CALIFORNIA HYDROLOGY UPDATE

CONDITIONS AS OF MARCH 31, 2025

The California Hydrology Update is a regular summary of current weather conditions in the State of California and serves as a supplement to the data on the California Water Watch website. It is produced by the California Department of Water Resources Hydrology Section and Sustainable Groundwater Management Office teams. For tips and resources on how to make water conservation a way of life, please visit saveourwater.com.

PRECIPITATION

At the end of March, the statewide average precipitation accumulation remained just above average conditions largely from a series of atmospheric rivers (during March 12-17) that passed through California. The statewide accumulated precipitation through the end of March 2025 was about 20.3 inches, which is 103% of average. The series of winter storms and atmospheric rivers that impacted California resulted in precipitation generally during March 1-3, 5-7, 12-18, 27-28, and 30-31 (shown in Figure 1).

Late March 1 to March 3, a trough and low-pressure system moved across the state, which resulted in widespread precipitation, cooler temperatures, and isolated thunderstorms. From March 5-7, another trough and low-pressure system traveled across California resulting in another round of widespread showers. Precipitation totals during March 1-7 included 0.5 to 3.0 inches over North Coast and Shasta Basin, up to 2.0 inches for Central Coast, 1.0 to 3.0 inches over Northern Sierra, 1.5 to 6.0 inches over Central Sierra, Southern Sierra, and Transverse Ranges, 0.5 to 4.0 inches for San Diego County, and up to

an inch for the rest of the state. During March 8-11, high pressure built near the state, which resulted in dry conditions across California.

For the March 12-18 period, the first atmospheric river made landfall over Northern California on March 12 and continued to travel south along the coast with weak atmospheric conditions. The first atmospheric river resulted in widespread precipitation along the coast, localized flooding, landslides, and heavy snow along Sierra Nevada and San Bernardino Mountains. Snow levels were around 6,000 feet on March 12 and dropped to around 5,000 feet during March 13. On March 15, the second atmospheric river made landfall over Southern Oregon and continued to travel south into Northern California and diminish once it reached Central California. The second atmospheric river resulted in heavy precipitation for Northern California (mainly along the border with Oregon). Precipitation totals for March 12-18 included 4.0 to 15.0 inches for the North Coast, 4.0 to 8.0 inches over Shasta Basin, 3.0 to 8.0 inches along Sierra Nevada, 0.5 to 3.0 inches in Central Valley, 1.5 to 6.0 inches for Central Coast, up to 2.0 inches for South Coast, and up to an inch for the rest of the state.

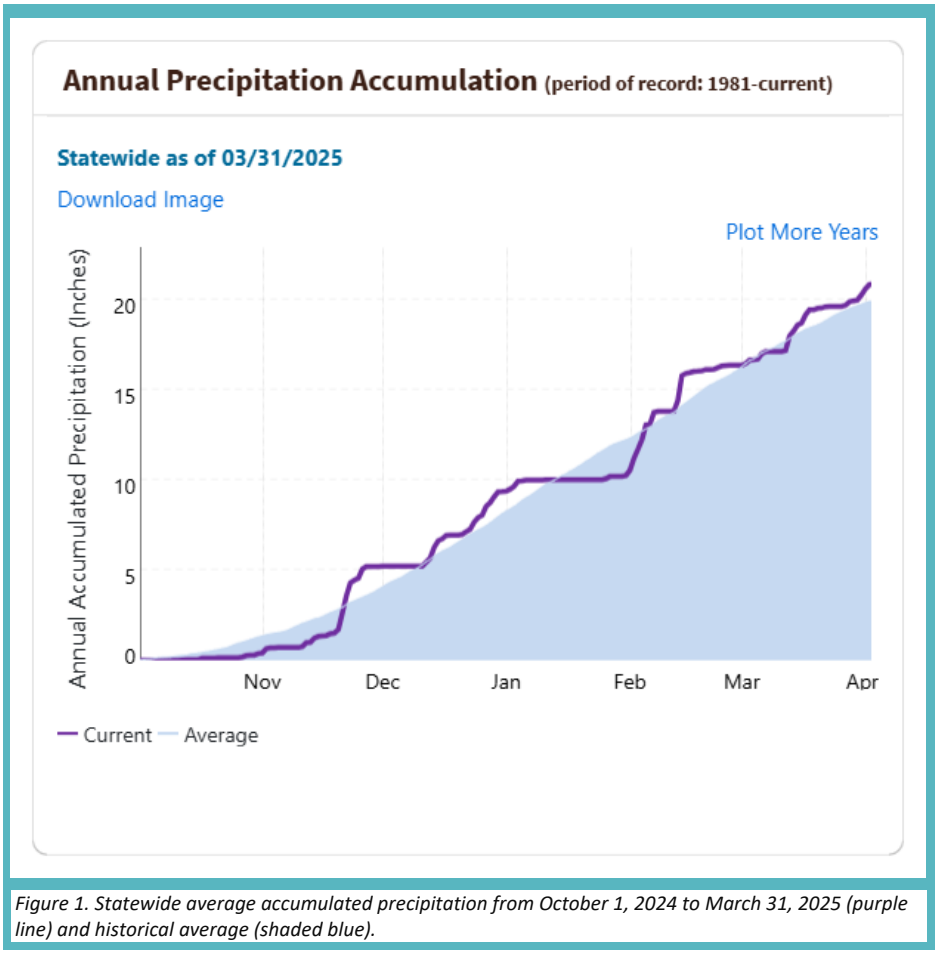

Figure 1. Statewide average accumulated precipitation from October 1, 2024 to March 31, 2025 (purple line) and historical average (shaded blue).

During March 19, a front and upper trough brought minor precipitation to Northern California (with higher amounts for the North Coast). During March 20-22, a series of shortwaves resulted in periods of additional showers over the North Coast and along the border with Oregon. High pressure began to build and resulted in dry conditions with higher temperatures from March 23-25. During March 26-28, a low-pressure system and trough traveled across California, which resulted in a few showers and isolated thunderstorms in Northern California and parts of Central California. While in between low-pressure systems, California was mostly dry during March 29. During March 30-31, another low-pressure system resulted in more widespread precipitation. Precipitation totals for March 25-31 included 2.0 to 10.0 inches for the North Coast, 3.0 to 6.0 inches over Shasta Basin, 1.0 to 6.0 inches along Sierra Nevada, 0.5 to 2.0 inches for Central Coast, up to 1.5 inches for the greater Bay Area, and up to an inch for Central Valley and South Coast.

As shown in Figure 2, for the water year to date through the end of March 2025, Northern California received above average accumulated precipitation, Central California received below to near average accumulated precipitation, and Southern California received well below average accumulated precipitation. The North Coast has accumulated about 57.5 inches of precipitation for the water year through end of March, which is 129% of average. The Sacramento River region has accumulated about 35.8 inches of precipitation for the water year through end of March, which is 118% of average. The San Joaquin River region has accumulated about 18.9 inches of precipitation for the water year through the end of March, which is 83% of average. The Central Coast has accumulated about 12.3 inches of precipitation for the water year through the end of March, which is 68% of average. The Tulare Lake region has accumulated about 11.3 inches of precipitation for the water year through the end of March, which is 85% of average. The South Coast has accumulated about 7.9 inches of precipitation for the water year through the end of March, which is 52% of average.

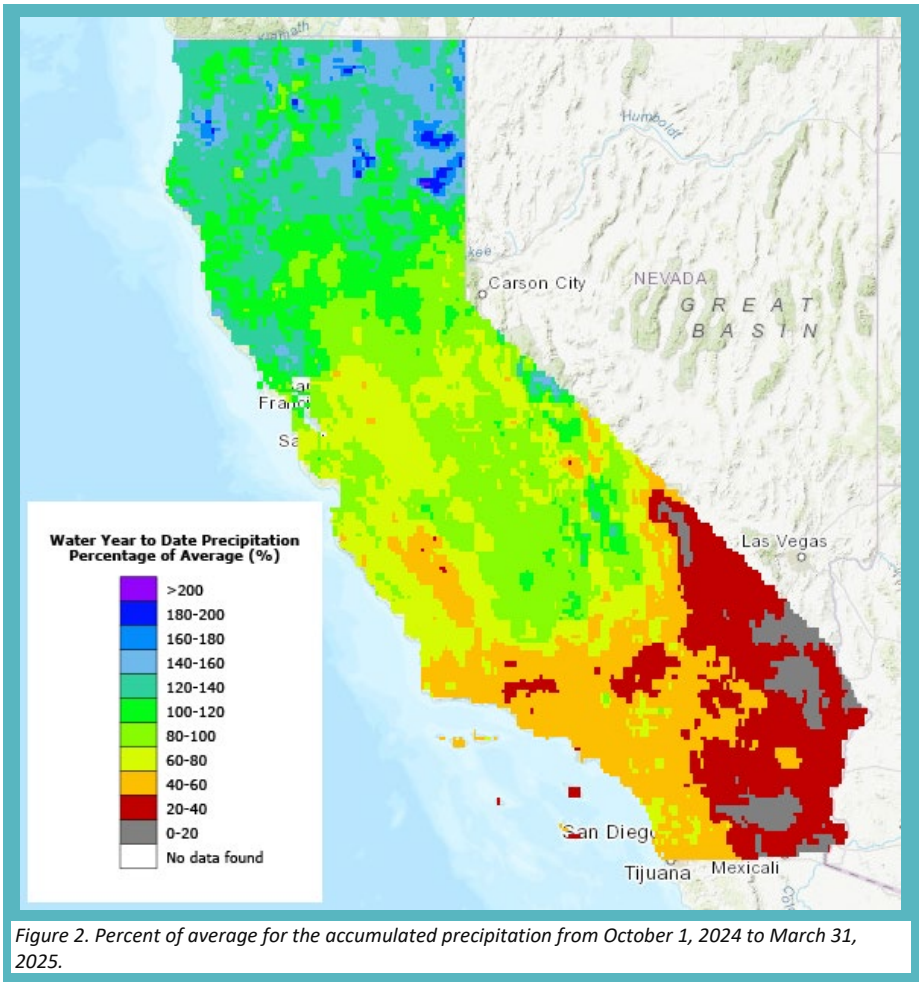

Figure 2. Percent of average for the accumulated precipitation from October 1, 2024 to March 31, 2025.

The Climate Prediction Center (CPC) monthly outlook issued on March 31, 2025, indicates equal chances of below, near, or above normal precipitation for Northern California, up to 40% chance of below normal precipitation for Central California, and 33-40% chance of below normal precipitation for Southern California during the month of April 2025. The CPC seasonal outlook covering the period of April 2025 through end of June 2025 indicates equal chances of below, near, or above normal precipitation for South Coast and up to 40% chance of below normal precipitation for the rest of California.

Sources: Statewide Hydroclimate and Water Supply Conditions, Forecast Information, Center for Western Weather Water Extremes (CW3E) Event Summaries, California Nevada River Forecast Center (CNRFC) Data Archive, Western Regional Climate Center (WRCC) Monthly Updates

TEMPERATURE

The statewide average temperature for the end of March was about 50.6°F, which is about 1 degree below the historical average for this time of year. The statewide average temperature was below average throughout March, excluding from about March 1-2 and 23-28 when it was above average. The statewide average temperature reached the minimum mean temperature on March 15 and the maximum mean temperature during March 25-26. The two graphs in Figure 3 show the statewide mean temperatures for the water year through March 31 (on the left) and the month of March 2025 (on the right).

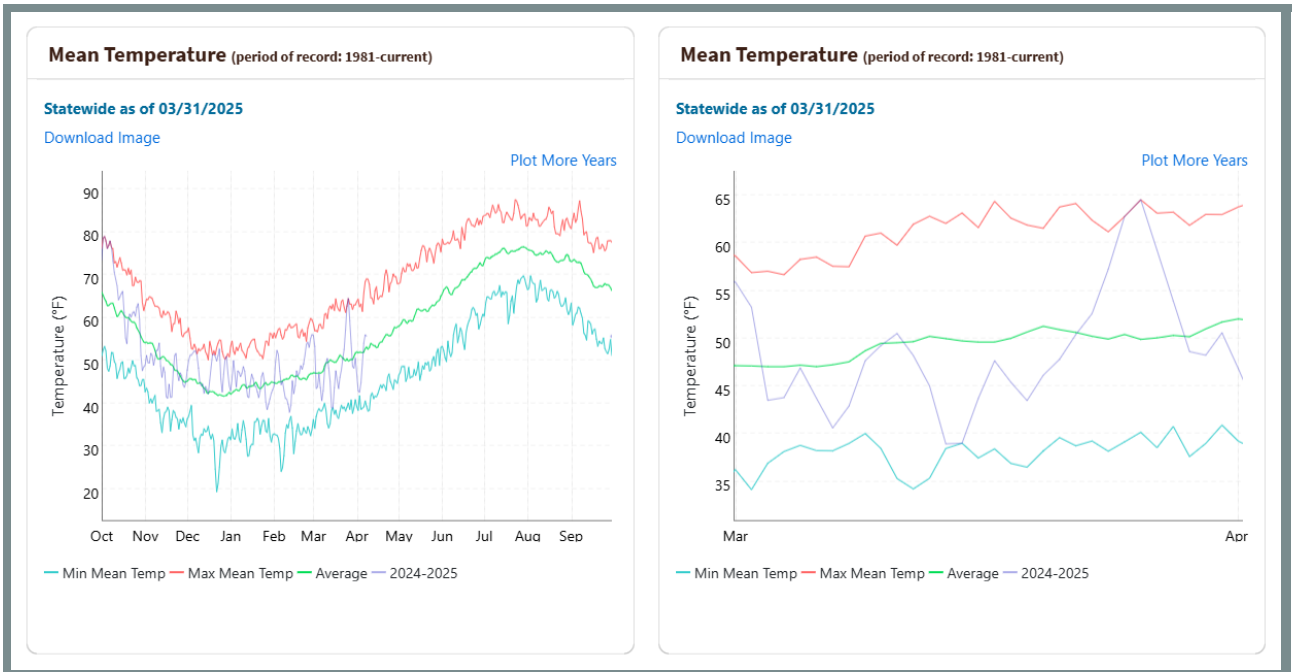

Figure 3. Water year 2025 statewide mean temperature is shown in dark blue as of March 31, 2025 (left) and displayed for the month of March 2025 (right).

According to the CPC, El Niño Southern Oscillation (ENSO) neutral conditions has returned during the past month and expected to continue during summer and greater than 50% chance through August-October 2025. The CPC temperature outlook issued on March 31, 2025 indicates equal chances of below, near, or above normal temperatures, up to 40% chance of below normal temperatures for Central California, and up to 50% chance of below normal temperatures for Southern California during the month of April 2025. The CPC seasonal outlook covering the period of April 2025 through end of June 2025 indicates 33-40% chance of above normal temperatures for Northern California and Central Valley, 40-50% chance of above normal temperatures along the borders with Nevada and Arizona, and equal chances of below, near, or above normal temperatures along Central and South Coast.

Sources: Statewide Hydroclimate and Water Supply Conditions, CPC 30-Day Forecasts

RESERVOIRS

Statewide reservoir storage at the end of March was 117% of average. As shown in Figure 4, most reservoirs have near or above average storage for this time of year.

Flood control reservoirs were able to maintain their storage to be near their respective top of conservation levels by making minor flood control releases (due to the greater inflow from atmospheric rivers and storms during the past month).

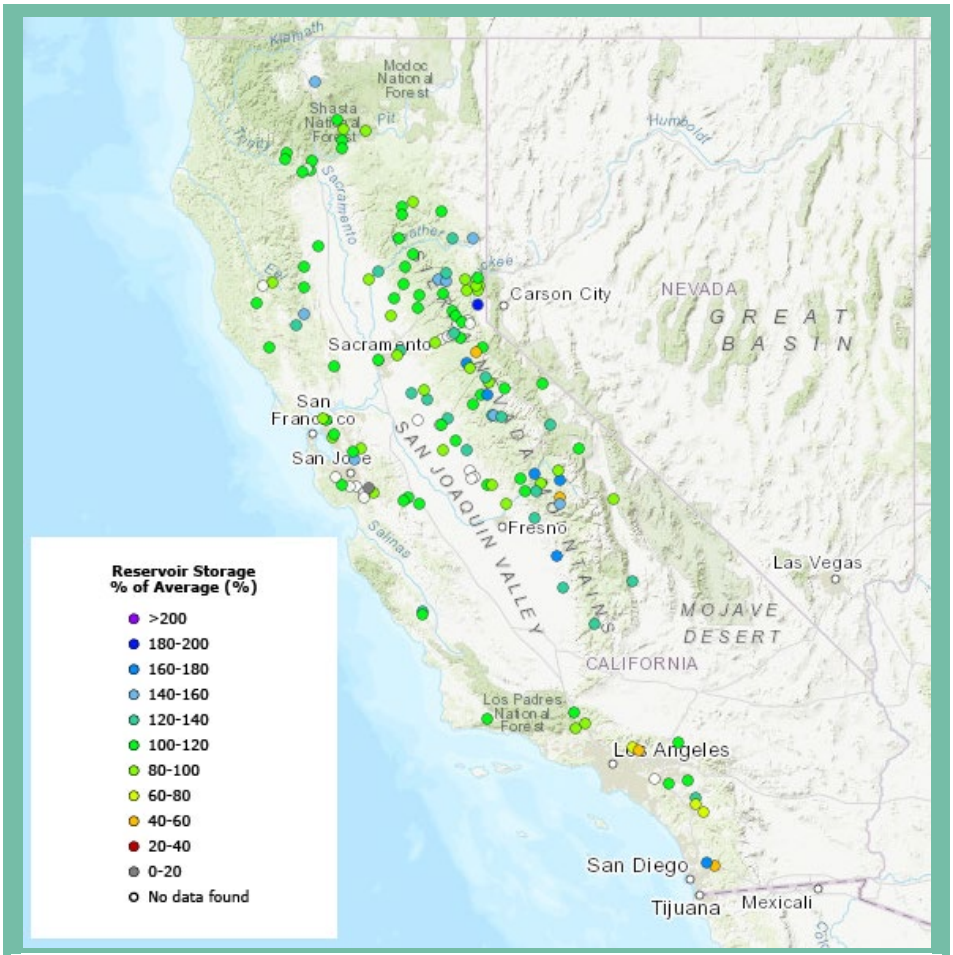

Figure 4. Reservoir storage percent of average for March 31, 2025.

The snowpack along the Sierra Nevada acts as a natural reservoir, where snow accumulates typically to a peak amount around April 1 and then begins to melt thereafter. A reservoir's top of conservation level gradually increases during spring and is higher by summer as it captures the snowmelt runoff which will be used for water supply during the dry months when water demand increases across the state.

At the end of March, the majority of flood control reservoirs were near their respective top of conservation levels, with a few that were slightly encroached. The major flood control reservoirs that were slightly encroached at the end of March include: Lake Shasta, Black Butte Lake, Lake Oroville, New Bullards Bar Reservoir, Folsom Lake, Lake McClure, Terminus Reservoir, Success Lake, Lake Mendocino, and Lake Sonoma.

The one major flood control reservoir that was notably below its respective top of conservation storage at the end of March includes Lake Isabella (by about 176 TAF).

Sources: California Water Watch, California Data Exchange Center Reservoirs Flood Control, CNRFC Observed Date of Peak Flow

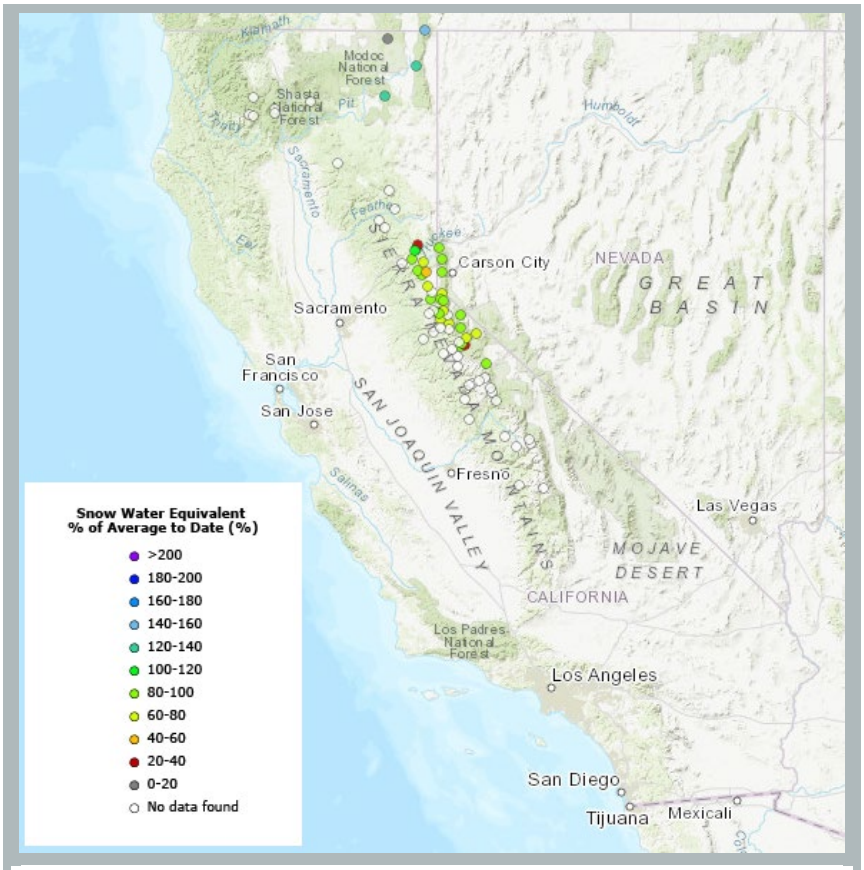

Figure 5. Snow sensor data shown for snow water equivalent (SWE) percent of average for the water year through March 31, 2025.

SNOWPACK

At the end of March, the statewide average snow water equivalent (SWE) was 23.8 inches, which is 92% percent of average for March 31. The series of atmospheric rivers and winter storm systems that traveled across California during March helped increase snow accumulation throughout the Sierra Nevada. The first atmospheric river (about March 12-14) resulted in 1-3 feet of snow accumulations for elevations above 5,000 feet along Sierra Nevada. The second atmospheric river (about March 15-17) resulted in 1-2 feet across Sierra Nevada. As shown in Figure 5, snow sensor readings for SWE percent of average for March 31 were above average for the Northern Sierra and Southern Cascades (113% of average), and below average for the Central Sierra (86% of average) and the Southern Sierra (81% of average). Figure 6 shows regional SWE conditions at the beginning of March 2025 (left) and end of March 2025 (right) to further show the increase of SWE during the past month.

In general, for the Sierra Nevada, snowpack accumulation peaks around April 1 each year, and thereafter begins to melt with longer days and longer exposure to solar radiation. Several factors involving the timing, pace, and scale of storms and their temperature characteristics through the end of March can influence the total amount of snowpack and when it will begin to melt. The snowmelt period typically is from April through July, where the runoff is collected by major reservoirs for water supply during the dry months of summer and beginning of fall.

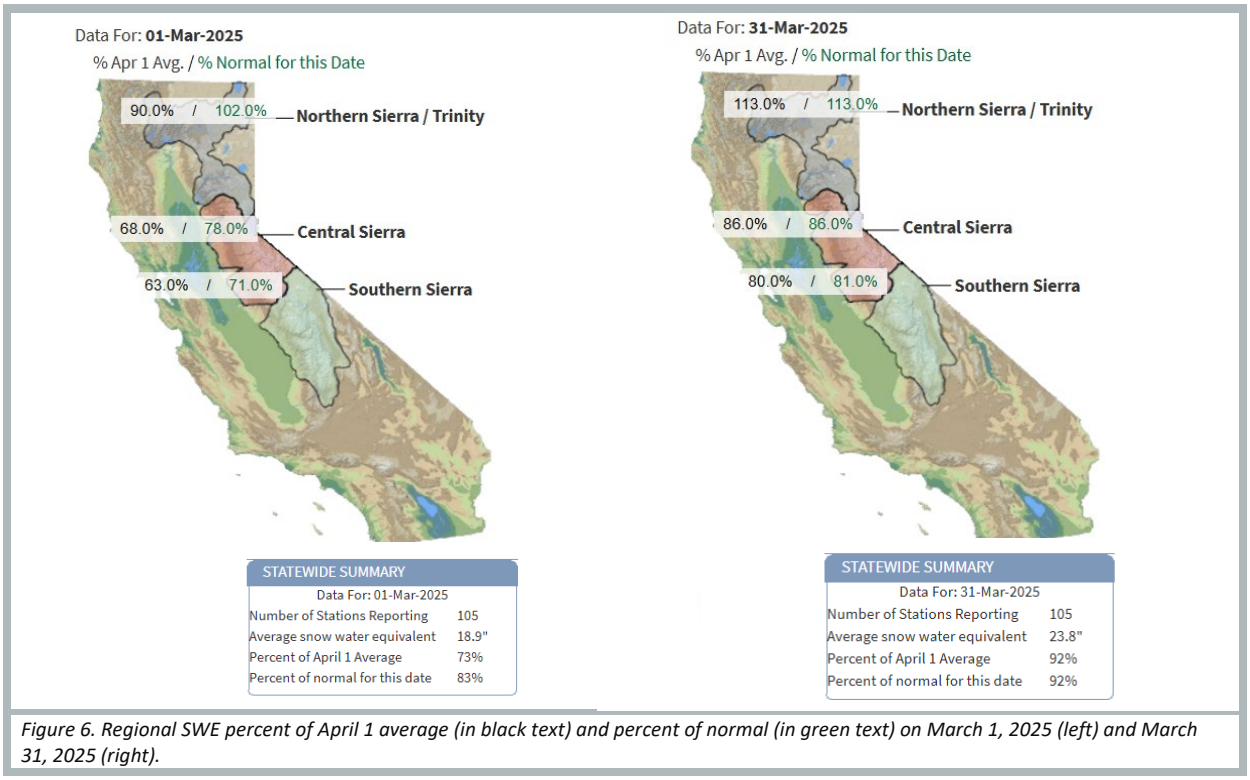

Figure 6. Regional SWE percent of April 1 average (in black text) and percent of normal (in green text) on March 1, 2025 (left) and March 31, 2025 (right).

Sources: California Water Watch, CDEC Snow Water Equivalent Plot

STREAMFLOW

Streamflow for about 57% of locations across California was at a normal flow rate at the end of March according to United States Geologic Survey (USGS) stream gage locations. About 33% of streamflow locations were flowing greater than average for this time of year, while about 10% of streamflow locations were flowing below normal for this time of the year. The series of atmospheric rivers and low-pressure systems in March caused a few of California-Nevada River Forecast Center (CNRFC) forecast locations to exceed their respective action/monitor stage, but below flood stage. The rain and routed flow along the Sacramento River during March resulted in weir flow at Tisdale Weir (during March 18-25). Tisdale Weir (through the Tisdale Bypass) allows overflow to go into the Sutter Bypass.

Sources: USGS Water Watch, California Nevada River Forecast Center (CNRFC), CDEC Daily Full Natural Flows

GROUNDWATER

Although rainfall increased in 2023 and precipitation was average in 2024, California continues to face a cumulative precipitation deficit from 2000 to 2024. While recent wet years have helped stabilize groundwater levels, California's future will likely see continued fluctuations between wet and dry periods. Recently measured monitoring wells show groundwater levels in 36% of monitoring wells across California are below normal, 41% are normal, and 23% are above normal. These statistics are based on 428 wells where groundwater levels have been collected for at least 10 years and the most recent measurements were collected within the last 60 days. There were zero dry domestic wells reported in the last 30 days. Data reported is as of April 10, 2025. Visit DWR's California's Groundwater Live for the latest groundwater conditions across the state.

Source: DWR California's Groundwater Live

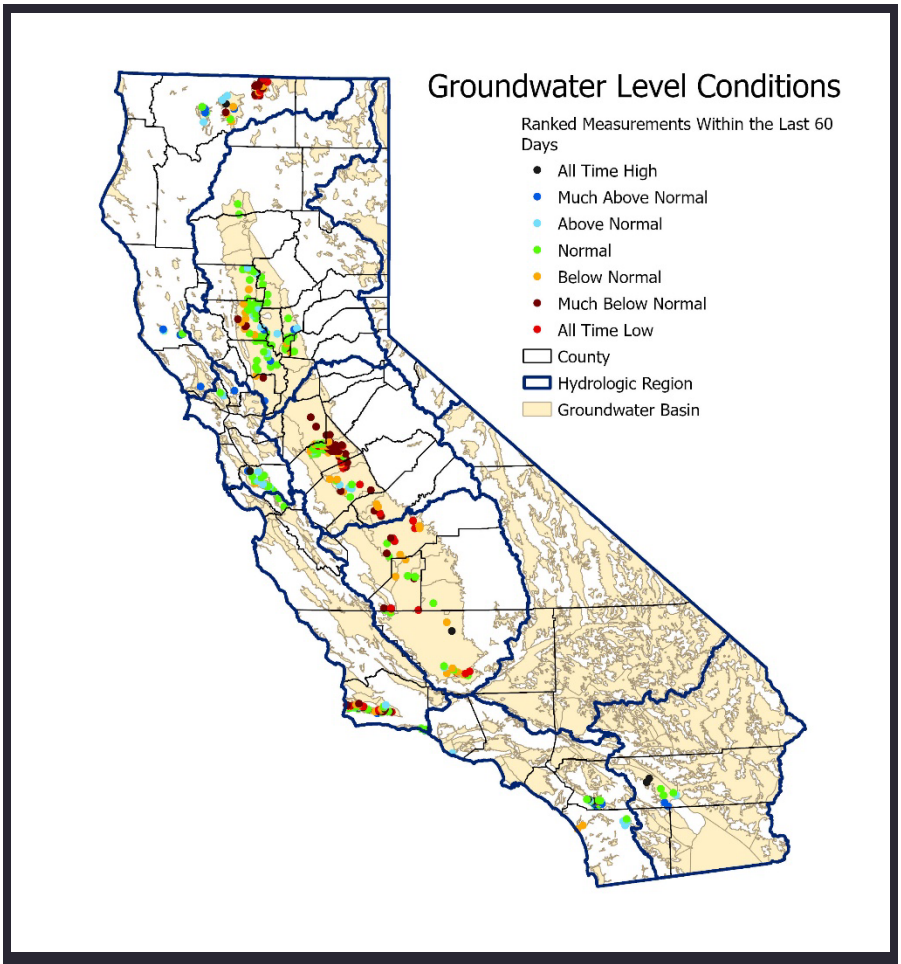

Figure 7. Map of Current Groundwater Conditions Based on Historical Averages.

Cover page photo: Snow blankets the meadow where the California Department of Water Resources conducts the fourth media snow survey of the 2025 season at Phillips Station in the Sierra Nevada. The snow survey is held approximately 90 miles east of Sacramento off Highway 50 in El Dorado County. Photo taken March 28, 2025.