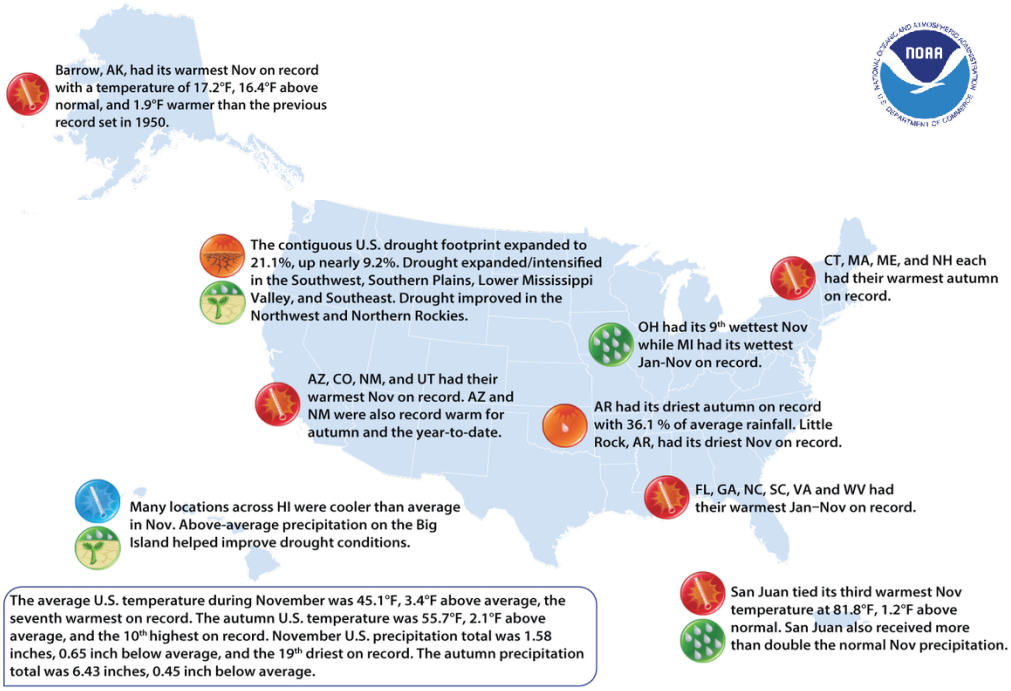
Quarterly Climate Impacts and Outlook

Western Region December 2017

Significant Events for September 2017 - November 2017



NCEI // www.ncdc.noaa.gov/sotc/national

Sep-Oct-Nov Highlights for the West

Northwest near to slightly wetter than normal; Southwest much drier than normal

AZ and NM observed warmest autumn on record; CO and CA among top-10 warmest

AZ reported 3rd driest autumn on record

USDM shows improvement of drought conditions in western MT, ID, WA, OR and degredation of conditions in AZ, NM, southern UT, southwestern CO

Early season snowpack in northern Cascades/northern Rockies near to above normal, other mountain ranges observed below normal snowpack

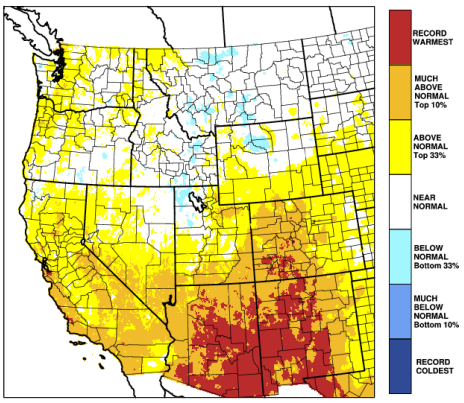
Large and destructive fires impacted many areas of West well into autumn

La Niña conditions are present and expected to persist through the winter season

Regional Overview for September 2017 - November 2017

Mean Temperature Percentile

September-November 2017

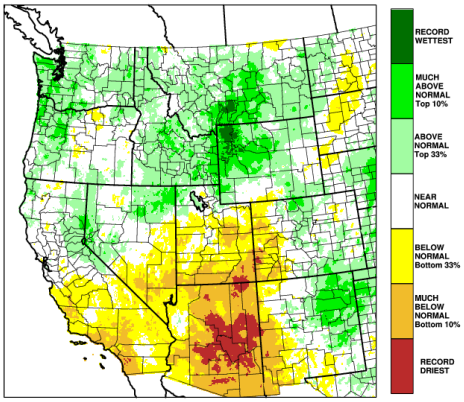


WRCC // www.wrcc.dri.edu/wwdt/

Autumn temperatures were well above normal across the Southwest. November was particularly warm; all of the Four Corners states observed their warmest November on record. The autumn season also featured significant heat waves in the Southwest, with southern California being particularly affected. Standout events include early September as well as a period over the Thanksgiving holiday. Well above normal temperatures contributed to dangerous fire weather. Stormy conditions helped to moderate temperatures across the northern tier of the region, resulting in near-normal temperatures.

Precipitation Percentile

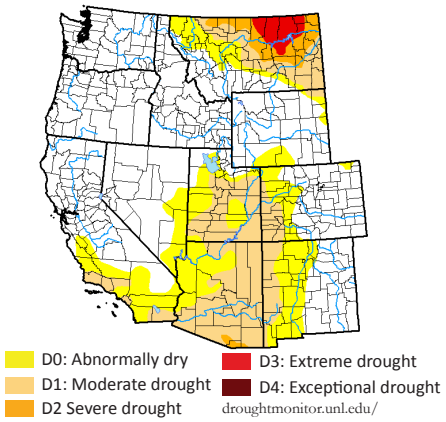
September-November 2017



Though it is early in the precipitation season, the observed pattern this autumn of wetter than normal conditions in the Northwest and drier than normal conditions in the Southwest reflects the pattern often seen during historical La Niña events. October featured one very strong storm impacting the far northwest part of the region, followed by a wet November extending southward into the Sierra Nevada. Snow levels remained high for the Sierra and southern Cascades, limiting snowpack accumulation to high elevations. Dry weather dominated across the Southwest, causing expansion of drought conditions in the USDM.

U.S. Drought Monitor

November 28, 2017



Autumn precipitation helped to alleviate drought conditions in the Northwest. Over this three month period, all drought or abnormally dry conditions were removed from WA, OR, and ID. Significant improvements were also made in MT, where only 53% of the state was experiencing drought conditions at the end of the season, compared with 91% at the start. With anomalously warm/dry weather, drought conditions expanded in the Southwest, especially in southern UT and along the AZ-NM border. At the end of the season, 21% of the West was experiencing moderate or worse drought conditions.

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Regional Impacts for September 2017 - November 2017

Weather

Several heat waves impacted portions of CA resulting in school closures and prompting opening of cooling centers

Los Angeles Dept. of Water and Power reported record high electricity demand during early Sept. heat wave

Drought, Flooding and Water Resources

Early season snowfall and wet autumn helped alleviate drought conditions and slow wildfire activity in MT

Anomalously warm and dry conditions in western NM caused irrigation season to extend into fall, raises drought concerns

Slow start to snowpack in Sierra, central/southern Rockies raises concern about developing drought, ski industry impacts

Agriculture and Fisheries

Severe thunderstorms on Oct. 1 caused major damage to agriculture (pumpkin, squash, chiles) in Valencia County, NM

Soggy soil conditions prevented ID farmers from planting 114,000 acres; typical affected area is ~20,000 acres

Bottom fishing closures near Charleston, OR, have had devastating impacts on businesses in area

Wildfire

Wildfires in the Northwest produced hazardous air quality for many areas, including metropolitan areas of Portland, Seattle

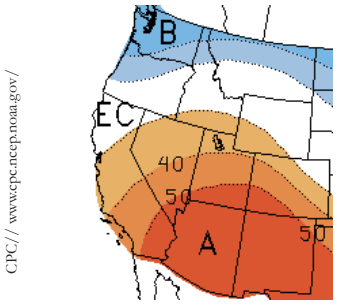
Many large fires in West in summer and autumn strained firefighting resources; MT particularly impacted

Destructive Central California Fires

MODIS image showing smoke from central CA fires on October 9, 2017

Following a hot, dry summer and before the onset of wetting rains, a "Diablo" wind event (dry northeasterly downslope winds) produced extremely hazardous fire weather conditions. Fuel moisture was at near-record low values, and with strong winds, several fires grew rapidly when ignited. The Atlas, Tubbs, and Nuns fires collectively burned over 140,000 acres in Napa, Solano, and Sonoma Counties. Approximately 10,000 firefighters from across CA and the U.S. were involved in fire suppression efforts. The Tubbs Fire became the most destructive in California history, destroying 5,643 structures and causing 22 deaths. The Nuns Fire was the 6th most damaging at 1,355 structures and two deaths. The Atlas stands at the 11th most destructive, with 781 structures destroyed and six deaths. Smoke from the fires produced poor air quality in the heavily populated San Francisco Bay Area. The fires have impacted the viticulture and cannibis agricultural industries in the affected counties, as well as the wine and tourism industries. According to the CA State Insurance Commissioner, insured loss estimates from the fires exceed $1 billion.

Regional Outlook for Jan-Feb-Mar 2017

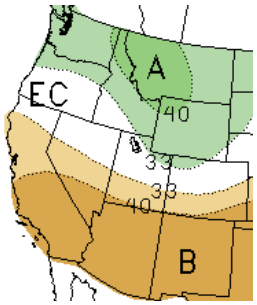


CPC// www.cpc.ncep.noaa.gov/

Jan-Feb-Mar temperature outlook produced by CPC Dec 21 2017

A indicates above normal
B indicates below normal
N indicates normal
EC means equal chances for A, N or B

Numbers indicate percent chance of temperature in warmest/coolest one-third and of precipitation in wettest/driest one-third

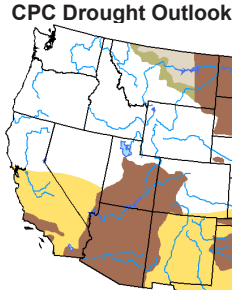


Jan-Feb-Mar precipitation outlook produced by CPC Dec 21 2017

NOAA CPC Oct-Dec Seasonal Outlook

Current outlooks suggest that the most favored outcomes are for persistence of wetter and cooler than normal conditions along the northern tier of the West and drier and warmer than normal conditions across the Southwest. This reflects the typical temperature and precipitation patterns in the West associated with La Niña conditions.

CPC Drought Outlook Dec 21-Mar 31 2018

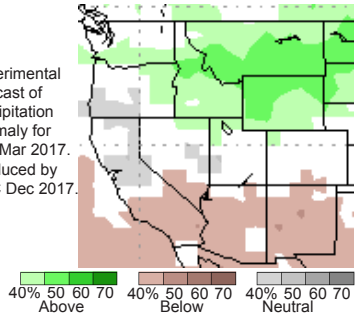


CPC// cpcncep.noaa.gov/products/

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

Produced by CPC Dec 21 2017

Experimental forecast of precipitation anomaly for Jan-Mar 2017. Produced by CPC Dec 2017.



CPC // www.cpc.ncep.noaa.gov

Seasonal Drought Outlook

Drought conditions are expected to persist and expand in the southern half of the region. Across much of northern MT, drought conditions are anticipated to improve, except in the eastern part of the state where drought is likely to persist.

NMME Precipitation Forecast

The National Multi-Model Ensemble combines 7 climate research models. The NMME suggests a 40% chance of below normal precipitation across the far Southwest and 40-50% chance of above normal precipitation for the Inland NW

Western Region Partners

Western Regional Climate Center
wrcc.dri.edu
National Integrated Drought Information System (NIDIS) - drought.gov
Western Governors' Association
westgov.org
Western States Water Council
westgov.org/wswc
NOAA/ESRL Physical Sciences Division
esrl.noaa.gov/psd
NOAA Climate Prediction Center
www.cpc.ncep.noaa.gov
National Centers for Envir. Info. (NCEI)
www.ncdc.noaa.gov
USDA/NRCS National Water and Climate Center - www.wcc.nrcs.usda.gov
National Interagency Fire Center
www.nifc.gov
NOAA's Western Regional Collaboration Team
www.regions.noaa.gov/western/western_region_team.html
Western Water Assessment
wwa.colorado.edu
Climate Assessment for the Southwest
climas.arizona.edu
California Nevada Applications Program
meteora.ucsd.edu/cnap
Climate Impacts Research Consortium
pnwclimate.org/resources
NWS River Forecast Centers
water.weather.gov/ahps/rfc/rfc.php
NOAA Fisheries Service
www.nmfs.noaa.gov/
NWS Western Region Forecast Offices
www.wrh.noaa.gov/
State Climatologists - stateclimate.org

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