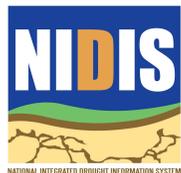
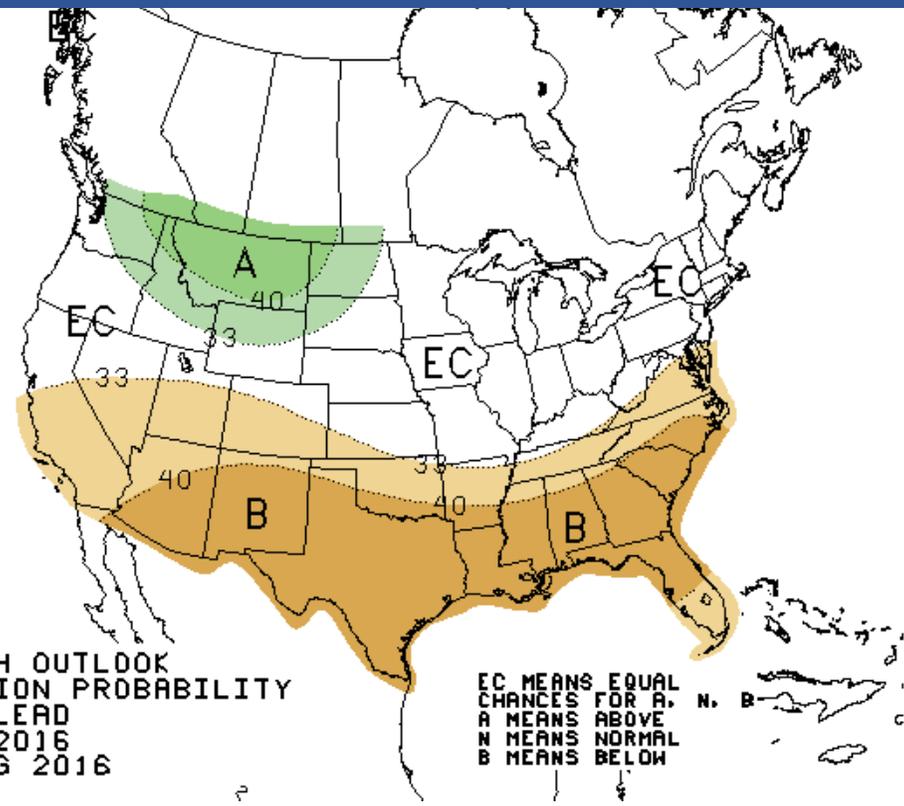
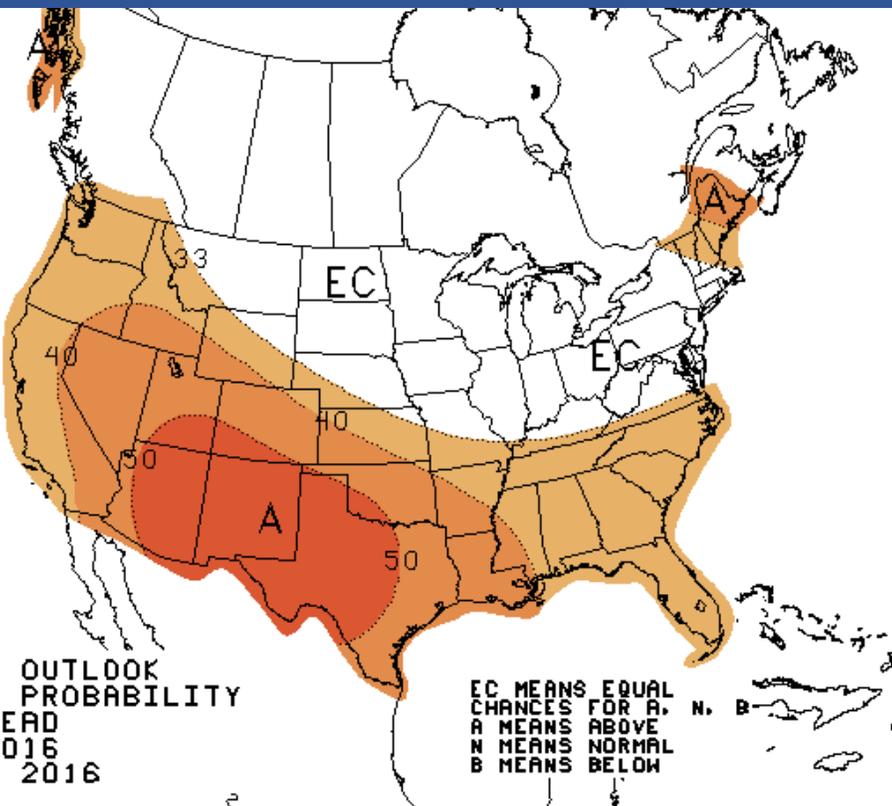
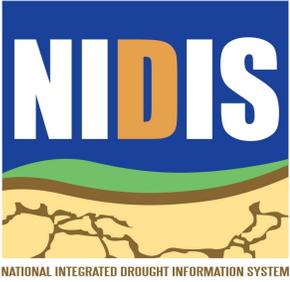


California-Nevada Drought Early Warning System Drought and Climate Outlook Webinar August 24th, 2016



Western Regional
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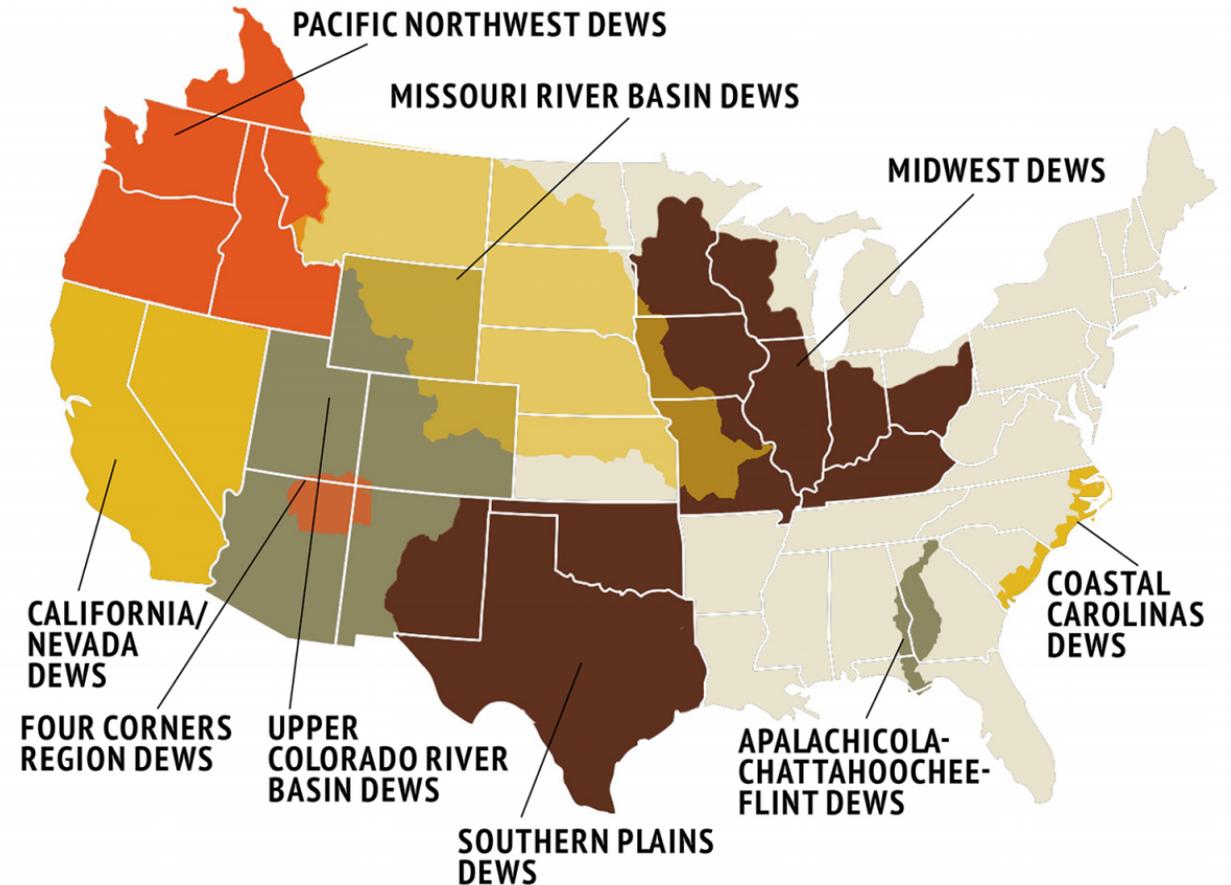


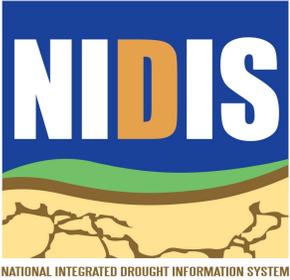


National Integrated Drought Information System (NIDIS)



- Provide a better understanding of how and why droughts affect society, the economy and the environment.
- Improve accessibility, dissemination and use of early warning information for drought risk management.
- Build off of a network of regional Drought Early Warning Systems (DEWS) to create a National Drought Early Warning System.





California-Nevada Drought Early Warning System (DEWS)



What is a DEWS?

A DEWS utilizes **new and existing partner networks** to optimize the expertise of a wide range of federal, tribal, state, local and academic partners in order to **make climate and drought science and impact data readily available, easily understandable and usable for decision makers;** and to **improve the capacity of stakeholders and economic sectors to better monitor, forecast, plan for and cope with the impacts of drought at all spatial and time scales.**

- **New CA-NV DEWS builds off**
 - Original CA DEWS (est. 2011)
 - Gov. Sandoval's Nevada Drought Forum (2015)
- **CA-NV DEWS Strategic Plan underdevelopment**



California-Nevada Climate Applications Program (CNAP)

- Climate information for decision-makers in California and Nevada
- Upcoming Two-Pagers:
 - Seasonal Forecasting
 - La Nina



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SIERRA NEVADA SNOWPACK

MARCH 2016

Snowpack Resources in CA and NV

Snowpack in California and Nevada supplies water, ecosystem services, and recreation. Snowpack serves as a natural reservoir as well as a key source of surface water and groundwater. In California, the spring snowpack on average stores about 70% as much as the water stored in the State's reservoirs, shown in figure 1. The snowpack plays a vital role in water management in accumulating water during the cool stormy season and then releasing water as snowmelt during the drier, warmer spring and summer period. In the Colorado River Basin, which supplies almost all of Southern Nevada and approximately 55% of Southern California water, runoff from snowmelt contributes about 70% of total water supplies. In addition, melted snowpack recharges groundwater, often more effectively than run-off. For example, in the Spring Mountains, west of Las Vegas, approximately 50-90% of groundwater recharge comes from snow.

Snowpack varies considerably from year to year in response to precipitation delivered by North Pacific storms and temperature fluctuations. Snowpack is often reported as snow water equivalent (SWE), or the amount of water stored in the snow. To accumulate snow, temperatures must be cold enough to cause the precipitation to fall as snow and to prevent the snow from melting. In the past two years, 2014 and 2015, Sierra Nevada snowpack was disproportionately depleted because of record high temperatures (figure 2). Results from hydrologic model runs in which 2014 temperatures were replaced with temperatures from 1917-2013 suggests that temperatures caused the 2014 snowpack in California to be lower by 60% on average. The results ranged between 2014 snowpack decreasing by as much as 160% and increasing by 20%, with 92% of the scenarios showing that snowpack was lower in 2014. The low snowpack in the last two years provides a scenario of future water supply conditions under climate change.

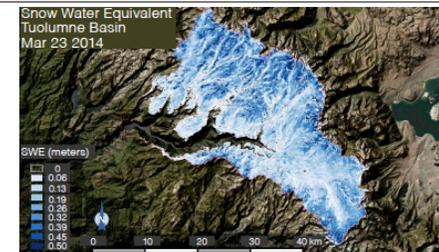


Figure 3: SWE has traditionally been measured by manual snow samples and by fixed pillows. Recently these surface measurements have been supplemented by airborne lidar. Mapped here over the Tuolumne Basin. Image courtesy of NASA Airborne Snow Observatory.

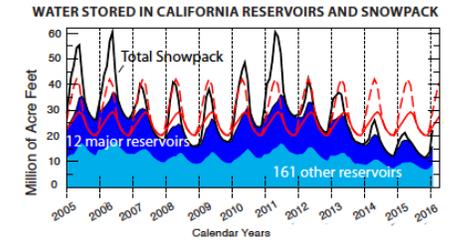


Figure 1: The total water stored in the 12 major reservoirs defined by CA Department of Water Resources, and the other 161 reservoirs, and in the monthly snowpack. The solid red line is the average reservoir storage from 2000-2015 and the dashed red line is the average snowpack plus reservoir storage. Updated from Dettinger and Anderson, 2015.

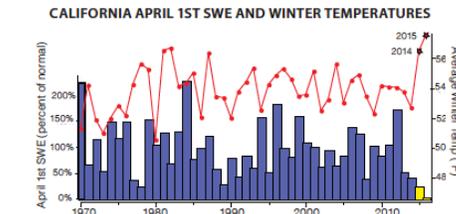


Figure 2: April 1st percent of normal SWE (blue bars and 2014-2015 yellow bars) and winter (DJF) temperatures (red line) for California. Data courtesy of the CA DWR and WRCC.

STRONG EL NIÑO EVENTS

Strong El Niño events tend to result in colder winter temperatures and increased precipitation throughout much of California and Nevada. This combination of cooler than average temperatures and increase precipitation typically leads to increased SWE during most strong El Niño events, with exceptions in 1965-66 and 1991-92.

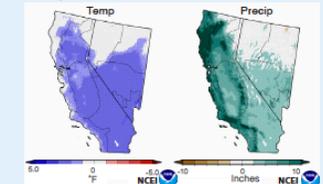


Figure 4: Temperature and precipitation Oct-Mar departure from average during strong El Niño events (1957/58, 1965/66, 1972/73, 1982/83, 1991/92, 1997/98). Courtesy of NOAA

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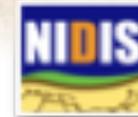
SAVE THE DATE

California-Nevada Drought Early Warning System Southern California Drought & Climate Outlook Thursday, Sept. 15, Riverside, CA

Please join NIDIS and the California-Nevada Climate Applications Program (CNAP), a NOAA RISA team, for a California-Nevada Drought Early Warning System (DEWS) Southern California Drought & Climate Outlook in Riverside, CA. This drought and climate outlook will provide stakeholders and other interested parties in the region with timely information on current drought status, as well as a preview of current and developing climatic events (i.e. El Niño and La Niña). Attendees will also have the opportunity to discuss regional drought impacts and informational needs. Presentations will include a regional focus, such as on wildfire and Santa Ana winds.

Additional contributors include NOAA's Western Regional Climate Center (WRCC), the Desert Research Institute (DRI), U.S. Forest Service (USFS), and the Climate Science Alliance-South Coast.

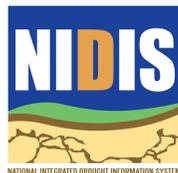
Find more details on Recent and Upcoming Events at
<https://www.drought.gov/drought/dews/california-nevada>



Today's Webinar Agenda

- **California-Nevada Drought and Climate Update,**
Kelly Redmond (WRCC, DRI)
- **Seasonal Outlook for Winter of 2016/17,**
David Pierce (SIO)
- **California Drought Impacts,**
State Climatologist Michael Anderson (DWR)

Questions will be answered at the end, please type questions in the chat box



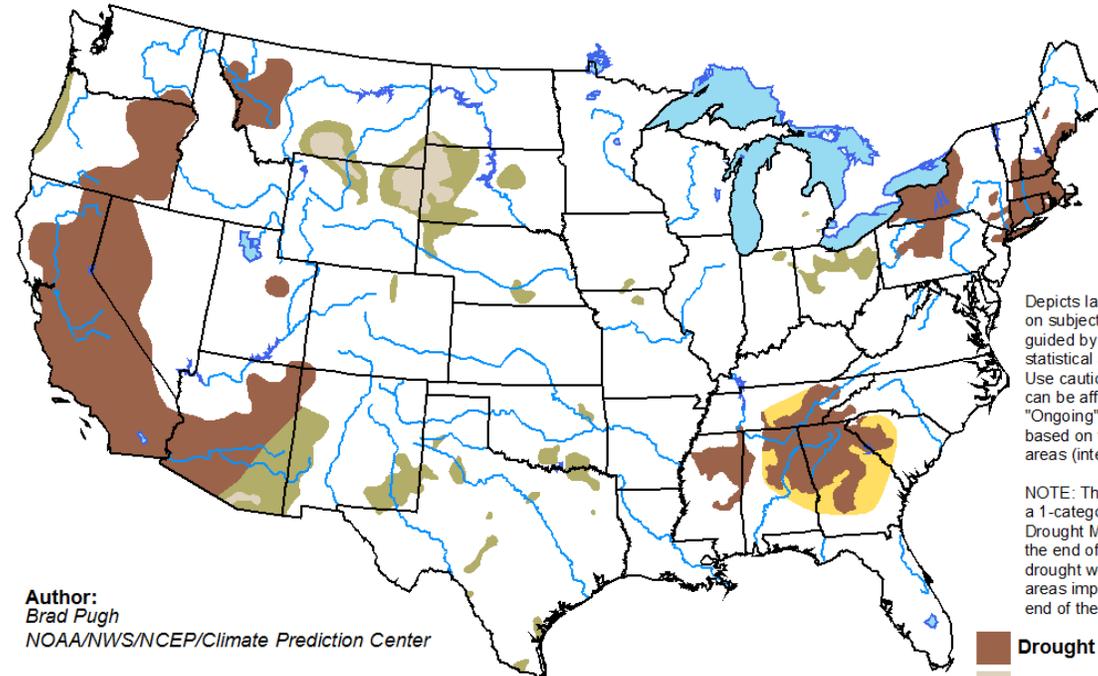
Western Regional
Climate Center



Questions & Answers

- *Please type questions in the chat box*
- *Please fill out our 3 question survey at the end of the webinar.*
- *Next webinar: Monday November 28th*

U.S. Seasonal Drought Outlook *Valid for August 18 - November 30, 2016* Drought Tendency During the Valid Period *Released August 18, 2016*

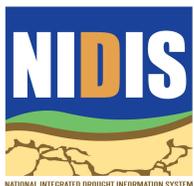
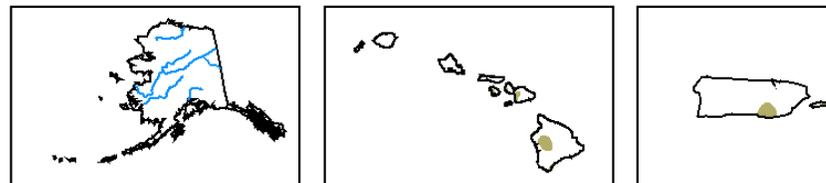


Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

Author:
Brad Pugh
NOAA/NWS/NCEP/Climate Prediction Center

- Drought persists
- Drought remains but improves
- Drought removal likely
- Drought development likely



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