

# WILL EL NIÑO END CALIFORNIA'S DROUGHT?

The stage is set for a strong El Niño event this winter, but experts say it is unlikely to erase California's four-year drought. While there is no single factor that will determine when the drought ends, here is a high-level look at factors the National Oceanic and Atmospheric Administration and the California Department of Water Resources will be watching for signs of improvement.



KEY CALIFORNIA DROUGHT RECOVERY FACTORS

## SNOWPACK

California relies on gradual snowmelt from the Sierra Nevada to provide a major portion of its water supply. To make a dent in the drought, this winter's snowpack would need to return to at least average or above — about 39 inches of snow water content on April 1.



## TEMPERATURES

Storms must be cold enough to support significant snowpack in the Sierra. The average winter minimum temperature in the Sierra would need to drop by 6 degrees from last year's average — from 32.1 degrees to 26 degrees. The above-normal temperatures currently predicted for Northern California are not a good sign.



## RAINFALL

Based on past drought-busting years, precipitation would need to be about 120% of average — about 60 inches — in key Northern California watersheds.



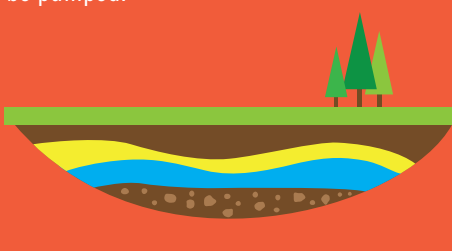
## RESERVOIRS

Four years of drought have reduced the state's key reservoirs to about a third of their capacity or less. Above-normal rain and runoff in Northern California would be needed for storage levels to recover this winter.



## GROUNDWATER

Groundwater levels are down by as much as 100 feet in some areas. Experts say recovery will be a multi-year process that depends on how basins are recharged and how much groundwater continues to be pumped.



## WATER FOR FARMS AND COMMUNITIES

Surface water deliveries for farms were reduced by 8.7 million acre-feet in 2015. Urban areas also have seen reduced deliveries and have been subject to mandatory conservation. Restored water deliveries and lifting of emergency conservation measures will be a sign of drought recovery.



## STRENGTH AND LOCATION OF STORMS

NOAA's latest outlook does not project where and when storms may occur. Heavy rain and even flooding in Southern California — without snow in Northern California — will not be enough to end the drought.



## MUDSLIDES AND DEBRIS

Torrential rainfall could trigger flooding, mudslides and debris flows — even during drought. Areas affected by recent wildfires are especially susceptible to mud and debris flow, with potentially big impacts on water supply sources.



## THE FOLLOWING YEAR

Even if El Niño brings heavy rain and snowfall this winter, drought conditions may return the following year. California may be facing a "new normal" of extreme droughts and floods due to climate change.

# 2017

KEY UNKNOWNNS