

Weather and Climate Summary and Forecast

January 2021 Report

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Summary:

- Warmer than average¹ to average for the month of December over California, Oregon, Washington, and Idaho with the Four Corners region cooler than average.
- The bulk of the western US was drier than average for the month of December. Late month storms brought near average to slightly above average precipitation to the PNW.
- Drought concerns continue over much of the west with over 65% of the area in severe to exceptional drought. Some improvement in drought conditions in the PNW, but longer-term concerns continue for California and the desert southwest.
- Active jet stream bringing storms into the western US over the next 10-15 days of the month. Precipitation amounts will be greatest from northern California into the PNW, while temperatures should remain average to slightly warmer than average. Models are hinting at a late month ridging event over the west, which would block storms moving southward and add to an already dry winter for California and the desert southwest.
- The forecast for the second half of winter continues to be strongly influenced by La Niña conditions in the Tropical Pacific. As such, the PNW across the northern states are forecast to be near average to slightly cool and wet, and California and the central to southern states are forecast to be warm and dry.

The month of December saw temperatures that were near average to warmer than average in Washington, Oregon, and California, while inland areas of the Great Basin and Rockies saw cooler than average conditions (Figure 1). The dominant pattern in Figure 1 comes from the extreme warmth in the northern Plains where temperatures were an amazing 6-9°F above average for the month, with slightly lower warm conditions extending south to Texas and east all the way to New England. In spite of late month additions in the PNW, the month of December was also dry over most of the western US (Figure 1). The only exceptions were for northwest portions of Oregon and Washington, and scattered areas in the Rockies where a wetter than average month was seen (Figure 1). Much of the rest of the country was also moderately dry in December, except portions of Florida and the mid-Atlantic coast to northern New England which experienced a wetter than average month (not shown).

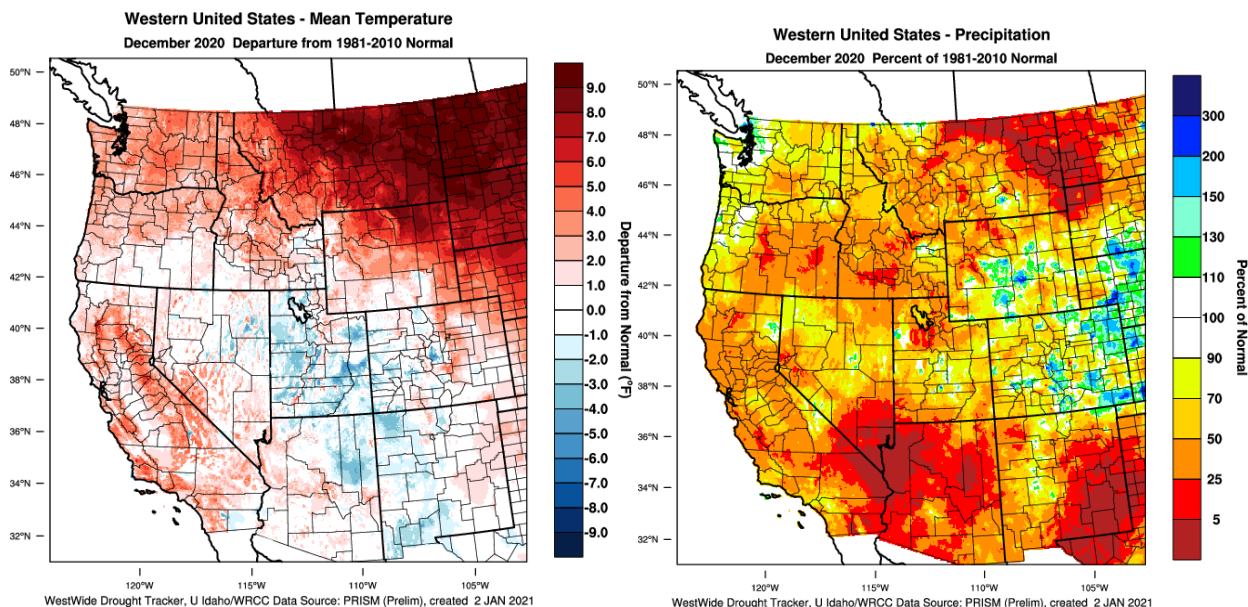


Figure 1 – Western US December 2020 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

¹ Note that all references to normal or averages in this report are to the 1981-2010 climate normal for each weather/climate parameter unless stated otherwise.

Gladly closing the books on 2020, the preliminary tally of climate characteristics for the western US resulted in temperatures near average to above average, although small portions of western Washington and Oregon, and scattered areas in the Rockies and central to southern California ended up slightly cooler than average (Figure 2). Once the preliminary data are finalized, we will likely see the western US close to 3°F above average with California and the desert southwest leading the way. This will likely be a top 3 warmest year on record for the west, compared to the estimated top 1 or 2 that we are expecting globally. The vast majority of the rest of the country also ended up warmer than average, except areas in the northern Plains, southern Plains, and Ohio River valley which saw average to close to 1°F below for the year (not shown). Precipitation amounts for the calendar year show that the western US was quite dry with most regions seeing between 20-90% of normal (Figure 2), with California and the desert southwest likely ending up with a top 3 driest year on record. Portions of western Oregon ended closer to average for the year, while western and eastern Washington, the Blue Mountains of Oregon, portions of Idaho and Montana, and the California-Arizona border ended up 90-125% of average rainfall for the year. The pattern in Figure 2 is also reflected in Figure 3 for the current and projected drought concerns in the west (see Drought section below). The dry conditions in the west extend across the Rockies and into the northern Plains south into Texas while the bulk of the eastern third of the country ended up with a wetter than average year (not shown).

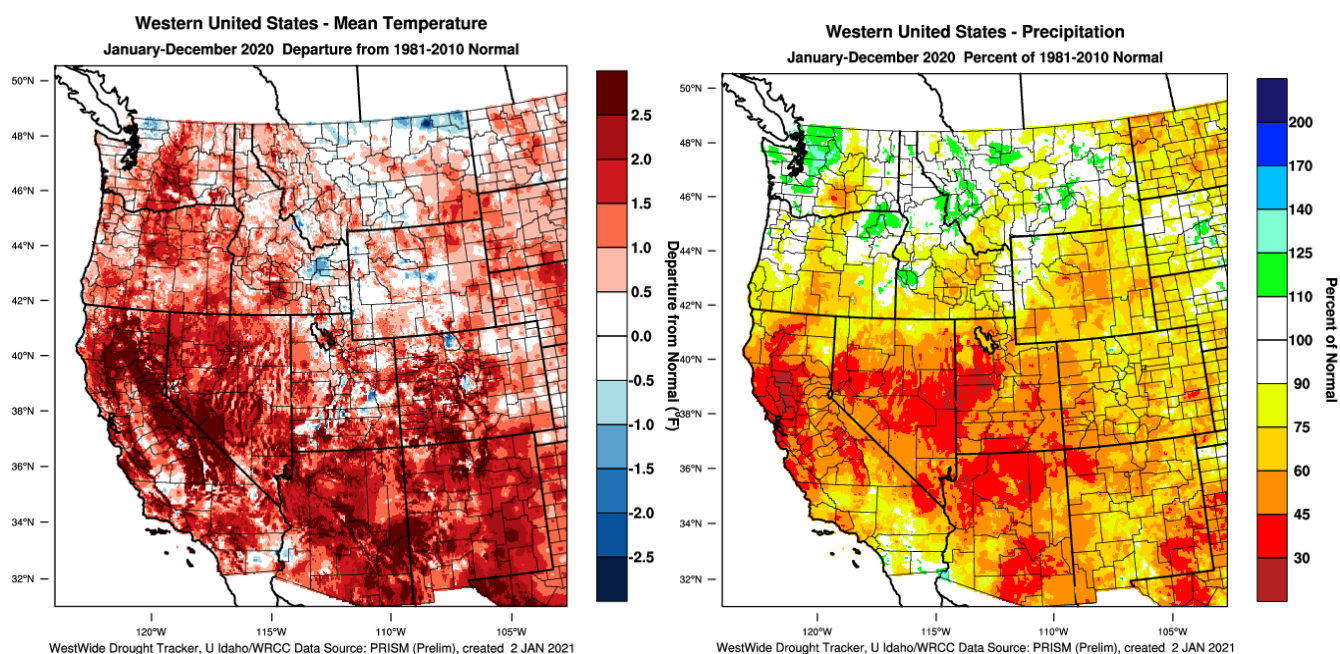


Figure 2 – Western US 2020 (January-December) temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

Drought Watch – At the end of the year drought concerns are still in place for most of the western US (Figure 3). Nearly 90% of the western US continues in some category of drought with 65% in severe to exceptional drought conditions. Western Washington, extreme northwestern Oregon, and northern Idaho and Montana are the only areas of the west that are not currently listed in a drought category. The longer-term outlook for the US through March has not changed much, continuing to show the forecasted dry conditions for much of the west with further development expected in Southern California, the southern Plains, Texas, and even the southeast. December precipitation in the PNW, along with the forecast for a relatively wet January (see forecast section below), has lowered drought concern in the PNW, but a strong dividing line with California and drier conditions continues (Figure 3, right panel). The Four Corners region continues to be the bullseye for the western drought, with the conditions being the result of a dry start to winter that comes on top of a weak monsoon season and record-high temperatures during 2020.

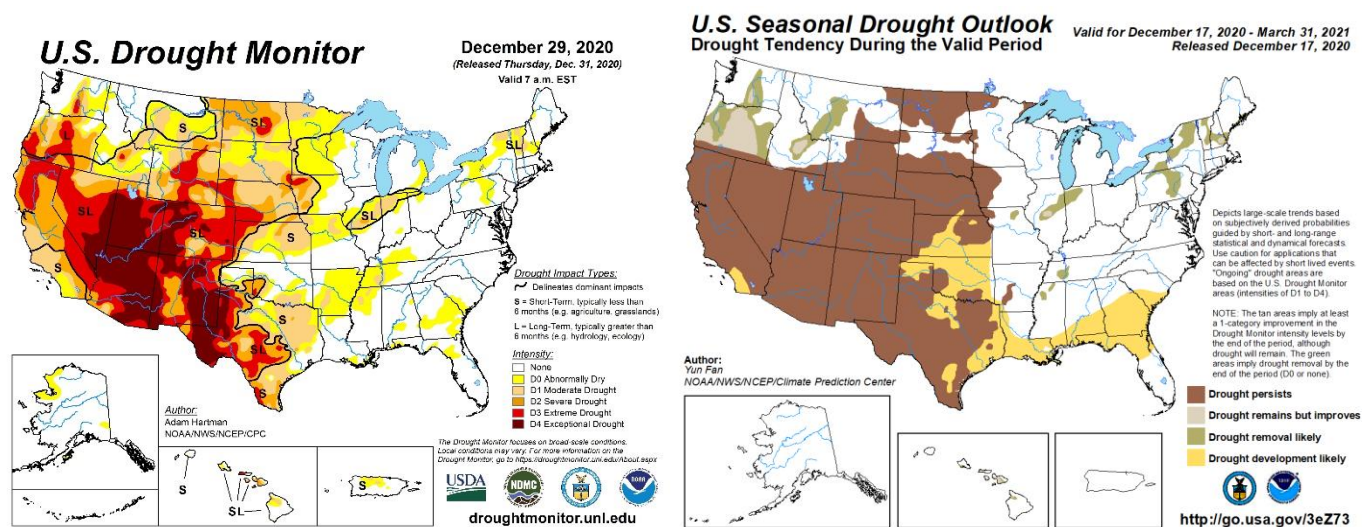


Figure 3 – Current US Drought Monitor and seasonal drought outlook.

ENSO Watch – La Niña conditions are fully in place in the Tropical Pacific (Figure 4). In mid-December, the Climate Prediction Center (CPC) reported that SSTs in the east-central Pacific were approximately 1.2°C (2.2°F) below average, with patterns in all key atmospheric variables consistent with La Niña conditions. The vast majority of model forecasts point to the Tropics exceeding the threshold of La Niña SST conditions through winter and dissipating next spring. The official CPC/IRI outlook and other agency outlooks are consistent with these model forecasts, calling for an 95% chance of La Niña for winter, and as such a La Niña advisory is in effect. The onset of winter has brought some of the typical La Niña conditions to the west with a wet-north and dry-south pattern playing out so far. As such I believe that we will likely continue to see the forecast pattern in the January and three-month forecasts in Appendix Figure 1 where the PNW has a greater chance of being wetter than average (roughly 70%), while California and the southwest have a greater chance to remain dry. Continuing what we have seen so far, and contrary to average La Niña conditions, which are typically much cooler than average over the entire west, the current forecast is calling for warmer than average to average conditions, which I think reflects more influence from the North Pacific (see below).

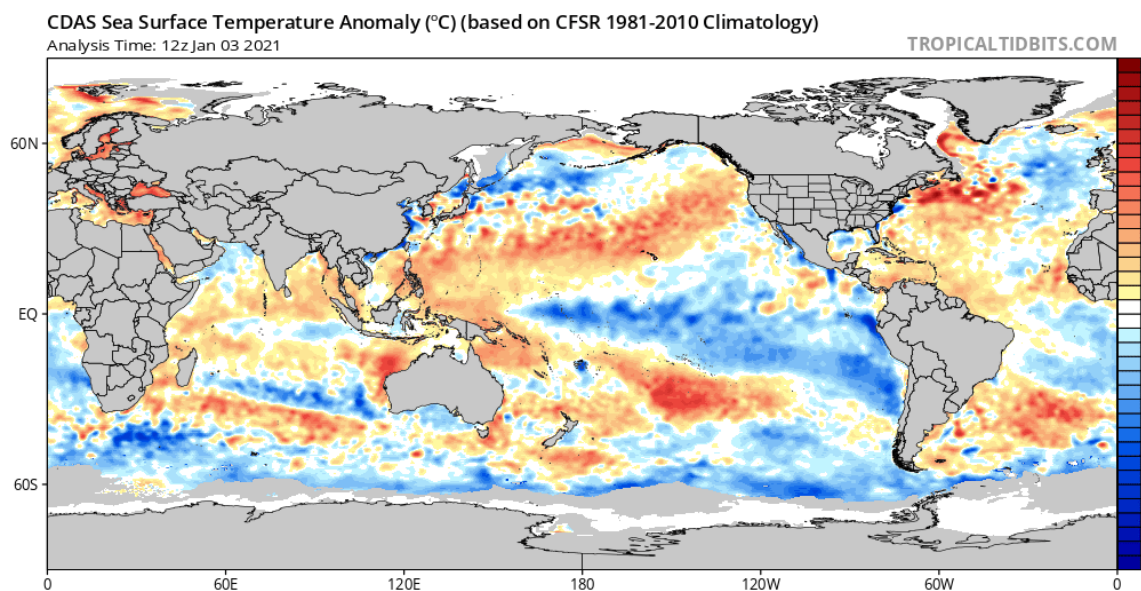


Figure 4 – Global sea surface temperatures (°C) for the period ending January 3, 2021 (image from Tropicaltibits.com).

North Pacific Watch – While the North Pacific continues to show a large area of anomalously warm water running 2-4°F above average (Figure 4), there has been some surface cooling over the last month and some coastal cooling all along the west coast from Baja California to the Gulf of Alaska. Even with the cooling, the North Pacific continues

currently closer to neutral or the warm phase of the Pacific Decadal Oscillation, which continues to put it out of phase with the Tropics (see above). The effect here is that the current warmth in the North Pacific will likely continue to mute the La Niña effect, making the magnitude of the impact lower. The result is that the PNW will likely be in for slightly warmer winter than expected with a La Niña but is likely to stay wet over the course of the winter, while California would likely be slightly warm and moderately dry.

Forecast Periods:

Next 5 Days: Active storm track into the PNW will bring on again off again systems with decent amount of rain, relatively high winds and surf. Northern California will also get in on the action during this period, with average to above average precipitation down to the Bay Area, but dry southward. Temperatures will likely remain seasonal to slightly above average.

6-10 Day (valid January 10-14): Continued wet-north, dry-south pattern, driven by an active jet stream but with zonal flow and a short ridge limiting much precipitation from central to southern California. Temperatures in the west are forecast to remain above average through mid-month over most of the region. The northern tier of states across to New England are forecast to be warmer than average for this time of year, while cooler than average conditions are likely across Texas, the Gulf Coast, and the southeast. Except the PNW and Florida, the bulk of the country is forecast to see a drier than average to average period.

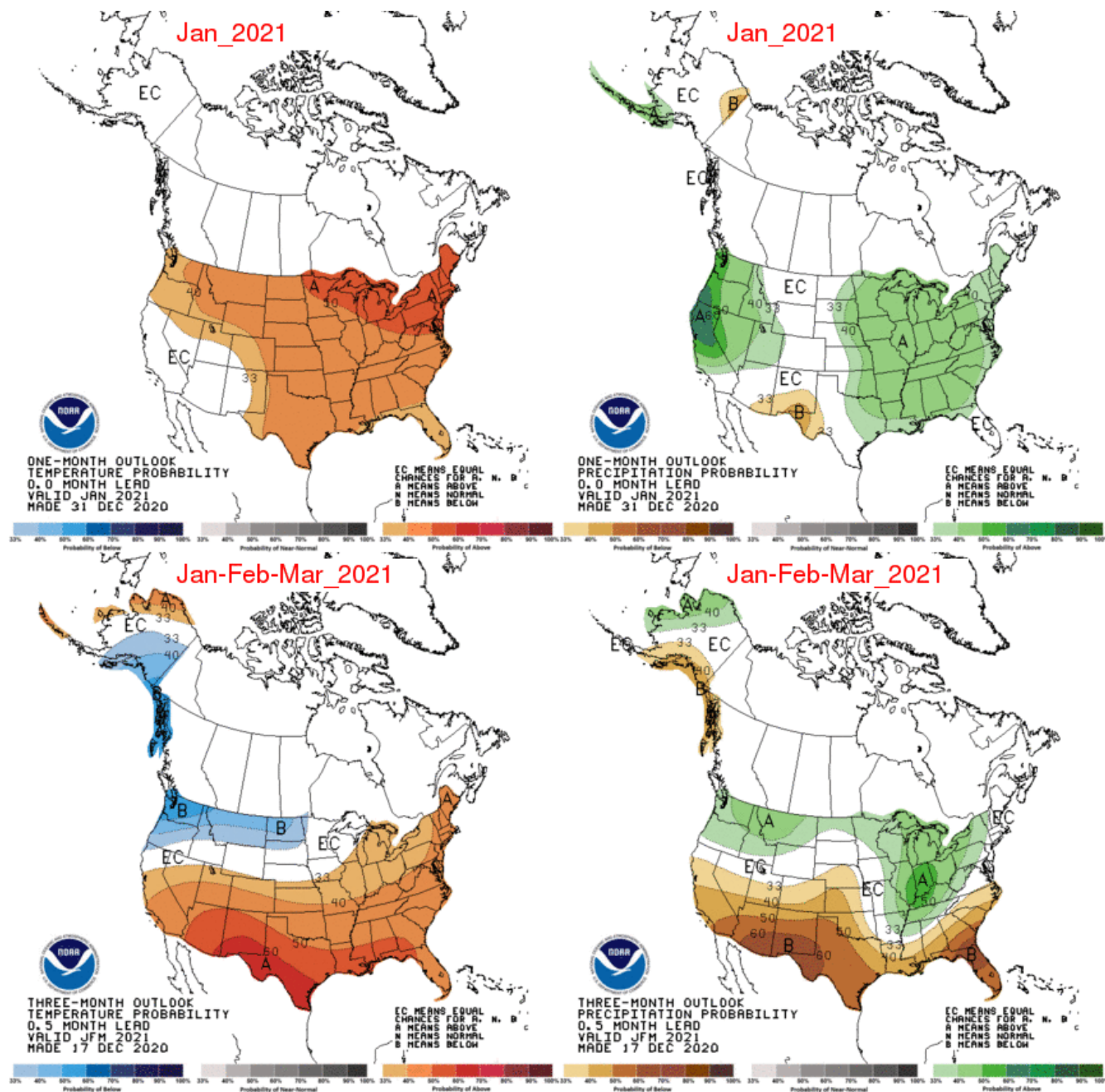
8-14 Day (valid January 12-18): The broad temperature pattern forecast through mid-month continues from the first of the month with high probability for a warmer than average west and northern tier of states, to average and cooler than average across the Ohio River valley, mid-Atlantic, and the Gulf Coast. There is some hint at a ridge building in over the west, which currently results in a drier than average period for all but the extreme NW of Washington. The northern Plains south into Texas is forecast to see a slightly wetter than average period, while the rest of the country is forecast to be relatively dry.

30 Day (valid January 1-31): The outlook for January is for the west to see near average temperatures across the PNW transitioning to equal chances of slightly above to slightly below for California and the desert southwest (see Appendix Figure 1). The bulk of the country is forecast to be warmer than average, especially across the Great Lakes and New England. For precipitation, the west is forecast to see a relatively wet month from Northern California into Oregon and Washington, but much of this will depend on the second half of the month ridging in the forecast. The rest of country is expected to see wetter than average conditions for the month, with the exception of Texas and New Mexico which is forecast to see an overall dry month.

90 Day (valid January-February-March): The second half of winter forecast continues to show the expected pattern for temperature and precipitation given the current La Niña (see Appendix Figure 1). As such the PNW, northern Rockies and Plains are forecast to see a cooler than average winter while the central to southern portion of the country are forecast to see above average temperatures. The precipitation pattern in the forecast also has a classic La Niña signature with the northern tier of states, Great Lakes, and Ohio River valley forecast for a wetter than average three-month period while the southern tier of states and central Plains forecast to see a drier than average period.

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