

# Weather and Climate Summary and Forecast

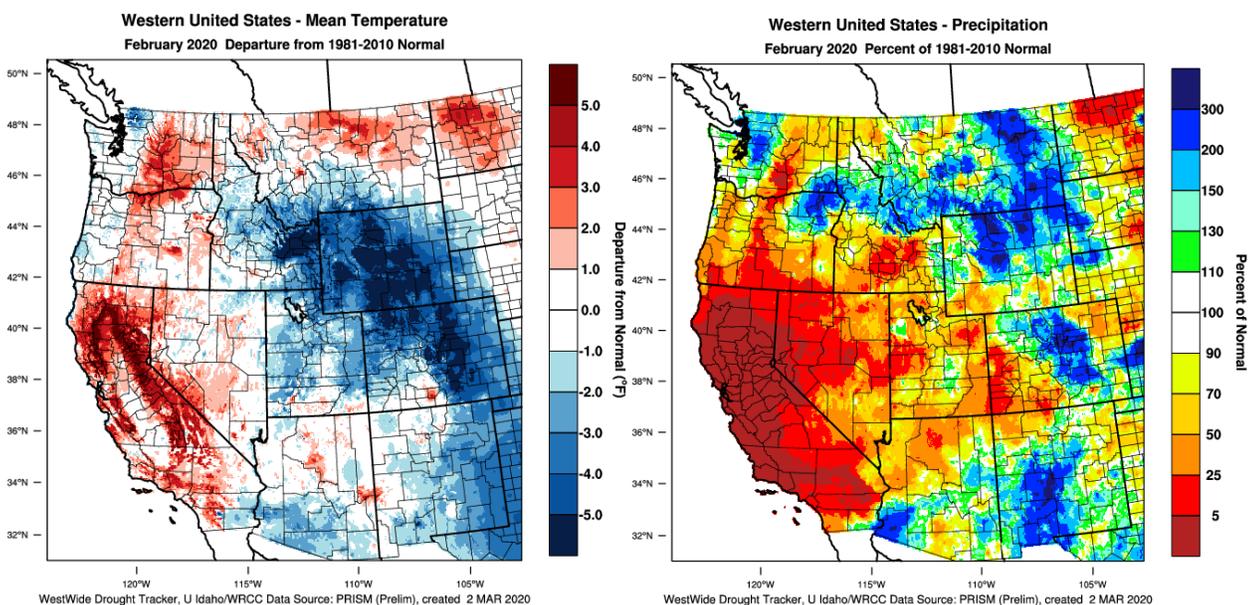
## March 2020 Report

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### Summary:

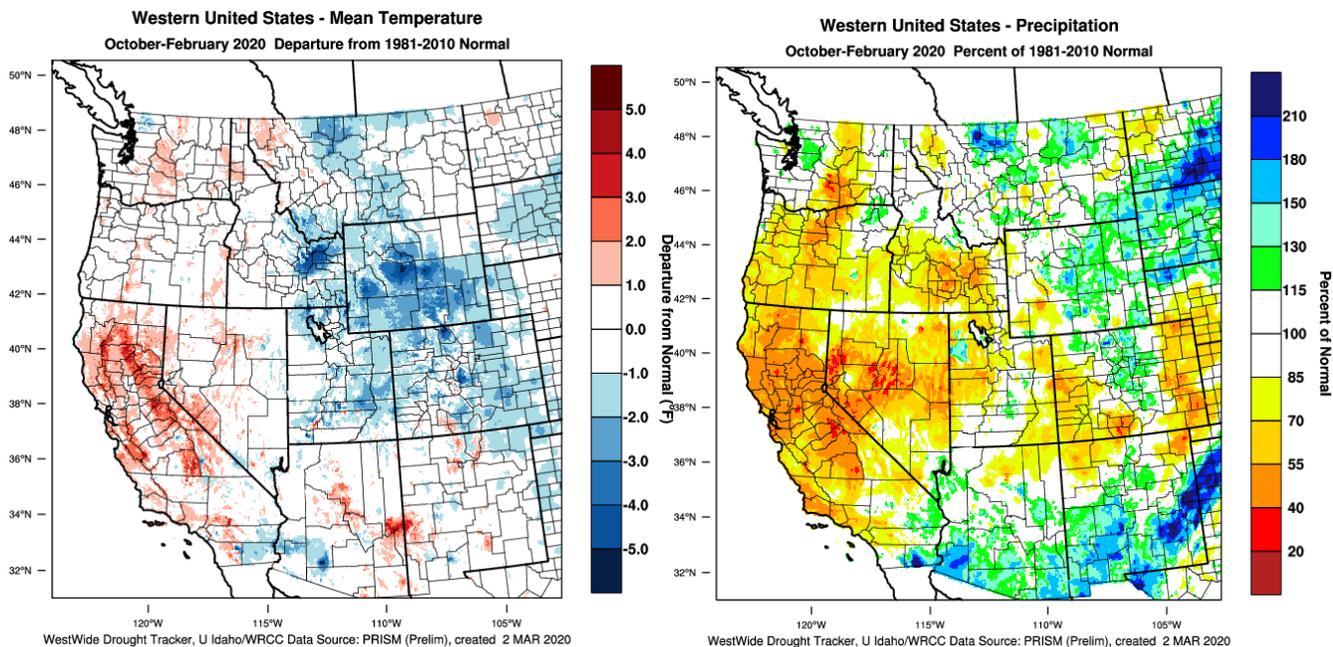
- For the western US February was relatively mild to warm except for the Rockies were colder than average conditions prevailed. The warmth was greatest in California, which was largely 3-6°F above normal.
- February was quite dry over most of the western US, especially in California where no measurable rain was observed in many locations. Mountain snowpack for the winter is now below average in California and portions of Oregon but remains above average for much of the northern Cascades and Rockies.
- The dry February has increased drought concerns for California, Oregon, and Washington.
- The short-term forecast is pointing to a slightly cooler period with some rain north, but the potential for the first precipitation in over a month in portions of California.
- The March through May seasonal forecast for the west coast is pointing to a near-average March, a cool and wet April, and then a warm and dry May. The overall outlook for the western US to end up slightly warmer than normal but likely staying drier than average for western Oregon and mostly of California or near average in the inland PNW. Unfortunately, drier than average conditions tend to lead to great frost risk in the spring.

February brought a mixed bag of conditions over the western US (Figure 1). Temperatures in western Oregon and Washington were near average to slightly below average while eastern portions of the state were 3-4°F warmer than average. California saw temperatures 3-6°F above normal over most of the state while the Rockies and desert southwest were relatively cool. The cool conditions extended across to Texas and portions of the central Plains and into the western Great Lakes while the eastern third of the country was 2-6°F warmer than average (not shown). February ended up largely dry across the west, especially in California where many locations did not receive any precipitation at all in one of the normally wetter months of the year (Figure 1). Dry conditions were seen into most of Oregon, except the Blue Mountains which received record rainfall in an atmospheric river event earlier in the month. Western Washington along with some areas in the Rockies and southwest were also wetter than average during February. February precipitation lowered drought concerns in Washington while bringing back drought concerns in California (see Drought Watch section below). For the rest of the country, the northern Plains, southern Texas, and Florida were drier than average while the southeast and New England were wetter than average (not shown).



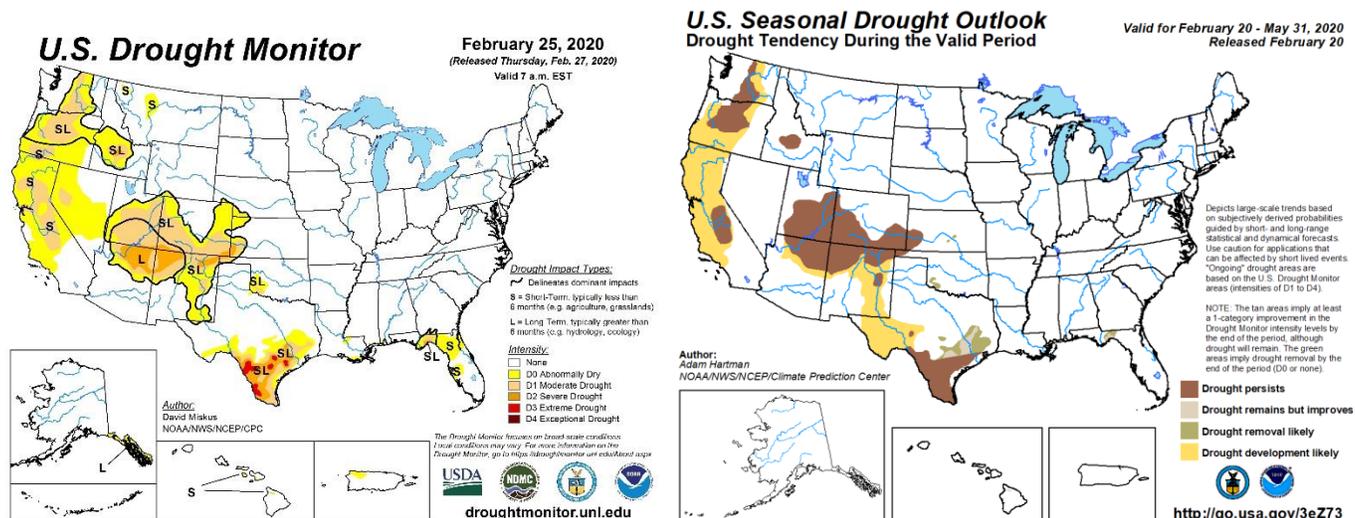
**Figure 1** – Western US February 2020 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

The warm and dry February has shifted the current water year (starting in October) warm and dry over most of the western US (Figure 2). California continues mostly warmer than average with only portions of inland southern California slightly below normal. Overall Oregon and Washington have been near average to slightly warmer than average for the water year. The rest of the west is running mostly cooler than average, especially the Rockies (Figure 1). The Rockies and northern to central Plains are the only areas of the country running colder than average (1-3°F below normal) while the rest of the eastern US is running 1-5°F above normal (not shown). The water year so far is running 20-85% of average precipitation over much of the western US with only western Washington closer to average and the Blue Mountains, southwest, and few isolated areas in the Rockies above average due to early precipitation at the start of the water year or recent extreme events (Figure 2). The relatively dry first half of winter is adding to longer-term drought concerns (see Drought section below), however, February inputs in western Washington have helped that region. The majority of the rest of the country has seen wetter than average conditions for the water year, except Texas which continues to be much drier than average (not shown).



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

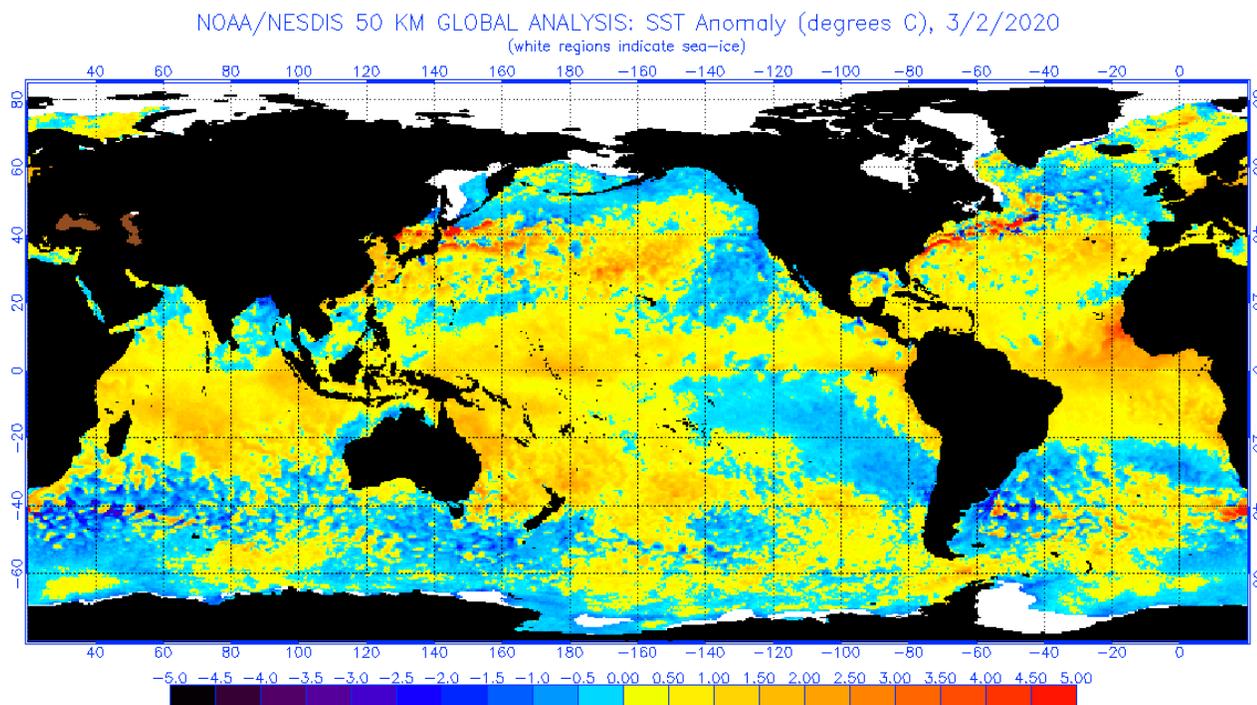
**Drought Watch** – Not much change from last month other than more of California moving back into moderate to severe drought and portions of Texas moving further into the extreme drought (Figure 3, left panel). The rest



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

of the US has not changed much with the Four Corners and southern Texas regions continuing to be the driest areas in the country. Snowpack numbers for late February across the western US are showing that snow water equivalents have dropped to below 50% of normal in California, 65-90% of normal in western Oregon, while remaining 85-125% of normal in Washington and the inland PNW due to a wetter than average February (see above). The longer-term outlook for the US through May shows the forecasted continued dry conditions for much of California, Oregon, and Washington with drought development and/or persistence through spring. The Four Corners region and much of western and southern Texas will likely remain dry through the spring (Figure 3, right panel).

**ENSO Watch** – The tropical Pacific continues to wax and wane between weak El Niño and neutral conditions. The latest reports indicate SSTs in the east-central Pacific were neutral, but above average during mid-February. Patterns in atmospheric variables are split between neutral and weak El Niño conditions. Most model forecasts favor warm-neutral SST conditions during spring, cooling to average by early summer. The official CPC/IRI outlook and other agencies outlooks are consistent with these model forecasts, calling for the continuation of ENSO-neutral. 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 and springs tend to be the least predictable. The current conditions do not hold much sway in the 90-day forecast, which appears to be flip, flopping between average, cool/wet, and warm/dry (see forecast periods below and Appendix Figure 1).



**Figure 4** – Global sea surface temperatures (°C) for the period ending March 2, 2020 (image from NOAA/NESDIS).

**North Pacific Watch** – Coastal waters from the Aleutian Islands to nearly Baja California have cooled from last month, which is indicative of strong coastal upwelling driven by the wind field over the North Pacific (Figure 4). Additional cooling further out into the North Pacific toward Hawaii is tied to high cloud cover reducing surface heating from solar radiation and colder air masses. However, much of the North Pacific remains warmer than normal and there are some indications that the coastal zone cooling might be short-lived once the seasonal high-pressure ridge builds in later in the 90-day period. The short-term influence here continues to be a strengthening ridge just off western North America that will likely bring lower precipitation during the second half of winter and into spring for many regions up and down the western US (see the FMA forecast below).

## Forecast Periods:

**Next 5 Days:** The next couple of days are looking very nice pretty much up and down the west coast. However, the warm and dry weather will give way to an unsettled period with a couple of fronts bringing lower temperatures and rain, with even parts of California potentially getting in on the action after a month of nothing in February.

**6-10 Day (valid March 9-13):** Best bet is for a slight cool down and mixed precipitation period through mid-month. The PNW is forecast to cool down to closer to average for this time of year while northern California will likely remain near average. The rest of California and the entire rest of the country is forecast to see warmer temperatures through mid-month. In terms of precipitation, the PNW is forecast to have some rain during this period but overall amounts will likely stay below what is normal for this time of year. California will likely see its first major rain event in over a month as cut-off low-pressure areas dive deep into southern California. The best chance for precipitation is from the Bay Area southward. The rest of the country is forecast to see average to above-average precipitation during this period.

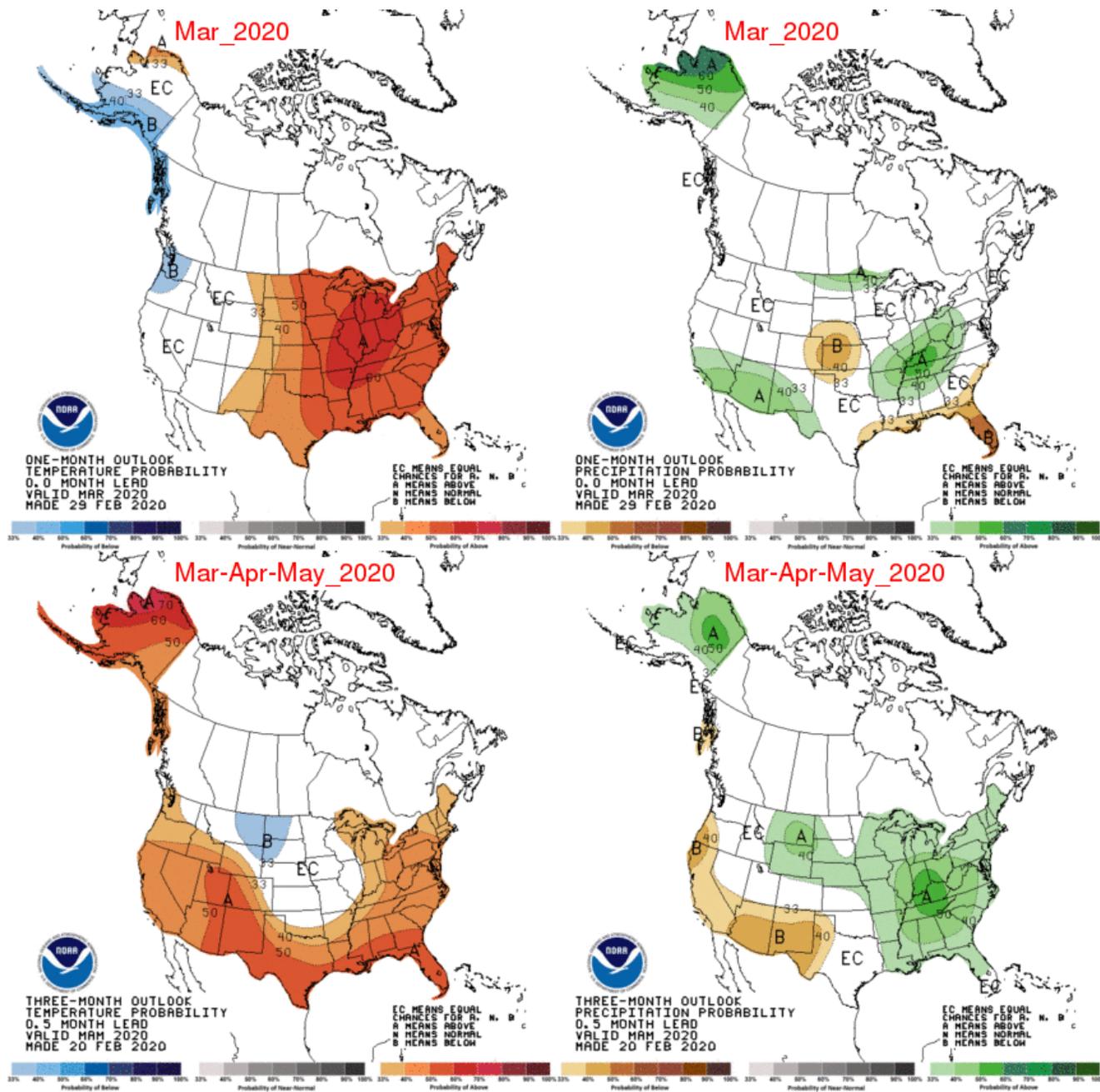
**8-14 Day (valid March 11-17):** Not much difference from the previous forecast period with northern California northward into western Oregon and Washington likely staying relatively cool. The rest of California and across pretty much the rest of the US is forecast to see warmer than average temperatures during this forecast period. Precipitation amounts are forecast to be near average for the PNW and the northern Rockies but continue above average in central to southern California and across much of the rest of the country.

**30 Day (valid March 1-31):** The current forecast for March is largely calling for an equal chance of being slightly above to slightly below average across the western US in terms of both temperatures and precipitation (see Appendix Figure 1). Cool conditions are likely to stay in place for the majority of the month in the western portions of Oregon and Washington while near-average conditions are forecast elsewhere in the west. The eastern half of the country is forecast to continue with a warmer than average month. The March precipitation forecast is indicating that the southwest, Ohio River Valley, and northern Plains will likely be wet, while the central Plains, Florida and much of the Gulf Coast will likely be dry overall.

**90 Day (valid March-April-May):** Mixed bag over the next three months for the west coast. Most forecasting agencies are pointing to a near-average March, a cool and wet April, and then a warm and dry May. Added together in the 90-day outlook (see Appendix Figure 1), the result is an overall outlook for the western US to end up slightly warmer than normal but likely staying drier than average for western Oregon and most of California, or near average in the inland PNW. The northern Plains are forecast to continue to see cooler than average conditions into spring while the rest of the country is forecast to remain warmer than average. In terms of precipitation, the expectation is for wetter conditions from the northern Plains across most of the eastern third of the country.

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**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).