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Weather and Climate Summary and Forecast: January 2020 Report

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Summary:

- A mild December continued the warmer than average start to winter over much of the west and throughout the rest of the United States.
- Precipitation amounts in December were lower than average across the PNW into Montana, while higher than average across most of California and the Great Basin. Mountain snowpack development for the winter is near average in California, but 30-80% of average in Oregon, Washington, and Idaho.
- Precipitation in December has lowered drought concerns in California; but has left much of the PNW with elevated drought concerns.
- The short-term forecast is pointing to a wet and quite cold period as Arctic air fills in over the western US. Models are currently pointing to these conditions lasting last through the rest of the month of January.
- The seasonal forecast for January through March has the odds tilted to a near normal to warmer than average period for the PNW south into California and across the southern tier of states to the east coast. Precipitation for JFM is forecast for near average in the PNW and northern California, and drier than average in central to southern California and across the southern border with Mexico.

December continued the relatively mild start to winter with temperatures over much of the western US above normal (Figure 1). The warmest areas were in the northern Rockies and Plains where temperatures were 4-6°F above normal while the central valley and coast of California, along with Oregon and Washington were mostly 1-4°F above average (Figure 1). A notable exception was in Southern California where temperatures were 0.5-2.5°F below average. The vast majority of the rest of the country experienced a warmer than average December with the upper Midwest experiencing 4-7°F above average (not shown). Precipitation across the west was largely a north-south split with dry conditions continuing from northern California throughout Oregon, Washington, Idaho, and Montana while central California into Nevada and the southwest saw some much-needed rain/snow (Figure 1). The pattern of December precipitation added to drought concerns in the PNW, while alleviating concerns in California (see Drought Watch section below). New Mexico, Texas and much of the southern Plains saw a very dry December while the northern Plains, Great Lakes and southeastern portions of the US saw a wetter than average month (not shown).

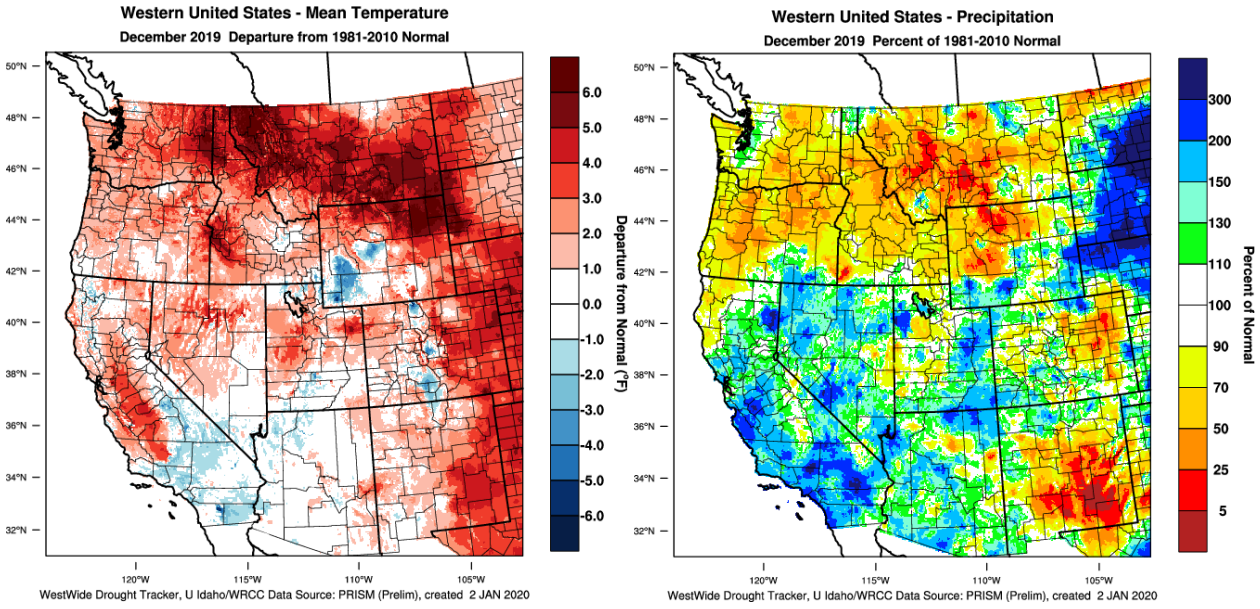

Figure 1 – Western US December 2019 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

As we close out 2019 the year will likely end up largely near average throughout the western US (Figure 2; final 2019 data will be released soon). However, some areas in eastern Oregon and Washington along with portions of southern California ended the year cooler than average. In Oregon, wine regions saw temperatures 0.4-0.8°F above average in the western valleys, while eastern Oregon wine regions were 0.3-0.7°F below average. A dramatic shift to a colder than average year occurs from the northern Plains and western Great Lakes with temperatures 1-4°F below normal. The southwest across through much of Texas, the southeast, and up into the eastern US all saw an above, much above or record warmest year in 2019. During 2019 precipitation ended mostly higher than average over the western US (Figure 2), except for the PNW which ended the year moderately drier than average in northwestern Oregon and western and northern Washington. In Oregon during 2019, the Willamette and Umpqua Valleys experienced a year that was drier than average while eastern Oregon was closer to average and the Rogue Valley was slightly wetter than average. 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).

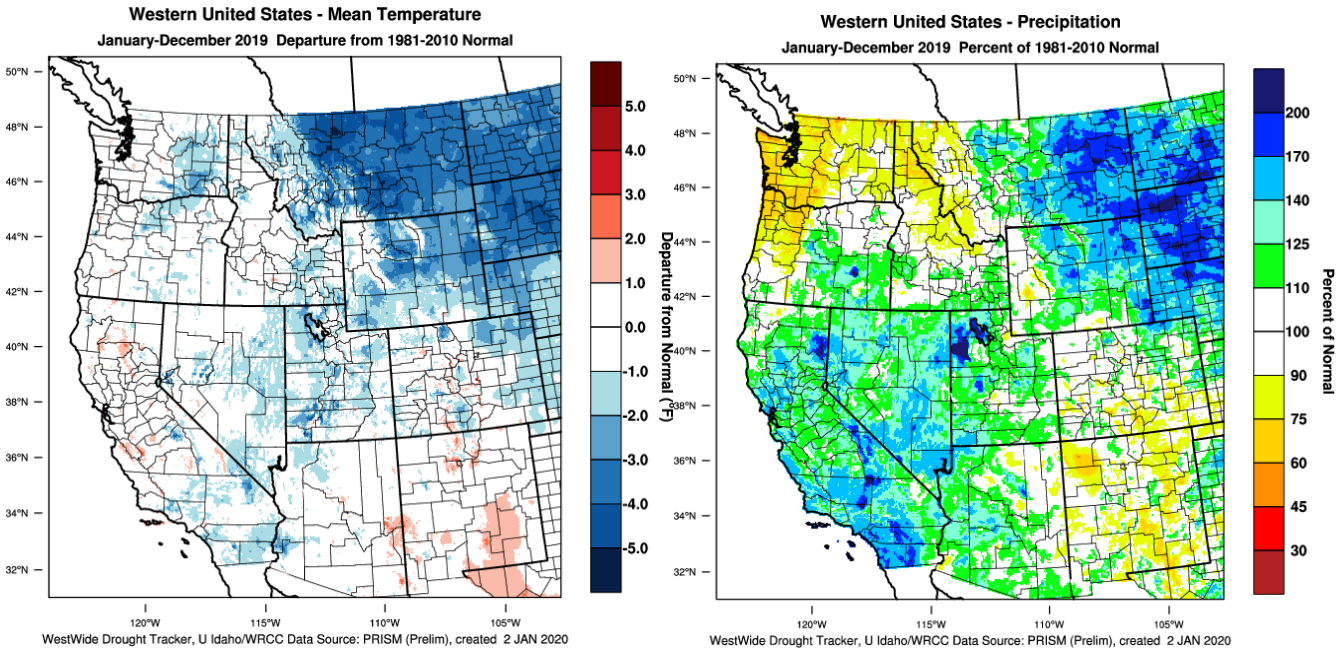

Figure 2 – Western US 2019 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

Drought Watch – Not much change from last month for the PNW as the slow start to the wet season has drought conditions remaining in place and increasing in some areas (Figure 3, left panel). California did see some significant

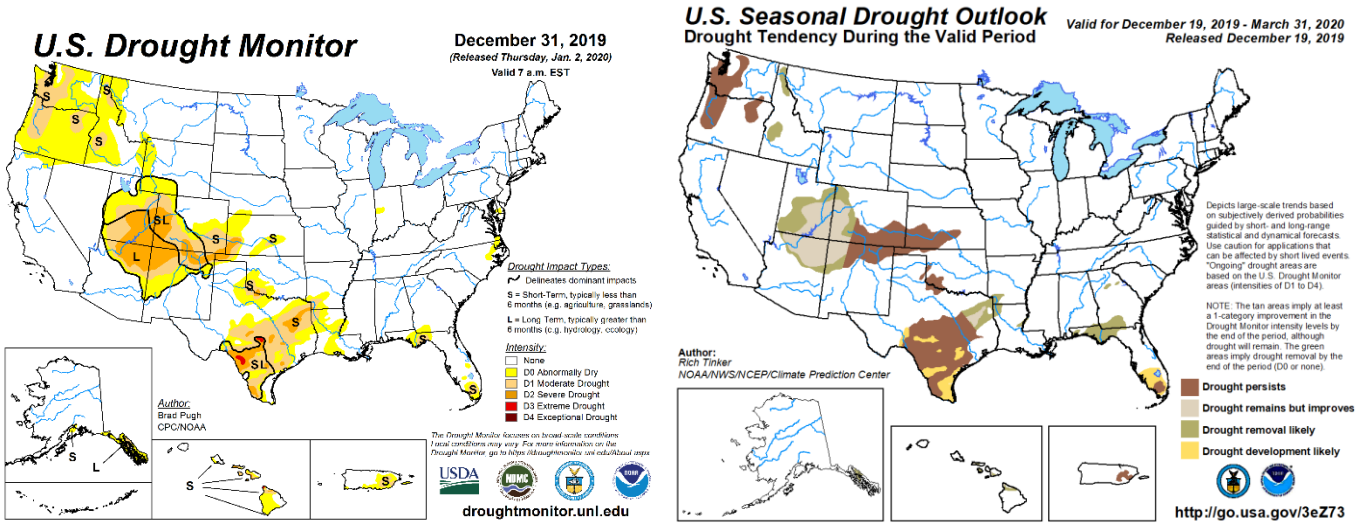

Figure 3 – Current US Drought Monitor and seasonal drought outlook.

improvement with rain/snow during December but is not far from falling back into drought conditions without normal inputs the rest of the winter. Snowpack numbers for early January across the western US are showing snow water equivalents that are 80-110% of normal in California, 30-60% of normal in Oregon, and 40-80% of normal in Washington. The Four Corners and southern Texas regions continue to be the driest areas in the country. The longer-term outlook for the US through March shows some changes, especially in the western valleys of the PNW where drought is forecast to persist through JFM. California is forecast to stay out of drought through this period and can be thankful for December rains setting the stage for the winter. Much of the Four Corners region is expected to see some improvement in drought conditions while central to south Texas will likely see drought persist 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 mid-December to early January. However, patterns in most atmospheric variables have 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 warm-neutral to borderline weak El Niño SST conditions during early winter, returning to ENSO-neutral from late winter to spring and even early summer. 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 types 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).

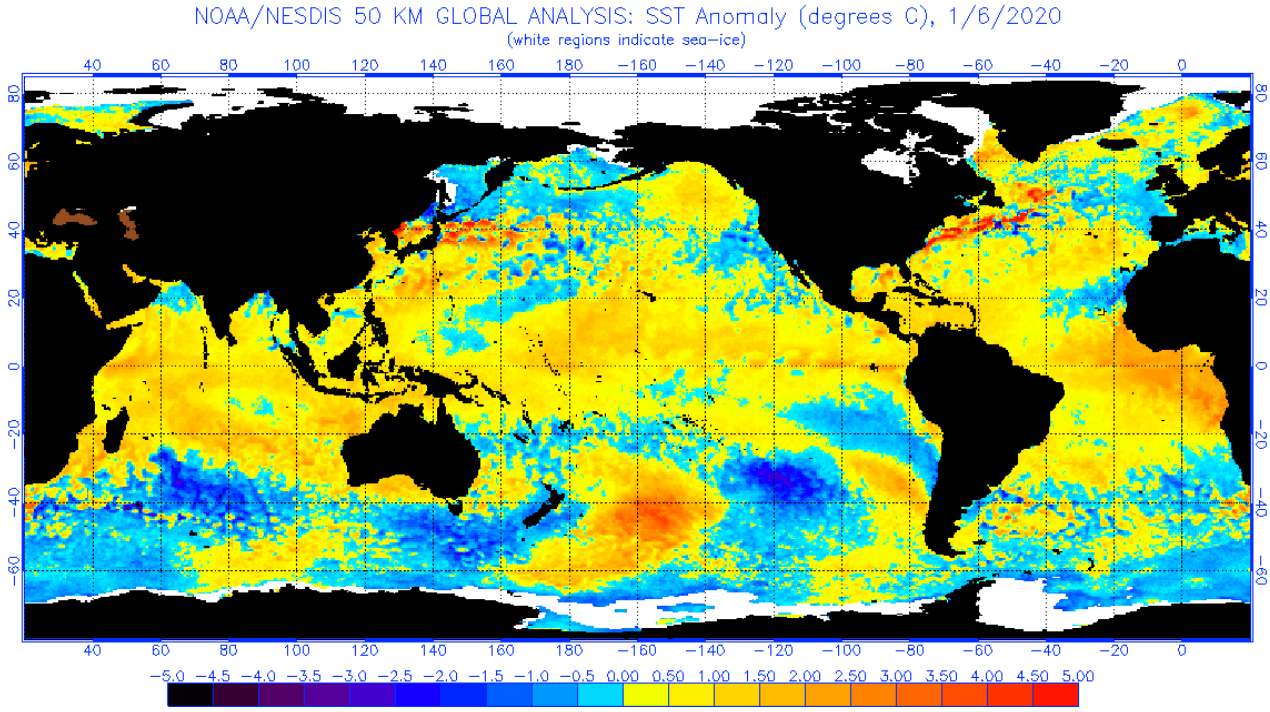

Figure 4 – Global sea surface temperatures (°C) for the period ending January 6, 2020 (image from NOAA/NESDIS).

North Pacific Watch – Overall the North Pacific and the Gulf of Alaska remain warmer than average (Figure 4). However, the trend to cooler coastal waters along the west coast continues from last month and extends further out into the North Pacific. Part of this appears to be the result of the greater coastal upwelling due to more persistent winds over the last couple of months, but also just simply due to colder air masses over the ocean basin recently. 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 JFM forecast below).

Forecast Periods:

Next 5 Days: The short-term forecast is dominated by a series of windy and wet systems that will likely bring moderate coastal to valley rains and mountain snows from Northern California north into the PNW and Canada. Temperatures will be cold enough to help build snowpacks.

6-10 Day (valid January 9-13): Conditions appear favorable for continued off-again, on-again precipitation up and down the west coast during this period. And models are currently indicating a good chance for the coldest air of the year dipping out of the Arctic and bringing widespread snow with it. The western US is forecast to experience much colder than average temperatures while the eastern US will likely see substantially warmer than average temperatures. Precipitation is currently forecast for much of the country through mid-month with the PNW, Rockies, and Ohio River Valley likely seeing the greatest amounts, while Southern California is forecast to be dry during this period. Again, snow down to fairly low elevations for the PNW and possibly into the northern Central Valley of California.

8-14 Day (valid January 11-17): Only differences from the previous forecast periods are likely wetter and colder conditions for much of the west. The cold air from the Yukon is forecast to continue filling into the western US bringing frigid air all the way to Southern California and the desert southwest. The news will continue to be the west-east coast difference of much colder vs warmer than normal temperatures through mid-month. Precipitation is forecast to continue over most of the country except a small portion of southern Texas. Otherwise more chance for mountain snowpack development, but also likely cold enough for valley snows even into California.

30 Day (valid January 1-31): Given the forecast for cold conditions during the first couple of weeks of the month in the west (see above), the overall month is forecast stay colder than normal with portions of the coast from central California to southern Oregon likely staying closer to average (see Appendix Figure 1). The eastern US, especially the southeast, is forecast to see a warmer than average month. Precipitation for the month is forecast to close to an average January when all is said and done. The west appears to have a decent chance of seeing average precipitation, while the northern Plains and the Ohio River valley will likely be wetter than average.

90 Day (valid January-February-March): The extended forecast into JFM continues to hold to the expectation for slightly warmer than average temperatures for much of the southern portion of the country into California and the PNW (see Appendix Figure 1). The exception is the Great Plains, Midwest, and Great Lakes which is forecast to see a wet JFM. Precipitation for these three months is forecast to be slightly wetter than average across the northern tier of states from the northern Rockies to the mid-Atlantic state, with central to southern California across to Texas and south Florida likely be drier than average. The current wisdom for the PNW is equal chances of being slightly above to below average.

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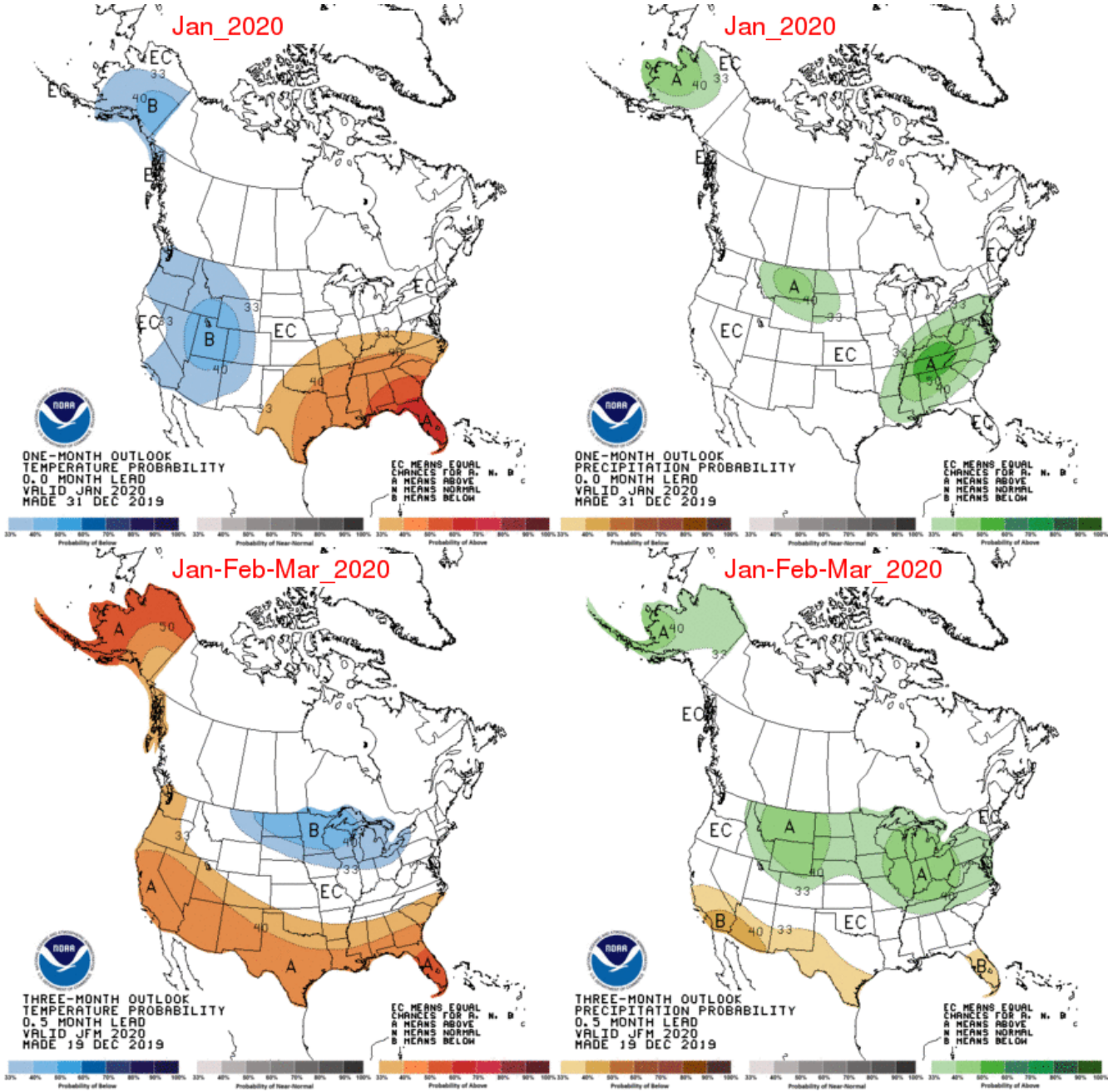

Appendix Figure 1 – Temperature (left panel) and precipitation (right panel) outlooks for the month of January (top panel) and January, February, and March (bottom panel) (Climate Prediction Center, climate.gov).