Drought University: Seniors

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3 Lessons Learned
from the 2012-2015 CA/NV drought

Know the climate and impacts – provide stakeholders with information that clarifies and extends what they already know.

Be prepared for an evolving set of questions and expectations involving drought prediction.

Outreach is critical but requires simplicity.
Lesson #1: Know the climate & impacts – provide stakeholders with information that clarifies and extends what they already know.

- Use historical observed variability to explain newly unfolding events, and when possible as an analogue for decision makers to understand future climate changes (e.g. the exceptionally warm dry years in 2014 and 2015).
Lesson #1: Know the climate & impacts – provide stakeholders with information that clarifies and extends what they already know

“Drought is defined by its impacts!” – K. Redmond

- Impacts vary enormously over the states and sector.
Lesson #2: Be prepared for an evolving set of questions and expectations involving drought prediction

• Be able to explain source of seasonal forecast skill and describe uncertainty

• Illustrate how drought has developed, persisted and eased in past cases

NMME FORECAST PRECIPITATION, JAN-MAR

Experimental NMME forecast for precipitation for Jan-Mar from the NMME, showing chance of T/P by percentile. CNAP Research by S. Shukla.
Lesson #2: Be prepared for an evolving set of questions and expectations involving drought prediction

- CA & NV’s fluctuating yearly water supply is highly dependent on the occurrence (or lack of) a few large storms
- Short term forecasts improvements are critical

Courtesy of CW3E, http://cw3e.ucsd.edu
Lesson #2: Be prepared for an evolving set of questions and expectations involving drought prediction

How long will the drought continue?
Is one good year enough?
What will it take to “bust” the drought?

- New CNAP tools in development and testing
Lesson #3: Outreach is critical but requires simplicity

- In recent years, up-to-date information is highly sought by the public who seek local and regional picture of drought.
- Media collaborators at Public Broadcasting have emphasized the need for easily understood drought measures and simple graphics.
- Ongoing linkages with responsible Media are invaluable in extending communication outreach.

DATA SOURCES: Rainfall data comes from a weighted average of 96 weather stations throughout the state. Snowpack data represents the average of three different multi-station measures of the northern, central and southern Sierra snowpack. Scripps Institution of Oceanography researchers, through the California Nevada Applications Program RISA and the Center for Western Weather and Water Extremes, helped compile the data.
Seasonality of Precipitation

Precipitation in California is highly variable year-to-year and understanding this variability is critical to water resource management and policy. California has a Mediterranean climate—cool, wet winters and dry, warm summers. This means that the bulk of California’s precipitation falls in the cool months of the year, with October through April. It is highly variable across the state with the south and west receiving less than 5 inches in a year while the north can get over 150 inches per year. One way to visualize the temporal distribution of California precipitation is using the Northern California 8-station precipitation index from the California Department of Water Resources. This index, which averages 50 inches per year, gives a sense of how much precipitation the Sacramento River watershed—a key area for the state’s water supply—has received. A map of the location of the stations is shown in Figure 1 along with the average monthly distribution of precipitation. As can be seen in Figure 1, the annual precipitation totals arrive in the three-month period from December through February and 20% of the annual precipitation falls between October 1 and April 30.

Four years ago, winter storms coming off the Pacific Ocean delivered unusual storminess to California. Some of these storms include moisture from atmospheric rivers—narrow bands of very high concentration water vapor that extend from the tropics and deliver heavy precipitation to the state which can lead to flooding (Rabin et al., 2006; Fig. 2). On average 5-7 larger storms arrive most of the precipitation that falls during the winter months (Deltinger et al., 2011). When more storms arrive, conditions are wetter; when fewer arrive, conditions are drier.

What is El Niño?

El Niño, when Pacific trade westerlies weaken, which weakens atmospheric pressure differences between the Pacific Ocean, the Western Hemisphere, the North Atlantic Ocean. El Niño tends to occur when warmer-than-normal ocean surface temperatures lead to a breakdown of the trade winds, which normally blow westward across the Pacific. This allows warm water to accumulate in the eastern Pacific, leading to warmer than normal temperatures and precipitation patterns in the United States, particularly in California. El Niño events are typically associated with increased precipitation in California and reduced precipitation in the western United States, particularly in California. El Niño events are typically associated with increased precipitation in California and reduced precipitation in the western United States.

A New Type of Heat Wave

Heat waves in California and Nevada are traditionally triggered by the day and naturally last a few days at night; however, the intensity of the day and temperature is often above 100°F or 37°C. Heat waves are a concern in many parts of the United States, but they are especially problematic in California, where the high temperatures can lead to severe health outcomes, particularly for vulnerable populations such as elderly people and those with pre-existing health conditions. In this section, we will explore the different types of heat waves that occur in California and Nevada, and discuss how they are affecting the state’s residents.

The figure above shows the average number of days with heat waves in California and Nevada. As can be seen, California has significantly more days with heat waves than Nevada. This is due to the state’s geography and climate. California is home to a variety of ecosystems, from the coastal regions to the mountain ranges, and this diversity is reflected in the state’s climate. The state’s climate is characterized by hot, dry summers and wet winters, with a significant amount of snowfall in the mountain ranges. This snowfall melts during the spring and summer months and provides water for the state’s crops and livestock.

The increase in heat waves in California and Nevada is concerning for the state’s residents, particularly for those who are vulnerable to the effects of heat waves. The state’s leaders are working to address this issue, including increasing awareness of the risks associated with heat waves and providing resources to help residents stay safe during these events. For example, the state’s health department has developed a heat wave response plan that outlines steps to be taken in the event of a heat wave. The plan includes strategies for providing water and other resources to those in need, as well as training for health care providers on how to identify and treat heat-related illnesses.

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Contact Us

If you have any questions or concerns about the information presented in this document, please do not hesitate to contact us. We are here to help and would be happy to provide additional information or assistance.

The UC Davis Climatology Lab

The UC Davis Climatology Lab is committed to providing accurate and reliable information about climate change and its impacts on California and Nevada. We are dedicated to helping our state’s residents understand the challenges they face and the actions they can take to address these challenges.

SOUTHERN CALIFORNIA CLIMATE CENTER

The Southern California Climate Center is a research and education center that focuses on the climate of the Southern California region. The center is dedicated to providing accurate and reliable information about climate change and its impacts on the region.

NATIONAL INTEGRATED Drought Information System

The National Integrated Drought Information System (NIDIS) is a national initiative that provides information about drought conditions and the impacts of drought on ecosystems and human activities. NIDIS provides a range of data and information, including maps and reports, to help decision-makers understand the severity and extent of drought in their area.

References


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Onto Graduate School???

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