

Sustainable Water Resources in the Southwest: Can We Have it All?

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I have been asked the simple and modest question: in the Southwest, can we “have it all?” Meaning, *can* we create a sustainable future for water supplies and water quality, maintain thriving economic development and population growth, and sustain and enhance our aquatic ecosystems and natural resource values and functions?

Acknowledging the caveats and apologies for being hopelessly inadequate to answer this question, my answer is: maybe, no and yes. The answers depend on the time frame analyzed, the global assumptions made, and how one defines, measures and evaluates the notions of sustainable water resources, thriving economy, and healthy aquatic ecosystems.

“Maybe”

When you consider the issue globally and over the long term (100 years plus), the only responsible answer is “maybe.” There is too much we do not know, and too many significant variables and trends that are uncertain.

How will global climate change affect water supplies, water quality, and aquatic ecosystems? How fast will changes occur, how sweeping, and how irreversibly? In California, the Department of Water Resources (DWR) has developed models and scenarios for the *California Water Plan* (see page 30) suggesting that water supply reliability may be seriously compromised by global climate change in the near term. More precipitation will fall as rain not snow, and the diminished snowpack will be higher in elevation than today. Surface water will be most plentiful for consumptive uses when it is least needed. Our ability to capture and store rainfall in surface water

reservoirs is inadequate to make up for snowpack storage. The policy response has been to suggest the need for more surface-water storage opportunities, more conjunctive use projects, and groundwater storage and banking.

Many also argue that we have left a relatively quiescent period of droughts and weather cycles and entered a period where longer and more severe drought cycles (and flooding periods) will be the norm. Under this scenario, water supply reliability becomes increasingly more important. Likewise, major flooding events threaten critical water supplies such as the California Bay/Delta and Sacramento region. I will leave it to the climate change experts to model our way toward the future, but it is difficult to claim that the water supply or quality implications are clearly understood.

Similarly, we do not know how our legal and institutional framework will adapt to changing needs and conditions. For example, in California, we may be approaching the point where a county-of-origin water rights suit will upset the uneasy balance that has existed between where water supply originates and where it is delivered. In many over-drafted basins in the West (particularly California), groundwater extraction regulations may be but one drought away. The federal government may not continue to pour funds into the Central Valley Project (or other western projects). This could have significant effects on the way water is distributed and on water for environmental purposes. As aquatic ecosystems become more stressed, more stringent environmental policies and regulations are likely. How such legal and institutional structures respond to

these challenges will have far-reaching effects that are difficult to predict.

The volatile global economic marketplace will also play a role. If present trends continue, agriculture in the West will gradually phase out or become so specialized as to produce less of our staple food needs. In theory, this frees water for urban growth, and may reduce some of our agriculturally related water pollutants. However, it is a complex and daunting policy issue when considering the deleterious effects on land use and transportation patterns, rural economies, and food security.

Likewise, the inevitable collapse of the petroleum-based economy will have implications for transportation and land use and how to sustain the sprawling communities of the West. Effects on water supply and quality are less clear, but shifts in the regional economy will be dramatic.

The conclusion? These global variables are complex and interrelated. The most rational policy response is to maintain as many viable options as possible, and create adaptable and flexible systems for infrastructure and accompanying institutions. To date, this has not been the practice.

“No”

When I think long-term, but focus regionally (Southwest), I must answer “no” to the question of sustainability, unless and until we address unbridled population growth and our current consumption patterns for land, water, and other resources. In other words, we need to move in a very different policy direction. To continue to expand indefinitely with a potentially shrinking supply of high-quality water into more

difficult lands (floodplains, wildfire-prone ecosystems, desert landscapes) with a more volatile climate and weather pattern is a losing formula. Add overdrafted aquifers in southern and central California and Arizona, and an overappropriated Colorado River, and the future looks daunting even without global variables.

The real question becomes: What gives first? My analysis suggests that aquatic ecosystems, which are already damaged beyond repair or stressed, will be sacrificed to urban growth and its infrastructure needs. Next, agricultural lands and water rights will continue to be sacrificed to urban growth. Finally, water quality problems will become so expensive or difficult to correct that we will either accept lower standards for water quality and aquatic health or abandon certain sources in favor of others. Eventually, poor water quality and lack of reliability for long-term water supply will repel commerce and erode the economic base.

To avoid this gloom-and-doom sequence, the second question is: Can we change course? This is where, I believe, there is some room for optimism, especially for the mid-term (30 to 50 years) and for certain subregions that choose to act progressively.

“Yes”

When I consider the question from a more limited time and geographic perspective, I am both more optimistic and more certain. The seeds of positive change are evident. Consider the “Seven C’s” of water in the West and how we are currently navigating them: creativity, conservation/recycling, conjunctive use, capture, and collaboration in the face of increased conflict and competition.

Water supply sources once deemed too exotic, speculative, expensive, or downright silly are now the favored sources for many purveyors. Many of these water supplies are more environmentally responsible and potentially more sustainable. Water conservation and water recycling form the cornerstone of many water supply strategies and are almost always in the mix. And while

water conservation programs are not moving as aggressively as many would like, institutions such as the California Urban Water Conservation Council are advancing the technology and capacity of conservation programs. Water pricing needs much more focus, as does landscape water efficiency. Conjunctive use of surface water and groundwater is not just a good idea, it is being aggressively pursued and implemented throughout the West. While questions remain about the effectiveness and sustainability of conjunctive use, it is a strategy that has become a mainstream approach to water supply reliability.

Creativity and innovation is not limited to these sources. Desalination has become viable in coastal areas as technology has reduced costs and the price of other sources has increased. Contaminated groundwater is being pumped and treated, giving value to a previously “lost” water source. When surface storage is suggested, off-stream reservoir sites (with fewer environmental impacts than traditional reservoirs) are being developed using available winter storm flows to avoid impacts to river systems. Finally, capture and infiltration of urban stormwater for groundwater recharge and to improve water quality is being considered and even required. Low-impact development (LID) techniques common in Oregon and Washington are now showing up in southwestern states. For example, the Inland Empire Water Agency in Southern California considers stormwater an asset significant enough to replace much of their imported supply.

Similarly, we have become ever more creative in our ability to protect water flows and provide them to the aquatic environment. The Environmental Water Account (EWA) of California’s Bay Delta process is one such example. The EWA allows the purchase of water on the open market to solve environmental problems just as they arise. It has been used in the past to provide temporary or augmented water supplies to users south of California’s Delta when the water system pumps must be turned off to

prevent fish entrainment. Think of it as a “water district” for the environment.

The Sacramento Water Forum has developed a unique way to improve salmon runs on the Cosumnes River near Sacramento. The aquifer beneath thousands of acres in this county has been contaminated by a major Aerojet facility. As part of clean-up requirements, Aerojet pumps and treats the contaminated groundwater and may do so for several hundred years. Through multi-party negotiations, a portion of the water (5,000 acre-feet) will be sent via an existing canal to the Cosumnes River to restore winter spawning runs by pre-wetting the channel during the fall in dry years. This complex and collaborative solution recharges groundwater, assists farmers, improves the aquatic environment and uses otherwise “wasted” water. Flow standards, based on sophisticated science and carefully negotiated arrangements, have been agreed upon for the Yuba and American rivers and elsewhere.

Collaborative governance is not a passing fad, but a proven approach to resolve regional differences and address competing needs. Sacramento’s Water Forum, consisting of 40 disparate organizations (water suppliers, cities, counties, environmental groups, businesses, and developers) has hammered out a historic consensus agreement for management of the lower American River. The solution is sustainable, comprehensive, and inclusive and seems to be withstanding changes in policy, administration, and environmental conditions. Such deliberate collaborations are becoming increasingly common in water resources management. DWR is championing the idea of integrated, regional water management plans throughout the state, and has provided substantial financial incentives to those regions that will pursue them. There is little doubt that collaboration is occurring and innovative approaches are being developed.

What Can We Do?

What can we do to facilitate these policy

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changes in organizational and water management behavior? First, we need to shed our feudal water management systems and embrace the collaborative and interconnected nature of problem solving. Incentives such as the promise of infrastructure bond money can make a difference. Second, changes in legal, institutional, and water-use behavior must accelerate to keep pace with growth. We must rethink where water comes from, how it is used, where it goes, and how many times we can use it. Third, we need to shed our inefficient land use practices and get serious about developing compact, mixed-use, dense, walkable, transit-oriented communities that reduce consumption of natural resources, land, water, and energy and increase our ability to sustain population and economic growth and protect ecosystems. The “smart growth” model can also be a smart water model. Fourth, we need to expand our efforts in ecosystem protection, restoration, and management at the regional or greater scale, much as has been initiated under California’s Bay Delta process. And, this effort must include incentives for private land and water owners, as well as public lands. Finally, we must nurture the more flexible, responsive, and regional water management institutions that we are experimenting with, to respond to this challenging future.

Concluding Remarks

So can we have it all? In the short- to mid-term, I believe we can, but significant changes of policy and practice are required at all levels, along with the formation of partnerships with stakeholders from government, business, environmental, and social organizations. If we do not alter our path, one or several of the “goods”—water supply, water quality, aquatic health, economic growth—will erode and others will follow. In the long-term, if we do not seriously address population growth and land/water/energy consumptive patterns of settlement, the future is dim.

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