

Weather and Climate Summary and Forecast Spring 2016

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April 8, 2016

As we move into April and the flush of growth from our warm spring, looking back at March we can see temperatures across the western US were near normal to above normal (Figure 1). Much of central California north into Oregon and Washington saw conditions that were 0.5-2.0°F in most locations while portions of the southwest and into the Rockies and Great Plains were 3-8°F above normal (Figure 1). The extreme warm conditions in March in the northern tier of the country continued across the rest of the eastern United States with temperatures 2-8°F above normal and some isolated areas as much as 10°F warmer than normal (not shown).

In terms of precipitation, forecasts for a wet March held for some and not for others. From central California and Nevada across to the Rockies and north into Idaho, Oregon and Washington storm events during the month brought 150-300% of normal precipitation (Figure 1). However, the roar of March left much of southern California and the southwest dry. The dry conditions across the southwest in March extended across the south to the Mississippi river valley and into the plains. Dry conditions were also seen pretty much everywhere along the east coast. Wetter than normal conditions were seen along the Mississippi and Ohio river valleys and north into the Great Lakes (not shown).

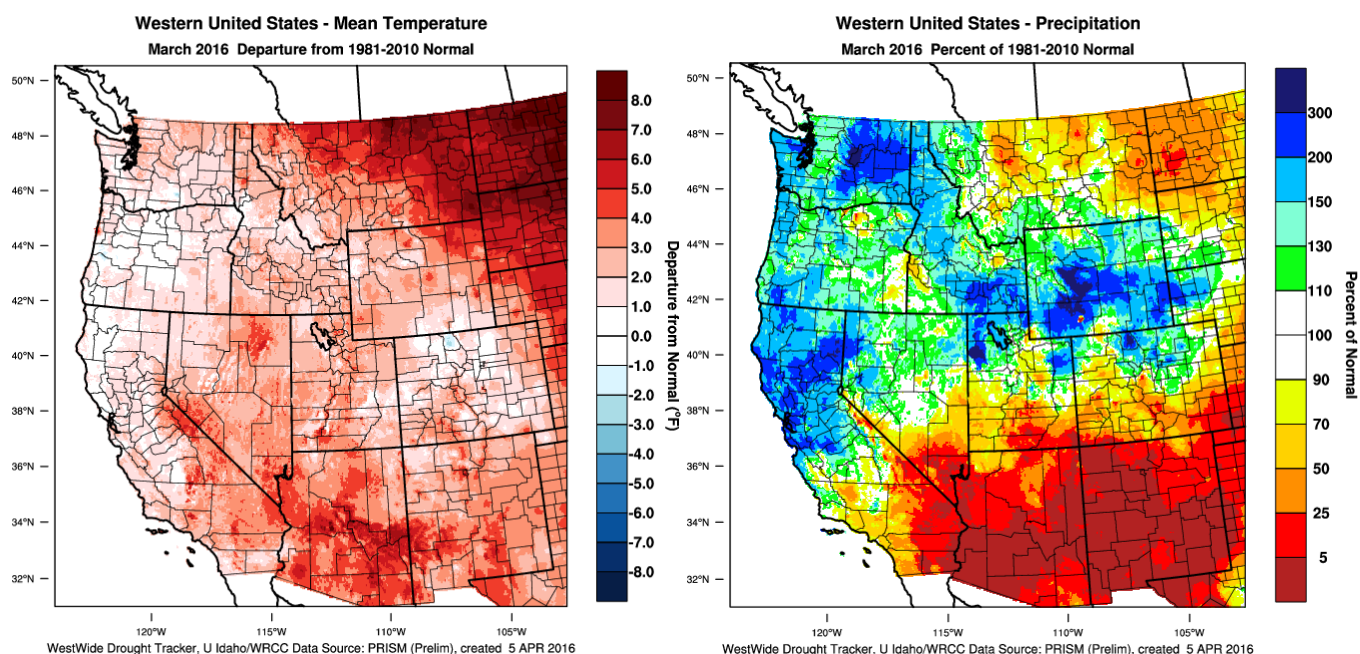


Figure 1 – Western US March 2016 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

For the water year of October through March the cumulative conditions show a normal to warmer than normal western US with precipitation amounts mixed (Figure 2). Average temperatures for the period have run 1.0-4.0°F or more above the 1981-2010 climate normals for much of California, Oregon, Idaho and Washington. Scattered areas in central to southern California and into the Great Basin and southwest have been closer to normal for the water year. On the other extreme, areas in the northern Rockies have seen a winter 5°F or more above normal. This pattern continues across the entire US, with temperatures running 1.0-3.0°F above normal in most region but 5°F or more above normal in the northern plains states (not shown). Precipitation amounts since October have been near normal to above normal from Northern California, across Nevada and into the PNW, while the southwest has remained mostly drier than expected (Figure 2). The rest of the US has been generally wetter than average, especially from Texas into the Great Plains and the Ohio River Valley and in portions of the Southern Eastern US (not shown). Even

with the decent March precipitation over much of the west, the current US Drought Monitor shows continued dry conditions in central and southern California into the southwest and Great Basin (Figure 3).

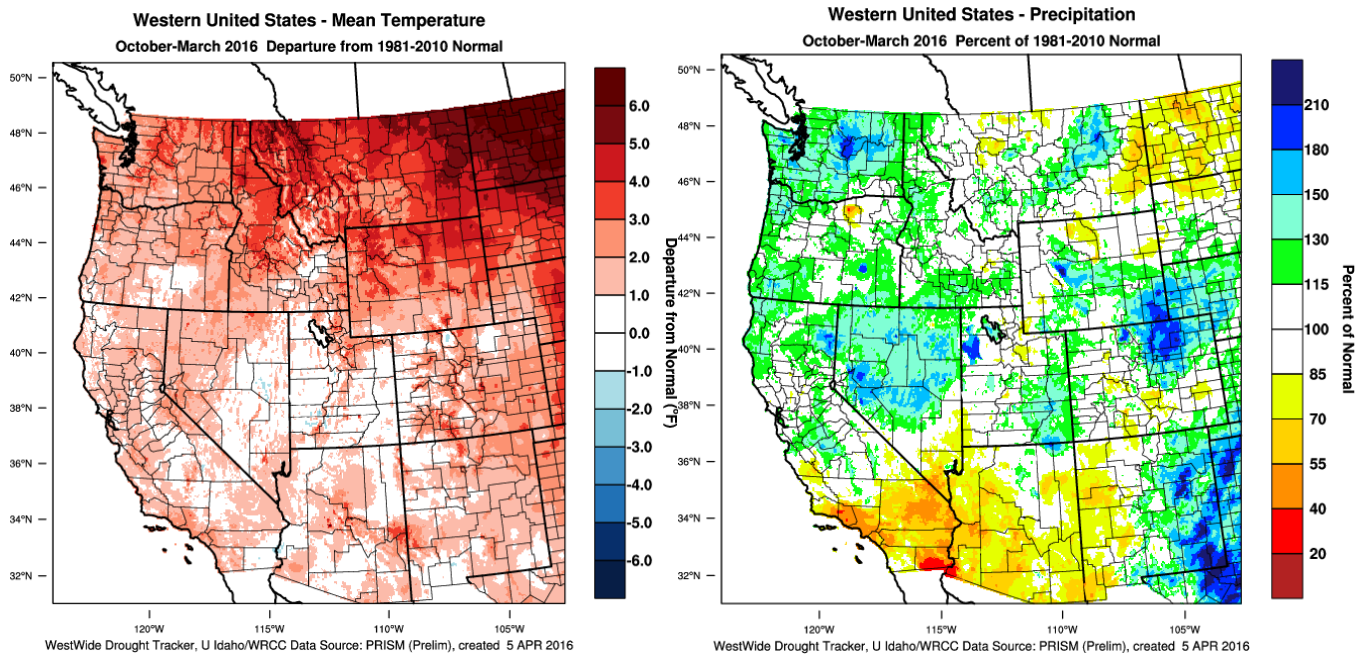


Figure 2 – Western US 2015-16 Water Year to date (Oct 2015 through March 2016) temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

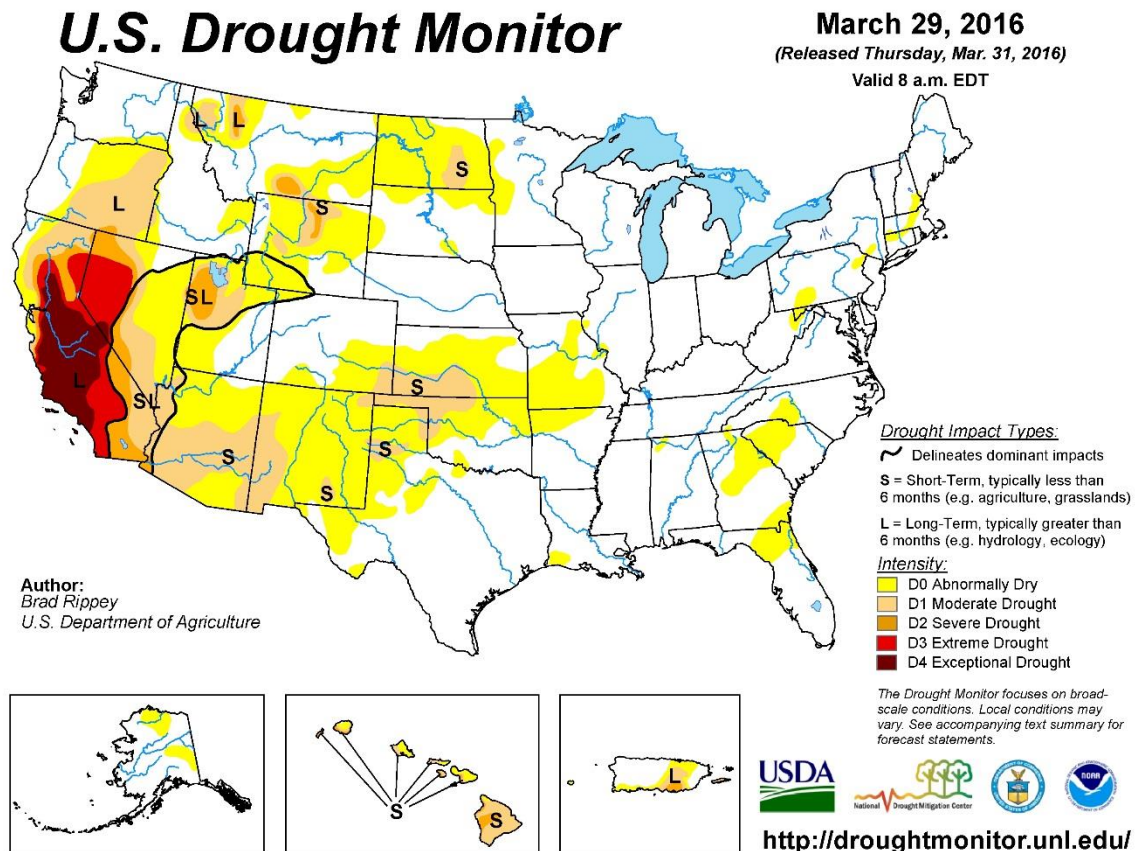


Figure 3 – Current US Drought Monitor.

El Niño Watch – No real change from last report so will leave this section as is ... Currently the Climate Prediction Center still has the status as an “El Niño Advisory”. However, the CPC and other agencies throughout the Pacific are indicating that the current strong El Niño will continue to weaken with a transition to ENSO-neutral during the late spring or early summer (Figure 4). Forecasters from many governments in the Pacific are in agreement with the general model consensus, though the exact timing of the transition is difficult to predict. However, El Niño effects throughout the region are expected to continue as there is a lag time from when the ocean temperatures shift to when the atmosphere responds. All observation agencies are now pointing to 50% or greater likelihood that we will transition into La Niña conditions next fall, which would likely spell a colder and snowier winter.

As mentioned last month the current El Niño has **not** brought similar impacts over the western US compared to other large El Niños. Interestingly, **very little** of this winter’s western US precipitation has come from the tropics, with the majority of it being tied to a classic west coast winter pattern. Just goes to show us how much we know! Even though the winter precipitation has not been what was expected, reservoirs in the western US and especially northern California are getting some much needed inflow, whether it will be enough to lower lingering drought concerns is the issue. Also, snow packs over the western US are in much better shape than they were at this time last year. But we still have a long way to go to get to the average for the water year.

North Pacific Watch – One reason that the winter has been different than expected is the shift in temperatures of the “blob” of warmer than normal sea surface temperatures (SST) in the North Pacific (Figure 4). During 2012-2015 the North Pacific was much warmer than normal and contributed to our warm years, especially higher minimum temperatures. However, the North Pacific SSTs have unexpectedly cooled even along much of the western North American coast. The result was likely the shift in the jet stream and a more vigorous late winter precipitation pattern in the west. Long range forecasts are typically driven by conditions in the North Pacific and the state of El Niño in the tropics. This shift to cooler waters in the North Pacific causes me more concern than what is happening in the tropics, and as such I will monitor how it evolves over the next few months.

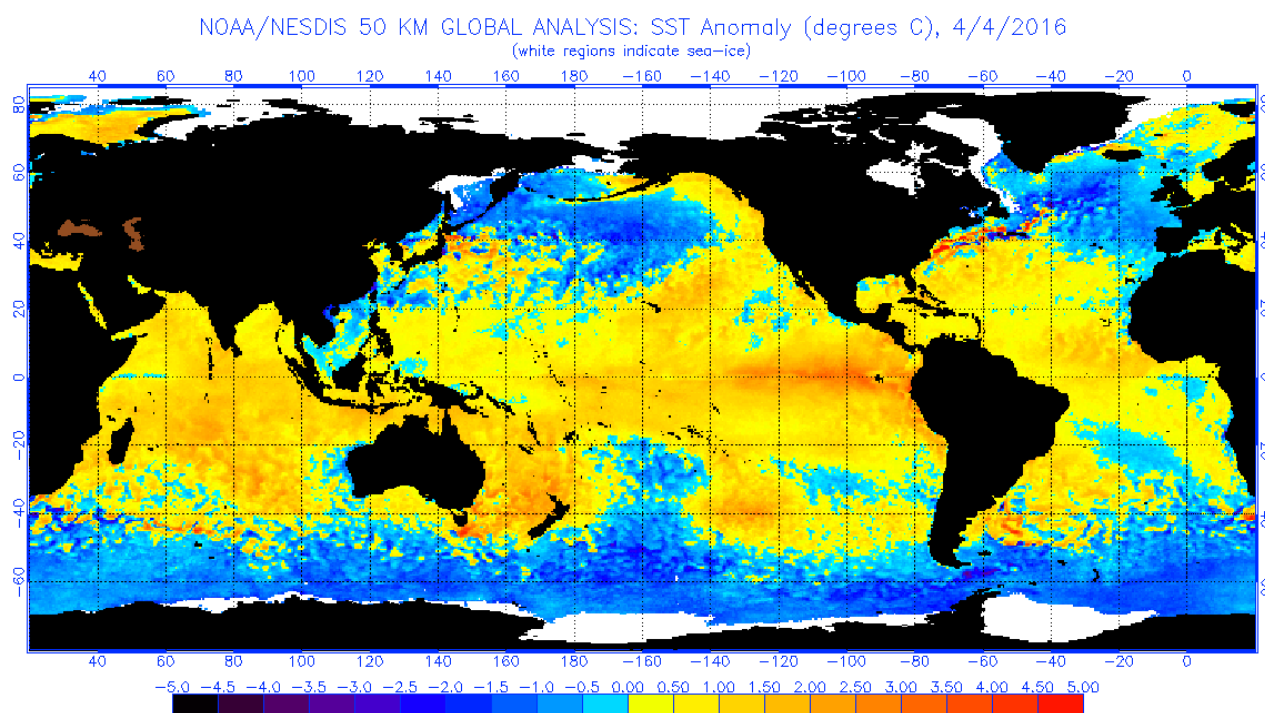


Figure 4 – Global sea surface temperatures (°C) for the period ending April 4, 2016 (image from NOAA/NESDIS).

Forecast Periods:

6-10 Day: Short term forecast is dominated by an active weather pattern in California with cut-off lows bringing what appears to be some substantial rains to regions that missed out on the March precipitation. Temperatures during this period are forecast to be near normal to above normal in all areas except central to southern California and into the

southwest. The precipitation forecast for this period shows normal to slightly wetter than normal conditions over most of the west. There are no dominant cold air masses expected during this period, so it appears that frost pressure will be very low or isolated to the typically colder regions and sites.

8-14 Day: Does not deviate much from the 6-10 day forecast with the overall pattern dominated by a greater chance of warm in the west to PNW. Precipitation forecasts during the two-week period into late April show a high likelihood of a normal to dry PNW, transitioning to above average precipitation in southern California and the southwest. Again, no evidence for circulation that would bring increased frost risk.

30 Day: Forecast through the month of April is tilting the odds to warmer than average conditions over the western US, while much of the rest of the US is forecast to have near normal temperatures. Precipitation during April is forecasted to average to slightly above average across the southern tier of states from central California across to the mid-Atlantic and southward. The PNW is forecasted to have a greater than average chance of being drier than normal during the month of April. Again, the only concern here is the shifting of the North Pacific to cooler waters, which could keep minimum temperatures lower into the frost season.

90 Day: The April-May-June (AMJ) forecast continues the 30 day April forecast as given above. No substantial change to the pattern in the western US with most areas expected to see higher than normal temperatures. The precipitation forecast for the west does not change much, with normal to slightly above normal rainfall expected from southern Oregon south throughout California, while the rest of the PNW is forecast to have a greater chance of seeing dry conditions over the next 90 days. Again, the main concern here is the shifting of the North Pacific to cooler waters, which could keep minimum temperatures lower throughout the frost season.

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