more people are served with the same amount of water than by other users. A water policy that allocated water in a rational way would, they feel, meet their needs as a top economic priority. They worry about the future reliability of water systems to meet growth; future water quality; and the costs of water services.

D. Environmental Justice Community

The social justice movements, including the environmental justice community, have long felt that their voices have not been heard, and they are uneasy over the historical and continuing lack of concern for social, cultural, and equity implications of traditional California water policy. They worry about inequitable health impacts resulting from water contamination, such as direct and indirect exposure to toxins through consumption of contaminated fish and other products that they catch or harvest themselves. Even here in California, there is a substantial population without access to basic water services: safe and affordable water and sanitation. As many as 80,000 California households—many of them low-income households—"may have a vulnerable source of water" according to a study from the Department of Water Resources, and over 4 million of the state's residents may be drinking unfiltered surface or well water that is contaminated.[3]

[3] The Environmental Justice Coalition for Water, Thirsty for Justice: A People's Blueprint for California, 16-17 (2005). Executive summary available at http://www.ejcw.org/FINALpercent20execpercent20summarypercent20electronic.doc

E. Academic or Professional Communities

Scientists often believe the problem is not enough information—if only we knew more about fish biology, or climatic variability, or the human health impacts of pharmaceuticals in groundwater, then the rationality of knowledge and science would lead to the right decisions.

Economists often believe if only we let pricing and markets work freely then the rationality of economics would lead to the right decisions.

Lawyers often believe that water laws and institutions and water rights systems, properly and effectively applied and enforced, would lead to the right decisions.

Some technological optimists argue that we just need to build big desalination plants or new dams.

And there are many other perspectives: Southern California has a different point of view about water than Northern California because of different climates, water sources, and attitudes. Rice or cotton growers have different water needs and priorities than almond growers or avocado growers.

II. REDEFINING THE PROBLEM

I raise this question of perception because I think it helps to explain the lack of progress in many areas of California environmental policy, but especially in water policy. Given these differences, perhaps it is no surprise that it is so hard to find common ground.

In the end, we must develop solutions, but a solution is useful only if it doesn't worsen someone else's problems. Rather than trying to pick or chose among different perceptions of the problem, maybe we can say something about what the water crisis *is not*. I believe that California's water crisis is not the result of a lack of resources, nor money, nor brains, nor infrastructure.

A. Our Problem Is Not Absolute Water Scarcity.

Yes, there are regional problems with scarcity, but California is water rich, not water poor. California actually has a lot of renewably available fresh water, even with our large population—on the order of 2,500 cubic meters per person per year (not even including the water from the Colorado River).[4] This number means nothing to most people, but the traditional measure globally of true water scarcity is a region with less than 500 cubic meters of water per person per year. Under 1,000 m^3 and you are water stressed. Under 1,700 m^3 and you have trouble meeting

[4] California Department of Water Resources., The California Water Plan, Bulletin 160-03 (2004).

domestic needs for food. By comparison, many countries have far less than does California, as shown in the table below.[5]

Country	Renewable water supply in cubic meters per person per year
Kuwait	10
UAE	100
Saudi Arabia	170
Singapore	220
Israel	450
Morocco	1100
Belgium	1200
Korea	1500

B. Our Problem Is Not Poverty.

We are a rich state: rich in money, education, ingenuity, and good will. Those things, like water, are not evenly distributed. But the uneven distribution of this wealth gives us a special responsibility to act.

C. Our Problem Is Not a Lack of Intelligence.

We've decoded the human genome, manipulated substances at the subatomic level, eliminated some diseases permanently, and used smart machines and technologies to explore the universe around us. There is no reason to think that we lack the intellectual capacity to address the water crisis.

D. Our Problem Is Not a Lack of Water Infrastructure in California.

We have lots of water infrastructure here—in fact, more than just about any place in the country measured as water-storage volume or miles of water-delivery systems.[6] I think the recent proposals for new dams in California result from a knee-jerk response rather than a rational analysis of what our problems are—even for the constituents proposing them. I.e., this is what we've always done, so let's do more of it. I would like to challenge the assumption that a few more dams or aqueducts will finally solve our problems. We might be able to build a few more dams or pipelines, but each new one comes with higher and higher economic, environmental, and social costs, and ultimately, if not already, these costs

[5] Peter H. Gleick, The World's Water 2006-2007, Table 1 (Island Press, Washington, D.C. 2006).

[6] California Department of Water Resources, "Management of the California State Water Project" Bulletin 132-05 (2005). *See also* U.S. Bureau of Reclamation project data for the Central Valley Project, http://www.usbr.gov/dataweb/html/cvp.html.

will be too high to bear. I also predict that if they were built, our water problems will be fundamentally unchanged. I do think there is an infrastructure problem, but I think it is a problem of management and operation, not one of quantity.

I'd like to be very explicit, however. Some water infrastructure investments are vital and must continue: in particular, we must continue to invest in water-quality infrastructure for our drinking water; purification and reuse for our wastewater, and reliable distribution systems to deliver one and remove the other.

III. AN ALTERNATIVE FUTURE

If California's water crisis is not the result of a lack of resources, or money, or brains, or infrastructure, then what is its cause? I think our water problems result from two issues: the lack of a vision for where we want to be, and the lack of a clear path from where we are today to where we want to be, through the morass of old systems of management developed over the first 150 years of California's existence.

I want to offer an alternative future—a positive vision for the next few decades. The first question to be asked is "What do we want?" Here are some of the most important things our society needs:

- A strong economy that allocates water equitably and uses water efficiently.
- Healthy agricultural communities and production with less uncertainty over water.
- Successful restoration and protection of California's unique environments.
- Collaboration and public participation in decision making over water through a process inclusive of the many perspectives mentioned above.

And if new dams and infrastructure aren't the answer anymore, or even if they aren't the only answer, then what kinds of new solutions can help lead us to our objectives? Below I offer six areas where I believe new thinking can lead us to new answers. These areas together comprise key elements of a "soft path" for water. [7]

A. We Must Rethink the Concept of Water Supply.

Rather than taking more water from overtapped aquifers and rivers, we must look to smart conjunctive use of surface and groundwater. We must relearn traditional methods of rainwater harvesting. We must realize that treated wastewater is an asset, not a liability. We must look, in

[7] Peter H. Gleick, "Soft water paths." 418 Nature 373 (July 25, 2002); Peter H. Gleick, "Global Freshwater Resources: Soft-Path Solutions for the 21st Century." 302 Science 1524 (Nov. 28, 2003).

some cases, to new technologies such as desalination and advanced treatment to expand the amount of water we can use sustainably.

B. We Must Properly Apply Economic Tools.

Water must be properly priced. The failure to price water properly leads to overuse, underinvestment, and poor economic decisions. Most of us don't pay enough for water. But water must also be fairly priced to reflect true costs, encourage efficient use, and protect the poor. This also means eliminating some subsidies for water. It also means comprehensive monitoring and metering of all water uses (urban, groundwater, and agricultural) to give consumers better market signals.

C. We Must Protect Water Quality and Do a Better Job of Matching Water Quality and Water Demands.

We must develop real-time, accurate water-quality monitoring technology, and more serious and comprehensive efforts to protect water from contamination. The Safe Drinking Water Act and the Clean Water Act need to be revised and updated for the 21st century. Different water uses require different water qualities. There is no need to use potable water to flush our toilets or water our lawns. Often, the best way to deal with wastewater is to figure out how not to produce it in the first place, but when we do, it no longer makes sense to collect our wastewater, treat it to a high standard, and then throw it away. We must treat wastewater as an asset, not a liability.

D. We Must Expand Our Concepts of Management and Regulation and Develop New Institutions.

For too long we have failed to integrate decisions about water policy with decisions about the kinds and forms of growth we pursue. As a result, we have uncontrolled or poorly managed growth in regions that are water short. We must address growth and water development together in a comprehensive and responsible manner. Our water institutions would also work more effectively if they functioned on a regional basis. Watersheds extend far beyond traditional local, county, or even state borders. Integrated regional water management offers benefits that purely local water management often ignores. We must consider moving away from the model of centralized water systems in places where small-scale decentralized facilities for purification and wastewater treatment may be more effective. And we must bring local communities and voices into real decision making roles. The best water management decisions are those that take into account the widest possible community perceptions.

E. We Must Do More with Less Water.

We must grow more food, flush more toilets, wash more clothes, generate more energy, produce more goods and services, and do more of everything, with less water. We must stop taking the "demand" for water for granted—or as fixed and immutable, something to be assumed, rather than managed. Our goal is not to use water: it is to attain the quality of life, health, goods, and services we may desire. Some of these things require water, but many of them require less water than we currently use. Thus, a fundamental part of the "soft path" means rethinking water use, reducing waste and losses, and improving water efficiency and productivity. I believe that improving efficiency is the most important new tool in our arsenal. In what may be the best sign of all that this is possible, more and more individuals, water districts, agencies, corporations, and countries are doing more with less water. The United States uses less water today for all purposes than it did 25 years ago; on a per-capita basis, we use much less than we did 25 years ago. So does California. So do Los Angeles, and Berkeley, and Seattle, and El Paso, and so on. Per-capita water use in the US has dropped 20 percent since 1980.[8]

But we can do much, much more. Indeed, a study from the Pacific Institute called "California Water 2030" shows that California can be a healthy, growing state with a strong agricultural and industrial economy, while using 20 percent less water than we do today.[9]

F. We Must Integrate Climate Change into All Aspects of Water System Design, Use, and Management.

We must do what we can to reduce greenhouse gas emissions; but in the coming years, we must plan for adapting and mitigating the impacts we now cannot avoid, especially impacts on water resources.[10]

CONCLUSION

It is time we recognize the need for a new path, a soft path, for water. I believe we're already on this path, but that the transition may be slower and more painful than we'd like. We face serious risks and a growing set of environmental crises, including unresolved water problems. But there are real, effective, affordable, and attractive solutions that can help

[8] U.S. Geological Survey, Estimated Water Use in the United States (these reports are released approximately every five years), *See also*, Heather Cooley & Peter H. Gleick "The Efficiency of Urban Water Use," in *The World's Water 2008-2009* (Peter H. Gleick ed., in press).

[9] Peter H. Gleick, Heather Cooley, & David Groves.. "California Water 2030: An Efficient Future." Pacific Institute (2005). http://www.pacinst.org/reports/california_water_2030/ca_water_2030.pdf.

[10] United Nations Foundation & Sigma Xi, "Confronting Climate Change: Avoiding the Unmanageable and Managing the Unavoidable; A report prepared for the United Nations Commission on Sustainable Development", 144 (2007). http://www.unfoundation.org/files/pdf/2007/SEG_Report.pdf.

us make the transition from where we are to where we want to be. I believe this transition is inevitable, but the challenge will be to make sure it happens fast enough to prevent the painful and disruptive impacts we all hope to avoid.