NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM

CALIFORNIA-NEVADA DROUGHT OUTLOOK MARCH 2017

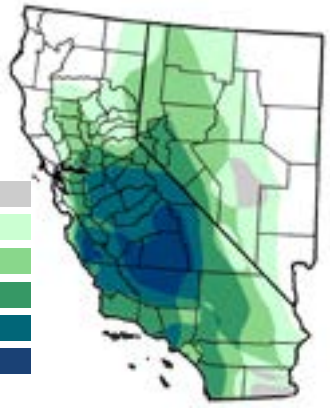
U.S. DROUGHT MONITOR FOR MARCH 28, 2017

Drought intensity

- D0: Abnormally dry
- D1: Moderate drought
- D2: Severe drought

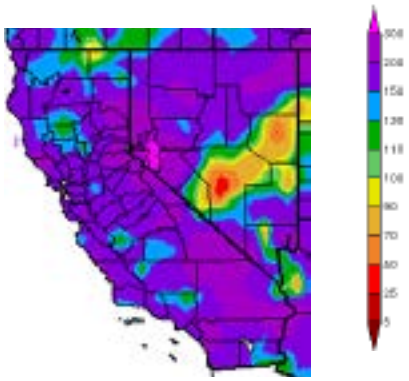
http://droughtmonitor.unl.edu/

U.S. DROUGHT MONITOR CLASS CHANGE: DEC. 28 -MARCH 28



- No change
- 1 Class improvement
- 2 Class improvement
- 3 Class improvement
- 4 Class improvement
- 5 Class improvement

% NORMAL PRECIPITATION OCTOBER 2016- FEB 2017



CURRENT CONDITIONS

Drought conditions in California-Nevada have continued to improve through late winter to early spring. Since January, much of central to southern California and Nevada have seen one to three class improvements, according to the U.S. Drought Monitor. As of March 28, only 8.24% of California and none of Nevada remain in moderate to exceptional drought according to the USDM, compared to 68.9% and 33.6% three months ago, respectively.

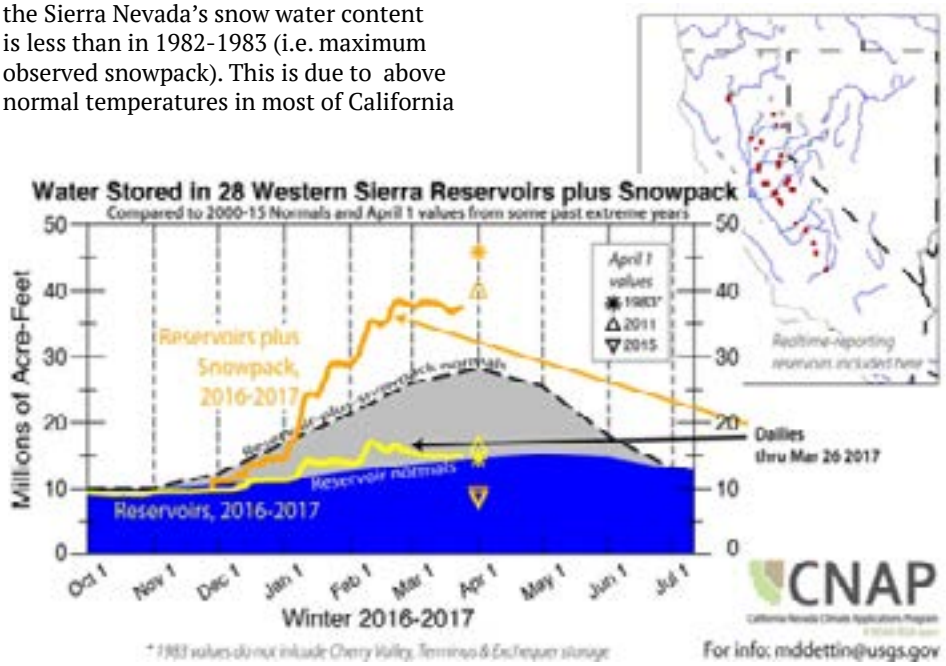
These improvements are due to above- to much-above-normal precipitation across almost all of California-Nevada. In both states, statewide precipitation since October 1st (a water year calendar is from October 1st to September 30th) has been the wettest on record.

These marked improvements result in part from continued landfall of large precipitation events called atmospheric rivers. Atmospheric rivers (ARs) are narrow corridors of high water vapor transport in the lower 2 km of the atmosphere. According to the Center for Western Weather and Water Extremes (CW3E) at Scripps Institution of Oceanography, more than 30 ARs have made landfall over California with some extending into Nevada during the 2017 water year. This number is approximately double the average number of ARs in a water year.

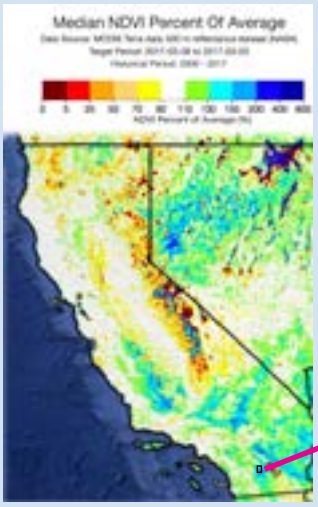
March has been relatively dry compared to January and February due to fewer and less intense AR events.

APRIL 1 SNOWPACK

While this water year has brought record-breaking precipitation to the region, the same cannot be said for record-breaking snowpack. Snowpack is above average in California and Nevada, however the Sierra Nevada's snow water content is less than in 1982-1983 (i.e. maximum observed snowpack). This is due to above normal temperatures in most of California and Nevada and high storm snow levels. As of March 26th, Nevada SNOTEL sites range between 107% to greater than 210% of normal snow water equivalent for this time of year, while California Department of Water Resources (CA DWR) north, central, and south automated snow sensors in the Sierra Nevada are at 146%, 174%, and 165% of normal, respectively.



For more details and up-to-date water storage tracking in California, visit: https://scripps.ucsd.edu/programs/cnap/water-storage-tracking-in-california/



CLIMATE ENGINE

From the Desert Research Institute, the University of Idaho, Google, and NIDIS, Climate Engine is an on-demand tool for cloud computing and visualization of climate and remote sensing data. Visit climateengine.org to analyze and interact with climate and land-surface environmental monitoring datasets in real-time to improve decision making related to drought, water sustainability, agricultural productivity, wildfire, and ecological health.

The image shows MODIS observed NDVI % difference from average from Climate Engine. Higher than average precipitation has resulted in greener than normal conditions across much of the west. For example, you can see the super bloom occurring in the Anza-Borrego Desert State Park. However, this condition could change quickly during the growing season for shallow rooted plants if little precipitation occurs. While increased precipitation and runoff this season is great for rivers and streams, impacts on vegetation is dependent on type of vegetation (crop versus grass/shrub/tree), rooting depths, and water sources (surface versus groundwater). For example, grasses have shallow roots while alfalfa crop has a deep root depth. Differences in root depth and soil water holding capacity (i.e. plant available water) cause differences in drought tolerance and response.

PHOTO BY SHAI KALANSKY

Early March's lack of storms and warm temperatures saw a reduction in the percent of April 1st average snowpack, with a slight rebound at the end of March. This loss of snow was most noticeable in the southern Sierras. Correspondingly, the southern Sierra basins snowmelt runoff forecasts for April-July have decreased the most since March 1st compared to the north and central basins.

Many reservoirs in California are near or above historical normal levels, with some near or above flood control release levels before the additional summer snowmelt. Forecasts of April-July unimpaired snowmelt runoff are greater than 100% of normal across the region, with potential higher in the eastern Sierra and Nevada (>200% in some basins). For example, Lake Tahoe will fill this summer. This will be the largest single-season rise in Lake Tahoe since records began, and currently releases (rare for this time of year) are being made to the Truckee River to avoid overflow. Uncertainty remains in groundwater recovery.

CLIMATE OUTLOOK

Over this past fall into early winter, equatorial sea surface temperatures (SST) cooled and reached weak La Niña conditions before transitioning to near-average SSTs in the central/east-central tropical Pacific Ocean in January-February, as a region of above-average SSTs expanded in the eastern Pacific. Currently ENSO-neutral conditions are present, favored to continue through spring 2017 with increasing chances of El Niño (>50%) developing by August-September-October 2017.

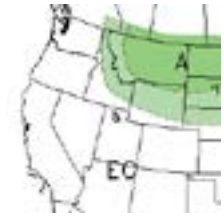
The CPC seasonal outlooks (figures at right) as of March 16th show equal chances of above, below, and average precipitation in April-May-June and July-August-September in California-Nevada. Above-normal temperatures are favored in eastern Nevada and southeastern California through spring, with above normal temperatures forecasted throughout the entire region in summer. According to the North American Multi-Model Ensemble (NMME), these temperatures could be 0.25-0.5˚C above normal in spring in eastern Nevada and southeastern California, and be 0.25-1˚C above normal throughout the region in summer. These warm temperatures could affect the rate of snowmelt and runoff as well as evaporative demand. Experimental evaporative demand forecasts (function of temperature, humidity, wind, solar radiation) show risk of anomalous evaporative demand in northern California and parts of southern California in June and July 2017. Through June, drought is expected to persist in the southern central Californian coast as well as near the southern California-Arizona border.

OUTLOOKS

"EC" means equal chances of above- or below-normal
"A" means above-normal chances

PRECIPITATION

APR-MAY-JUNE



JULY-AUG-SEPT

33%-40% 40%-50%

TEMPERATURE

APR-MAY-JUNE

JULY-AUG-SEPT

33%-40% 40%-50% 50%-60%

http://www.cpc.ncep.noaa.gov/

ABOUT THIS OUTLOOK

On March 27, 2017 NIDIS and its partners held a California-Nevada DEWS Drought & Climate Outlook Webinar as part of a series of regular drought and climate outlook webinars designed to provide stakeholders and other interested parties in the region with timely information on current drought status and impacts, as well as a preview of current and developing climatic events like La Niña. A video of and presentations from this webinar can be accessed here: https://www.drought.gov/drought/calendar/events/california-nevada-drought-climate-outlook-webinar-march-27

CONTRIBUTORS

Daniel McEvoy, WRCC/DRI
Julie Kalansky, CNAP/CW3E/SIO/UCSD
Justin Huntington, WRCC/DRI
Amanda Sheffield, CNAP/SIO/UCSD