Securing Access to Water
Institutional Strategies for Coping with Drought

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Analysis of legal, institutional and management issues surrounding strategies to augment water supply during a drought, including groundwater recharge and conjunctive management, resulted in a proposal to establish a strategic groundwater reserve to mitigate severe water shortages. A more detailed analysis followed of current approaches to reduce vulnerability to drought by three north and central coast water agencies.

The first phase of this project examined the institutional framework for drought planning in California and the legal requirements, policy tools and management approaches utilized by the state, local water suppliers and individual water users to achieve a reliable water supply during prolonged water shortages. Analysis demonstrated that throughout the state, current approaches fail to promote the establishment of sufficient buffers to reduce vulnerability to extreme drought events. Groundwater recharge and storage, along with an innovative strategy - the establishment of strategic groundwater reserves – were proposed to increase long-term water supply security during extended dry periods. This would include 1) bringing groundwater basins into hydrologic balance through recharge processes, 2) developing metrics and incentives to establish and maintain a groundwater reserve. State authority to establish the reserve was delineated, including Article X, Section 2 of the California Constitution, and other sections of the California Water Code.

The second phase of the project focused on current approaches to reduce vulnerability to drought by three water agencies, the Sonoma County Water Agency (SCWA), the City of Santa Cruz Water Department and the Pajaro Valley Water Management Agency (PVWMA). The two coastal regions served by these agencies share a climate characterized by great physical and biological heterogeneity, with almost no rain in the summer and periodic long-term physical droughts. The central coast agencies do not import water whereas the Sonoma County Water Agency on the north coast receives water from the Eel River via the Potter Valley Hydropower Project. None of the agencies import water from the state or federal water projects, leaving them especially vulnerable to a severe drought.

City of Santa Cruz Water Department

The City of Santa Cruz Water Department receives its water primarily from the San Lorenzo River and north coast streams. It has one reservoir with a modest storage capacity that was built in 1960 when the population was 31,000. Today the department serves ~90,000 residents, and projections anticipate that water demand will increase. It is the only municipality around Monterey Bay that does not rely heavily on groundwater. Its main problem is that surface runoff and storage do not furnish an adequate supply during dry years. The City's Drought Emergency Ordinance reflects a typically reactive approach to planning for water shortages, requiring that rules to conserve water be put into effect when a lack of sufficient rainfall, runoff and reservoir storage result in inadequate supplies to support normal water needs. The city proposes that future needs could potentially be

satisfied by conservation, full development of existing supplies, and new supplies. Yet, after a 3-year drought, its available supply, which is limited by reservoir storage, would extend to only one additional dry year. As a result, the city is exploring a conjunctive management project with the adjacent Soquel Creek Water District that involves the construction of a desalination plant. In contrast to the City of Santa Cruz, Soquel Creek has access to groundwater resources, but lacks a large surface water supply. Conjunctive management would provide desalinated water to Soquel Creek during wet years when Santa Cruz receives its water from normal precipitation. Soquel Creek would use wet year water in lieu of pumping groundwater, thereby recharging its aquifer. During dry years, Santa Cruz would use the desalinated water and Soquel Creek would use its groundwater to supply its constituents.

Pajaro Valley Water Management Agency (PVWMA)

The Pajaro Valley relies on ground water for nearly all of its water supply. Agriculture uses about 85% of the resource (about 50,000 acre feet per year) and residential and commercial users consume the rest. Ground water levels in the Pajaro Valley are below sea level much of the year, and in some areas of the coast seawater intrusion extends as much as 2 miles inland. In 1980, the State Department of Water Resources identified the Pajaro Valley Basin as one of eleven basins with critical conditions of overdraft. The increase in population in the four major cities of the watershed – Watsonville, Hollister, Gilroy, and Morgan Hill, along with the development of rural and agricultural areas reliant on ground water, contributed to the overdraft, as did a shift in the types of crop grown. Because no single agency had jurisdictional authority to manage the entire ground water basin, in 1984, voters approved the formation of PVWMA to manage existing and supplemental water supplies in order to prevent an increase in, and to reduce long-term overdraft, land subsidence, and water quality degradation, and to ensure sufficient water supplies. A recycled water program was established after decades of planning and significant state and federal grant funding. In September 2009, the Watsonville Area Water Recycling Facility began delivering tertiary treated, disinfected recycled water through the Coastal Distribution System for use in irrigation. However, when the PVWMA raised rates to fund its programs, it was sued by local citizens and it lost in litigation. As a result, it is working on finding a more acceptable funding mechanism to enable it to reduce the still significant ground water overdraft in the valley.

Sonoma County Water Agency (SCWA)

The SCWA is the main entity responsible for supplying Russian River water to about 570,000 people throughout Sonoma County and neighboring Marin County. The region has experienced rapid population growth, accelerated urbanization and agricultural development over the past few decades. Until very recently the agency relied on imported Eel River water stored in Lake Mendocino reservoir to recharge its underlying aquifer. It also relied on water stored in a second reservoir, Lake Sonoma. The listing of both Eel and Russian River salmonids under the Endangered Species Act resulted in mandates by the National Marine Fisheries Service to (1) reduce Eel River flows into the Russian River, (2) reduce summertime flows in the mainstem Russian River and on Dry Creek (the conduit for Lake Sonoma water), and (3) enhance habitat on Dry Creek. This led to an increased effort by the agency to diversify its water supply and management strategies, including both conservation and the conjunctive management of surface and ground water. Ground water conditions have changed significantly since the state conducted studies 20–25 years ago, and there is current concern regarding the degradation of water quality from seawater intrusion, high nitrate concentrations, and mixing with waters high in mineral content. The agency is working with scientists from the U.S. Geological Survey to evaluate ground water resources in several basins to

develop a detailed understanding of the ground-water/surface-water system, including the Santa Rosa Plain, and Sonoma Valley.

Analysis

Each agency's approach to water supply planning has been influenced by its legacies of access along with its region's physical, economic and demographic characteristics. Increasingly, state and federal mandates and funding have provided strong incentives for each agency to move in specific directions. Thus Federal Endangered Species Act requirements were one important catalyst for the SCWA to propose a modification of its pending State Water Resources Control Board application for additional water rights, and to put on hold its plans for a new transmission system to move water from Lake Sonoma to the Russian River. Instead it is pursuing a diverse set of strategies, including ground water studies, as a way to secure a more sustainable and long-term supply for the region. Likewise, the state's Urban Water Management Plan requirements were a factor in the City of Santa Cruz' decision to explore a more proactive drought planning strategy through a conjunctive management partnership with neighboring Soquel Creek. With the help of government funding, PVWMA is now also able to implement its plan to utilize tertiary treated water for irrigation. However, after losing litigation regarding its rates under Proposition 218, the agency needs to find an acceptable funding mechanism to solve the ground water overdraft in the Pajaro Valley, balance the basin, and stop seawater intrusion. While all the agencies are attempting to move towards more sustainable water supply management, at this time none of the agencies have specific plans to establish reserves to reduce their vulnerability to an extended drought.

Publications

Ruth Langridge, "Confronting Drought: Water Supply Planning and the Establishment of a Strategic Groundwater Reserve," *University of Denver Water Law Review, Volume 12 Issue 2, Spring 2009*

Collaborative Efforts

A collaborative effort has been initiated with Professor Andrew Fisher in the Department of Earth and Planetary Sciences at the University of California, Santa Cruz for the next phase of this research. We have also had discussions with Professor John Dracup, Department of Civil and Environmental Engineering at the University of California, Berkeley, and Dr. Larry Dale at Lawrence Berkeley Laboratories for new work on the energy costs of pumping groundwater.

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