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Central Valley Project (CVP) Operations: In Brief

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Summary

California is in its fifth year of drought. Rain and snowstorms in Northern and Central California in the winter of 2015-2016 improved but did not eliminate drought conditions in the state. According to the U.S. Drought Monitor, as of May 31, 2016, approximately 59% of the state was suffering from severe drought conditions. This figure represents an improvement from one year ago, when 94% of the state was under a severe drought designation.

The stress on water supplies due to the drought has resulted in cutbacks in water deliveries to districts receiving water from federal and state facilities, in particular the federal Central Valley Project (CVP, operated by the Bureau of Reclamation within the Department of the Interior) and the State Water Project (SWP, operated by the state of California). In 2015, California Governor Jerry Brown mandated a 25% reduction in water use for nonagricultural users. In 2016, the State Water Resources Control Board (SWRCB) relaxed some of these restrictions and set new requirements for drought operations and planning. However, the drought declaration made by Governor Brown on January 17, 2014, remains in effect.

On April 1, 2016, the Bureau of Reclamation announced its initial water allocations for CVP contractors for the 2016 water year. Despite the improved precipitation and water supplies in 2016 (especially in the northern and central parts of the state), some CVP contractors are projected to see a fourth straight year of curtailments to their water supplies. Particularly hard hit have been contractors south of the Sacramento and San Joaquin Rivers' Delta (Bay Delta).

Congress is considering legislative proposals that would attempt to address western drought issues in several pending bills in the 114th Congress. These bills include, among other approaches, provisions that would alter the Bureau of Reclamation's authorities to operate the CVP, as well as provisions that would affect Bureau of Reclamation projects throughout the West. The two bills that have received the most attention to date are H.R. 2898 and S. 2533; however, several related bills have incorporated drought-related text and could be acted upon in 2016.

Cutbacks in water supplies to CVP contractors during a period of increased precipitation have caused some to criticize the management of the CVP by the Bureau of Reclamation and insist that more water should be pumped to users. Some also question the extent to which other factors beyond drought (e.g., restrictions to protect endangered species and other regulatory requirements) are the underlying cause of water shortages. Some supporters of these bills contend that the proposed congressionally directed changes in the operation of the CVP would result in much-needed increases to water allocations for agriculture and municipal contractors. Opponents argue that some of the proposed changes would undercut environmental regulations, harm fish and wildlife, and potentially lower water quality. Opponents further contend that some of the proposed provisions in these bills would alter the implementation of the Endangered Species Act (ESA), potentially resulting in a precedent for all listed species. However, supporters of the bills note all provisions would be implemented in a way that is consistent with existing laws, including ESA.

This report provides an abbreviated summary of recent hydrologic conditions (including precipitation and reservoir levels) in California and their effect on water deliveries, in particular those related to the federal CVP. In addition, it summarizes some of the issues pertaining to CVP operations that are being debated in the 114th Congress.

Contents

Figures

Tables

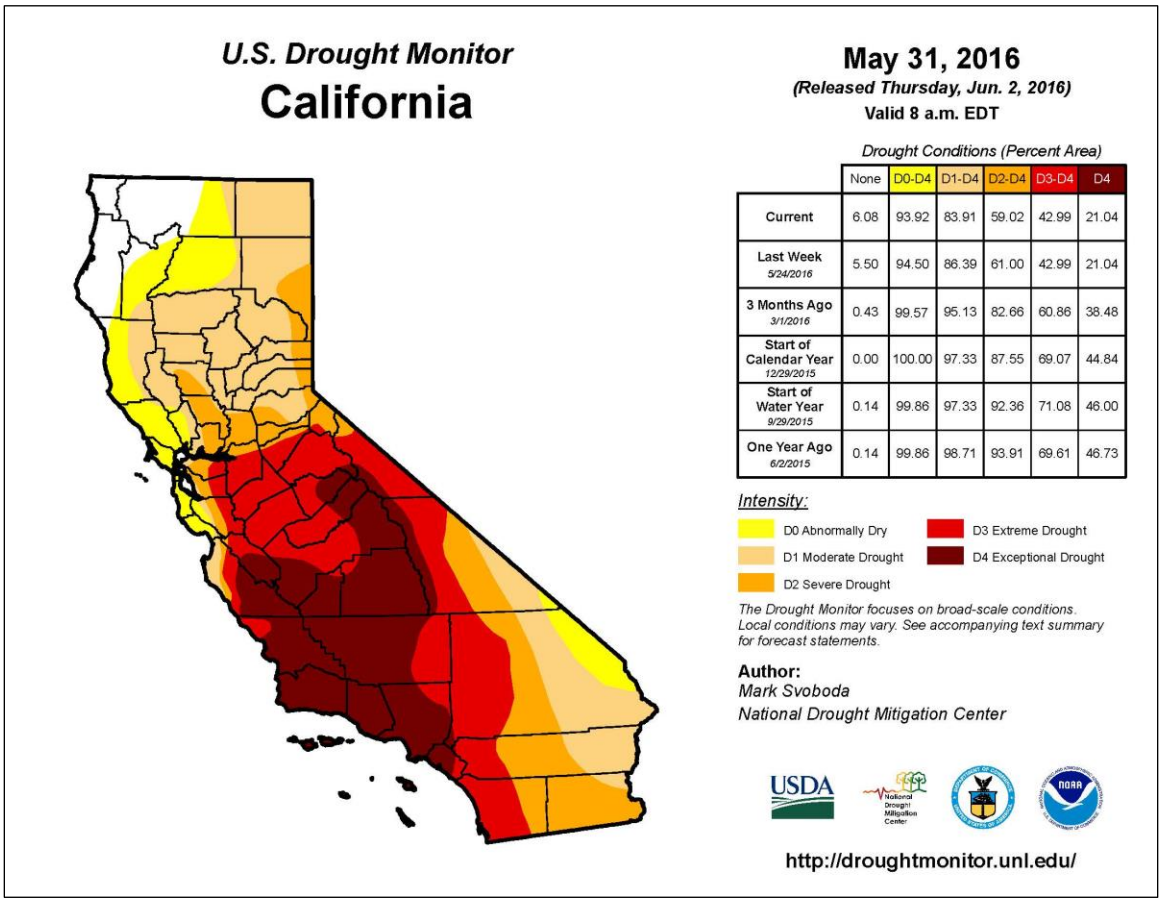
Contacts

Background

California is in its fifth year of drought. Rain and snowstorms in Northern and Central California in the winter of 2015-2016 improved hydrologic conditions but did not eliminate the state's ongoing drought. As shown below in **Figure 1**, as of May 31, 2016, approximately 59% of the state was suffering from severe drought conditions. This figure represents an improvement from three months ago, when 83% of the state was in the severe drought category, and one year ago, when 94% of the state fell under this designation. The current drought is the result of extensive dry conditions in recent years. The previous four years have been classified as below normal (2012), dry (2013), and critically dry (2014 and 2015).

Figure 1. U.S. Drought Monitor: California

(conditions as of May 31, 2016)



Source: United States Drought Monitor, "U.S. Drought Monitor: California," at http://droughtmonitor.unl.edu/Home/StateDroughtMonitor.aspx?CA.

The stress on water supplies due to the drought has resulted in cutbacks in water deliveries to districts receiving water from federal and state facilities. A drought declaration made by California Governor Jerry Brown on January 17, 2014, remains in effect. In 2015, the governor mandated the first-ever 25% statewide reduction in water use for nonagricultural users.[1] On May

[1] Although not mandated by the governor, some agricultural water contractors with senior water rights voluntarily (continued...)

18, 2016, the State Water Resources Control Board (SWRCB) adopted a new regulation that replaces the prior percentage reduction-based water conservation standard with a localized "stress test" approach.[2]

On April 1, 2016, the Bureau of Reclamation (Reclamation; part of the Department of the Interior) announced its estimated annual water allocations for federal Central Valley Project (CVP) contractors in water year 2016 (October 2015 through September 2016).[3] For many contractors, allocations are expected to be significantly below contracted amounts.

This report provides high-level summary information on precipitation and reservoir levels in California and their impact on water deliveries (in particular, on those deliveries related to the federal CVP). It also summarizes some of the issues pertaining to CVP operations that are being debated in the 114th Congress.

Hydrologic Status

As noted above, as of late May 2016, 59% of California remained in *severe* drought, with 42% in *extreme* drought and 21% in *exceptional* drought.[4] These figures all represent significant improvements over both the beginning of the water year and one year ago. Improvements were due in part to the El Niño-Southern Oscillation phenomenon, which led to increased precipitation and streamflows in some parts of the state in the winter of 2015-2016.

As a result of the recent uptick in precipitation, water levels at several of California's largest reservoirs rebounded in early 2016 (see **Figure 2**). In particular, heavy rains in Northern and Central California in January and March 2016 significantly improved conditions at the state's two largest reservoirs: Shasta Reservoir (operated by Reclamation) and Lake Oroville (operated by the state of California). As of late May 2016, both reservoirs held more water than 100% of their historical averages for that date. Notably, other major reservoirs (especially those south of the Sacramento and San Joaquin Rivers' Delta confluence with the San Francisco Bay, known as the Bay-Delta) did not benefit to the same extent from the higher precipitation levels, and the southern part of the state is expected to remain under drought status.[5]

(...continued)

reduced their water usage by 25%, as well. See California Water Boards, "State Water Board Approves Voluntary Cutback Program for Delta Riparian Water Rights," press release, May 22, 2015, at http://www.swrcb.ca.gov/press_room/press_releases/2015/pr052215_riparian_proposal.pdf.

[2] The standards require local water agencies to ensure a three-year supply assuming three more dry years like those the state experienced from 2012 to 2015. Agencies that would face shortages under these scenarios must meet a conservation standard equal to the amount of shortage. For more information, see California Water Boards, "36 Month Urban Water Supply Now Basis for Local Emergency Water Conservation Efforts," updated May 18, 2016, at http://www.waterboards.ca.gov/water_issues/programs/conservation_portal/docs/factsheet/fs051816_mediaemergreg.pdf.

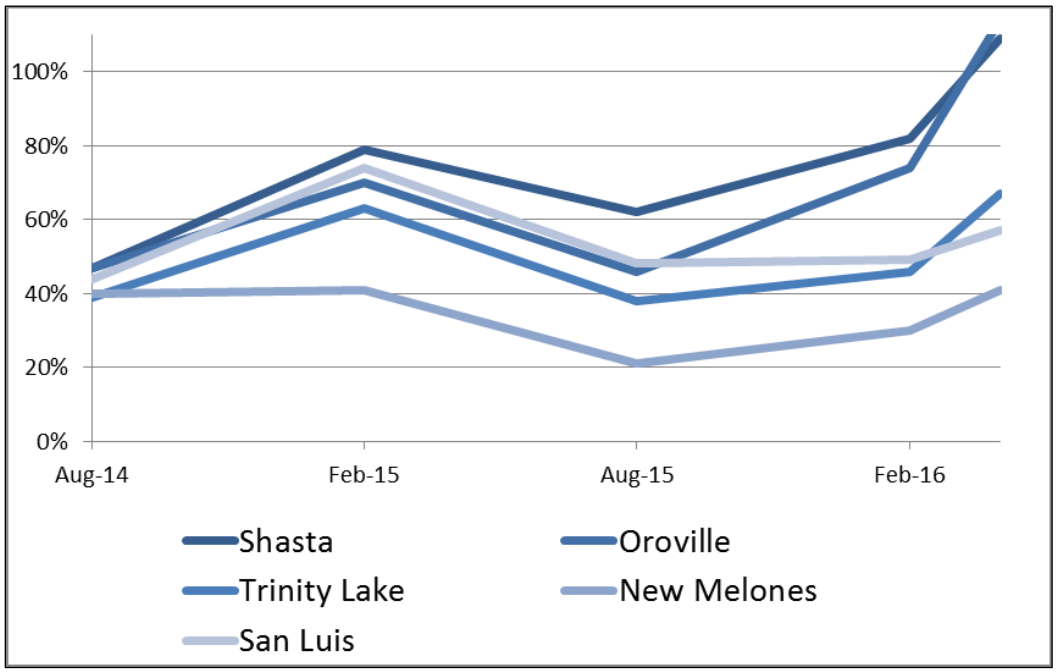
[3] The contract year for most Central Valley Project (CVP) contractors runs from March 1 to February 28.

[4] United States Drought Monitor, "U.S. Drought Monitor: California," May 31, 2016, at http://droughtmonitor.unl.edu/Home/StateDroughtMonitor.aspx?CA.

[5] National Weather Service, Climate Prediction Center, "U.S. Seasonal Drought Outlook: March 17-June 30, 2016," at http://www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_summary.php.

Figure 2. Water Levels at California's Five Largest Reservoirs

(percentage of historical average, August 2014-April 2016)



Source: CRS, based on data from California Department of Water Resources, "California Data Exchange Center—Reservoirs," at http://cdec.water.ca.gov/reservoir.html.

Another hydrologic metric is the water content in snow in the Sierra Nevada Mountains. In normal years, the snowpack provides for approximately 30% of California's water needs. Water from snowpack typically melts in the spring and early summer, thus addressing water needs for the state in the late summer and fall. The April 1 snow water equivalent is another important measure of California's water supplies. As of early April 2016, statewide snow-water equivalent was 19.4 inches, or 70% of normal. Although this figure represents a significant improvement from this time in recent years and helped to ameliorate the widespread drought present at the end of 2015, it was short of both normal levels and the record precipitation that would likely be needed to end the current drought.[6]

Federal and State Water Project Deliveries

Recent proposals and debates related to state and federal water allocations in California revolve around two major water projects that are significant for the state's agricultural and municipal water suppliers: the Federal Central Valley Project (CVP) and the State Water Project (SWP). Major CVP and SWP pumps that supply water for Central and Southern California are located at the southern end of the Bay-Delta. Thus, CVP allocations typically distinguish between "North-of-Delta" and "South-of-Delta" users.

[6] Snow-water equivalent to date is available at http://cdec.water.ca.gov/cdecapp/snowapp/sweq.action.

Central Valley Project Deliveries

Each year, Reclamation announces estimated deliveries for its CVP contractors in the upcoming water year.[7] The CVP—which covers approximately 400 miles in California, from Redding to Bakersfield—supplies water to hundreds of thousands of acres of irrigated agriculture throughout the state, as well as to some wildlife refuges and municipal and industrial (M&I) water users. In a normal water year, the CVP delivers, on average, approximately 7 million acre-feet of water to contractors (including 5 million acre-feet to agricultural contractors). In recent years, Reclamation has made significant cutbacks to water deliveries for many CVP contractors due to the drought, among other factors.

On April 1, 2016, Reclamation announced its initial allocations for the upcoming water year (allocations for 2016 are shown below in **Table 1**). In contrast to recent years, Reclamation estimated that, as a result of recent rains, it would be able to provide some level of water supplies for most CVP agricultural and M&I water service contractors. Sacramento River Settlement Contractors and San Joaquin River Exchange Contractors with senior water rights predating the CVP are expected to receive their full contract allotments in 2016.[8] (These contractors saw reduced allocations in 2014 and 2015.) However, most CVP South-of-Delta contractors,[9] including those in many of the state's largest and most prominent agricultural areas, will see severely curtailed water supplies for the fourth consecutive year.

Table 1. Water Allocations for CVP Contractors, 2012-2016

(percentage of maximum contract allocation)

	2012	2013	2014	2015	2016 (est.)
North-of-Delta Users					
Agricultural	100%	75%	0%	0%	100%
M&I	100%	100%	50%	25%	100%
Settlement	100%	100%	75%	75%	100%
Refuges	100%	100%	75%	75%	100%
American River M&I	100%	75%	50%	25%	100%
In Delta-Contra Costa	100%	75%	50%	25%	100%
South-of-Delta Users					
Agricultural	40%	20%	0%	0%	5%
M&I	75%	70%	50%	25%	55%

[7] Reclamation typically estimates these deliveries as a percentage of the total contract allocation to be made available for contractors within certain divisions, geographic areas, and/or contractor types (e.g., South-of-Delta Agricultural Contractors).

[8] Senior water rights holders are those known as the Sacramento River Settlement Contractors north of the Bay-Delta and the Exchange Contractors south of the Bay-Delta. Senior water rights holders have a combined first priority to approximately 3.0 million acre-feet of CVP water.

[9] South-of-Delta refers to contractors who reside south of the Bay-Delta, or south of the pumping stations that convey water into the CVP and the State Water Project (SWP).

	2012	2013	2014	2015	2016 (est.)
Exchange	100%	100%	65%	75%	100%
Refuges	100%	100%	65%	75%	100%
Eastside Division	100%	100%	55%	0%	0%
Friant Class 1	45%	45%	0%	0%	65%
Friant Class 2	0%	0%	0%	0%	0%

Source: U.S. Bureau of Reclamation, "Summary of Water Supply Allocations," at http://www.usbr.gov/mp/cvo/vungvari/water_allocations_historical.pdf.

Notes: CVP = Central Valley Project. "M&I" indicates municipal and industrial water service contractors. "Settlement" refers to contractors on the Sacramento River (North-of-Delta), and "Exchange" refers to contractors on the San Joaquin River (South-of-Delta) with special contracts and minimum delivery levels recognizing state water rights predating those acquired by the Bureau of Reclamation for construction and operation of the CVP. Contra Costa, Eastside Division, and Friant Class 1 and Class 2 represent individual or groups of water contractors.

State Water Project Deliveries

The other major water project serving California, the SWP, is operated by the state of California's Department of Water resources (DWR). The SWP primarily provides water to M&I users and some agricultural users. For 2016, SWP water deliveries are expected to be significantly higher than they were in 2015. On April 21, 2016, DWR estimated that in 2016, the SWP would be able to meet 60% of requested deliveries, or 2.5 million acre-feet.[10] The 2015 allocation was 20% of deliveries. Recent SWP deliveries are shown below in **Table 2**.

Table 2. California State Water Project Allocations

(percentage of maximum contract allocation)

	2012	2013	2014	2015	2016 (est.)
State Water Project	50%	65%	35%	5%	50%

Source: California Department of Water Resources, "State Water Project Allocation Increased," April 21, 2016, at http://www.water.ca.gov/news/newsreleases/2016/042116.pdf.

What Is at Stake?

The widespread nature of drought conditions—coupled with previous low water supplies in the state's major reservoirs and regulatory restrictions on CVP and SWP operations—has affected sectors and areas throughout California. Many cities and counties have instituted water rationing, some species populations have declined, and mandatory cutbacks have been put in place.

Although agriculture constitutes a much smaller percentage of California's economy than it did historically, California agriculture is still the nation's largest producer in terms of cash farm receipts—accounting for 12% of the U.S. total in 2014, the last year for which national data are available. According to the U.S. Department of Agriculture/National Agricultural Statistics

[10] See California Department of Water Resources, "State Water Project Allocation Increased," April 21, 2016, at http://www.water.ca.gov/news/newsreleases/2016/042116.pdf.

Service Crop Year Report, California farm and ranch receipts totaled $56 billion in 2014, an increase of $2 billion over 2013.[11] Those agricultural users with access to groundwater or other supplies have seen receipts grow despite the drought, but others have had to fallow land or uproot trees and shrubs. Some livestock producers have had to purchase supplemental hay and grain. Hundreds of thousands of acres have been fallowed because sufficient water was not available.[12] Fruit and nut orchards continue to rely on irrigation to keep trees alive.

The availability of other water supplies (e.g., groundwater or transferred surface water) has helped some agricultural users adjust to dry conditions. However, with much of the state categorized as a drought disaster area, whether other supplies will continue to be available is uncertain. Some areas already are experiencing low groundwater levels and land subsidence due to increased groundwater pumping. Groundwater provides about 45% of California's water supply in an average year; however, under drought conditions, such as in 2015, groundwater may supply as much as 65% of the state's water needs. Further, groundwater supplies may be limited or become too expensive to pump. California has enacted a statewide law that will increase groundwater planning and monitoring, but implementation will take many years.[13]

Drought also affects resource sectors other than agriculture. Certain water flows are critical for hydropower, recreation, and fish and wildlife. For example, cool temperatures are needed in waterways and lakes to maintain aquatic ecosystems and species viability. Some salmon runs experienced a 95% loss of eggs laid in 2015, and surveys of Delta smelt found fewer than five fish that year. In addition, recreational reservoirs, river-rafting opportunities, and recreational and commercial fisheries are all potentially at risk. California wetlands also provide Pacific Flyway habitat, which is critical to migrating birds.

Regulatory Factors

Complicating the hydrologic situation and water supply allocations is a complex web of state and federal regulatory requirements on CVP and SWP operations. These requirements affect how much water is delivered from the projects. They address releases of water from reservoirs and limits on pumping from the Bay-Delta to protect habitat, threatened and endangered species (e.g., salmon and Delta smelt), and water quality. In some years, pumping restrictions to protect state-set water quality levels, particularly increases in salinity levels, are greater than restrictions to protect endangered species.[14]

In wet years, restrictions under the federal Endangered Species Act (ESA; 16 U.S.C. §§1531 et seq.) may have a higher nominal impact on exports than water quality restrictions, and they may

[11] See U.S. Department of Agriculture, Economic Research Service, "State Fact Sheets," at http://www.ers.usda.gov/data-products/state-fact-sheets.aspx.

[12] One study has reported that the 2015 drought resulted in an estimated 550,000 acres fallowed. See Richard Howitt et al., *Economic Analysis of the 2015 Drought for California Agriculture*, UC Davis Center for Watershed Sciences, August 17, 2015.

[13] California's groundwater law establishes a framework that requires local agencies to manage groundwater in a sustainable manner. The law sets out a schedule that begins with the California Department of Water Resources adopting regulations for evaluating groundwater sustainability plans by June 1, 2016. It also requires formation of regional groundwater sustainability agencies, identifies high- and medium-priority basins in critical groundwater overdraft status, and implements the plans.

[14] Through the Porter-Cologne Act (a state law), California implements federal Clean Water Act requirements and authorizes the SWRCB to adopt water quality control plans, or basin plans (see Cal. Water Code §13160). The SWRCB oversees the allocation of water resources to various entities, has regulatory authority to protect water quality, and addresses flow requirements for fish.

have proportionally higher impacts in certain months. Due to overlapping state and federal restrictions, there is disagreement over how much water might be available absent such restrictions. Reclamation estimated that ESA restrictions accounted for a reduction of 144,000 acre-feet from the long-term average for CVP deliveries in 2014, while water quality restrictions accounted for 176,000 acre-feet. For 2015, Reclamation estimated that ESA accounted for approximately 144,000 acre-feet of reductions from the long-term average and has yet to provide an update for water quality restrictions. For its part, DWR estimated that SWP ESA restrictions resulted in a reduction of 47,000 acre-feet in water year 2014 and a reduction of 92,000 acre-feet in water year 2015. Such figures are not readily available for water quality restrictions.[15]

The ongoing cutbacks to CVP contractors in 2016 despite the recent increases in precipitation and water supplies in Northern and Central California have led some to criticize Reclamation's operation of the CVP and highlight the extent to which factors other than the drought (e.g., endangered species and water quality requirements) may bear responsibility for the curtailments. To address these concerns and provide more water to agricultural and municipal contractors, some have proposed, among other approaches, that Congress change Reclamation's authorities to operate the CVP, including its implementation of regulatory requirements under ESA that may restrict pumping operations. Others, however, are opposed to modifying the implementation of ESA regulations and propose water conservation, water recycling, and increased storage, among other strategies, to provide more water for users.

Congressional Response

Congress plays a role in CVP water management and has addressed the drought by facilitating water banking, water transfers, and new storage. In recent years, Congress has enacted other drought-related provisions, including extending authorization for the Reclamation States Emergency Drought Relief Act (P.L. 102-250), providing authority to incorporate water storage into dam safety projects (P.L. 114-113), and providing additional funding to Reclamation for western drought response in FY2015 ($50 million) and FY2016 ($100 million) Energy and Water appropriations bills.

Legislation that addresses CVP operations, among other drought-related issues, has been introduced and is under consideration in the 114th Congress. Selected bills receiving significant congressional and media attention include H.R. 2898, which was passed by the House on July 17, 2015. H.R. 2898's provisions are included in Division C, Title I of the House version of S. 2012, the Energy Policy Modernization Act of 2016 (passed by the House on May 25, 2016); S. 1894, which was introduced in the Senate on July 29, 2015; and S. 2533, which was introduced on February 10, 2016. Several other bills containing provisions that are similar to one or more of these bills have recently been introduced or acted upon.[16] These bills propose similar approaches to addressing some drought issues and different approaches to other issues, including how federal agencies would deliver CVP water supplies in relation to existing laws and regulations. For more on these bills and other drought-related issues, see CRS Report R44180, *Drought Legislation: Comparison of Selected Provisions in H.R. 2898 and S. 1894*, and CRS Report R43649, *Federal Response to Drought in California: An Analysis of S. 2198 and H.R. 3964*.

[15] Personal communication between the author and the California Department of Water Resources, March 30, 2016.

[16] For example, some or all of the House Appropriations Committee recommendations for the Bureau of Reclamation in the FY2017 Energy and Water Appropriations bill (H.R. 5055, §§204-206) also contained several provisions comparable to those in H.R. 2898. Finally, H.R. 5247, introduced on May 15, 2016, is identical to S. 2533.

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