

Weather and Climate Summary and Forecast February 2021 Report

Gregory V. Jones
Linfield University
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Summary:

- January was relatively mild across the west, with warmer than average¹ to average temperatures for all regions except small areas of the Great Basin and Rockies.
- January was also generally dry across the west, except for average or slightly above average in the PNW, and a late month atmospheric river event that brought significant rainfall to the central coast in California and a portion of the Sierra Nevada mountains.
- Not much change in drought concerns for the majority of the west with over 65% of the area continuing to be in severe to exceptional drought. First half of winter has provided enough to lower concerns in the PNW, but longer-term concerns continue for California and the desert southwest.
- Early February precipitation events from northern California to the PNW will give way to drier conditions for most of the west through mid-month at least. Arctic air will keep the west cooler than average to average for the month, with a big flip to extremely cold over the eastern half of the country.
- The second half of winter forecast remains influenced by La Niña conditions in the Tropical Pacific, but also the relatively warm North Pacific. As such, the PNW and 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.

January was generally mild over the western US with temperatures near average to warmer than average in Washington, Oregon, and California, while inland areas of the Four Corners saw slightly cooler than average conditions (Figure 1, note that the scale in the map is deceiving, the temperatures in most of WA, OR, and CA range from +0.5 to +3.5°F). The extreme warmth in the northern Plains, where temperatures were an amazing 7-10°F above average for the month, extended over the eastern half of the country although more in the range of 1-4°F above average. The month of January was generally dry over most of the western US (Figure 1), although portions of the PNW did see moderate precipitation and the area in the central coast of California and Sierra Nevada received all its precipitation from a single event late in the month. Much of the rest of the country was also moderately dry in January, except the central to southern Plains which experienced a wetter than average month (not shown).

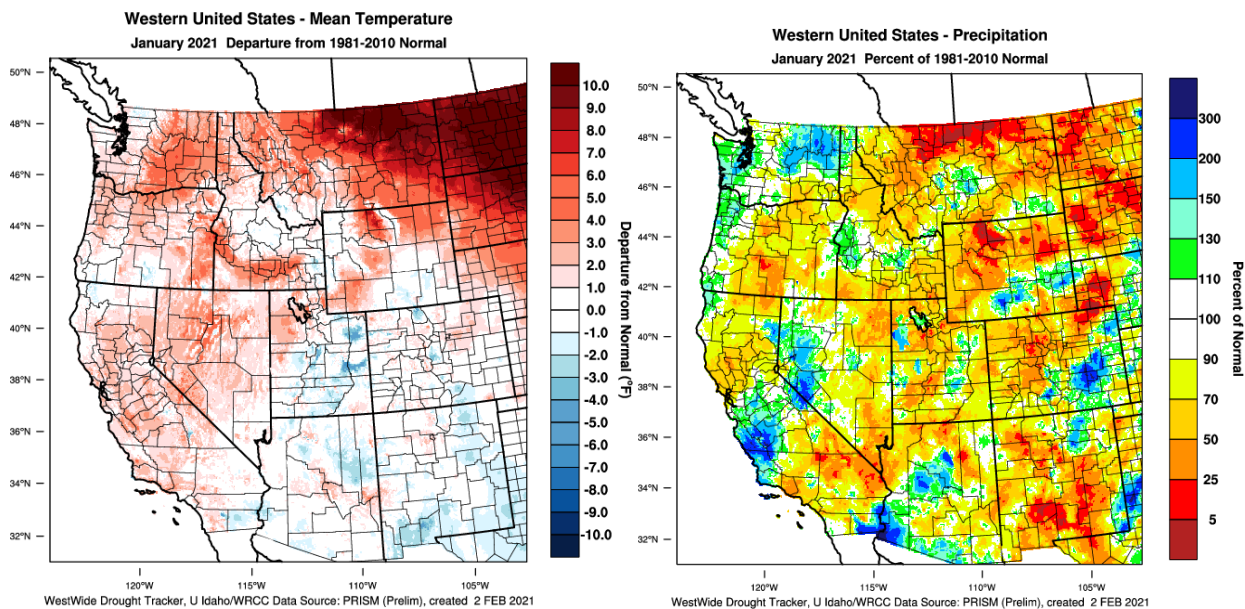


Figure 1 – Western US January 2021 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

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.

Shifting to the water year period starting October 1st, Figure 2 shows that the majority of the western US has seen a warmer than average winter so far. Temperatures are running 0.5 to 4.5°F for most locations, with elevations showing a greater deviation than lowland areas, and the northern Rockies and Plains experiencing an extremely warm winter to date. Only isolated areas in the Great Basin and the central Rockies have seen a cooler than average winter so far. The rest of the country is also running warmer than average, with only the southern Plains and Mississippi River valley being close to average (not shown). Precipitation amounts for the water year so far show that the western US has been quite dry with most regions seeing between 15-85% of normal (Figure 2), with portions of California and the desert southwest continuing to experience long-term drought conditions (see drought section below). Portions of western Oregon, most of Washington, and portions of Idaho and Montana are seeing a near average to wetter than average winter so far, which matches the forecasts over the last few months. The single atmospheric river event in late January was enough to bring portions of the central coast closer to average; but did not help the rest of the state much. The pattern in Figure 2 continues to be 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 are currently experiencing a near average to wetter than average water year to date (not shown).

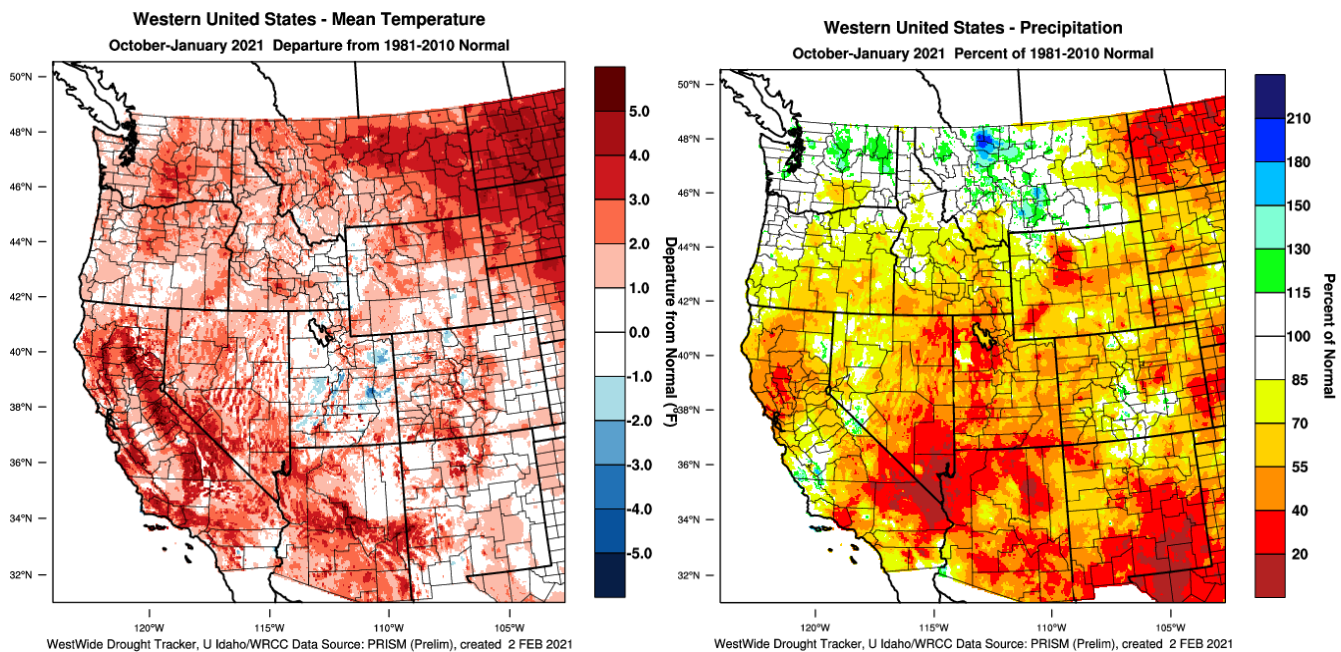


Figure 2 – Western US water year October 2020 through January 2021 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

Drought Watch – Drought concerns remain in place for the majority of the western US (Figure 3). Early season precipitation in the PNW has lowered the severity, as did the late January precipitation event in California. However, over 90% of the western US continues in some category of drought with over 65% in severe to exceptional drought conditions. Western Washington, northwestern Oregon, eastern Washington, northern Idaho and Montana, and portions of western Wyoming are the only areas of the west that are not currently listed in a drought category. The longer-term outlook for the US through April continues 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 and January precipitation in the PNW has lowered drought concern in the PNW, with the dividing line with California and the drier conditions southward continuing (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 first half of winter that comes on top of a weak monsoon season and record-high temperatures during 2020.

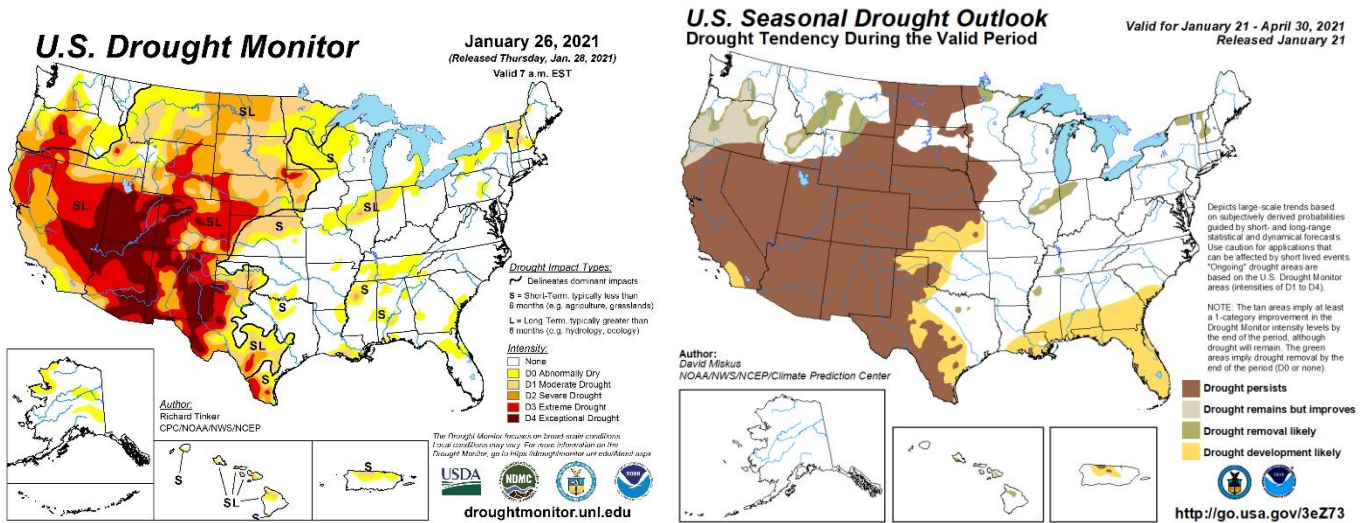


Figure 3 – Current US Drought Monitor and seasonal drought outlook.

ENSO Watch – La Niña conditions continue in the Tropical Pacific (Figure 4). As of mid-January, the Climate Prediction Center (CPC) reported that SSTs in the east-central Pacific remain 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 into spring. The official CPC/IRI outlook and other agency outlooks are consistent with these model forecasts, calling for a 95% chance of La Niña through the JFM three-month period, and as such they are continuing the La Niña advisory. So far, this winter has brought some of the typical La Niña conditions to the west with a wet-north and dry-south pattern (see Figure 2). I believe that we will likely continue to see the forecast pattern in the February and three-month forecasts in Appendix Figure 1 where the PNW has a greater chance of being wetter than average (roughly 70-80%), 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).

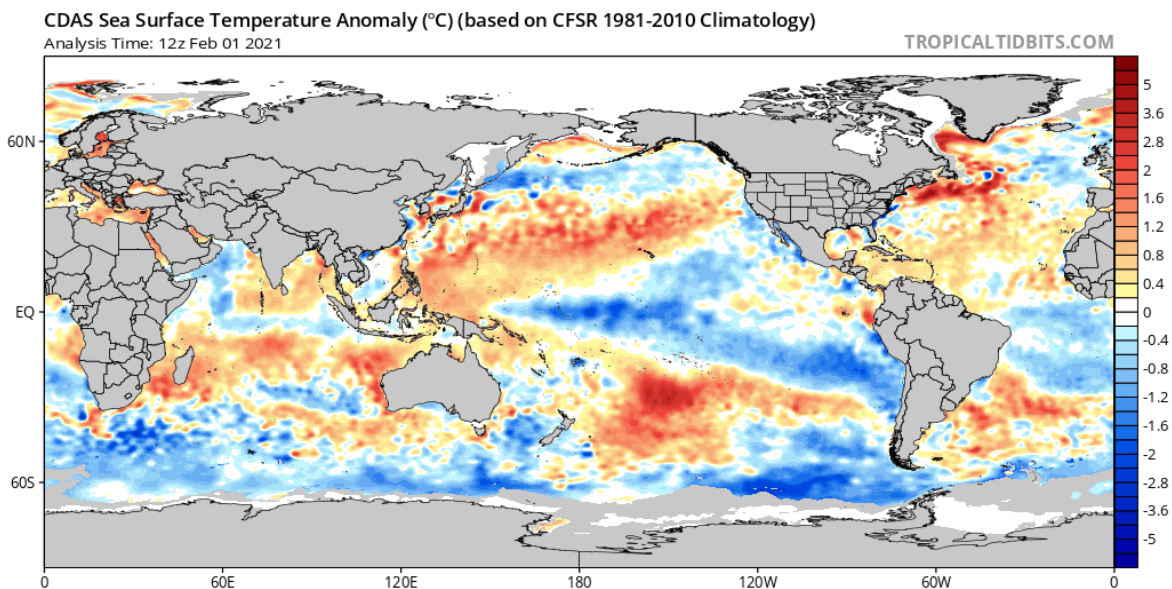


Figure 4 – Global sea surface temperatures (°C) for the period ending February 1, 2021 (image from TropicalTidbits.com).

North Pacific Watch – Some surface cooling in the North Pacific SSTs has continued with portions of the Gulf of Alaska and offshore from central California to Baja showing the greatest change over the last month. However, a

large area of anomalously warm water running 2-4°F above average continues across the mid-North Pacific (Figure 4), The North Pacific has remained 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 second half of winter than expected with a La Niña but is likely to stay wet over the remainder of the winter, while California would likely be slightly warm and moderately dry.

Forecast Periods:

Next 5 Days: Unsettled conditions over the next few days will bring rain and snow to central to northern California and northward through the PNW. Less rain the further south you go. By later in the week, we will move into a dry period with cool to seasonal temperatures, fog in the valleys, and no rain in the forecast until close to mid-month.

6-10 Day (valid February 8-12): The transition from the first to second weeks of the month will be dominated by two blasts of Arctic air moving out of Canada. Currently it looks like they will move over the Rockies, northern Plains, and Great Lakes and spare the west from the coldest of the air. However, expect cooler temperatures in the PNW giving way to near average temperatures in California and mild conditions in the southwest. The circulation during this period appears to be holding the western US to overall dry conditions. For this period, the only portions of the US expected to see wet conditions are the northern Rockies and the Gulf Coast.

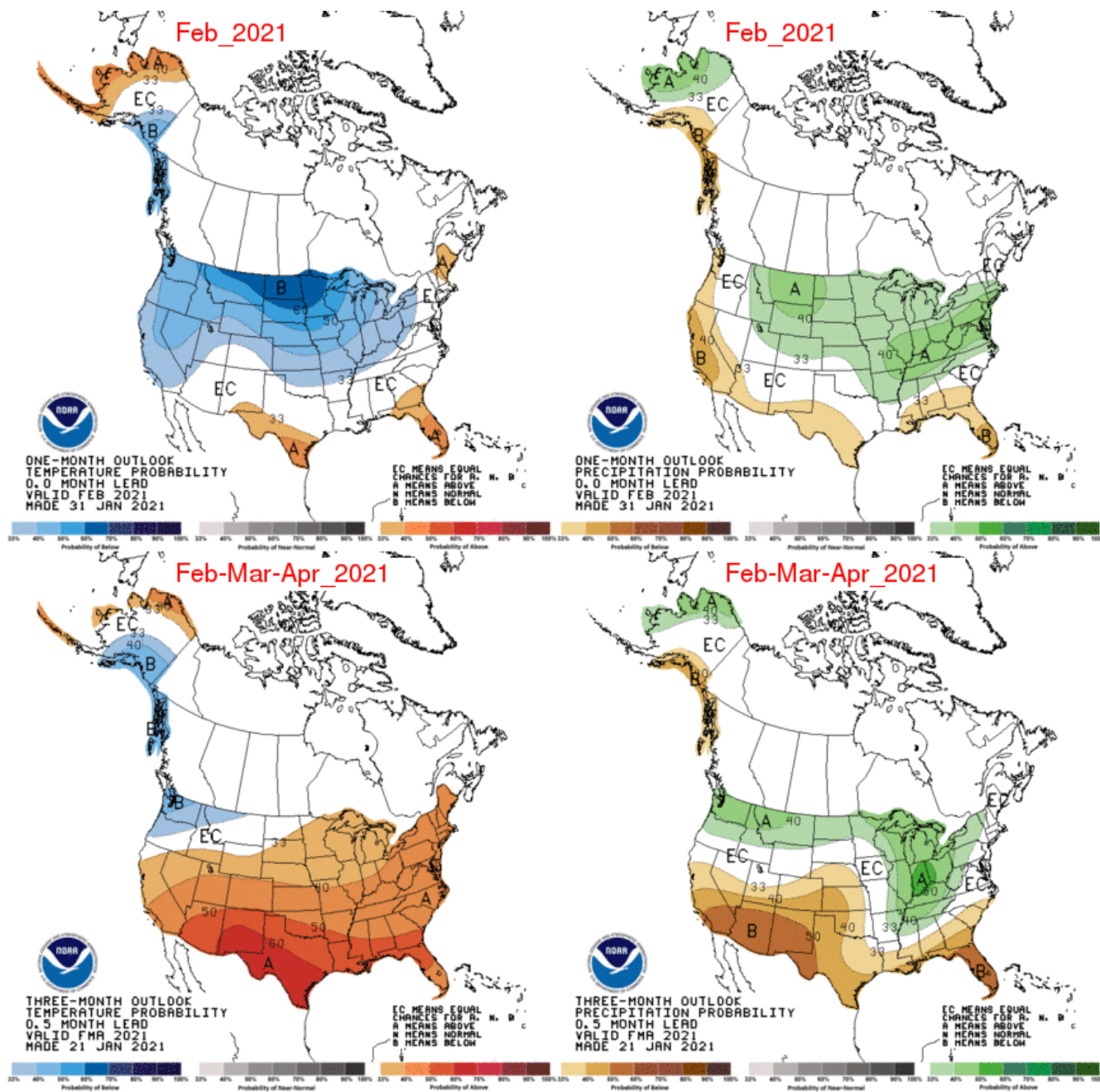
8-14 Day (valid February 10-16): The broad temperature pattern forecast continues with cold Arctic air dominating the eastern half of the country with moderately cool conditions likely in the PNW south into California and slightly warmer than average in the southwest. Precipitation during this period will likely continue to be minimal across the west compared to normal for this time of year. Much of the rest of the country is also forecast to be dry, with the northern Rockies and Plains along with the Texas Gulf Coast the only areas forecast to see much precipitation.

30 Day (valid February 1-28): The outlook for February is dominated by the cold air outbreaks from Canada resulting in the majority of the country likely seeing a colder than average month. The coldest conditions will likely be seen across the northern tier of states and especially the northern Plains (see Appendix Figure 1). The western US will likely see its coldest month of the winter so far. The southern tier of states and up the eastern seaboard are forecast to see near average temperatures for the month. The precipitation forecast is pointing to the west coast to likely see a dry month with coastal California having the greatest probability of being dry. Dry conditions are also forecast across the south and the Gulf Coast, while the Northern Rockies, Plains, Great Lakes, Ohio River Valley, and mid-Atlantic are forecast to see a wetter than average month.

90 Day (valid February-March-April): The general pattern from previous three-month forecasts continues the expected temperature and precipitation outlooks 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 to average period through April, while the central to southern portion of the country are forecast to see above average temperatures. The precipitation pattern forecast also continues the classic La Niña influence 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.

Gregory V. Jones, Director
Evenstad Center for Wine Education
Evenstad Chair in Wine Studies
Linfield University
900 SE Baker Street
McMinnville, OR 97128-6894
503-883-2218
gjones@linfield.edu





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).