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California Drought Fact Sheet Series 4
Informing the general public about the 2012-16 drought

Drought and Water Policy

How do farmers get their water?

As of 2010, farmers in California irrigated their crops with 62% surface water and 38% groundwater [1]. However, surface water deficits during this drought are favoring a shift to further groundwater use.

Surface Water: California farmers rely on a network of federal, state, and local water projects to deliver water to their fields. Among the most important of these projects are the federal Central Valley Project (CVP) that delivers water from Northern California and the Sierra foothills to the Central Valley, and the State Water Project (SWP) that transports water to Northern and Southern California, the San Joaquin Valley, and the Central Coast. These large-scale projects transmit water across California, and the state's many agricultural water contractors and irrigation districts act as distributors by delivering this water to farmers [2].

In an average year, the SWP delivers to farmers 1 million acre-feet (MAF) [3] of water, and the CVP delivers 5 MAF [4]. However, allocations have been dramatically reduced during the current drought. The Department of Water Resources cut all SWP contracted allocations, including those to agriculture, to 20% in 2015 [5]. The US Bureau of Reclamation had to fully eliminate the agricultural share of CVP allocations for many agricultural contractors. These cuts were made to meet the minimum water delivery amounts to preserve public health and safety for municipal and industrial water users. However, some Delta farmers retained 75% of their allocations by agreeing in advance to cut use by 25% [6, 7].

Photo courtesy of Bureau of Land Management

Central Valley Project Canals.

Groundwater: Before the 2014 Sustainable Groundwater Management Act, California had little statewide jurisdiction over groundwater, and landowners overlying groundwater had been able extract it and put it to reasonable and beneficial use largely without legal obstacles.

In 2014 and 2015, the drought caused surface water shortages of 37% and 48% respectively (compared to 2010). Groundwater was used to largely make up for this missing surface water. As such, groundwater use increased by 61% in 2014 (around 5 extra MAF) and 72% in 2015 (approximately 6 extra MAF) [8, 9, 10].

However, chronic overdependence on groundwater is unsustainable. The massive growth in groundwater pumping in recent years risks serious overdraft—withdrawal of groundwater faster than it is replenished—and has led to subsidence of the soil and reduced aquifer storage capacity [11]. Overdraft during relatively minor drought years is already quite significant; for instance, from 2003-2009, the Central Valley used a net 26 MAF of groundwater. Thus, the accelerated withdrawal during this drought may damage the long-term viability of the state's groundwater resources [12].

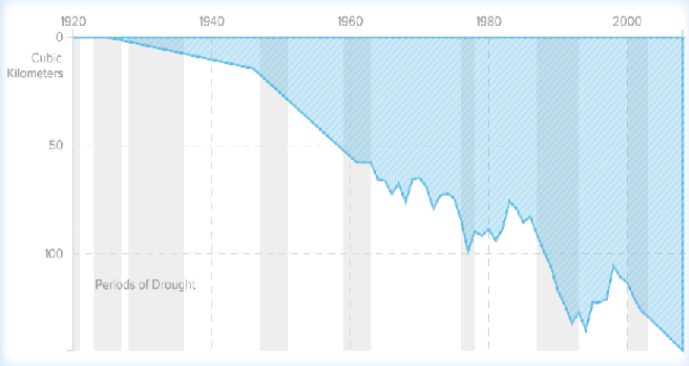

Image: Water in the West, Stanford University

Cumulative groundwater depletion from the Central Valley, 1920-2008 (drought years in gray). 140 cubic kilometers were depleted by 2008 — 4.5 times the volume of Lake Mead, America's largest reservoir.

California Water Rights

California's water law defines both groundwater rights (generally unrestricted overlying rights) and surface water rights (most significantly, riparian and appropriative rights) in order to manage the state's water resources. However, it can be difficult to incentivize conservation.

Riparian Rights: the owner of a parcel of land that borders a body of water has the right to use that water, without needing a permit. The water must be used on the parcel that is connected to the water. All riparian right owners along a body of water have the same priority and must share the water according to their needs, including in drought years [13].

Appropriative Rights: a first-come, first-served system of water use rights. Appropriative rights were conceived during the Gold Rush, when miners set up a system of temporal priority to divvy up water used on their claims. A formal permit system was developed in 1914, but until then, no formal permission was needed to stake an appropriative rights claim. Rights that predate 1914 are almost never curtailed due to their temporal priority.

The State Water Resources Control Board (SWRCB) typically cuts usage by junior rights holders before calling for similar cuts from senior rights holders [13]. However, for the first time since 1977 (an intense drought year), the SWRCB ordered some pre-1914 senior rights holders in 2015 to stop diverting water from rivers. Some of these water users, concerned about damage to their livelihoods, are choosing litigation over compliance [14].

Barriers and Incentives to Conserve

One of the barriers to conservation is a "use it or lose it" rule regarding appropriative rights. Those who use less than their maximum allocation for 5 years risk losing the right to any portion of the water that they had not been utilizing [15].

To address this problem, California has a system for water transfers between willing buyers and sellers. This market was established in the late 1970s as a means of allocating water to areas in need during dry years. California's water code was updated to protect water rights holders from losing their rights in the case of water transfers. Southern California, San Joaquin Valley, and Sacramento Valley are the state's leading suppliers of water for trades, and Southern California and the San Joaquin Valley are the largest demanders (primarily for urban and agricultural uses respectively) [16].

Photo: Paul Harnes/California Department of Water Resources

Many of the recent water transfers due to crop idling have been from rice fields.

What progress is being made?

While the state and its agricultural sector are becoming increasingly strapped for water, both farmers and policymakers are making important steps towards a more sustainable water regime in California.

In an act of collaborative foresight, farmers holding riparian rights in the San Joaquin-Sacramento Delta volunteered in May 2015 to cut their water usage by 25% during the growing season in exchange for the state's guarantee that further cuts will not be required of them [7].

Policymakers have taken an important step to manage California's groundwater use through the 2014 Sustainable Groundwater Management Act, the strongest legislation that the state has passed on groundwater. This law mandates the formation of a local Groundwater Sustainability Agency (GSA) for each of the state's 127 identified groundwater basins, empowered to monitor, investigate, charge fees for, or otherwise limit groundwater pumping. The Department of Water Resources has categorized basins along a scale of management priority—very low, low, medium, or high priority—and requires the GSAs of medium and high priority basins to submit groundwater sustainability plans in 5-7 years that will guide each basin to sustainable groundwater use within 20 years [12].

1. http://pubs.usgs.gov/circ/1405/pdf/circ1405.pdf
2. http://www.acwa.com/content/california-water-series/californias-water-california-water-systems
3. http://www.water.ca.gov/swp/cvp.cfm
4. http://www.usbr.gov/mp/cvp/about.html
5. http://www.water.ca.gov/swpao/deliveries.cfm
6. http://www.usbr.gov/mp/cvp-water/docs/1-cvp-water-quantities-allocation.pdf
7. http://www.nytimes.com/2015/05/23/us/some-california-farmers-to-cut-water-use-to-ease-drought.html?_r=1
8. https://watershed.ucdavis.edu/files/biblio/DroughtReport_23July2014_0.pdf
9. https://watershed.ucdavis.edu/files/biblio/Final_Drought%20Report_08182015_Full_Report_WithAppendices.pdf
10. http://www.ppic.org/main/publication_quick.asp?i=1160
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12. http://www.watereducation.org/sites/main/files/file-attachments/groundwater_act_handbook.pdf
13. http://www.waterboards.ca.gov/waterrights/board_info/water_rights_process.shtml
14. http://www.sacbee.com/news/state/california/water-and-drought/article26994334.html
15. https://www.co.sutter.ca.us/pdf/pw/wr/gmp/WaterRightsSummary.pdf
16. http://www.water.ca.gov/watertransfers/docs/Background_and_Recent_History_of_Water_Transfers.pdf

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