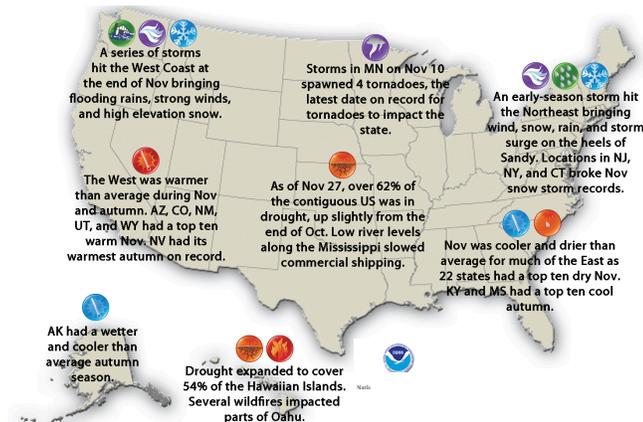


Quarterly Climate Impacts and Outlook

Western Region December 2012

National - Significant Events for September - November 2012

Highlights for the West



Rainfall across the western region was characterized by **prolonged wet and dry conditions** as a function of location and month.

September 30th marked the **end of the Southwest Monsoon Season** with many locations receiving near to much above their normal monsoon precipitation totals.

The **wildfire season** extended well into October across much of the northern tier of the region.

For most of the three-month period, **snowpack accumulation** lagged long-term climatological averages across much of the intermountain West.

At the end of November, an **atmospheric river** (a narrow plume of moisture-rich air extending thousands of miles that produces heavy rainfall, particularly in mountainous terrain) delivered more than a foot of rain and multiple feet of snow at high elevations to locations in northern California and the Pacific Northwest.

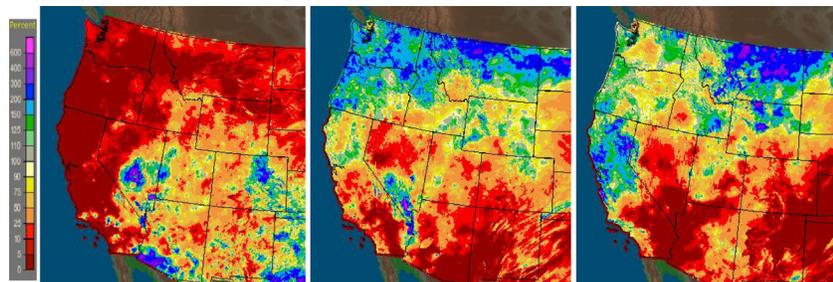
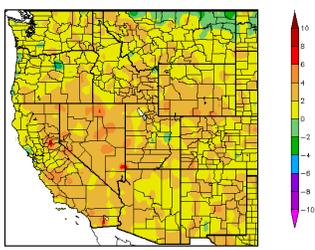
Equatorial sea surface temperatures are close to average across the tropical Pacific Ocean except for the far eastern portion, reflecting ENSO-neutral conditions.

The January–November period was the warmest first 11 months of any year on record for the contiguous US, and for the entire year, 2012 will most likely surpass the current record (1998, 54.3°F) as the warmest year.

The September–October–January contiguous US temperature of 54.7°F was the 21st warmest, 1.1°F above average.

Regional - Climate Overview for September - November 2012

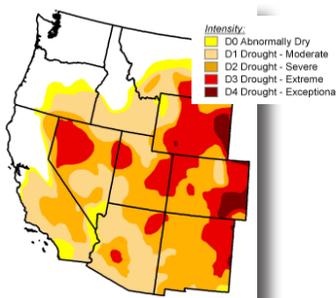
Temperature and Precipitation Anomalies



Departure from Normal Temperature (°F) for 9/1/2012 - 11/30/2012. The scale ranges from -10 to 10 °F.

Percent of Normal Precipitation (%) for (from left to right) Sep., Oct. and Nov. 2012. The scale ranges from 0 - to 600 %.

Drought



US Drought Monitor 12/18/2012

The temperature anomalies shown in the left panel indicate that most of the interior West had above-normal temperatures (warm colors), with slightly cooler-than-normal temperatures limited to northern Montana.

The percent of normal precipitation maps for September, October, and November feature a reversal of wet and dry conditions between the northern and southern parts of the region. The Pacific Northwest and Northern Rockies experienced near-record dry spells lasting until mid-October, which were then replaced by a period of well-above normal precipitation (+50% above normal) from mid-October through early December. Washington had the 7th wettest October on record. With the end of a robust monsoon season, the Southwest and central Rockies received significantly below normal rainfall in October and November.

The US Drought Monitor shows the persistence of moderate to extreme drought conditions in much of the interior West. (The Drought Monitor is a collaborative product from the USDA, NOAA and National Drought Mitigation Center www.droughtmonitor.unl.edu/monitor.html.)

Regional Impacts - for September - November 2012

Drought and Water Resources Impacts

In the upper Colorado Basin where the autumn precipitation has been extraordinarily low, reservoirs, river flows, and soil moisture in much of the basin are all well-below normal to start the 2013 Water year.

The much drier than normal conditions in 2011 across Arizona and New Mexico continued throughout much of 2012 and, with the dry autumn, this region is off to a poor start for the beginning of Water Year 2013.

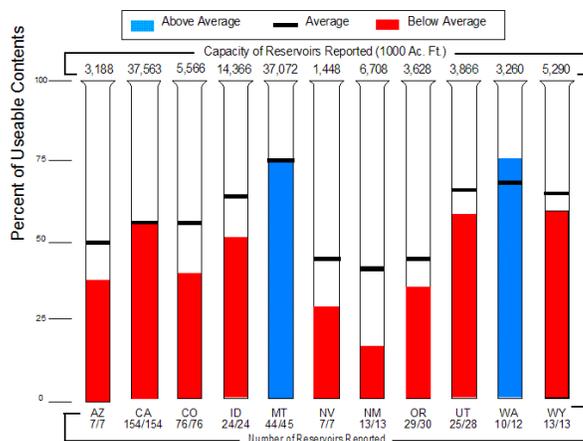
High river flows resulted from the October-November above-normal precipitation in the Pacific Northwest with some enhanced runoff and erosion in areas scorched by wildfire. Significant precipitation in the Pacific Northwest, California and the Great Basin has allowed reservoirs to refill conservation pools depleted from previous low runoff.

Agriculture

USDA topsoil moisture values and other soil moisture estimates indicate very dry conditions persist across the intermountain west and central Great Plains that are likely to impact winter wheat production as well as the recovery of drought-stressed pastures and rangeland.

Wildfires and Air Quality

With dry fuels, high temperatures, and low relative humidity prevailing throughout the early fall, many large wildfires ignited or grew through September and into early October. The prolonged wildfire season impacted air quality locally as well as large regions downwind of the burn areas.



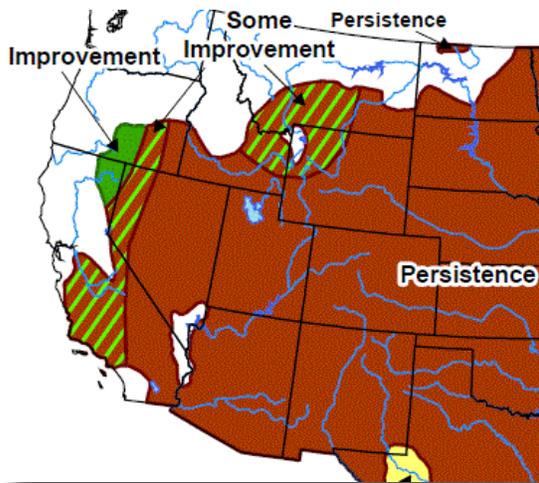
Reservoir storage as of Dec 1, 2012. Prepared by the USDA, Natural Resources Conservation Service, National Water and Climate Center, Portland, Oregon. (www.wcc.nrcs.usda.gov)

Reservoir volumes throughout much of the interior West continued to decline. In winter, a sizeable flood reserve space is maintained in many reservoirs, for example, those in California. Thus, while significantly below capacity, average or near-average winter storage volumes are not necessarily indicative of drought conditions. The upcoming winter season precipitation will be critical for water supply across the western US.

Regional Outlook - for Winter 2012-2013

Seasonal Drought Outlook

- Some drought improvement is expected along the western boundary of the existing drought as well as areas in Idaho, Wyoming and Montana.
- Drought conditions are expected to persist across much of the Intermountain West and Great Plains.
- Drought persistence or intensification is expected for most of the Southwest.
- Drought development is expected across areas of western Texas that are currently abnormally dry.



NOAA Seasonal Climate Outlook

The temperature outlook for January, February and March 2013 indicates enhanced odds for above normal temperatures for much of the southern half of the continental US except for coastal areas of southern California. Below normal temperatures are favored for parts of the northern Rockies and the northern Great Plains.

The precipitation outlook for January, February and March 2013 includes elevated chances for below median precipitation amounts for much of the southwestern US extending from southern California to western Texas and the southern Great Plains. Enhanced odds of above median precipitation amounts are indicated for the northern Rocky Mountains.

(Climate Prediction Center, www.cpc.ncep.noaa.gov)

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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

USDA/NRCS National Water and Climate Center - www.wcc.nrcs.usda.gov

National Interagency Fire Center
www.nifc.gov

DOI WaterSMART
www.usbr.gov/WaterSMART

NOAA/ESRL Physical Sciences Division
esrl.noaa.gov/psd

NOAA's Western Regional Collaboration Team
www.regions.noaa.gov/western/western_region_team.html

Western Water Assessment
colorado.edu

Climate Assessment for the Southwest
climas.arizona.edu

California Nevada Applications Program
meteora.ucsd.edu/cap

Climate Impacts Research Consortium
pnwclimate.org/resources

Colorado Basin River Forecast Center
www.cbrfc.noaa.gov

California Nevada River Forecast Center
www.cnrfc.noaa.gov

NOAA Fisheries Service - www.nmfs.noaa.gov

NWS Western Region's Climate Service
nws.noaa.gov/om/csd/index.php?section=programs#western

State Climatologists - stateclimate.org

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www.drought.gov/portal/server.pt/community/reports