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California Drought: Water Supply and Conveyance Issues

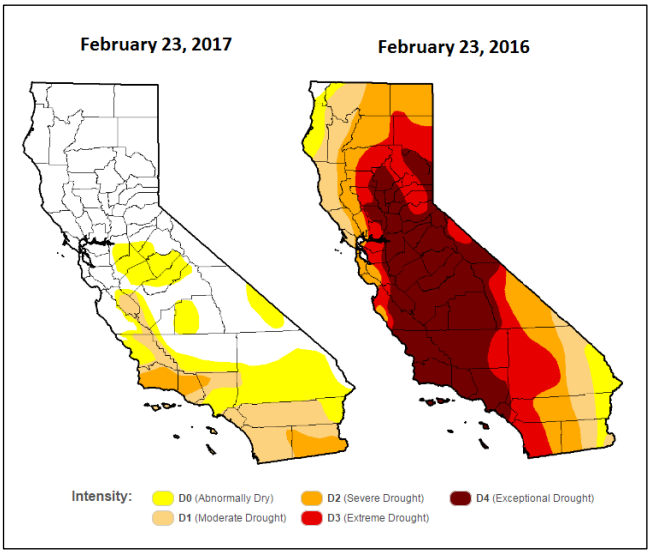
Overview

Despite recent rain, snowstorms, and severe flooding, portions of California—primarily the south-central coast and Southern California—continue to experience moderate to severe drought. (See **Figure 1**.) Compared to a year ago, however, statewide conditions have improved greatly. The 2015-2016 winter was the driest since recordkeeping began in the 1950s, but the 2016-2017 winter is shaping up to be one of the wettest. Although recent months have brought intense precipitation, more may be needed to replenish groundwater supplies depleted by five years of drought. Ongoing drought conditions in California are of continued interest to Congress.

Despite the recent precipitation and even flooding in some areas, some portions of California may be entering a sixth year of drought; water deliveries to municipal water and irrigation districts from federal and state water projects may still be curtailed. It is not clear if, or by how much, above-normal precipitation in 2017 will ease drought conditions in remaining dry areas or how water supply will be affected.

A drought declaration made by the governor on January 17, 2014, remains in effect, as do statewide water conservation measures.

Figure 1. California Drought: Feb. 2017 and Feb. 2016



Source: U.S. Drought Monitor at http://droughtmonitor.unl.edu/Home/StateDroughtMonitor.aspx?CA.

U.S. Department of Agriculture secretarial drought designations also remain in place for approximately two-thirds of the state (24 primary and 8 contiguous counties), as of February 22, 2017. Such federal declarations make available emergency loans, which partially compensate for losses for producers who cannot obtain commercial credit.

Unlike many other states, California has a vast water-supply system composed of the State Water Project (SWP) and the federal Central Valley Project (CVP). Both projects supply water to irrigation and water districts throughout much of the state. The SWP primarily provides water to municipal and industrial (M&I) users and some agricultural users. The SWP announced an increase in water deliveries for 2017 over 2016, but deliveries remain curtailed (60% of contracted supply), as of January 18, 2017.

The CVP supplies water to hundreds of thousands of acres of agricultural land throughout the state, as well as to some wildlife refuges and M&I water users. In 2015, water deliveries to some entities with CVP water contracts were cut by 100% (i.e., the users received no CVP water). For senior water rights contractors, CVP supplies were reduced by 25% in 2015. In 2016, the Department of the Interior's Bureau of Reclamation cut back water deliveries to some CVP water users. Water deliveries for many CVP contractors were announced at 100% on February 28, 2017; however, allocations for some water service contractors have not yet been announced.

> Congress funds and oversees the Central Valley Project, which in a "normal" water year delivers an average of approximately 7 million acre-feet of water—an estimated 20% of California surface water withdrawals.

Major CVP and SWP pumps that move water to Central and Southern California are located at the southern portion of the Sacramento and San Joaquin Rivers' Delta confluence with the San Francisco Bay (Bay-Delta). Approximately 22 million people receive water from the Bay-Delta annually. Curtailed operation of the pumps and the CVP water deliveries have been the subject of much congressional debate; Congress directed increased flexibility in pumping levels in the Water Infrastructure Improvements for the Nation (WIIN) Act (P.L. 114-322, Subtitle J), enacted in December 2016.

What's at Stake?

Drought conditions in California over the past five to six years, combined with restrictions on CVP and SWP operations to protect water quality, fish, and wildlife, affected several sectors and areas. Many cities and counties instituted water rationing, some fish and bird populations declined, and the governor mandated a 25% cutback in nonagricultural water use statewide.

California agriculture remains the nation's largest producer in terms of cash farm receipts—accounting for 12.5% ($47 billion) of the U.S. total in 2015, the last year for which data are available. Although California's 2015 receipts were down 17% from 2014, producers with access to groundwater or other water supplies saw receipts grow

despite the drought, and some even expanded production. Others had to fallow land or uproot orchards and vines due to drought. Some livestock producers had to purchase supplemental hay and grain.

Low water supplies could have ramifications beyond the state, resulting in higher product prices for some commodities—particularly those for which California is the primary producer (e.g., almonds). California produces 65% of the nation's noncitrus fruit and nuts. However, where crop substitutes exist, or where the crops can be grown elsewhere, prices may not be immediately affected.

Some cities' and farms' access to groundwater or transferred surface water helped some users adjust to dry conditions. However, even with improved drought conditions and surface water storage, low groundwater levels and land subsidence due to groundwater pumping during the last five years of drought may persist. California has enacted a statewide law that will increase groundwater planning and monitoring, but implementation will take many years.

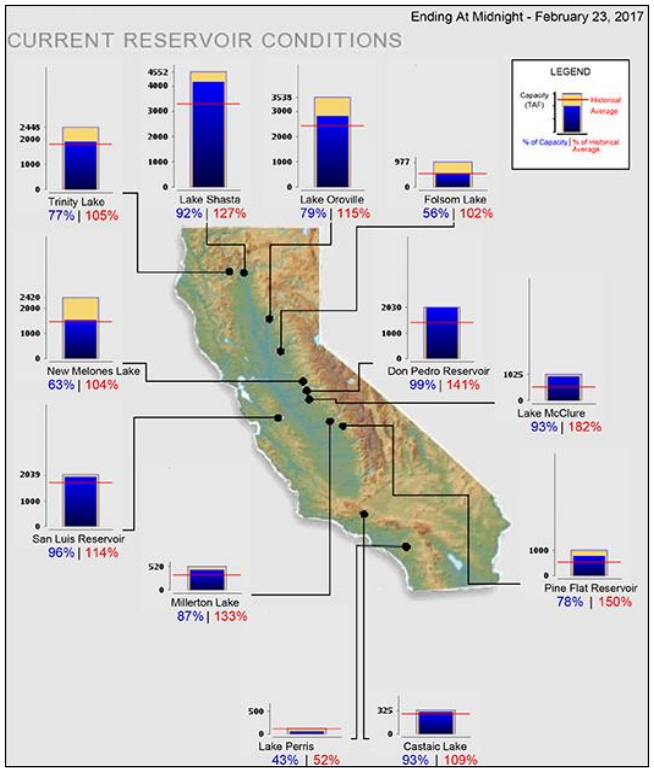
Long-term drought also affects electric power production, recreation, air quality, and fish and wildlife. For example, some salmon runs experienced a 95% loss of eggs laid in 2015, and a June 2016 survey of Delta smelt found 13 adult smelt, the lowest catch in the history of the survey (the total population is estimated at 13,000—a record low), according to the U.S. Fish and Wildlife Service. Although recent rains and projected runoff may improve conditions for salmon and smelt, poor ocean conditions in 2015 and 2016 will affect adult returns for coho and Chinook salmon; thus, 2017 returns remain uncertain. Preseason projections for 2017 salmon returns will be available in the spring.

Storage and Hydrologic Status

In early 2017, water levels at most of California's largest reservoirs are well above their historic averages. (See **Figure 2.**) The water content of snow in the Sierra Nevada Mountains is also well above average. Snowpack is a major part of water storage for the state.

Snowpack in the Northern Sierra/Trinity Mountains is 161% of normal for this time of year. Snowpack in the central and southern Sierra Mountains is 193% and 204% of normal for this time of year, respectively. A major question for water supply moving into the spring and summer months is when and how rapidly snow melt and runoff might begin. A warming trend could force reservoir managers to release water from reservoirs to allow space for incoming runoff. If storms upon which these decisions are based fail to materialize, or if runoff is less than projected, the result may be less water in reservoir storage for coming dry months. How to balance competing reservoir storage space for water supply versus flood storage is a major challenge for both state and federal reservoir operators.

Figure 2. Major California Reservoir Levels



Source: California Data Exchange Center, *Selected Reservoirs Daily Graphs—Water Supply*, at http://cdec.water.ca.gov/reservoir.html.

Note: The red lines indicate percentage of historical average for the same time of year, whereas the blue bars represent percentage of total reservoir capacity.

Regulatory Factors and Congressional Activity

Water project operations and deliveries are determined not only by hydrologic and storage conditions but also by state and federal regulatory requirements on CVP and SWP operations. These requirements affect how much water is delivered from the projects. State water rights priorities and Reclamation contracts also affect water allocation. Many water users have called for modifying regulations to allow for more water transport and deliveries; some fishermen and environmental groups believe such changes may risk extinction of species.

The 114th Congress addressed CVP and SWP project operations in Subtitle J of P.L. 114-322 by adding some flexibility in project operations. (See CRS In Focus IF10536, *Water Infrastructure Improvements for the Nation Act (WIIN)*, by Nicole T. Carter et al.) Additional legislation to provide more water to water users has been introduced in the 115th Congress (e.g., H.R. 23). Oversight of how the Trump Administration implements P.L. 114-322 is also likely in the 115th Congress.

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