

Weather and Climate Summary and Forecast

December 2019 Report

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Summary:

- A mild November was experienced over much of the west, while the east shivered in substantially colder than average temperatures for the month.
- The rainy season continued its slow start for the majority of the western US during November, except the last few days to a week which brought much needed precipitation to many areas. However, the overall pattern shows that much of the west remained dry, while portions of the southwest saw average to above average rainfall during November.
- The seasonal forecast for December through February points to the bulk of the country likely staying overall mild to warmer than average with wetter than average conditions north and average to drier than average conditions south. Neutral conditions in Tropical Pacific lower seasonal forecast ability during this period, but the warm North Pacific should boost precipitation totals across the northern states and Canada, with the southern tier of states less clear at this point.

November brought relatively mild conditions to the western US (Figure 1). However, a very interesting pattern of warmer than average higher elevations and near average conditions in most of the valleys was seen over much of the west. The Sierra Nevada and Cascade mountains experienced temperature 3-7°F above normal while areas such as the Central Valley of California and the Willamette Valley were near average (Figure 1). A notable exception was the wine regions in eastern Washington and Oregon where temperatures were 1-3°F below average. Much of the rest of the country experienced a colder than average November with the upper Midwest seeing a month with 4-7°F below average (not shown). Dry conditions continued from the last two weeks of October through most of November over much the west (Figure 1). Central California north into Oregon, Washington, and Idaho experienced 50% or less of average November precipitation while the desert southwest saw 200-300% of average precipitation for the month. Much of the rest of the country saw moderately dry conditions for the month of November with only portions of west and south Texas, Montana, Wyoming, and upstate New York seeing a wetter than average month (not shown).

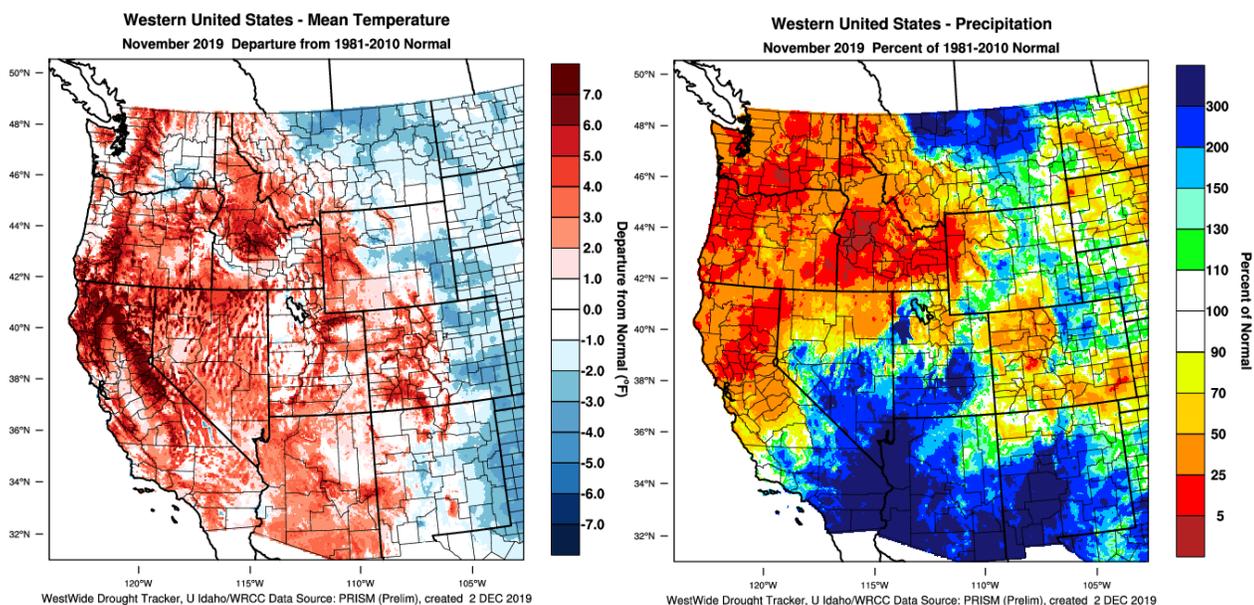


Figure 1 – Western US November 2019 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

Year to date temperatures for 2019 have been largely near average throughout the western US with a striking transition to much cooler than average temperatures east of the Rockies (Figure 2). Areas in eastern Oregon and Washington along with portions of southern California have remained cooler than average for the year. The northern Plains and western Great Lakes will likely end up having a cooler than average year as the region is currently running 1-4°F below normal (not shown). Near normal temperatures have been seen south into Texas while the southeast and east coast have been warmer than average for the year to date (not shown). Year to date precipitation continues to be mostly higher than average over the western US (Figure 2), except for the PNW which remains moderately dry in northwestern Oregon and western and northern Washington. Wetter than average conditions to date in the central US extend into the eastern US while south Texas and the southeast are drier than average (not shown).

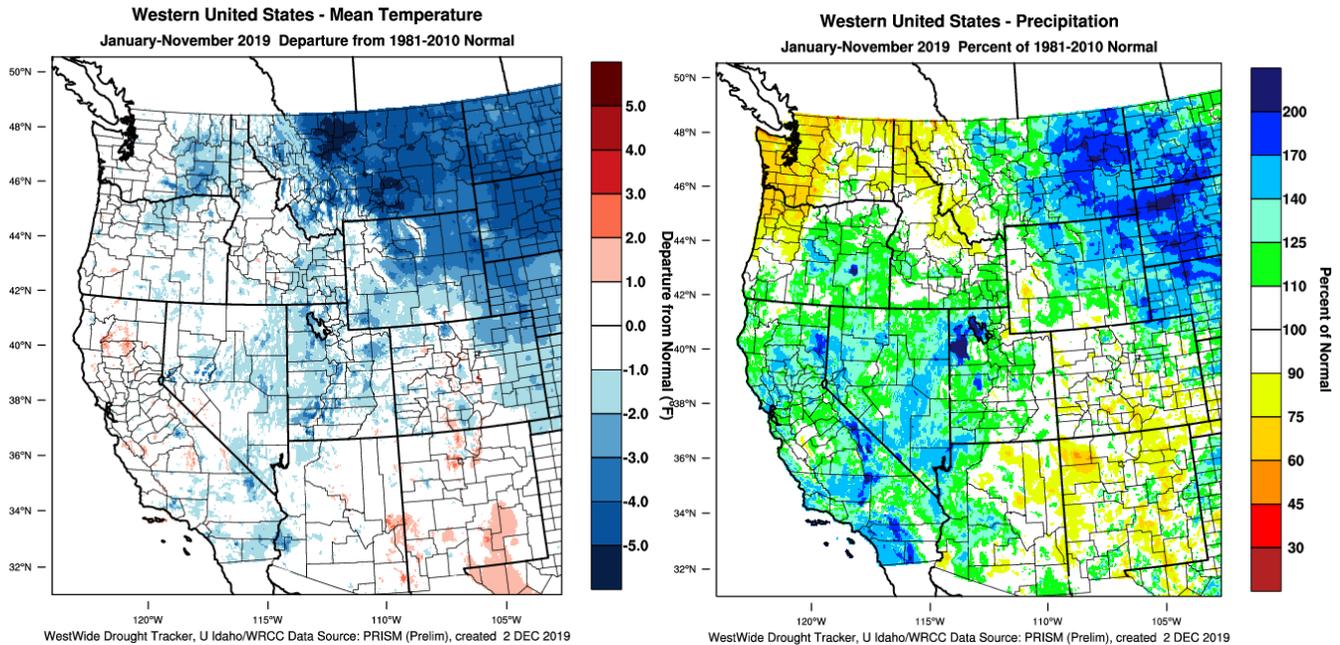


Figure 2 – Western US 2019 year to date temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

Drought Watch – The slow start to the wet season in the west has drought conditions remaining in place throughout much of California, Oregon, and the Four Corners region (Figure 3, left panel). The current US Drought Monitor shows that the drought footprint has increased slightly with the main areas of concern being in the Four Corners region and the desert southwest along with central Texas and portions of the southeast. The longer-term outlook for the US

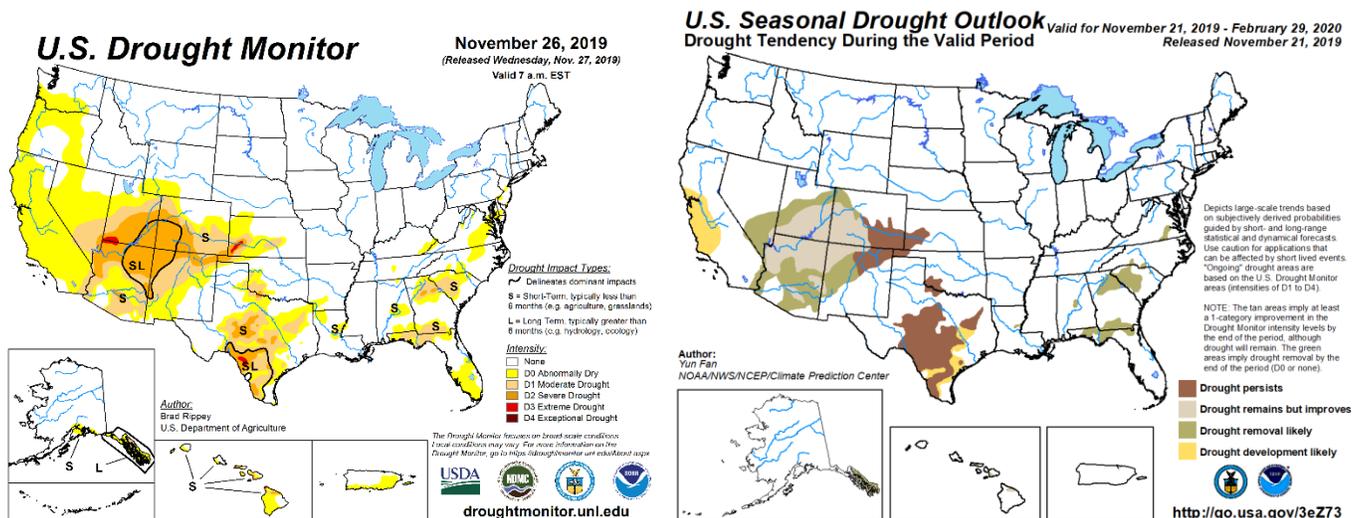


Figure 3 – Current US Drought Monitor and seasonal drought outlook.

through February shows some changes, especially in the western valleys of the PNW and much of California which will likely see some improvement or complete drought removal over the next three months. However, there is some concern for the central coast of California to remain dry over the next three months. The Four Corners region and the southeast is expected to see some improvement in drought conditions while central Texas will likely see drought persistent during the winter months (Figure 3, right panel).

ENSO Watch – The tropical Pacific continues to wax and wane between neutral and El Niño conditions. The latest reports indicate SSTs in the east-central Pacific were near thresholds of weak El Niño levels during October and early November. However, patterns in most atmospheric variables generally maintained neutral conditions. The oceanic warming is attributed to intra-seasonal variability, and the overall diagnosis indicates ENSO-neutral conditions will likely persist. Most model forecasts favor ENSO-neutral through winter and spring, with slightly higher chances for El Niño than La Niña. The official CPC/IRI outlook, and numerous other forecasting agencies outlooks, are consistent with these model forecasts. When ENSO is in a neutral phase, tropical Pacific SSTs are usually close to average. However, ENSO-neutral conditions do not mean that regional weather conditions will necessarily be average, but that these type of winters tend to be the least predictable. If these conditions continue to hold, the weather across the western US will likely be cool to average in terms of temperatures and dry for the first part of winter and then average for the second part of winter (see forecast periods below and Appendix Figure 1).

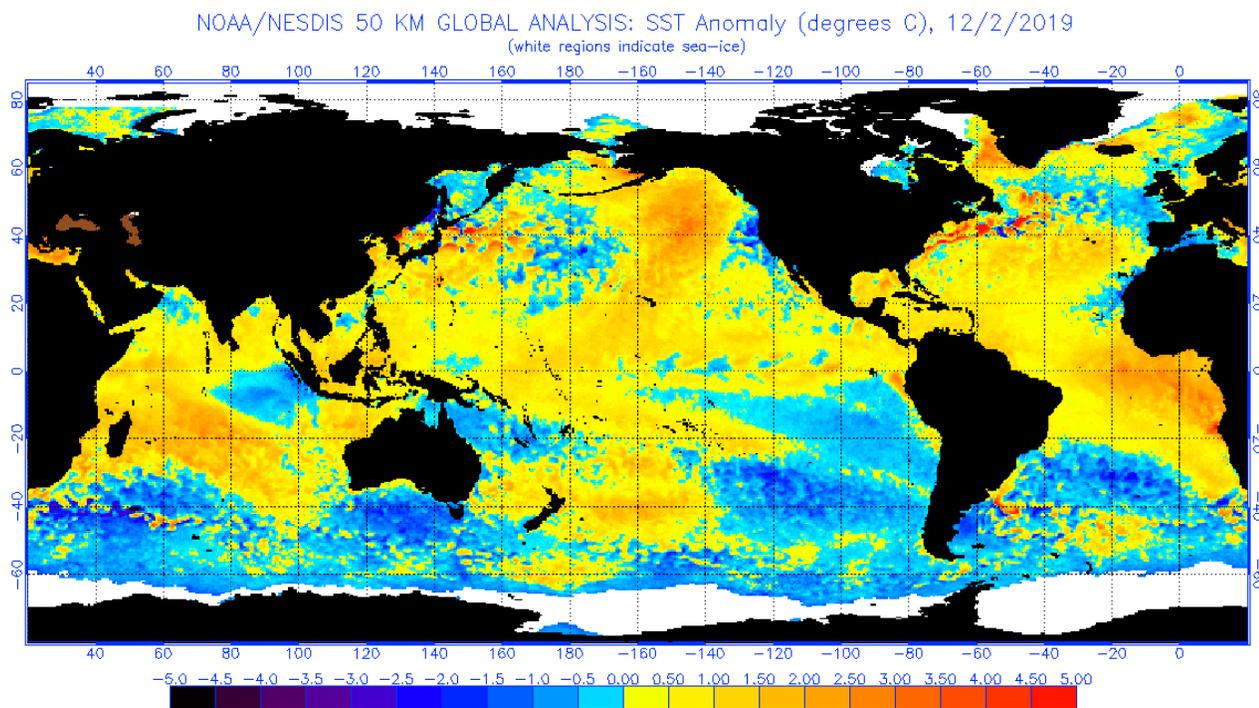


Figure 4 – Global sea surface temperatures (°C) for the period ending December 2, 2019 (image from NOAA/NESDIS).

North Pacific Watch – Overall the North Pacific and the Gulf of Alaska remain much warmer than average (Figure 4). However, the trend to cooler coastal waters along the west coast continues from last month. Again, this is likely the result of the greater coastal upwelling due to more persistent winds over the last couple of months. The thought is that the current warmer than average North Pacific sea surface temperatures (SSTs) should influence both circulation and the amount of moisture in the atmosphere. The effect will likely bring a wetter than average western Canada but near average to lower than average winter precipitation the further south along the west coast. With the Tropical Pacific (see above) in a neutral phase the North Pacific stands to have a greater impact on our winter precipitation pattern this year (see the DJF forecast below).

Forecast Periods:

Next 5 Days: The short-term forecast points to a relatively large system filling in over most the western US with moderate coastal to valley rains and mountain snows. Temperatures will not be as cold as the last week or so, but cold enough to help build snowpacks.

6-10 Day (valid December 11-15): Current conditions are favoring a mild second week of the month with the western US seeing average to moderately warmer than average temperatures. The warmer than average conditions transition to cooler than average conditions in the central and eastern portions of the country, except sunny and warm south Florida. In terms of precipitation, the mid-month forecast is tilting the odds to a wetter north and drier south in the western US with the transition likely along the Southern Oregon and Northern California border. The bulk of the rest of the country is forecast to be wetter than average during this period.

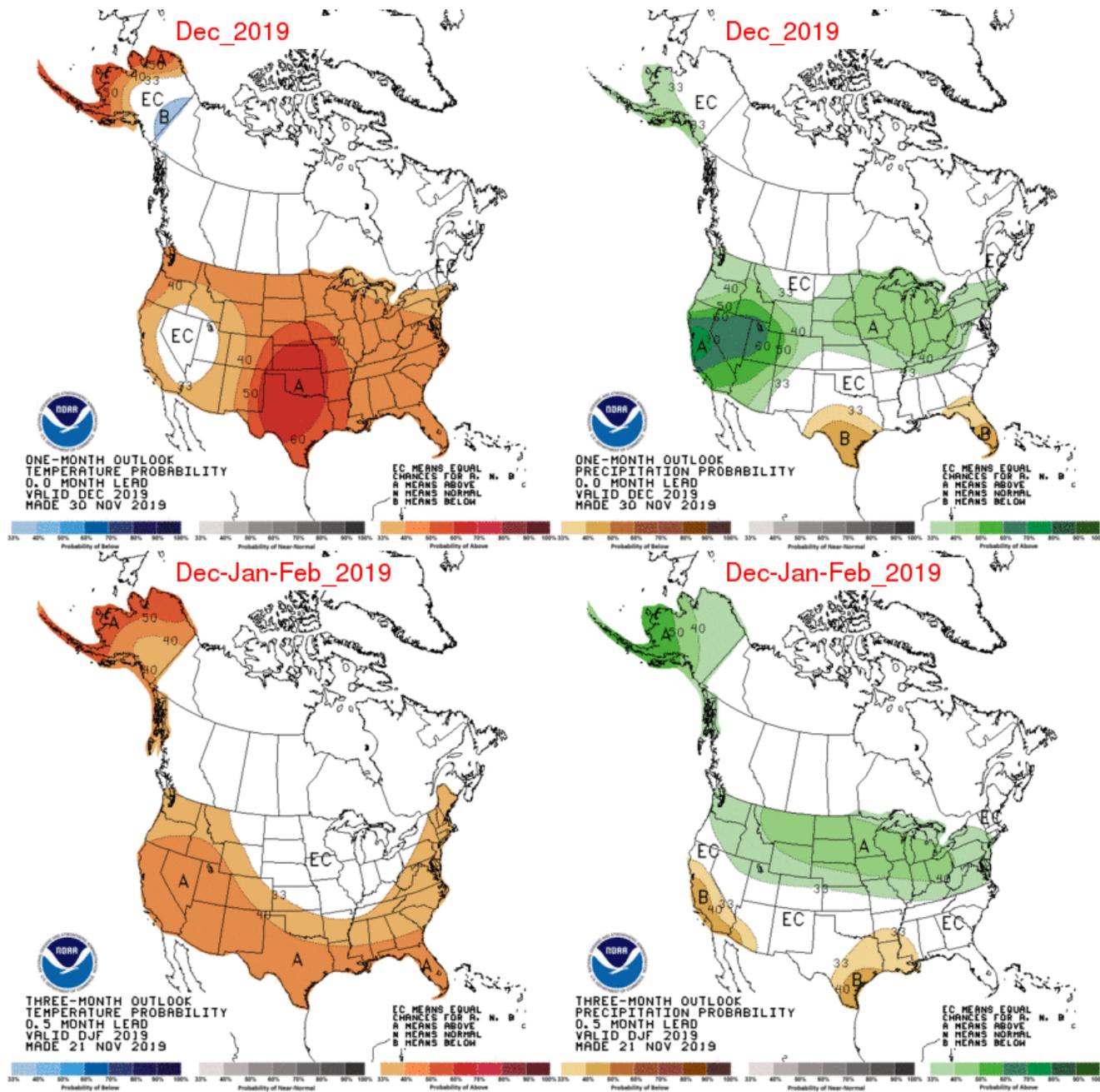
8-14 Day (valid December 13-19): Not much change in the forecast from the 6-10 day (above). The western US is expected to stay near average to slightly warmer than average during this period. The bulk of the eastern US is projected to stay cooler than average, except south Florida and the southeast which will likely be closer to average. Precipitation over the western US is forecast to stay dry in much of California and Nevada while likely being slightly above average in the PNW and Rockies. The rest of the country is likely to see near normal to above normal precipitation for this time of year.

30 Day (valid December 1-31): The broader pattern forecasted for the entire month of December indicates the likelihood of warmer and generally wetter United States. Temperatures for the month a forecast to be warmer than average over the center of the country with a bullseye over Texas and the southern Plains (see Appendix I). Two areas of the US have equal chances of being above or below for the month, including the broader Great Basin and Northern New England. The overall precipitation forecast is pointing to the western US likely seeing a wetter than average December, with central California with the greatest chance of a wet month. Some of this has already occurred with decent rains early in the month in California but will likely be followed by a moderately dry middle of the month and some indication for a wetter second half of the month. The northern tier of states is forecast to see a wetter than average month, while south Texas and Florida are forecast to see drier than average conditions.

90 Day (valid December-January-February): The extended forecast into the heart of winter continues to hold from prior months with the expectation for slightly warmer than average temperatures for much of the country (see Appendix I). The exception is the Great Plains, Midwest, and Great Lakes which have an equal chance of seeing slightly above to slightly below temperatures for the month. Precipitation for these three months is forecast to be slightly wetter than average across the northern tier of states from the PNW to New England, with central to southern California and the western Gulf Coast to likely be drier than average.

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