Office of the Washington State Climatologist

April 2021 Report and Outlook

April 8, 2021

http://www.climate.washington.edu/

March Event Summary

Average March temperatures were below normal in western WA and near-normal to above normal in eastern WA. Precipitation, on the other hand, was consistently below normal statewide (Figure 1). The much below normal precipitation in eastern WA set records for many stations; Table 1 shows a selection of these, including Odessa, Davenport, Mazama, and Boundary Dam that rank as the driest March for their respective periods of record. The number of days of precipitation in March was also notably low for many stations. Spokane International Airport, for example, recorded measurable precipitation on only 2 days in March, which is the fewest number of wet March days in the long historical record at that station.

Figure 2 shows the March daily temperature and precipitation time series for SeaTac Airport. The 13 days with measurable precipitation tied for the 7th fewest days in March on record. Note that the temperatures were mostly near-normal (within the green envelope), with many instances of minimum temperatures below normal throughout the month. In eastern WA, there were some warm temperatures early in the month (not shown), with Kennewick measuring a record high temperature on the 5th (75°F) and Pasco on the 6th (74°F). Overall, there were few daily temperature records set of either extreme.

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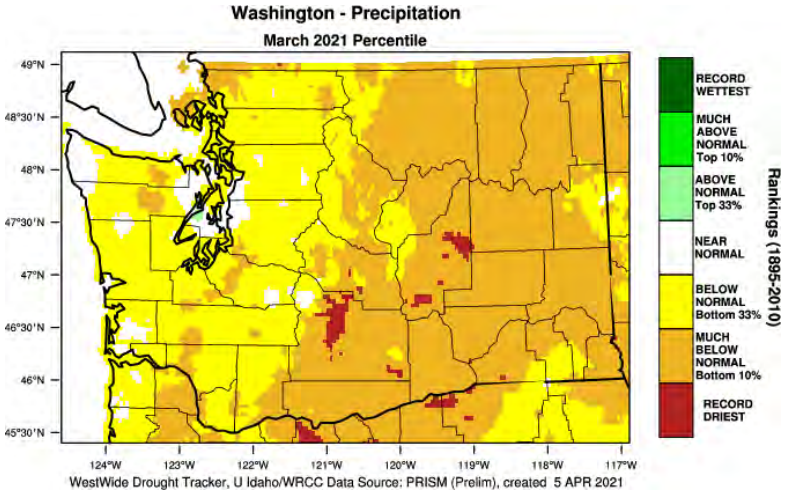


Figure 1: March 2021 precipitation percentiles compare to the 1895-2010 record for WA (WestWide Drought Tracker).

While relatively rare in WA, we had two confirmed tornados in March. The first occurred near Ilwaco in southwest WA on the evening of the 21st. It was rated as an EF-0 that traveled about 0.30 miles and NWS Portland reported that it was the first tornado in Pacific county since 1991. A second weak tornado on the afternoon of the 25th touched down near the Tri-Cities. Neither caused much damage.

Station	March Precipitation (in)	Rank	Record	Records Began
Odessa	T	1	-	1903
Davenport	0.03	1	-	1910
Mazama	0.22	1	-	1969
Boundary Dam	0.34	1	-	1966
Prosser	0.04	2	0.02"; 1935	1935
Spokane AP	0.26	2	0.12"; 1909	1881
Yakima AP	0.08	3	0.01"; 1973	1947
Walla Walla AP	0.61	3	0.42"; 1965	1949
Pullman 2 NW	0.72	5	0.45"; 1992	1941
Bellingham AP	1.46	7	0.76"; 1965	1949

Table 1: March 2021 precipitation rankings (driest to wettest) for selected WA stations.

Another notable weather event for the month was the strong cold frontal passage that occurred on the 28th. This was associated with strong winds (gusts of 50-70 mph throughout WA), mountain snow, and and even a dust storm in eastern WA. The winds kicked up dust that blanketed US 395 near Ritzville and I-90 near Schrag, causing near-zero visibility. The Spokane National Weather Service issued a rare dust storm warning on the afternoon and evening of the 28th. In the Cascades, two gusts of 104 and 123 mph were recorded on Mt Rainier at 10 am and 3 pm, respectively, on the same day.

Dust storm on March 28 on I-90 west of Ritzville (photo by WSDOT; KXLY).

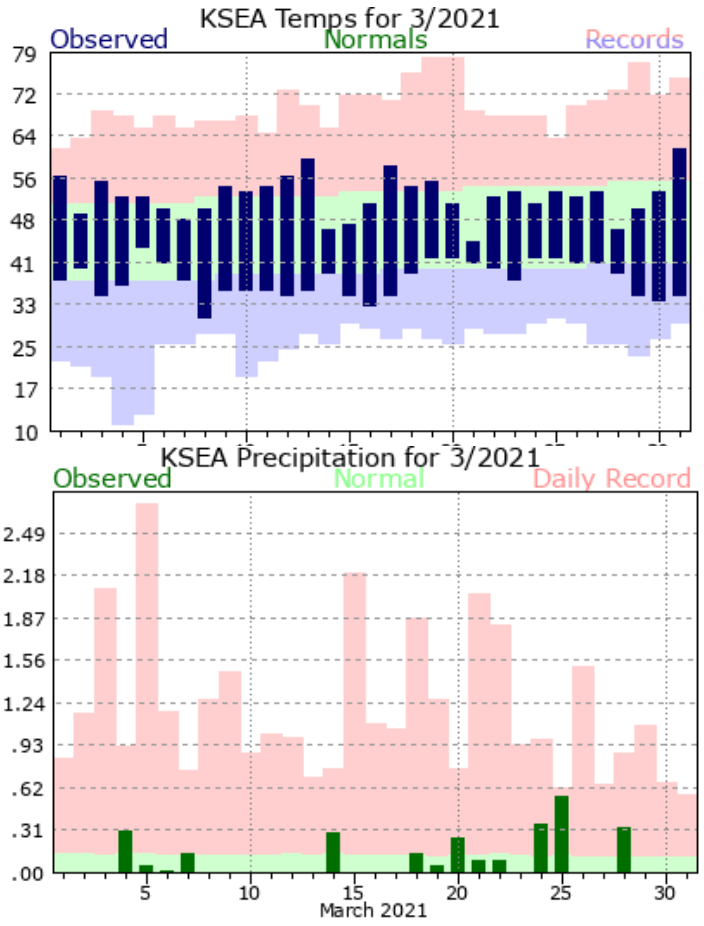


Figure 2: March 2021 daily temperature and precipitation for SeaTac Airport compared to normal (green envelope). NWS

Snowpack and Drought Monitor Summary

Despite the dry March conditions, there was growth in the mountain snowpack. The basin average snow water equivalent (SWE) percent of normal from the Natural Resources Conservation Service (NRCS) as of April 1 - typically considered the peak in our snowpack season - is shown in Figure 3. Snowpack is well above normal in the Olympic, Cascade and Blue Mountains, ranging between 119 and 157% of normal. The Lower Pend Oreille and Spokane basins are closer to normal with 95 and 102% of normal SWE, respectively.

In an attempt to balance the above normal snowpack with below normal precipitation, there was some expansion of the abnormally dry (D0) and moderate drought (D1) conditions on the U.S. Drought Monitor (Figure 4). The expansion kept the more mountainous terrain without a dryness/drought designation due to the good snowpack conditions. The Northwest River Forecast Center April 1 April-September natural water supply forecast (Figure 5) shows near-normal to above normal streamflow for most of the state where rivers are dominated by snowmelt. The below normal Apr-Sept streamflows are appearing in southeast and southwest WA, where streamflows are more influenced by rainfall.

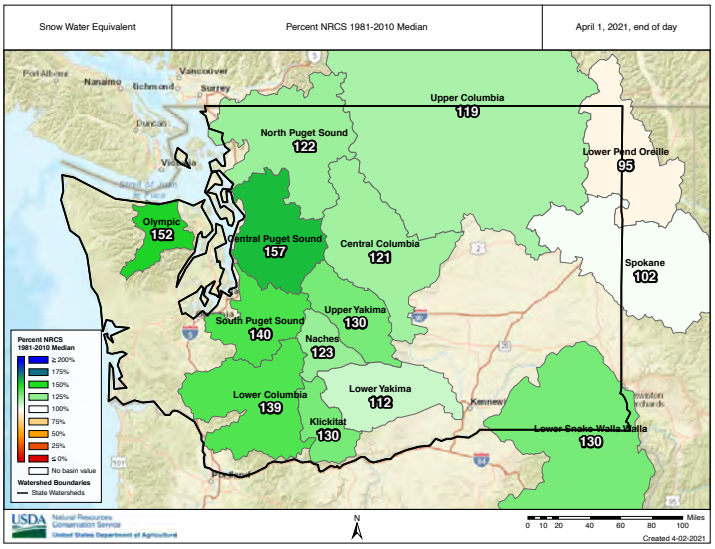


Figure 3: Snowpack (in terms of snow water equivalent) percent of normal for Washington as of April 1, 2021 (from NRCS).

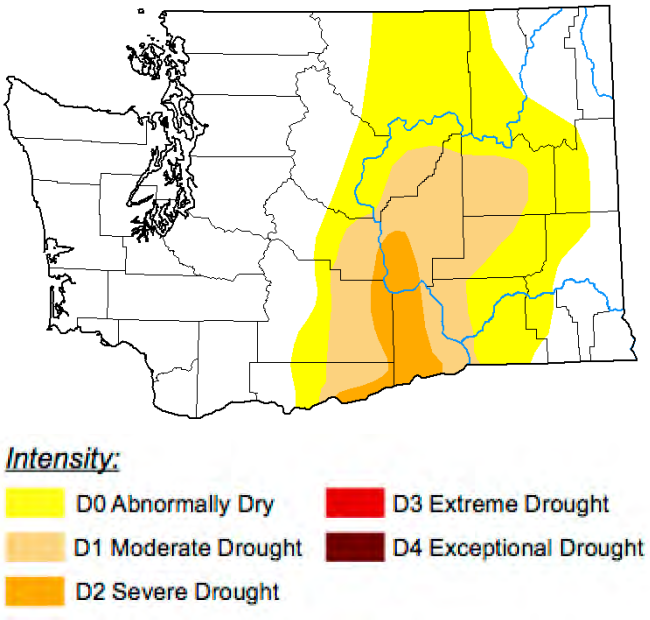


Figure 4: The April 8, 2021 edition of the U.S. Drought Monitor.

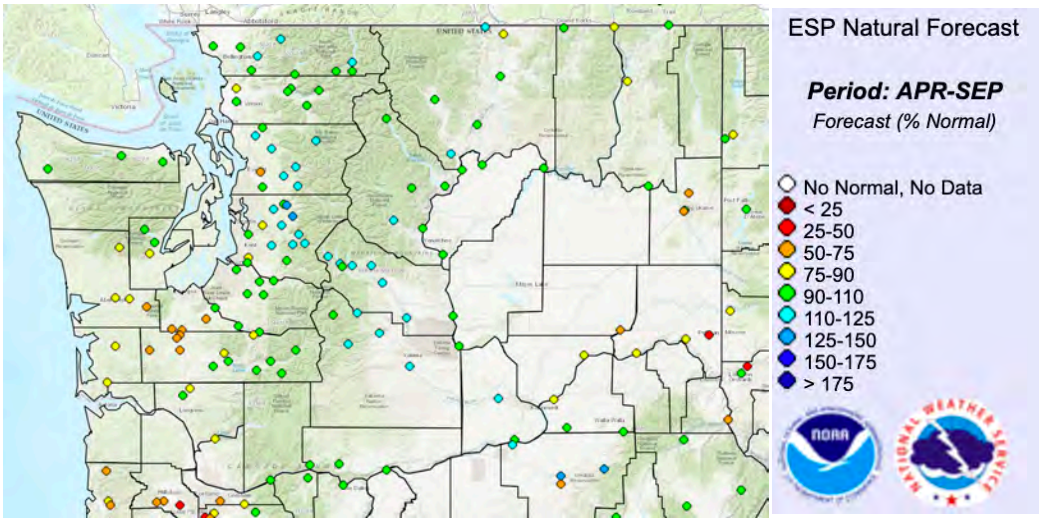


Figure 5: The April-September natural water supply forecast released on April 1, 2021 from the [NWS NW River Forecast Center](#).

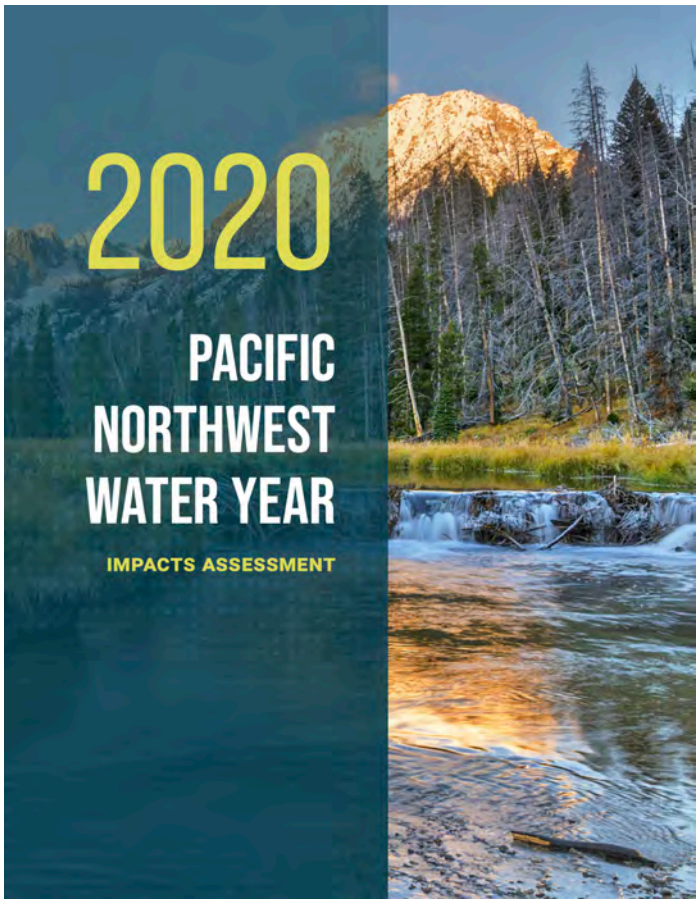
The CoCoRaHS Corner

photo by Henry Reges, CoCoRaHS

Greetings to all of our new CoCoRaHS observers that signed up during the month of March! CoCoRaHS likes to run a friendly competition during the month of March (known as "CoCoRaHS March Madness") to see which state can recruit the most new volunteers. Minnesota took the prize this year, with Rhode Island winning in the "per capita" count. Washington recruited 16 new volunteers for March (welcome!), ranking right in the middle of the pack. The Spokane National Weather Service office partook in a little WA/ID state rivalry, and challenged each state within their forecast area to recruit the most new volunteers. The WA portion of their forecast area won, with quadruple the amount that were recruited on the ID panhandle! While the competition part can be a big motivator for some, we're just happy to see more people interested in the program nationwide.

Pacific Northwest 2020 Water Year Impacts Assessment Released

A message from the State Climatologist



The Pacific Northwest Water Year 2020 Impacts Assessment has been released and is now available online. Sponsored by the NOAA National Integrated Drought Information System (NIDIS), OWSC and colleagues with the University of Washington Climate Impacts Group led this regional collaboration that involved researchers and state and federal practitioners from Idaho, Oregon, and Washington. The report recaps the major weather and climate events of water year 2020 (October 1, 2019-September 30, 2020) and connects these conditions with impacts experienced by farmers, water managers, fisheries managers, and others.

The impacts were collected by three main sources, 1) from discussions at the annual OR/WA water year meeting held in the fall, 2) from a regional water year survey that our team distributed to several regional water associations and other listservs, and 3) from the National Drought Mitigation Center/NIDIS Condition Monitoring Observer Report survey. For the 2020 report, drought was a focus, particularly in OR, where a flash drought occurred in late summer in southeastern OR, causing impacts to agriculture such as limiting forage for livestock, reducing growth of alfalfa, and needing to conserve and haul water. Drought in Deschutes River Basin in OR also impacted irrigated agriculture earlier in the summer.

Impacts from the devastating September wildfires were also highlighted, though not the focus of this report. For example, drinking water systems were damaged in OR (Figure 6) and power outages from wildfires in WA impacted drinking water system pressure, chlorination, etc. Damage to wine crops from the wildfires directly and from the smoke were also reported across the region. Water year 2020 also had the problem of "too much water", and flooding impacts from the early February 2020 atmospheric river event in southeast WA and northeast OR are also reported on. The purpose here is not to re-write the assessment in full, but to whet your appetite for browsing the report. Lots of white space and pretty pictures makes for a pleasant read.

With that said, we are open to feedback on this assessment! We plan to continue this effort for at

Figure 6: Damage to a pump station at the City of Detroit, OR (Photo credit: Heath Cokeley, Oregon Association of Water Utilities Circuit Rider).

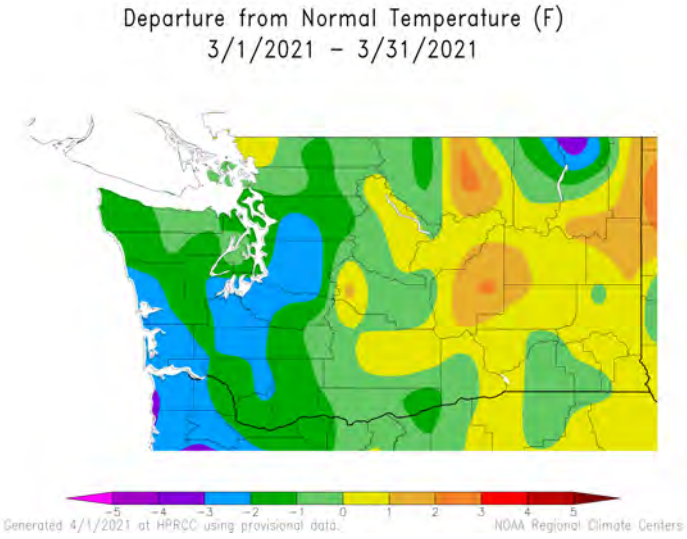
least the next two water years, and want this product to be useful. One goal of this work is to provide ongoing documentation of historical water years to look at patterns and specific weather/climate conditions that caused impacts. Another goal is for this assessment to be used to learn what other resources managers, state agencies, utilities, etc. did to respond to certain weather/climate conditions. The ultimate goal is to improve management of drought and other climate-related impacts in the future.

Citation

Bumbaco, K.A., C.L. Raymond, L.W. O'Neill, D.J. Hoekema. 2021. 2020 Pacific Northwest Water Year Impacts Assessment. A collaboration between the Office of the Washington State Climatologist, Climate Impacts Group, Oregon State Climatologist, Idaho Department of Water Resources, and NOAA National Integrated Drought Information System.

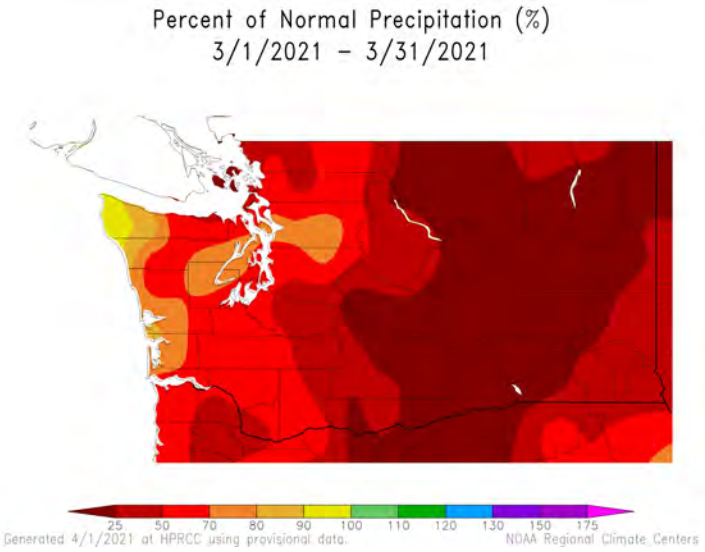
Climate Summary

Average March temperatures were generally below normal for western WA and near-normal to above normal for eastern WA. Coastal and southwestern WA were cool spots, according to the map from the High Plains Regional Climate Center; Hoquiam and Vancouver were 2.4 and 2.2˚F below normal, for example (Table 2). Average monthly temperatures in the southern Puget Sound and parts of the central Puget Sound are also between 2 and 3˚F below normal. On the other hand, many eastern WA locations, such as Wenatchee, Pullman, and Pasco (-0.5, 0.1, and 0.5˚F, respectively) had near-normal March temperatures. There were also pockets in north central and northeastern WA with above normal temperatures. Examples include Omak and Ephrata, with temperatures 1.9 and 1.2˚F above normal, respectively.



March temperature (˚F) departure from normal relative to the 1981-2010 normal (HPRCC).

Total March precipitation was below normal throughout the entire state. Precipitation was less than 25% of normal in eastern WA, with Ephrata and Hanford receiving a dismal 4 and 9% of normal, respectively (Table 2). Pullman was the "wettest" relative to normal on the east side with 41% of normal March precipitation. Precipitation totals and percentages were better in western WA, but still ranged from 40 to 90% of normal. Bellingham, for example, only received 45% of normal precipitation for the month and the San Juan Islands were much below normal as well. The Northwest tip of the Olympic Peninsula received near-normal precipitation for March - one of the only locations in the state.



March total precipitation percent of 1981-2010 normal (HPRCC).

Station	Mean Temperature (°F)			Precipitation (inches)			Snowfall (inches)		
	Avg	Normal	Departure from Normal	Total	Normal	Percent of Normal	Total	Norm	Percent of Normal
Western Washington									
Olympia	42.1	44.5	-2.4	3.01	5.29	57	M	0.7	-
Seattle WFO	45.2	46.6	-1.4	3.22	3.51	92	0	0	0
SeaTac AP	45.6	46.5	-0.9	2.61	3.72	70	T	0.8	0
Quillayute	42.4	44.1	-1.7	9.36	10.83	86	M	0.7	-
Hoquiam	43.6	46.0	-2.4	5.75	6.99	82	M	0	-
Bellingham AP	44.8	44.2	0.6	1.46	3.22	45	M	0.7	-
Vancouver AP	45.8	48.0	-2.2	1.43	3.57	40	M	M	-
Eastern Washington									
Spokane AP	41.5	40.2	1.3	0.26	1.61	16	T	3.5	0
Wenatchee	43.6	44.1	-0.5	0.10	0.64	16	M	M	-
Omak	43.4	41.5	1.9	0.13	1.19	11	M	M	-
Pullman AP	40.7	40.6	0.1	0.84	2.05	41	M	M	-
Ephrata	44.2	43.0	1.2	0.03	0.68	4	M	M	-
Pasco AP	46.8	46.3	0.5	0.12	0.79	15	M	M	-
Hanford	47.4	46.4	1.0	0.05	0.57	9	0	0.4	0

Table 2: March 2021 climate summaries for locations around Washington with a climate normal baseline of 1981-2010. Note that the Vancouver Pearson Airport and Seattle WFO 1981-2010 normals involved using surrounding stations in estimating the normal, as records for these station began in 1998 and 1986, respectively.

Climate Outlook

According to the Climate Prediction Center (CPC), La Niña conditions are still present in the equatorial Pacific Ocean. Over the last 4 weeks, sea surface temperature (SST) anomalies have warmed in equatorial Pacific though the SSTs are still below normal. Low-level easterly wind anomalies have also persisted over the same area. Still, there is an indication that the La Niña event is beginning to wind down. ENSO forecast models indicate a 60% chance of a return to neutral conditions by April-May-June.

The CPC outlook for April (Figure 7) has increased chances of below normal temperatures for nearly the entire state. There is a higher likelihood of below normal temperatures west of the Cascade Mountains, but cooler than normal temperatures are also expected east of the crest. The precipitation outlook is a mixed bag with equal chances of below, equal to, or above normal precipitation statewide.

The three-month outlook for April through June (Figure 8) has increased chances of below normal temperatures for a little more than half the state. The remaining half (southern Cascades through NE WA) has equal chances of below, equal to, or above normal temperatures. For April-June precipitation, there are equal chances of below, equal to, or above normal precipitation everywhere except for the southeast corner of WA, for which there are slightly elevated odds of below normal precipitation.

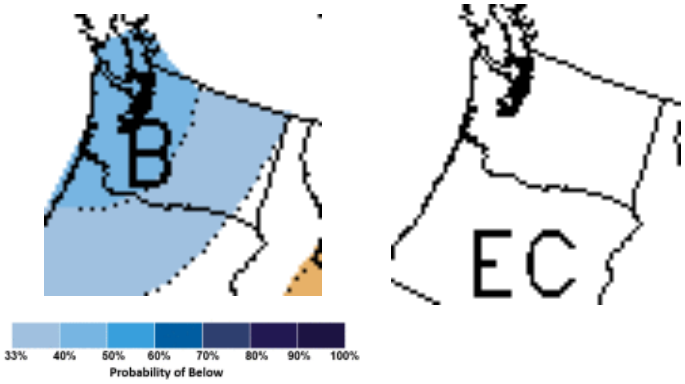


Figure 7: April outlook for temperature (left) and precipitation (right).

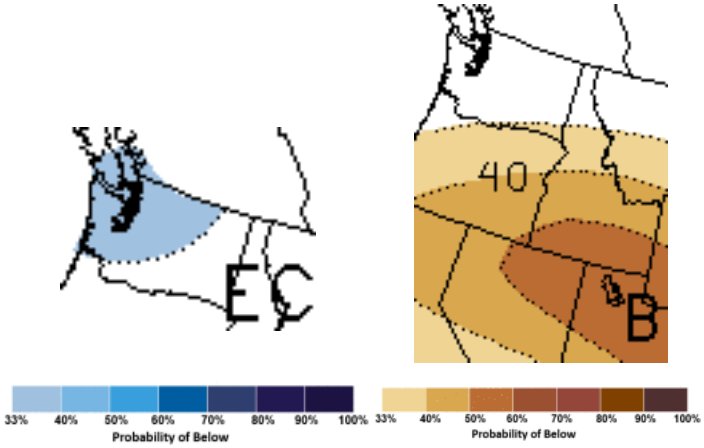


Figure 8: April-May-June outlook for temperature (left) and precipitation (right) (Climate Prediction Center).