The West Wide Drought Tracker

Drought Monitoring at Fine Spatial Scales

John T. Abatzoglou, Daniel J. McEvoy, and Kelly T. Redmond

BACKGROUND. The western United States has seen increases in population and water use over the past century. Total water use has remained relatively unchanged over the past several decades due to water conservation efforts. However, water scarcity has become more acute across much of this semiarid region during recent decades due to long-term declines in water storage juxtaposed with the region's notable hydroclimatic variability. Observed declines in mountain snowpack and increases in atmospheric demands tied to long-term warming trends have further exacerbated water scarcity and increased the importance of monitoring efforts given the array of social, economic, and ecosystem sectors dependent upon the already stressed water supply. The recent severe drought in California and protracted drought across much of the southwestern United States over the past couple decades have prompted demand for accessible drought decision-making information at appropriate spatial scales across the western United States.

Drought monitoring is particularly important in the western United States due to the extensive coverage of arid and semiarid lands that are prone to water shortages. Stakeholders from a range of sectors across the region whose interests include energy, wildfire, agriculture, and water resource management have expressed the need for local-to-regional drought information as high-stakes decisions (e.g., drought declaration) may be made based on incomplete or insufficient data given the sparseness of long-term climate observations across the region. In addition, drought monitoring presents challenges across the western United States due to sharp geographic gradients in moisture availability, significant interannual-to-decadal climate variability, and the region's strong reliance on mountain snowpack for water supplies.

Numerous drought monitoring tools distribute crucial information to stakeholders. However, existing tools are typically limited by some combination of the following: a short period of record, coarse spatial resolution, or the inability to download and manipulate data. For example, the National Centers for Environmental Information (NCEI) Climate at a Glance tools provide drought and climate information at relatively coarse spatial scales (e.g., climate divisions) that are valuable for large-scale regional assessments, but may provide insufficient spatial detail for local decision-making. The PRISM Climate Group (PRISM is described in the next section) provides maps of hydroclimate anomalies from 1980 to the present, but does not present drought indices. A heavily used tool for drought declaration and decision-making is the U.S. Drought Monitor (USDM), which relies on a blend of quantitative metrics and local impact information to produce weekly maps of drought severity. However, the USDM is limited temporally with a period of record beginning in 2000. The West Wide Drought Tracker (WWDT) was developed to overcome some limitations of existing drought monitoring tools through a set of applied data and visualization platform to enhance access to data on climate and drought indices at finer spatial scales. Here we describe the WWDT web application and present a case study on the utility of the WWDT in examining the 2012–16 California drought.

AFFILIATIONS: Abatzoglou—University of Idaho, Moscow, Idaho; McEvoy And Redmond*—Desert Research Institute, and Western Regional Climate Center, Reno, Nevada
* Deceased
CORRESPONDING AUTHOR: John T. Abatzoglou, jabatzoglou@uidaho.edu

DOI:10.1175/BAMS-D-16-0193.1