



# Office of the Washington State Climatologist

## March 2023 Report and Outlook

March 9, 2023

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

### February Event Summary

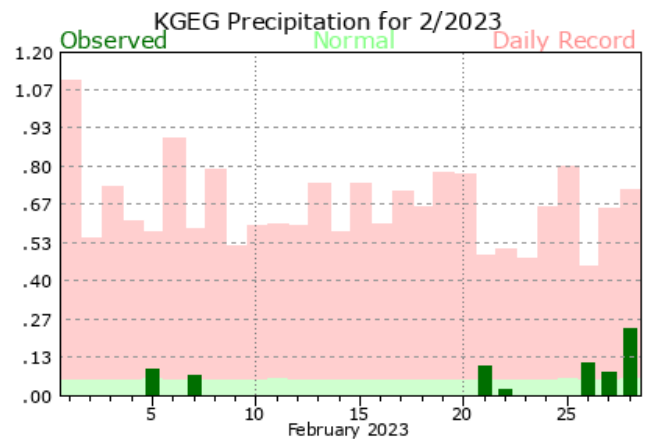
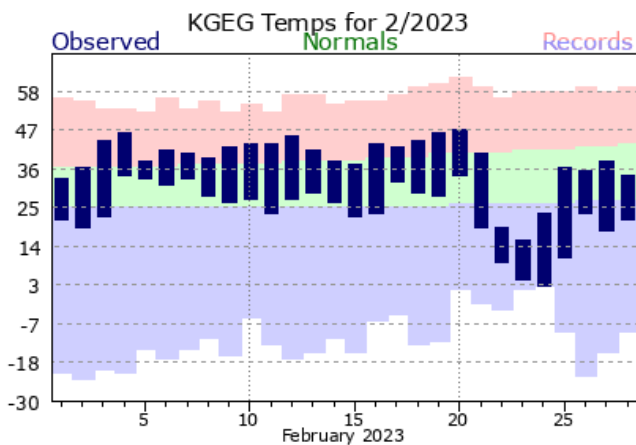
Mean February temperatures and total February precipitation amounts were below normal across most of WA State. Averaged statewide, mean temperatures were 1.9°F below normal while precipitation averaged 76% of normal.

February began with normal to above normal temperatures before cooling down during the second half of the month. This cooler part of the month included a prominent cold snap, as shown in Figure 1. The relatively dry month resulted in few individual station precipitation records being set, but there were some exceptions. Quillayute, for example, set a maximum daily rainfall record of 2.49” on the 7th.

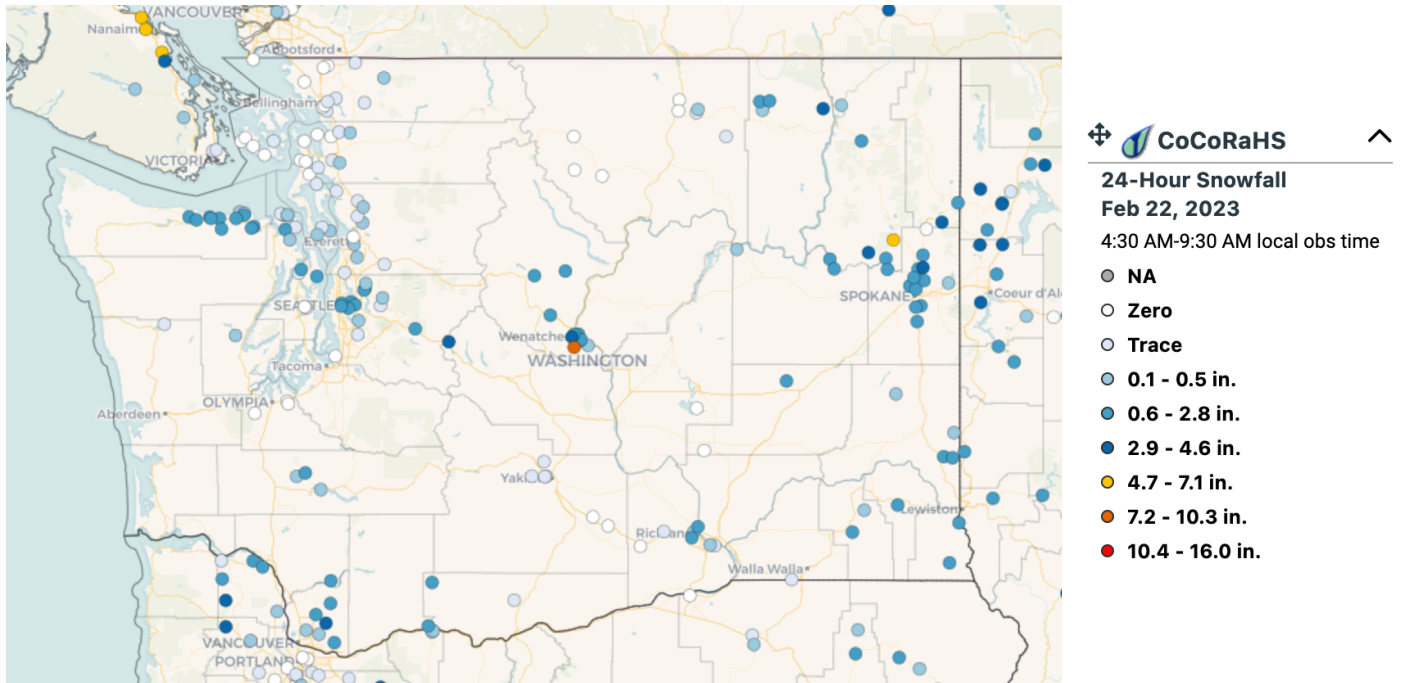
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Later in the month, gusty winds accompanied a pattern shift on the 20th, with gusts between 40 and 50 mph widespread across the state. Snow levels dropped on the 21st and lowland snow was recorded around the state for the next several days. Figure 2 shows the 24-hour CoCoRaHS snowfall totals on the morning of the 22nd, where



**Figure 1: February 2023 daily temperatures for Spokane International Airport compared to the 1991-2020 normal (green envelope) and previous records (blue and red envelopes; [NWS](#)).**



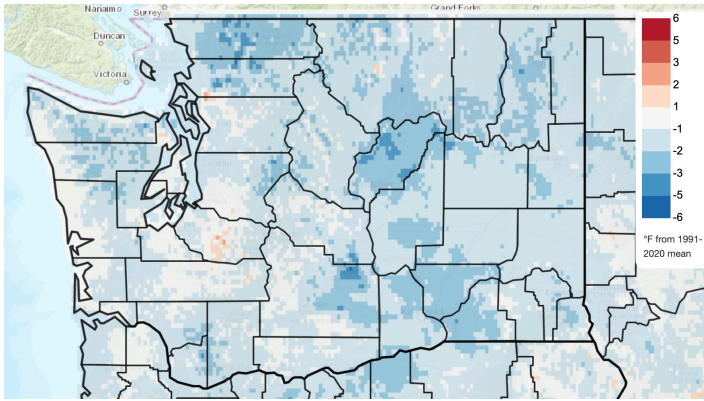
**Figure 2: 24-hr snowfall totals on the morning of February 22, 2023 from [CoCoRaHS](#) observers.**

snow mainly fell in Clallam, Jefferson, Kitsap, and King counties west of the Cascades, and was more widespread east of the Cascades. Lowland snow was more widespread in western WA on the morning of the 23rd, but totals were not as high as the 5-12” measured in the Portland Metro area.

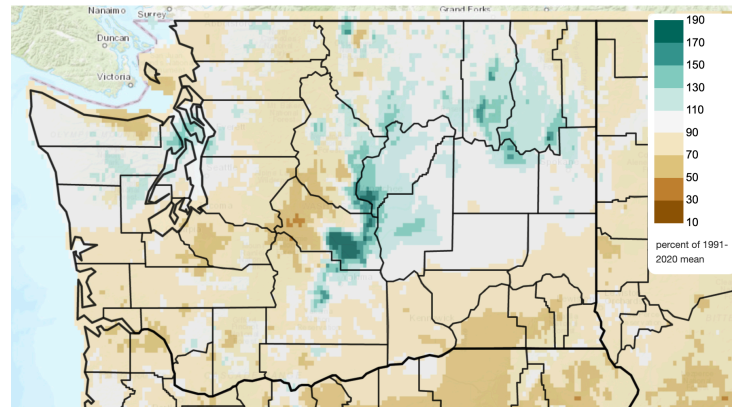
Temperatures were also quite cold during this period with record low daily minimum temperatures being set on the 23rd at Spokane AP (16°F), Wenatchee Pangborn (20°F), Ephrata (21°F), and Omak (22°F). More were set on the 24th and 25th. On the 24th, daily record low minimum temperatures were set at Spokane (3°F - tied), Ellensburg (5°F), Yakima (8°F), Walla Walla (9°F), Pasco (10°F), Wenatchee (12°F), Vancouver (18°F), Bellingham (20°F - tie), SeaTac (22°F), and Quillayute (24°F - tie). Lowland snow was measured again statewide on the morning of the 26th, and more localized snow fell through the end of the month. On the 28th, Spokane AP measured a record maximum snowfall for the date of 4.4”.

Despite the snowy period at the end of February, the month was still drier than normal overall, so how did meteorological winter shape up? Figure 3 shows the distributions of the December-February (DJF) mean temperature departure from normal and total precipitation as a percent of normal. DJF temperatures were between 1 and 3°F below normal, despite the above normal temperatures in January. DJF precipitation was below normal (between 70 and 90% of normal) for a majority of the state, with a few areas drier. The Olympic Peninsula, central Puget Sound, and much of central and northern eastern Washington had normal to above normal DJF precipitation.

Mean Daily Temperature Anomaly, Last 3 Full Months  
2022/12/01 - 2023/02/28

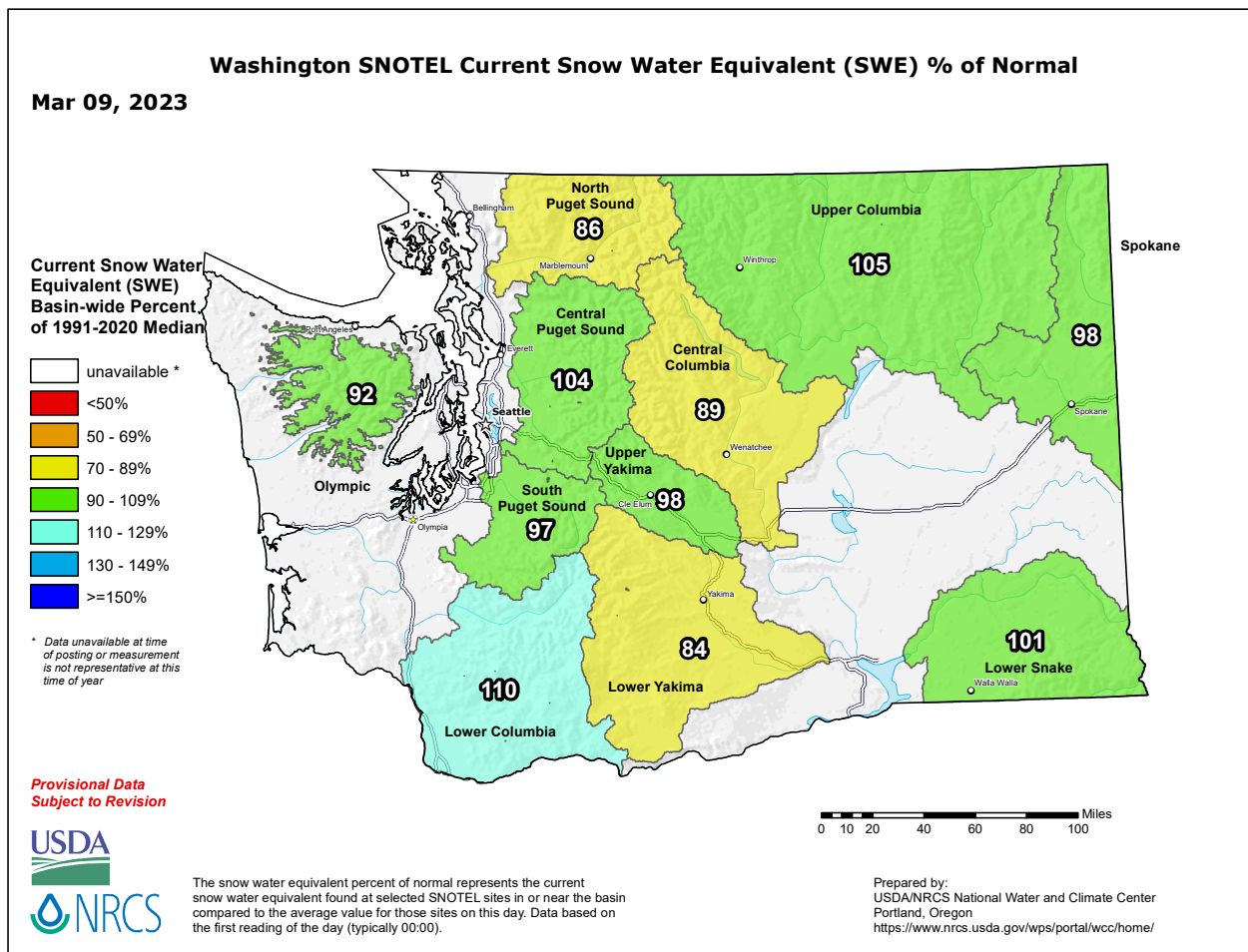


Total Precipitation Anomaly, Last 3 Full Months  
2022/12/01 - 2023/02/28



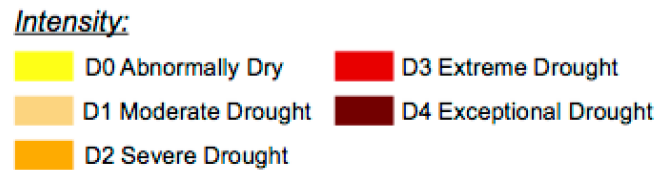
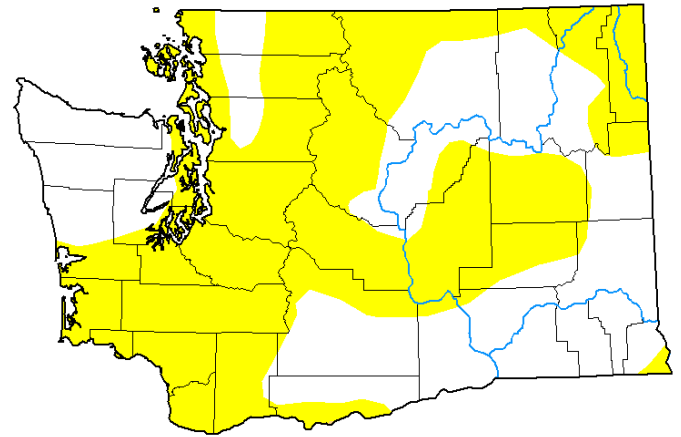
**Figure 3: December 2022-February 2023 average temperature departure from the 1991-2020 normal (left) and total precipitation percent of normal (right) from [Climate Toolbox](#).**

## Snowpack and Drought Summary



**Figure 4: Snowpack (in terms of snow water equivalent) percent of normal for Washington as of March 9, 2023.**

With the drier than usual February conditions, snowpack built at a slower than usual rate. Still, the growth late in February and into early March brought many of the basin snow water equivalent (SWE) averages into the normal range. The Natural Resources Conservation Service (NRCS) basin average map as of March 9 (Figure 4) shows normal snowpack in the Olympic, Central Puget Sound, South Puget Sound, Upper Yakima, Upper Columbia, Spokane, and Lower Snake basins, ranging between 92 and 105% of normal. The Lower Columbia has above normal SWE, with 119% of normal. The North Puget Sound, Central Columbia, and Lower Yakima basins are lagging behind normal.



**Figure 5: The March 9, 2023 edition of the [U.S. Drought Monitor](#).**

The coverage of “abnormally dry” conditions on the U.S. Drought Monitor (Figure 5) grew since the last edition of our newsletter, in accordance with the drier than normal February. Below normal streamflows and drier than usual soils also supported the expansion of the “abnormally dry” category.

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## Pacific Northwest Water Year 2022 Impacts Assessment Released

A Message from the State Climatologist

The [Pacific Northwest \(PNW\) Water Year 2022 Impacts Assessment](#) is now available! Funded by the NOAA National Integrated Drought Information System, and produced through a collaboration of regional entities, this assessment summarizes the water year conditions and related impacts and responses by different sectors. The sector impacts covered in this report are drinking water, agriculture, forestry, fisheries, hydropower, recreation, and stormwater. This is the third water

year impacts assessment, now joining a growing archive of both the [2020](#) and [2021](#) water years.

The 2022 Water Year Assessment focuses on the abrupt transitions between abnormal seasons. The water year was characterized by a dry winter (Jan-Mar was the 41<sup>st</sup> driest in Washington), shifting to a wet spring (Apr-Jun was the 3<sup>rd</sup> wettest in Washington), and then to a dry summer (Jul-Sep was the 2<sup>nd</sup> driest in Washington). The dry



*The cover of the [PNW Water Year 2022 Impacts Assessment](#).*

January-March conditions were even more anomalous in Oregon and Idaho. This sort of variability – on shorter time scales – has been the focus of recent highlight pieces of this newsletter, partially motivated by the swings in conditions seen over the last year. For the PNW, the assessment notes that these abrupt seasonal transitions were challenging for forecasting and operation planning in multiple sectors. Regarding agriculture, for example, the timing of the transition between dry (March 2022) and wet (April) was particularly challenging because it occurred when annual irrigation allotments were being considered. In this way, the abrupt shifts are more difficult to manage than the impacts from either abnormally dry or abnormally wet conditions alone, which is a nuance that may not

have been as appreciated prior to the 2022 water year.

Another highlight from the assessment is the recognition, for the second year in a row, of the importance of spring PNW conditions in determining the magnitude and extent of drought. The record wet April-June in 2022 was the mirror image of the record dry April-June 2021 across the PNW. In 2022, the wet and cool spring drastically improved the outlook for drought for the remainder of the water year. For locations in Oregon and Idaho where drought was still experienced, it was much less severe than it otherwise might have been, and drought concerns were alleviated almost completely in Washington state. The caveat here being that the switch to a warm and dry July-September reversed some of that improvement.

We hope this small preview entices you to look through the assessment. Together with the 2020 and 2021 Water Year Assessments, we are working towards the goal of providing ongoing documentation of the specific conditions that cause impacts, and ultimately improving the management of drought and other climate-related impacts in the future.

### **Reference**

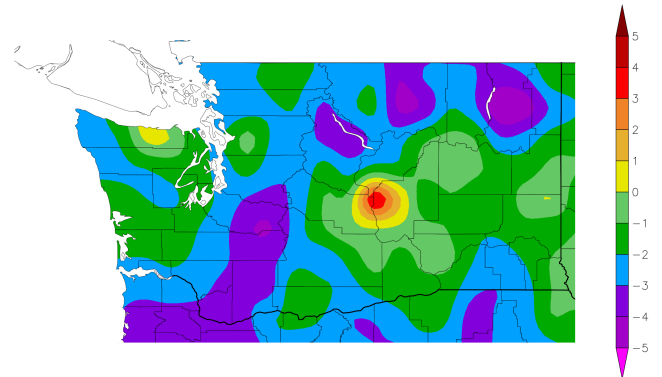
Bumbaco, K.A., C.L. Raymond, L.W. O'Neill, A. Mehta, D.J. Hoekema. 2023. 2022 Pacific Northwest Water Year Impacts Assessment. A collaboration between the Office of the Washington State Climatologist, Climate Impacts Group, Oregon State Climatologist, Idaho Department of Water Resources, and NOAA National Integrated Drought Information System.

# Climate Summary

In contrast to the above normal mean temperatures across Washington in January, February average temperatures were below normal across most of the state. Temperatures were between 1 and 4°F below normal for the majority of the state, as illustrated by the map from the High Plains Regional Climate Center map on the right. North central Washington and the southern Cascades were especially anomalous: Omak was 4.2°F below normal (Table 1). Parts of the Lower Columbia Basin were the exceptions, with near-normal temperatures. The warm bullseye in eastern WA appears spurious due to unreliable temperature readings from Quincy in western Grant County.

Total February precipitation was below normal for most of the state. Precipitation was less than 50% of normal across most of eastern Washington. Ephrata and Pasco were particularly dry relative to normal, with 19 and 38% of normal, respectively. Precipitation percentages of normal were more varied west of the Cascades, though still mostly on the dry side. Olympia, Seattle, and Bellingham, for example, all received only about 65% of their normal February precipitation. The foothills on the western slopes of the central and northern Cascades and the northwestern portion of the Olympic Peninsula were the exceptions with normal to above normal February precipitation. Quillayute, for example, recorded 112% of its normal precipitation for the month (Table 1).

Departure from Normal Temperature (F)  
2/1/2023 – 2/28/2023

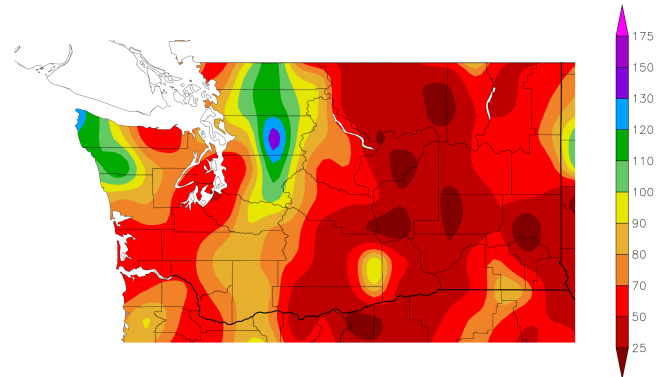


Generated 3/6/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

**February temperature (°F) departure from normal relative to the 1991-2020 normal (HPRCC).**

Percent of Normal Precipitation (%)  
2/1/2023 – 2/28/2023



Generated 3/6/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

**February total precipitation percent of 1991-2020 normal (HPRCC).**

Station	Mean Temperature (°F)			Precipitation (inches)			Snowfall (inches)		
	Avg	Norm	Departure from Normal	Total	Norm	Percent of Normal	Total	Norm	Percent of Normal
Western Washington									
Olympia	38.9	40.7	-1.8	3.30	5.09	65	M	M	-
Seattle WFO	41.4	43.4	-2.0	2.46	3.54	69	0.8	1.0	80
SeaTac AP	40.7	44.0	-3.3	2.36	3.76	63	2.2	2.2	100
Quillayute	40.1	42.1	-2.0	10.85	9.73	112	M	M	-
Hoquiam	42.6	43.6	-1.0	3.85	6.65	58	M	M	-
Bellingham AP	39.5	41.7	-2.2	1.75	2.85	61	M	M	-
Vancouver AP	40.4	43.1	-2.7	1.49	3.77	40	M	M	-
Eastern Washington									
Spokane AP	31.7	32.9	-1.2	0.70	1.44	49	8.6	7.8	110
Wenatchee	32.7	34.5	-1.8	0.45	0.76	59	M	M	-
Omak	28.3	32.5	-4.2	0.32	0.91	35	M	M	-
Pullman AP	32.7	35.4	-2.7	0.80	1.59	50	M	M	-
Ephrata	33.7	34.9	-1.2	0.12	0.64	19	M	M	-
Pasco AP	37.7	38.4	-0.7	0.24	0.63	38	M	M	-
Hanford	37.1	38.2	-1.1	0.39	0.66	59	1.4	2.8	50

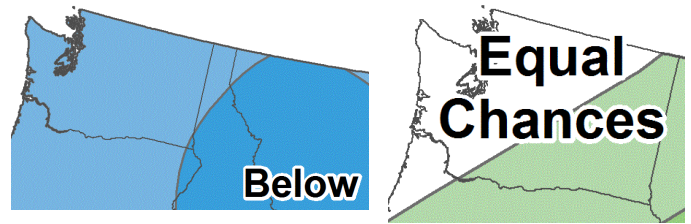
**Table 1: February 2023 climate summaries for locations around Washington with a climate normal baseline of 1991-2020.**

# Climate Outlook

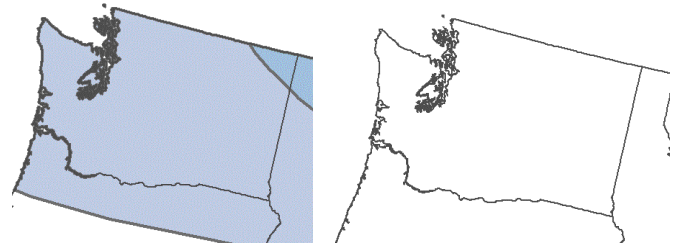
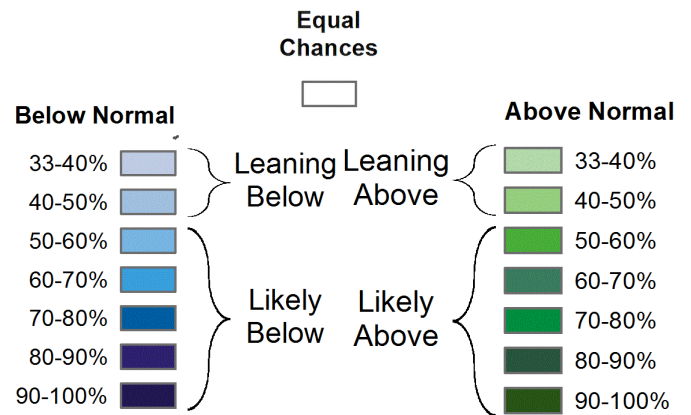
According to the Climate Prediction Center (CPC), the long-lasting La Niña that began in the latter portion of 2020 has finally ended. ENSO models indicate the probability of neutral conditions at 94% during March-May 2023, and as a group, slow warming from this spring into fall.

The CPC outlook for March (Figure 6) is calling for higher than usual odds of below normal temperatures statewide. The chances of below normal temperatures are relatively high for the three-class outlook, at between 50 and 60%. March precipitation is expected to be above normal for south central, southeastern, and northeastern Washington, with the odds between 33 and 40%. The remainder of Washington, specifically west of the Cascades and the north central portion of the state, have equal chances of below, equal to, or above normal March precipitation.

The three-month spring outlook (March-April-May; MAM in Figure 7) is similar to the March outlook for temperatures. There are slightly elevated odds of below normal MAM temperatures statewide. March-May precipitation is uncertain with equal chances of below, equal to, or above normal precipitation statewide.



**Figure 6: March outlook for temperature (left) and precipitation (right).**



**Figure 7: March-April-May outlook for temperature (left) and precipitation (right) (Climate Prediction Center).**