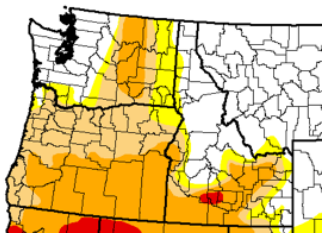
CIRC
Climate Impacts Research Consortium

PNW Climate Impacts and Outlook

Water Year 2014

Drought Update



US Drought Monitor 3/25/2014
droughtmonitor.unl.edu

Because drought is a concern in the Pacific Northwest, we chose to focus this edition of our seasonal newsletter on water year 2014. A persistent high-pressure ridge during the 2013/2014 winter made for the third driest start to the water year in the PNW. (The water year runs from October 1 to September 30). Most of the region is depicted on the US Drought Monitor as at least abnormally dry (d0), with portions of all three PNW states in severe drought (d2). Five Oregon Counties—Klamath, Lake, Harney, Malheur, and Crook—have been granted severe drought declarations by Governor John Kitzhaber.

This lack of precipitation was especially noticeable during the typically soggy winter months. However, the evolution of this winter's and subsequent drought concerns can't be explained without also considering temperature. February was the wettest month in the PNW since December 2012. But this precipitation fell mostly as rain, not snow. This winter, snowpacks across the state have struggled to build as rising temperatures led to more rain than snow at the state's higher elevations. This has meant, for instance, that the Mt. Ashland ski resort in southern Oregon did not open for the winter season, a first in its 50-year history.

Precipitation

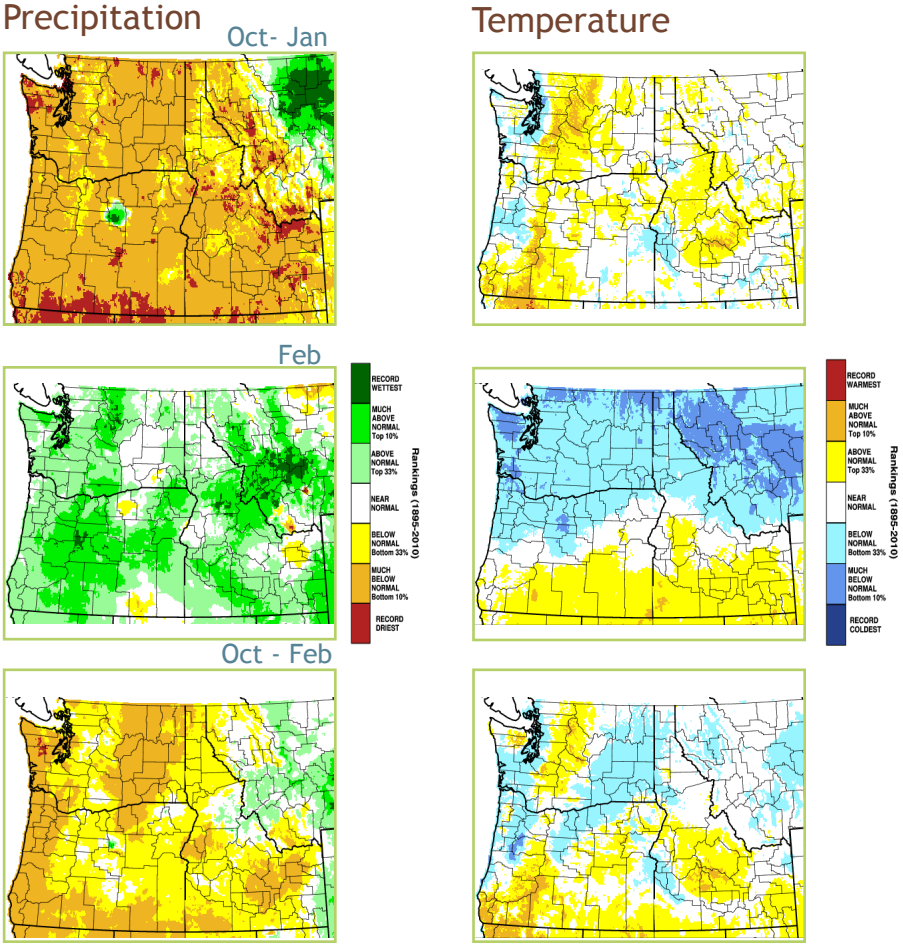
Some parts of Oregon, Washington, and Idaho experienced their driest start to the water year ever in the period from October 1 to January 31. February brought some relief with above average precipitation across much of the region, though more rain than snow fell in southern Oregon. Heading into spring, precipitation deficits remain across most of the region. Areas that do not have reservoir storage have expressed concern about summer water supply.

Temperature

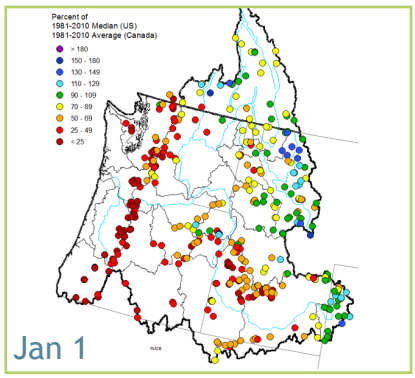
In the few instances where storms did occur, warmer-than-normal temperatures in the mountain ranges hindered snowpack accumulation from October to January. In February, cooler-than-normal temperatures in Washington, northern Oregon, and northern Idaho helped boost mountain snow levels during an active storm pattern. Meanwhile, above average temperatures in southern Oregon continued to hammer on the struggling snowpack in the Siskiyous and southern Cascades. Over the past 5 months, temperatures in some of the lower elevations in the region were below normal, including Oregon's Willamette Valley and Idaho's Snake River Plain.

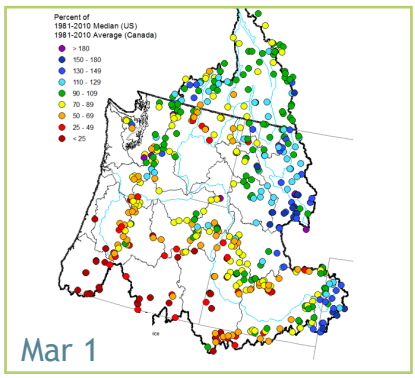
Snowpack

As discussed previously, low precipitation and warm temperatures in the mountains made for a slow start to the snow season in the PNW. On Jan 1, Mountain snowpack was below normal across much of the region (left figure). Washington and Idaho have mostly recovered, though above average precipitation in February and March did not help Oregon's snowpack (March 1, right figure). According to the Natural Resources Conservation Service, precipitation would have to be about 250% of normal over the remainder of the spring for snowpack to reach near normal in Southern Oregon. Snow below 5000 feet in Oregon has already started to melt.

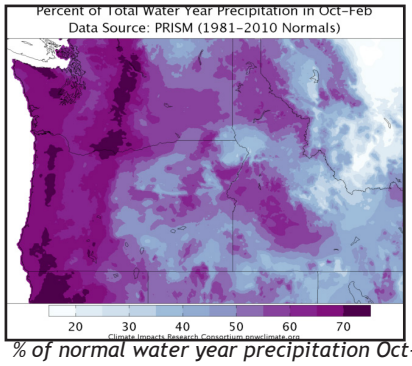


West-Wide Drought Tracker maps of precipitation and temperature for the Pacific Northwest (Western Regional Climate Center)





Mountain snowpack % of 1981-2010 normal in the Columbia River Basin for Jan 1 (left) and March 1 (right). Maps from Natural Resources Conservation Service (NRCS).



% of normal water year precipitation Oct-Feb compared to 1981-2010 (credit: John Abatzoglou)

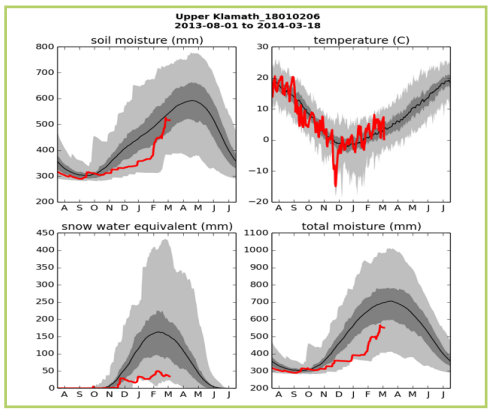
By the end of climatological winter, the wettest portions of the region have usually received close to three-quarters of their precipitation for the year (see figure on left). This year, February and March's above normal precipitation helped to boost water year totals across the Pacific Northwest. However, one and a half wet months did not make up for four dry months. Precipitation in western Oregon and eastern Washington is close to half of normal for the same time period, with the biggest deficits in southwestern Oregon.

Wet springs have made up for a dry winter in the past. This was the case in 2005. A wet February and March helped to alleviate drought concerns in Washington and Idaho. California is experiencing a drought of historic proportions. It comes as no surprise then that the Oregon counties bordering California have large precipitation deficits, low snowpack, and similar worries.

One area with a near record-low snowpack is Oregon's Klamath Basin. NRCS basin-averaged snow water equivalent was less than 25% of normal in mid-March. The graphic to the right is drawn from the new Pacific Northwest Drought Monitor, developed at the University of Washington. The four boxes represent the Upper Klamath Lake subbasin (Oregon). While snow water equivalent remains much below normal through March, total moisture and soil moisture increased dramatically in February and March with warm, wet storm systems.

Similar plots are available for subbasins across the Columbia River Basin, as well as streamflow forecasts and recent changes in west-wide SWE and moisture. The PNW Drought Monitoring system, funded in part by CIRC, is available at:

http://www.hydro.washington.edu/forecast/monitor_west/index.shtml



Upper Klamath Lake total moisture percentiles from Aug 1- present from PNW Drought Monitor

Partners

National Integrated Drought Information System (NIDIS)

www.drought.gov

Office of the Washington State Climatologist

www.climate.washington.edu

twitter: @wastateclimate

Oregon Climate Service

www.ocs.oregonstate.edu

twitter: @orclimatesvc

Climate in the Inland NW

climateinw.wordpress.com

Special thanks to NRCS Oregon for snowpack updates.

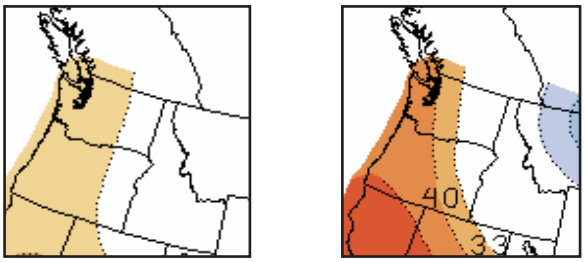
This product is brought to you by The Pacific Northwest Climate Impacts Research Consortium (CIRC). CIRC delivers science, information, and tools to decision makers responsible for the management of resources and services in a changing climate. Our team consists of experts from Oregon State University, the University of Oregon, the University of Idaho, the University of Washington, and the Extension Services of Oregon, Washington, and Idaho. CIRC is funded by the National Oceanic and Atmospheric Administration (NOAA) and housed in the Oregon Climate Change Research Institute (OCCRI) at Oregon State University.

CIRC Climate Impacts Research Consortium pnwcirc.org/

Seasonal outlook and ENSO status

Precipitation

Temperature



NOAA's Climate Prediction Center Seasonal Outlooks for April, May, June (NOAA/NWS)

The April-June outlook from NOAA was posted on March 20, 2014 and is mostly unfavorable for drought relief, especially in western Oregon and Washington.

NOAA's Climate Prediction Center outlook shows a higher than usual chance (40%) of below normal precipitation (light brown on map) in all but extreme eastern Washington and Oregon. Idaho and eastern Oregon and Washington have equal chances of above, below, or normal (33% probability for each).

The odds are tilted toward above average temperatures (50%) in western and central Oregon and Washington (darker orange on map). 40% odds of warmer temperatures in central Oregon and Washington, and equal chances of above, below, or normal (33%) in Idaho.

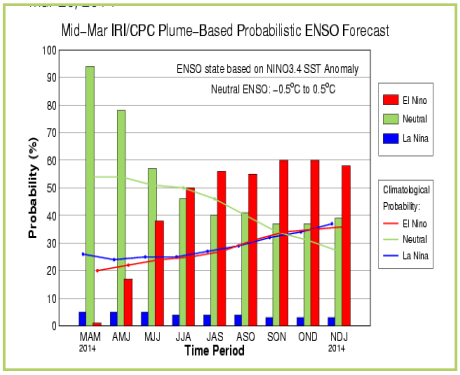
ENSO-neutral conditions are expected to persist through spring 2014.

In March 2014, NOAA's Climate Prediction Center issued an El Niño watch. There is a 50% chance of El Niño developing in summer or fall 2014.

An El Niño event is characterized by an area of of above average sea surface temperature anomalies in the equatorial Pacific. El Niño events tilt the odds toward warmer/drier winters in the Pacific Northwest, but they are only one of many mechanisms driving winter climate in the region.

A watch does not guarantee the development of an El Niño event.

The last El Niño event was the winter of 2009-2010.



Probabalistic ENSO forecast from NOAA/IRI http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/