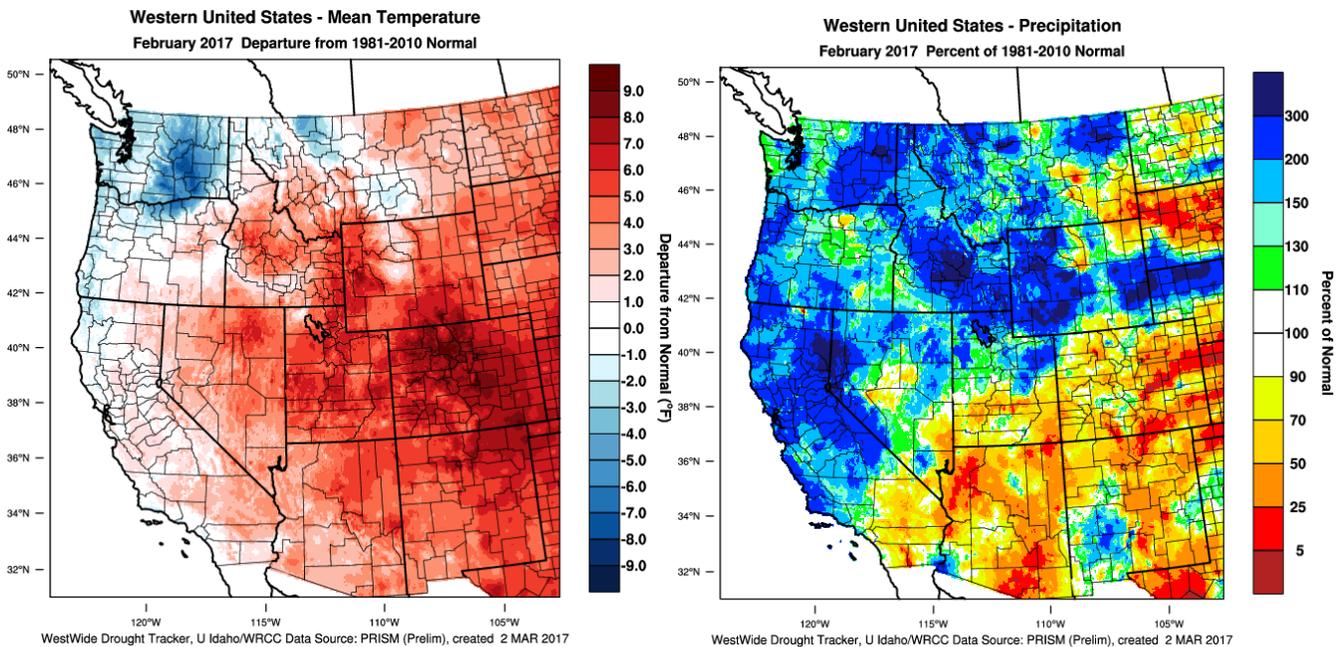


# Weather and Climate Summary and Forecast Spring 2017

Gregory V. Jones  
Southern Oregon University  
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The general pattern in temperatures across the US continued from January into February. The PNW remained the coldest area with temperatures 1-5°F below normal in eastern Washington and Oregon (Figure 1). Western Oregon south into California was relatively cool as well, while the Northern Rockies warmed some over the bitter cold experienced in January. The remainder of the west saw a warmer than normal February with portions of the Rockies seeing 3-7°F above normal temperatures. The rest of the country was much warmer than normal for the month with the bulk of the US seeing 5-9°F above normal (not shown) and widespread reports of very early spring phenology including cherry blossoms in DC peaking now through mid-March.

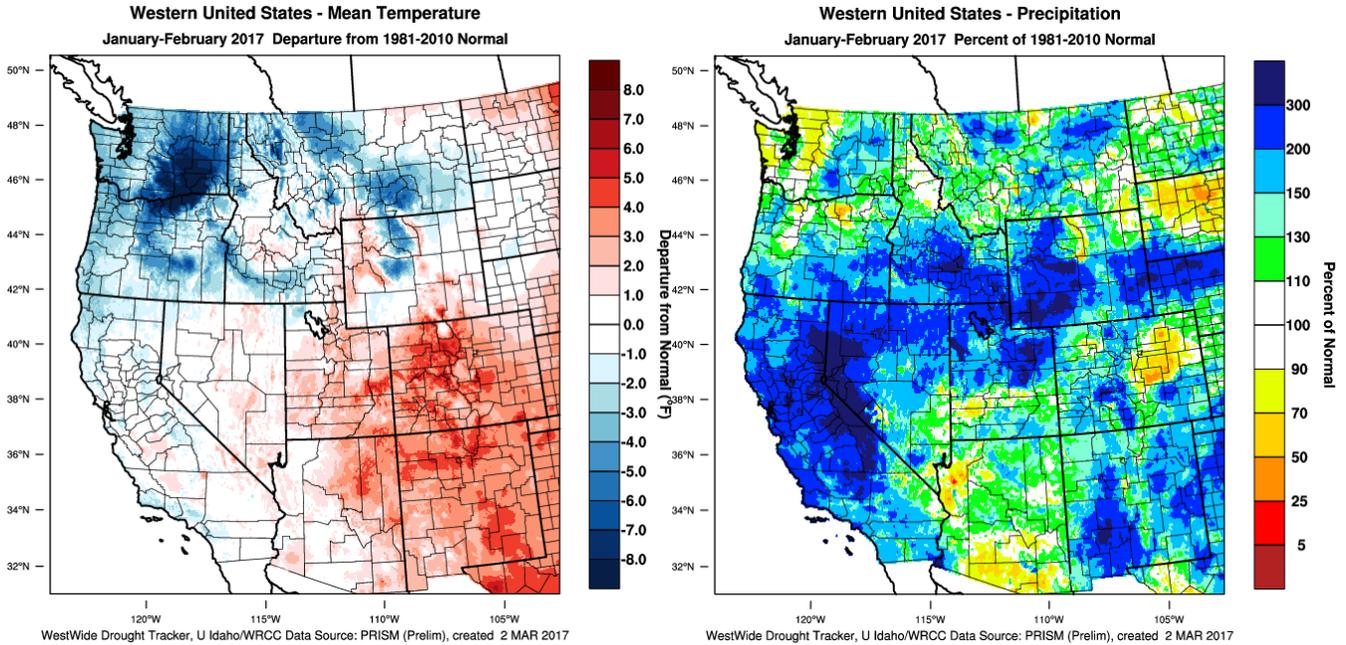
February precipitation amounts continued the wetter than average conditions in Northern California, the PNW and the Northern Rockies (Figure1) with many areas seeing 150 to over 300% of normal for the month. The greatest amounts were seen throughout the Sierra Nevada mountains, portions of the inland PNW, and Montana where some areas reported as much as 400% of average snowfall. Precipitation amounts nationwide were mixed with drier than normal areas across the Midwest, southeast, and middle Atlantic states (not shown), while portions of the Great Lakes and Texas/Oklahoma were wetter than normal for the month.



**Figure 1** – Western US February 2017 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

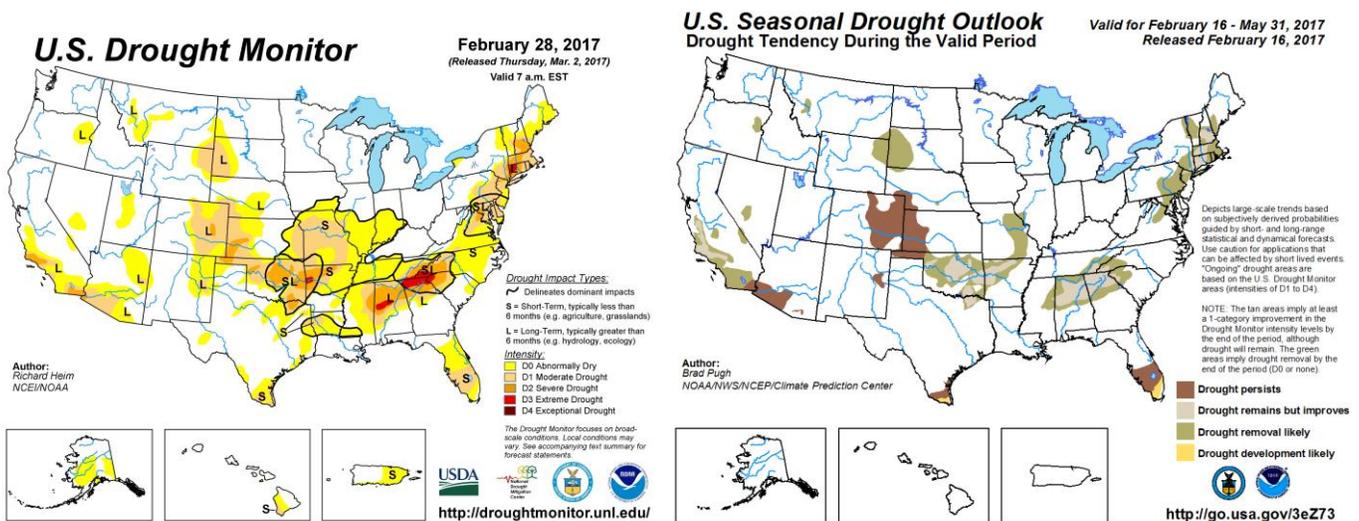
The first two months of 2017 have seen a very cold PNW with observations running 1-8°F below normal. The core of the coldest area straddles the Columbia Valley into eastern Washington and eastern Oregon (Figure 2). The majority of California and Nevada have experienced slightly below average to slightly above average temperatures while the Four Corners region has been warmer than average. The general nationwide pattern for the first two months of the year are for a near normal to colder than normal west and substantially warmer than average eastern US (not shown). The first two months of 2017 have brought considerable precipitation to many areas in the west with the bullseye in California and the Sierra Nevada mountains across into the Northern Rockies (Figure 2). Extending it back to the start of the water year in October shows nearly the exact same pattern (not shown). Nationwide the wetter

than average conditions for the year extend out of the west and across much of the Great Plains into the Great Lakes then south into Texas, while the southeastern US and New England areas were drier than average (not shown).



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

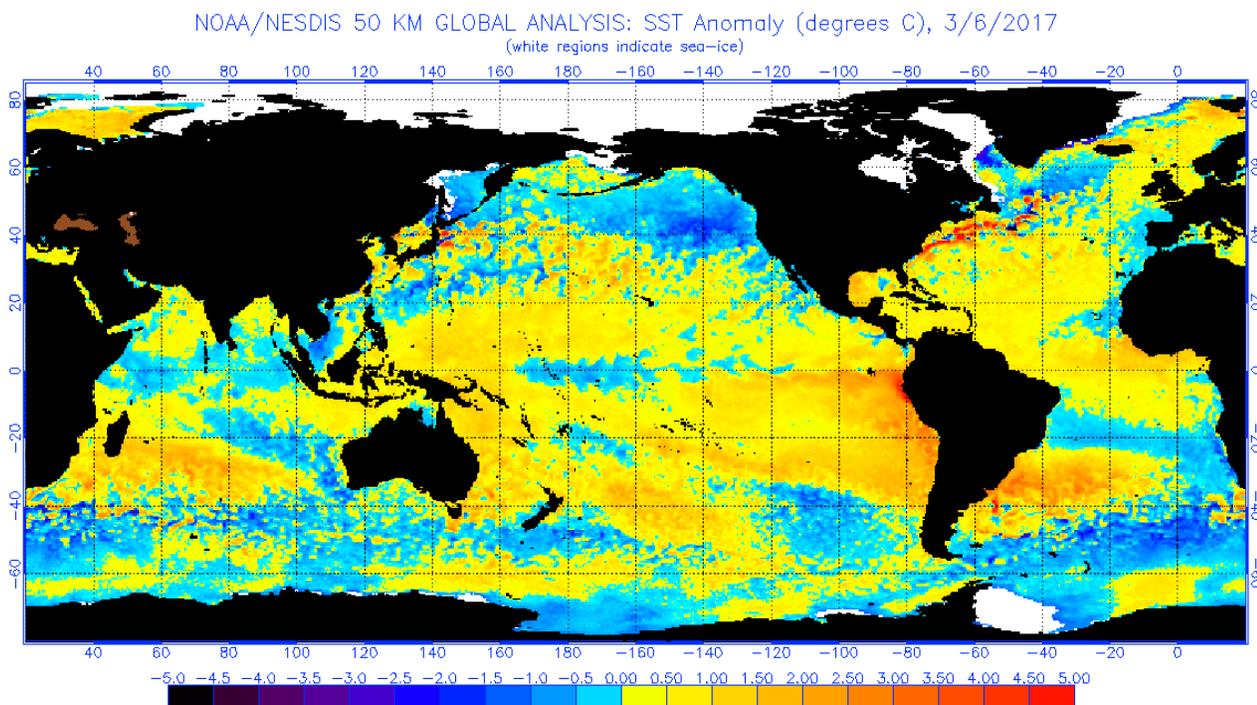
**Drought Watch** – Winter precipitation amounts in the western US continue to erode away at the drought zones of the past few years. The most recent Drought Monitor shows that drought conditions continue in Central to Southern California, but have been moved to mostly moderate status. Drought conditions have developed further in Oklahoma, across New England and the southeast, but the overall extent and intensity of the drought conditions as lessened in each area (Figure 3, left panel). The US seasonal drought outlook (Figure 3, right panel) forecasts that additional areas in California will likely see drought removal, with an area of the south-central coast remaining in drought but likely to improve overall. Similar changes are seen for the drought areas of the southeast and New England, while drought conditions in Colorado, Kansas, and Oklahoma are likely to persist and/or intensify.



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

**La Niña Watch** –Colder than average waters in the tropical Pacific have waned and La Niña conditions are no longer present (termed neutral). Most models predict the continuation of neutral conditions through the Northern Hemisphere summer. Neutral conditions tend to mean that there is little tropical influence in mid-latitude weather, however neutral periods can mean other things to the overall flow of the atmosphere (see North Pacific Watch below). Statistically, neutral conditions in the tropics would slightly favor the next few months to be warm and dry across the southern half of the US; wet and cool to cold in the north (see forecast periods below and Appendix Figure 1). Interestingly, some models and forecast agencies are calling for a decent chance for El Niño conditions (warmer than average tropical SSTs) to develop by summer or early fall. Will have to watch these models over the next month or two to get a read on potential influences to ripening periods across the west.

**North Pacific Watch** – The large pool of cooler than average ocean temperatures across the North Pacific remains in place (Figure 4). Sea surface temperatures (SST) in this area are running 4-5°F cooler than average and 7-10°F cooler than last year at this time (note figure is in °C). This shift is largely responsible for the cooler PNW this winter as seen in Figure 1 and 2. Cooler waters in the North Pacific are also tied to the positive 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 conditions show a North Pacific that continues out of phase with the Tropical Pacific. History would tend to tell us that the current PDO-ENSO conditions would favor a relatively cool to cold and wet PNW into Northern California and a moderately dry and slightly warmer than normal southern California extending across the desert southwest. Unless something else develops, the cooler SST off the west coast and out into the North Pacific would point to a greater chance for a cooler and later spring than we have experienced in a while. Statistical and dynamical analogs have this year currently looking like what we experienced in 2012.



**Figure 4** – Global sea surface temperatures (°C) for the period ending March 6, 2017 (image from NOAA/NESDIS).

**Forecast Periods:**

**6-10 Day (valid Mar 12-16):** Continued cooler than average and wet, wet for the PNW, while California trends drier and warmer. Northern tier of states from the PNW across to New England and the mid-Atlantic all are forecast to be colder and wetter than normal over this period. The southern tier of states is expected to remain warmer than normal with a bullseye in the desert SW, which is also forecast drier than average.

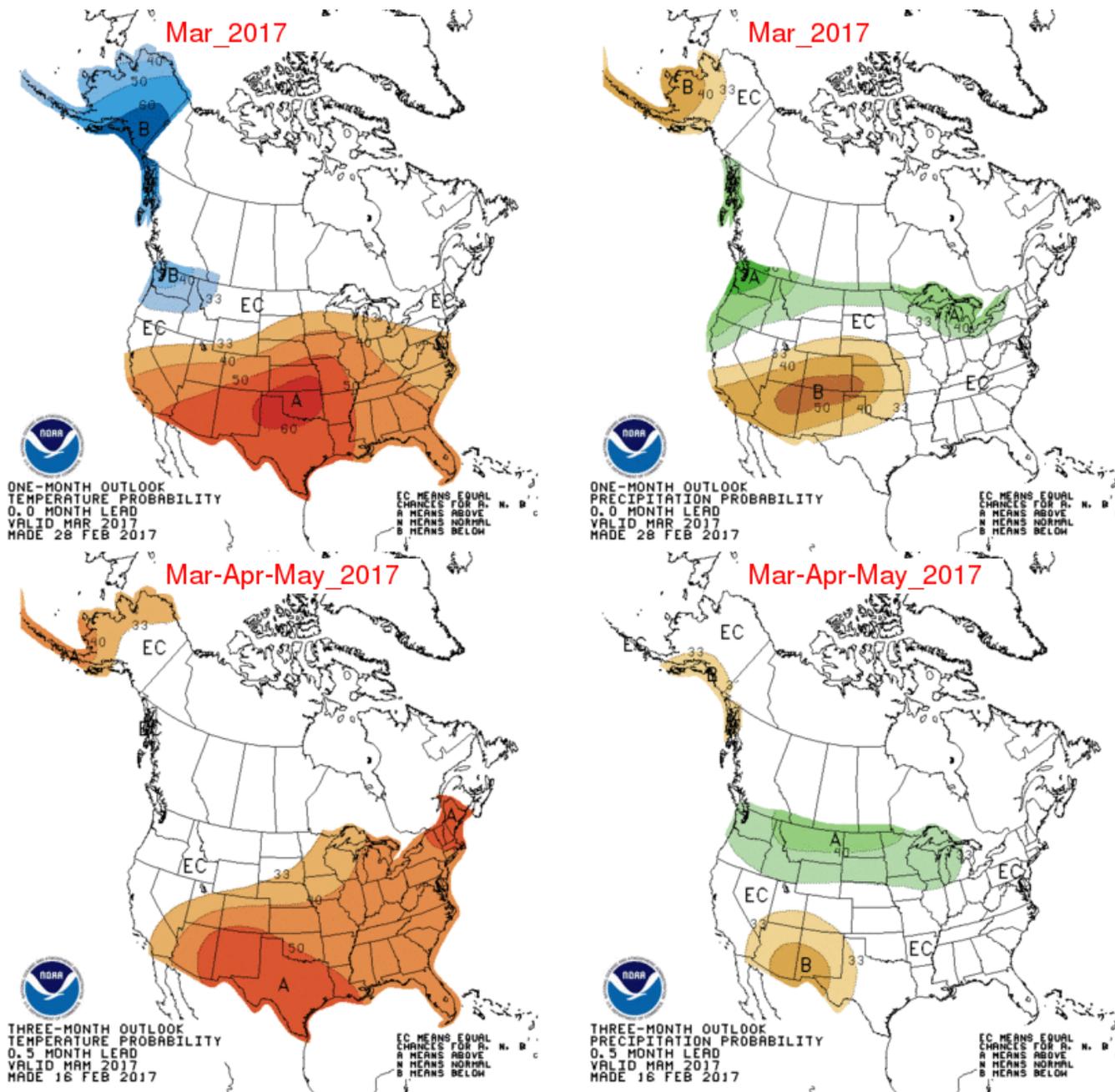
**8-14 Day (valid Mar 14-20):** Broad forecast pattern does not change much from the 6-10 day period with the PNW likely to continue wetter and colder than average while California is forecast to continue its warm-up. Colder than average conditions extend across the northern states during this forecast period, but the bulk of the country is projected to warm-up considerably. Desert SW is forecast to continue dry, while the eastern half of the US is forecast to be normal to wetter than average.

**30 Day (valid Mar 1-31):** The February pattern of a cooler than average PNW and warmer than average conditions for the majority of the rest of the US is forecast to continue in March (see Appendix Figure 1). The precipitation forecast for March calls for the PNW to continue its winter trend to wetter than average. The pattern for a wetter month extends across the northern Rockies and into the Great Lakes. A portion of the desert SW and into the southern Rockies and central plains are forecast to be drier than average for the month, while the Mississippi River valley and into the southeast and New England have an equal chance of being slightly above to slightly below (see Appendix Figure 1).

**90 Day (valid Mar-Apr-May):** The long lead forecast for March-April-May (MAM) from the CPC continues the general conditions from the previous 90 day forecast. The California, the PNW, and northern Rockies are forecast to have an equal chance of seeing slightly above to slightly below average temperatures (NOAA's Climate Prediction Center, see Appendix Figure 1). Or in other words, this region will likely see close to normal spring temperatures with a normal spring frost season, which is quite a difference from the last few years when there was little to no spring frost at all. The rest of the country is forecast to continue to have a warmer than normal spring. The MAM precipitation forecast is holding to a likely higher than average spring precipitation amounts across the northern states and into the Great Lakes. The desert SW continues to be forecasted to remain drier than average the rest of the country is forecasted to have an equal chance to be slightly above average, normal, or slightly below average precipitation (see Appendix Figure 1).

Gregory V. Jones, PhD  
Environmental Science and Policy  
Southern Oregon University  
1250 Siskiyou Blvd  
Ashland, OR 97520  
541-552-6758  
[gjones@sou.edu](mailto:gjones@sou.edu)





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