

California groundwater management trickles up from local sources

July 7 2011, by Donna Hesterman



Land surface in California's San Joaquin Valley subsided about 29 feet (9 meters) between 1925 and 1977 because of groundwater depletion. Signs on the telephone pole indicate the former elevations of the land surface in 1925 and 1955. Credit: Richard Ireland, U.S. Geological Survey (1977)

In a typical year, California gets about 30 percent of its water from groundwater wells. Yet when it comes to managing this precious resource, the state of California relies on a mixed bag of more than 2,000 local water agencies with varying degrees of authority.

Critics say that this decentralized system leaves the state vulnerable to overdraft, which occurs when water is pumped out faster than replacement water is absorbed. But according to a new report published by Stanford University's Program on Water in the West, a surprising number of local water districts are taking on the challenge of groundwater protection, even without state leadership.

"Contrary to popular expectations, our report uncovers a [treasure trove](#) of innovative strategies for groundwater management in California," said the paper's author, Rebecca Nelson, a former Australian water lawyer who is now a graduate student in the Stanford Law School.

"The California [legal framework](#) for groundwater management is weak," Nelson said. "It doesn't compel local districts to do anything, so many of them don't. But there are these gems in the rough. This report highlights the work of some of these outstanding managers."

Statewide survey

To evaluate how well groundwater is managed in California, Nelson first had to overcome the lack of basic information about groundwater management in the state. Because California lacks a centralized data clearinghouse, she had to contact more than 50 local districts and request copies of their groundwater management plans – if they had any.

"Maybe on two hands you could count the districts that acknowledge the environmental effects of over-pumping," Nelson said.

This lack of statewide data is a problem not only for researchers but also for local water agencies wishing to learn from each other and develop a comprehensive regional strategy, she said.

Despite California's inherent decentralization, the survey revealed that some local districts are making advances on a number of fronts, including conservation and transparency. Nelson found that several water agencies are developing effective conservation strategies without state mandate. The Mendocino City and Soquel Creek water districts, for example, have opted to limit pumping by issuing permits and charging fees, much like those used to manage rivers, reservoirs and other surface waters.

To balance their water budgets, some districts are shifting their focus from water-supply augmentation to water-demand reduction. It's a politically risky approach, Nelson said, because most districts are governed by elected boards, and telling constituents that they no longer have unlimited access to groundwater could jeopardize a board member's re-election campaign.

Transparency has been another historic problem, she said: "Groundwater agencies are protective about their local information, because they fear that the state will intervene if it learns too much about local problems."

But in the survey, Nelson discovered that some agencies have begun to overcome this lack of transparency by forming new, unexpected partnerships. For example, the Northeastern San Joaquin County Groundwater Banking Authority in California's farm-rich Central Valley has decided to include environmental organizations in its groundwater management planning process. "It doesn't happen often that an agricultural district will bring in a group like the Sierra Club, but it's great when it does," Nelson said.

Critical overdraft

A trained engineer, Nelson worked as in-house counsel for an interstate river basin commission in her native Australia before coming to Stanford to pursue a doctorate in law. She soon discovered that over-pumping had already caused serious problems in parts of California, where 11 groundwater basins suffer from critical overdraft.

"Years of groundwater siphoning can pose a variety of critical challenges," said Buzz Thompson, professor of law and co-director of the Woods Institute for the Environment at Stanford. "As groundwater tables fall, for example, the cost of pumping water to the ground increases. Ultimately groundwater use can become uneconomic."

Subsidence is also a serious issue, said Thompson, noting that parts of the Central Valley have sunk 30 feet or more as a result of groundwater overdraft. "Overdrafting of groundwater can also reduce flows in hydrologically connected rivers and, in the case of coastal aquifers, lead to saltwater intrusion," he added.

State vs. local

The current system for managing groundwater in California evolved through a series of court battles between landowners over well rights dating back to the 1800s. Today, California is almost unique in having no statewide legislation providing for management of groundwater use.

Some experts recommend that a comprehensive strategy should be developed at the state level. But that's unlikely to happen, said Nelson, noting that many groundwater users will oppose new state regulations that could chip away at their water rights.

Ultimately, Nelson hopes that her report will inspire water management districts to collaborate and create a comprehensive plan that makes sense for the entire state. "The homegrown innovations uncovered by this report point the way forward for local agencies to better manage groundwater in California, and the way towards an updated and improved state policy structure to encourage them to do so," she said.

The Program on Water in the West is jointly run by the Woods Institute and The Bill Lane Center for the American West at Stanford. Nelson is also lead researcher with the Comparative [Groundwater](#) Law and Policy Program, a collaboration between the Program on Water in the West and the United States Studies Centre at the University of Sydney.

Provided by Stanford University

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