Drought

September 2020

What Is Drought?

Drought is a deficiency in precipitation over an extended period. It is a part of normal climate variability in many climate zones. The duration of droughts varies widely. Drought can develop quickly and last only for a matter of weeks, exacerbated by extreme heat and/or wind, but more commonly drought can persist for months or years.

- Meteorological drought is based on the degree of dryness (rainfall deficit) and the length of the dry period.
- Hydrologic drought is based on the impact of rainfall deficits on the water supply such as stream flow, reservoir and lake levels, and ground water table decline.
- Agricultural drought is based on the impacts to agriculture by factors such as rainfall deficits, soil water deficits, reduced groundwater, or reservoir levels needed for irrigation.
- Socioeconomic drought is based on the impact of drought conditions (meteorological, agricultural, or hydrological drought) on supply and demand of some economic goods. Socioeconomic drought occurs when the demand for an economic good exceeds supply as a result of a weather-related deficit in water supply.

Folsom Lake - July 20, 2011

Folsom Lake - January 16, 2014

The Palmer Drought Severity Index (PDSI) is a leading index used to analyze drought. Using temperature and precipitation data to estimate the relative dryness of a region, values less than zero indicate drier than normal conditions, while values greater than zero indicate wetter than normal conditions. PDSI is used to assess drought at seasonal timescales. PDSI, in combination with natural paleoclimate records such as tree rings and ice cores, can be used to put historical periods of drought in context. The Crop Moisture Index (CMI) is a short-term drought indicator that is primarily used in the agricultural sector to make decisions about planting and harvesting crops.

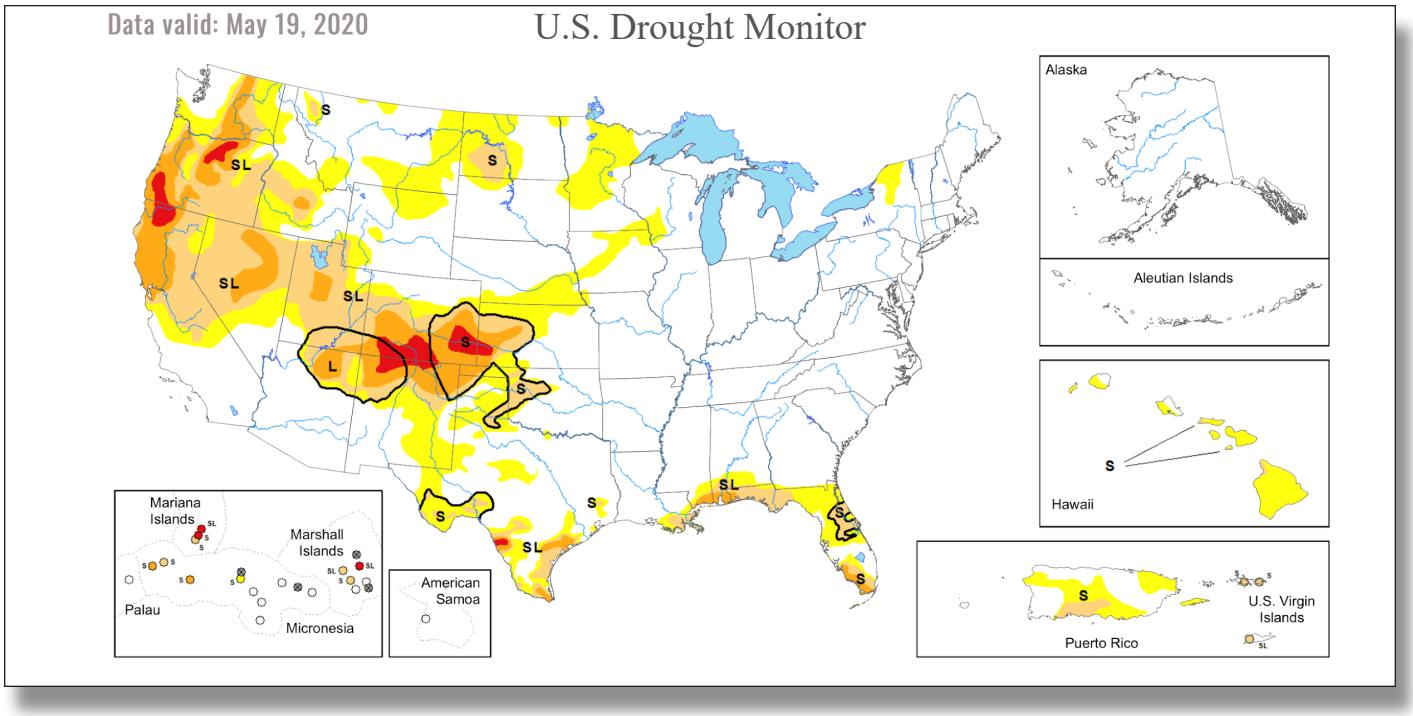
Drought, when combined with extreme heat, is the second most impactful and deadly type of extreme weather event in the United States. Since 1980, droughts have caused an estimated $232.5 billion, Consumer Price Index (CPI)-adjusted, in economic damages as well as 2,993 deaths (https://www.ncdc.noaa.gov/billions/). The California drought of 2011-2017 led to nearly 60% of the state to be under the 'exceptional drought' designation in the U.S. Drought Monitor, causing widespread agricultural and economic losses in the state.

For drought monitoring, forecasting, and information go to:
https://www.cpc.ncep.noaa.gov/products/Drought/

Drought Monitoring and Assessment

The U.S. Drought Monitor (USDM) is a weekly collaborative product that provides a general summary of current drought conditions. Since 1999, the National Drought Mitigation Center (NDMC), National Oceanic and Atmospheric Administration (NOAA) Climate Prediction Center (CPC), National Integrated Drought Information System (NIDIS), USDA, and the University of Nebraska have been sharing data and drought information to produce a weekly assessment of drought for the U.S. and its territories. The USDM synthesizes physical drought indicators, including precipitation and soil moisture, and field reports and news accounts are reviewed and synthesized.

NIDIS was established by Congressional Act in 2006 to implement an integrated drought monitoring and forecasting system at federal, state, and local levels. NIDIS' responsibilities include drought monitoring, forecasting, response, research, and education as part of its Drought Early Warning System (DEWS). These components are featured within the U.S. Drought Portal (https://www.drought.gov/drought/) and were created to allow for governments of all scales to prepare for and act upon drought conditions. NIDIS' goal is "to improve the nation's capacity to manage drought-related risks by providing the best available information and tools to assess the potential impacts of drought, and to prepare for and mitigate the effects of drought."



Drought Prediction

Predicting drought remains a challenge. Global weather patterns, which affect the location and intensity of precipitation, are constantly changing and are difficult to predict on drought timescales. CPC's U.S. Monthly and Seasonal Drought Outlooks show predicted trends for areas currently experiencing drought and indicate areas where droughts may develop. The Drought Outlooks take many factors into consideration, including short and long-range forecasts, regional drought history, and climate anomaly patterns ("teleconnections"). In the coming decades, water management strategies will need to address rising global temperatures, more variable precipitation and groundwater depletion, and how these factors heighten the potential for worsening drought conditions in the U.S.