

Weather and Climate Summary and Forecast February 2018 Report

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February 5, 2018

Summary:

- For the majority of the month of January the persistent ridge of high pressure over the eastern Pacific continued bringing warm and dry conditions throughout the western US. As a result, many regions across California, Nevada, Arizona and Oregon have less than 40% of their normal snowpack.
- While the ridge has shifted slightly from time to time, allowing moisture into portions of Washington and northern Oregon, it appears to have a lock on the west at least through mid-February. There is some indication of cooler and wetter conditions late in the month, but the models have not been consistent enough to call for a major change yet.
- The seasonal forecast from February through April remains dominated by the pattern expected by the La Niña in the tropics and cold PDO conditions in the North Pacific. As a result, the forecasts continue to tilt the odds to spring being cool/wet in the PNW and cool to average and dry in California. The odds for making up the current precipitation deficits decline daily and large areas of the west are likely to see drought conditions develop or get worse in the coming months.

The general weather pattern that developed in December did not deviate much during the month of January. The ‘ridiculously resilient ridge’ of high pressure kept temperatures warmer than normal over much of the western US during the month (Figure 1). Temperatures ran 1 to 7°F warmer than average with Nevada, Idaho and the Northern Rockies seeing the highest departures from average. The influence of the ridge pattern can be seen in Figure 1 where the warmer than average conditions abruptly give way to the cooler than average conditions in the Plains. While the ridge shifted enough to allow moisture through to Washington and northern Idaho, the majority of the western US was drier than average in the month of January. For the rest of the US the bulk of the country saw moderately lower to substantially cooler than average conditions during the month (not shown). Precipitation amounts were mixed across the rest of the country with the southwest to the southeast seeing 5 to 60% of average rainfall while portions of the Great Plains and New England saw 130-200% of normal precipitation (not shown).

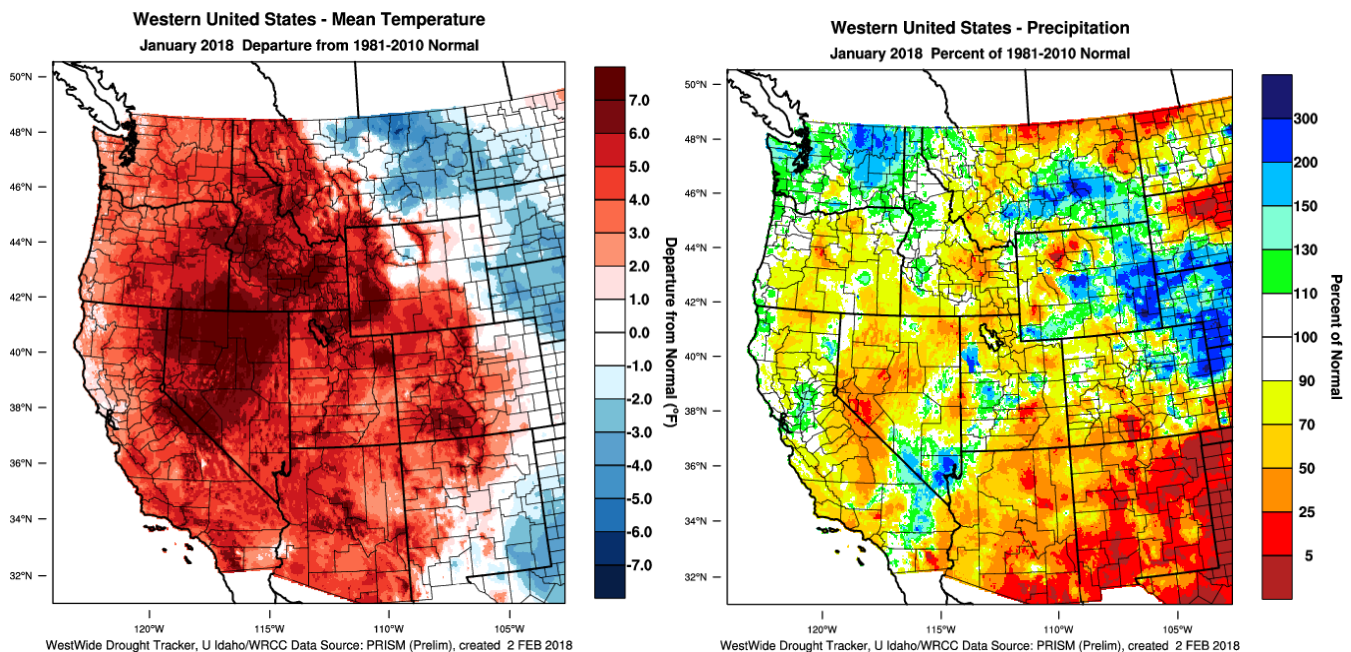


Figure 1 – Western US January 2018 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

For the water year to date (starting October 1st) the warmer and drier conditions are evident over most of the western US (Figure 2). Temperatures are running largely above normal (1-5°F) with the warmest regions in Southern California across to the Four Corners and into the Rockies. Closer to average conditions were seen in portions of Washington, Oregon, and Northern California. The overall temperature pattern during this four-month period has been largely driven by the strong ridging seen during December and January. For the rest of the US the current water year period is running near average to slightly below average (not shown). In terms of precipitation the water year to date has remained very dry for Central to Southern California across into the desert southwest and Four Corners region (10-40% of normal; Figure 2). Much of Oregon and southern Idaho have also been drier than average with precipitation amounts running 70-80% of normal to some regions being near normal. Current snow water equivalents are running 25-45% of average in Oregon, California, Nevada and the southern Rockies with only the northern Rockies running more than 100% of average (not shown). The rest of the country has been mostly dry as well, with only the Great Lakes region, northern New England and portions of southern Florida being wetter than average. The pattern in both temperature and precipitation for the winter so far has followed what was forecasted back in October from the moderate La Niña conditions in the tropics (see section below).

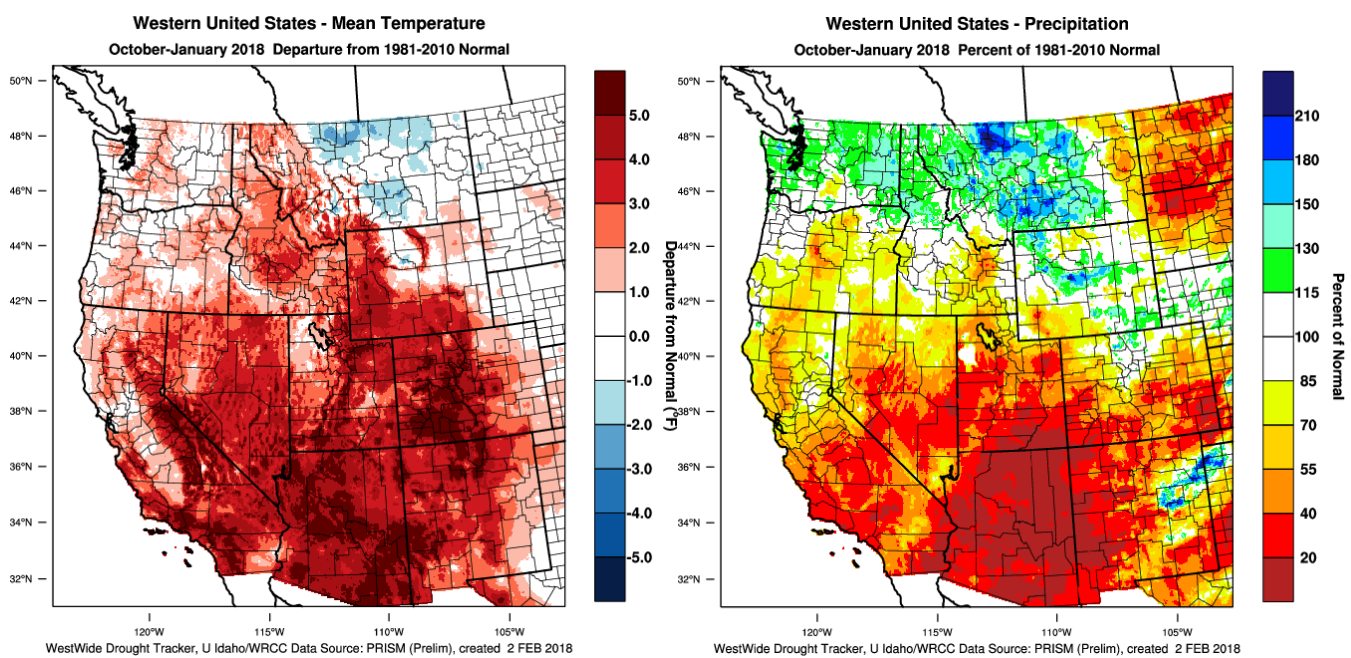


Figure 2 – Western US Water Year October 2017 - January 2018 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

Drought Watch – A year ago the US had its lowest drought footprint in nearly two decades, now nearly half of the country is in some level of drought. The relatively dry water year to date in the west (Figure 2) and over the majority of the country has upped the spatial extent of drought (Figure 3; left panel). Nearly the entire southern tier of the US is now under moderate to extreme drought conditions with the Four Corners through to the panhandles of Texas and Oklahoma being the most extreme. For the west the biggest change is the extension of a large area of abnormally dry conditions throughout northern California, most of Oregon, southern Idaho, and all of Nevada. The US seasonal drought outlook (Figure 3, right panel) forecasts that the driest regions in central to southern California across to Texas will likely persist or further develop through the end of March. The seasonal forecast is also showing drought development in much of the Gulf Coast while the driest areas of eastern Montana and the western Dakotas will likely see drought persist into the spring.

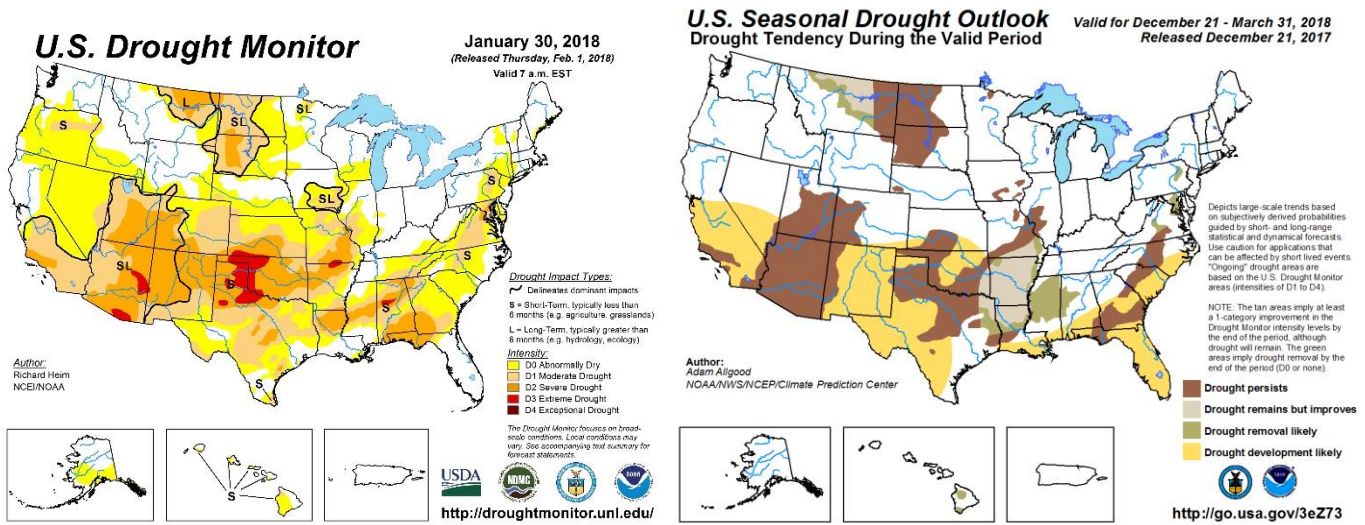


Figure 3 – Current US Drought Monitor and seasonal drought outlook.

La Niña Watch – In mid to late January 2018, the tropical Pacific reflected La Niña conditions, with SSTs in the east-central tropical Pacific in the range of weak to moderate La Niña and most atmosphere variables showing patterns suggestive of La Niña conditions (Figure 4). The collection of latest ENSO prediction models indicates weak La Niña conditions continuing through the Northern Hemisphere winter and early spring, followed by a return to neutral conditions during spring. Forecaster consensus across numerous agencies favors the continuation of weak La Niña conditions through February-March-April. As mentioned in previous reports, I believe if the forecasted conditions hold true, the next few months will continue to be warm and dry in the southern half of the US; wet and ‘coolish’ in the north (see forecast periods below and Appendix Figure 1).

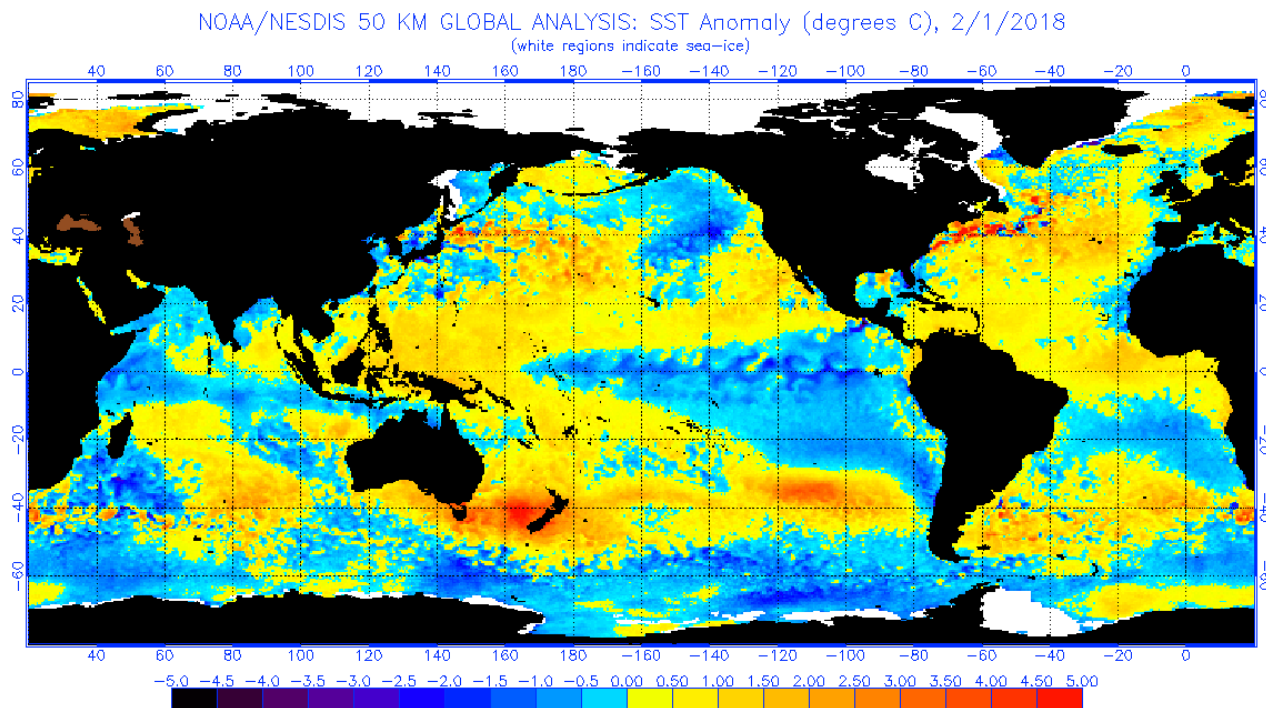


Figure 4 – Global sea surface temperatures (°C) for the period ending February 1, 2018 (image from NOAA/NESDIS).

North Pacific Watch – Not much change in the North Pacific SST from last month. Moderately cool SST remains from the Gulf of Alaska southwest into the central ocean basin while a small area of warmer surface waters is found along the west coast (Figure 4). This pattern continues to resemble the negative or cold phase of the Pacific Decadal Oscillation or PDO, a large-scale, long-term climate variability mechanism in the North Pacific Ocean that is closely

associated with El Niño-La Niña cycles. The current pattern shows that the North Pacific is more in phase with the Tropical Pacific, which typically means that the expected role that each mechanism plays is typically more enhanced. Locally derived analog years for this season using the current state of ENSO and the PDO indicate increased chances for near to below normal temperatures across the PNW during February-March-April, with the greatest possibility of below normal temperatures for Oregon and Washington areas east of the Cascades (see forecast below). These analogous years indicate increased chances for near to slightly above normal precipitation, with above normal probabilities highest for mountainous areas, the Cascades westward, Northern California, and interior western Oregon. Points south into California and the desert SW have warmer and drier conditions in analogous years with La Niña and a cold phase PDO.

Forecast Periods:

6-10 Day (valid February 11-15): A continuation of current conditions is forecast through the middle of the month over the west. This is the result of broad ridging over the western US and eastern Pacific that will keep the majority of the region warmer and drier than average. The only possible upset to this pattern is a slight shift east/west of the ridge which will allow some moisture in the PNW and some cooler air to slide southward. The middle portion of the country from Texas north into the Plains and Great Lakes will likely be colder than average as the cooler air flows down the eastern side of the ridge. The southeast and up into New England has a high likelihood of being much warmer than normal during this period and should see plenty of precipitation.

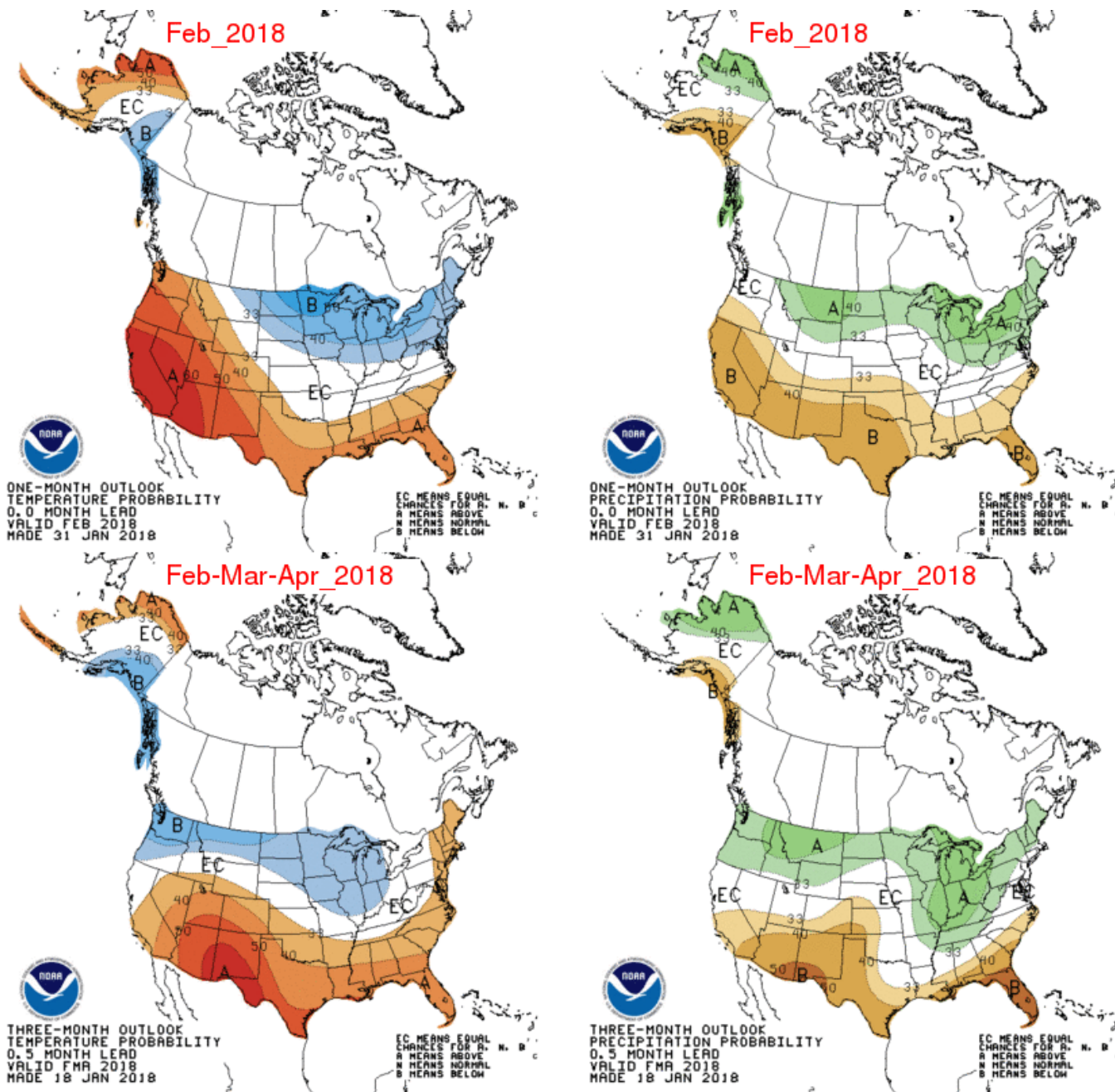
8-14 Day (valid February 13-19): Not much change moving into the third week of the month with the western US forecasted to stay warmer than average for this time of year. Near average temperatures are forecasted for the middle of the country while the eastern US is forecast to remain warmer than normal during this period. The vast majority of the country is projected to be dry through this period with only northern New England and southern Texas forecasted to see much in the way of precipitation.

30 Day (valid February 1-28): The overall pattern for the month of February remains dry in the west and south while the Ohio River valley north into the Great Lakes and New England are forecasted to stay wetter than normal during the month (see Appendix Figure 1). The forecasted temperatures for the month follow a similar pattern with the western third of the country having a high likelihood of being warmer than normal. While the southeast is also forecast to be warmer than average, the remainder of the eastern US is forecast to end up with a normal to cooler than average month.

90 Day (valid February-March-April): The general pattern resulting from a La Niña winter is currently ruling the forecast for February through April (see Appendix Figure 1). The FMA forecast is pointing to conditions similar to last year at this time with a cooler than average period for the PNW across toward the Great Lakes while the southern tier of the United States is forecast to be much warmer than normal. The precipitation forecast over the next 90 days includes the likelihood of the northern tier of states being above average transitioning to the southern tier of states likely being below normal. The west coast is expected to have a similar pattern with a wetter than average PNW and drier than average southern California. Northern to Central California has an equal chance of being slightly wetter to slightly drier than average.

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Appendix Figure 1 – Temperature (left panel) and precipitation (right panel) outlooks for the month of February (top panel) and February, March, and April (bottom panel) (Climate Prediction Center, climate.gov).