Washington State Climate Office

March 2025 Report and Outlook

March 10th, 2025

https://climate.uw.edu/

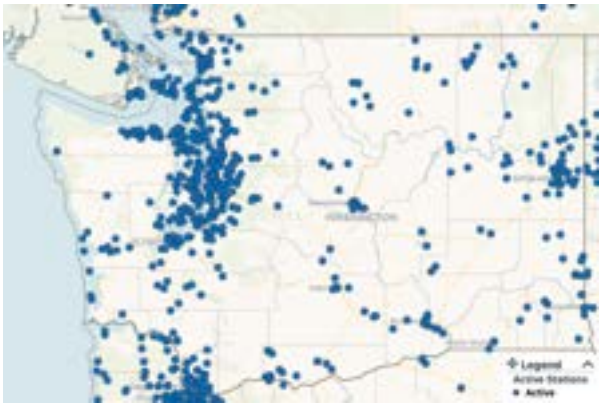
CoCoRaHS March Competition

Every March, the Community Collaborative Rain, Hail, and Snow Network (CoCoRaHS) hosts a friendly competition to see which state can add the greatest number of new observers! CoCoRaHS is a community science network that allows members of the public to report daily precipitation measurements using a high-quality backyard rain gauge. There are over 26,000 observers across the country, and these regular precipitation measurements help us evaluate precipitation events in real-time and can even help improve climate records when observers report reliably over a long period of time.

You can view maps of daily rainfall, snowfall, and other variables produced by the network of observers using the CoCoRaHS map tool. You may notice there are many observers in larger metropolitan areas in Washington, but we have data gaps in more rural parts of the state.

Learn more about becoming an observer, and help us expand the number of observers in our state and cover these data gaps. This competition will run through March 31st, and you can view the live leaderboard anytime throughout the competition. Happy observing, Washingtonians!

In this Issue



Map of currently active CoCoRaHS observers across Washington as of March 2025 (CoCoRaHS).

February Event Summary

February 2025 brought below normal temperatures across much of the state and ranked as the 28th coldest February statewide since 1895. Temperatures were below normal for much of the first half of the month, with daily high temperatures at many stations that were closer to normal daily lows (Fig. 1). This cooler weather was accompanied by showery conditions which produced much below normal temperatures during that period. On the morning of February 11, many stations statewide approached or set low daily minimum temperature records including 6°F at Ephrata Airport, 11°F at Richland, 14°F at Olympia Airport, and 23°F at SeaTac Airport.

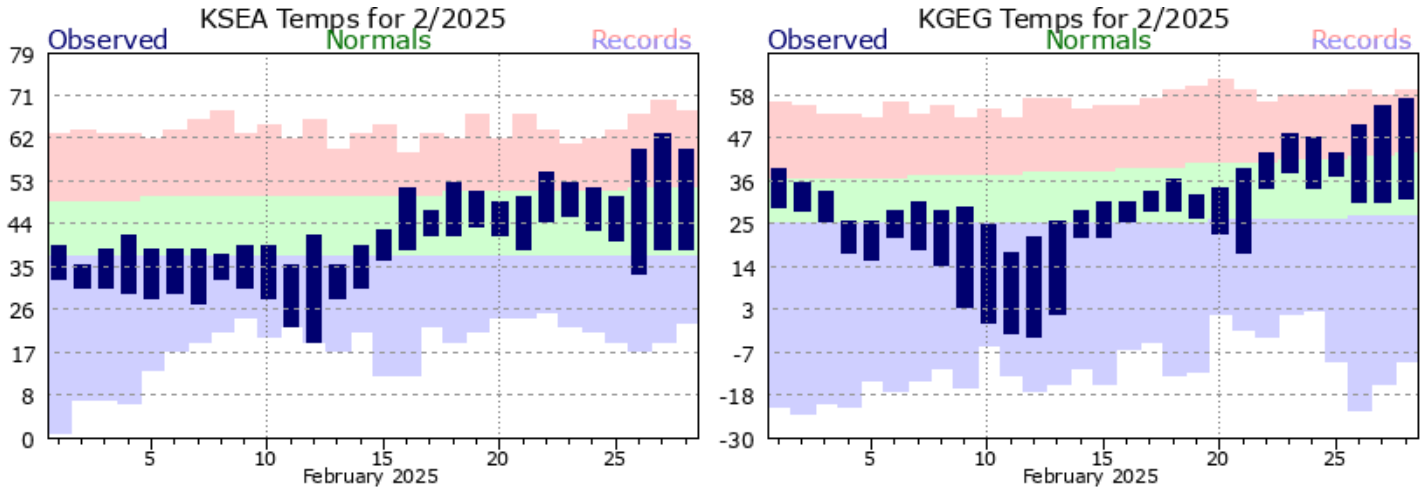


Figure 1: Daily high and low temperatures overlaid with daily normals and records at Seattle (left) and Spokane (right) International Airports.

brought near daily lowland snow across western Washington and parts of eastern Washington. Although snow totals amounted to typically under 1-2" each day across the I-5 corridor, February 6 brought more impressive totals across Puget Sound and in Spokane (Fig. 2). Snow totals of 2-5" were common across the northeast Olympic Peninsula and the I-5 corridor from Seattle northward. Across Spokane, totals of 2-4" were recorded on the 6th as well.

Figure 2: 24-hour snowfall ending on the morning of February 6th, 2025. Representative of a particularly snowy day among a 11-day stretch of lowland snow from February 1st-10, 2025 (CoCoRaHS).

Showery lowland snow continued for the next several days, and then came to an end across western Washington on the 10th. Even colder air settled in across the state from February 9-14 and

Light snow (generally under 0.50" of accumulation) returned to the western Washington lowlands on February 14 as well. This cold arctic air then retreated toward the middle of the month, and temperatures returned to near or slightly above seasonal averages for the rest of the month.

Impactful weather returned on February 22-23 as a warm atmospheric river brought widespread precipitation. The associated low pressure system then strengthened and arrived in Washington through the evening and overnight hours of February 24-25. Widespread wind gusts of 45-55 mph led to downed trees and around 175,000 households without power across western Washington. SeaTac Airport recorded a gust of 52 mph which approached the longstanding February record of 60 mph set during the infamous February 13th, 1979 windstorm. Olympia AP also recorded a gust to 52 mph overnight.

Winds gradually calmed into the morning of the 25th, and the rest of the month featured settled, sunny, and mild weather. High temperatures soared into the mid 60s across the western Washington lowlands and to the upper 50s to near 60°F across the eastern Washington river valleys on the 27th.

Winter Season Summary (Dec-Jan-Feb)

A much warmer than average December followed by a generally cool January and February balanced out to near-normal temperatures for the state when averaged over the 3-month winter period (Fig. 3). Winter precipitation shows clear geographic differences, with wetter than normal conditions across the Lower Columbia River Valley. Despite our more active weather pattern in February, 3-month precipitation has continued to lag behind in the western half of the state. Crucially, precipitation has been below normal in the Cascades, Olympic Peninsula, and in portions of the Okanogan Highlands; all important water storage regions as we head toward our dry season.

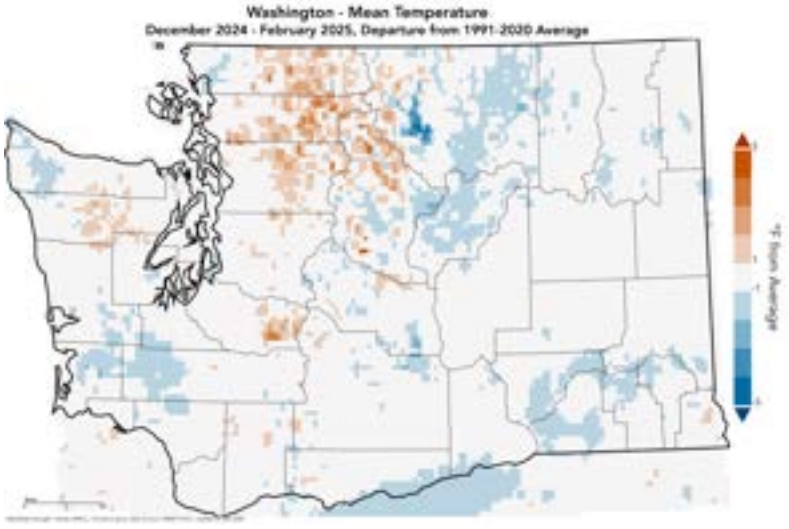


Figure 3: December-February 3-month mean temperature departure from the 1991-2020 normal. Temperatures were near-normal when averaged over this period (WestWide Drought Tracker)

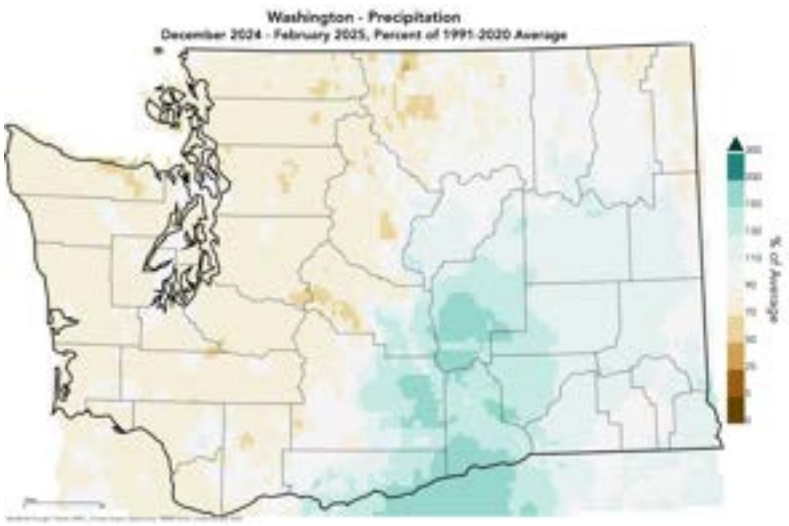


Figure 4: December-February 3-month precipitation departure from the 1991-2020 normal. Precipitation was below normal across Western Washington and the Okanogan highlands, but above normal in the Lower Columbia Valley (WestWide Drought Tracker)

Snowpack and Drought Summary

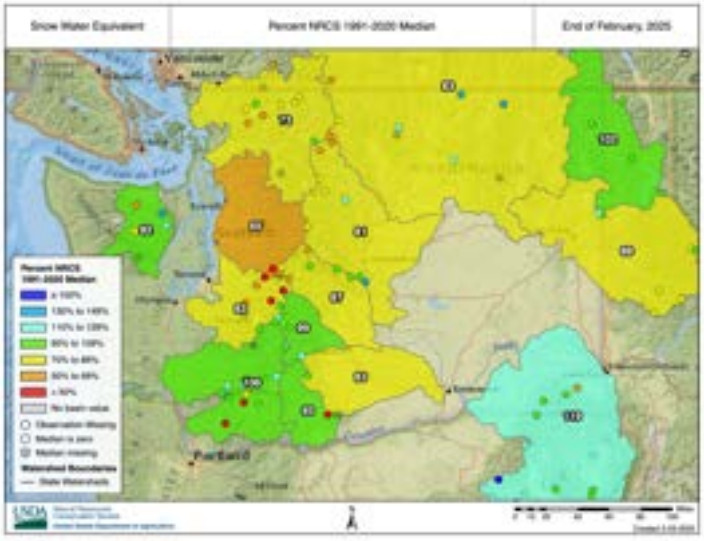


Figure 5: Statewide SWE percent of 1991-2020 median as of the end of February 2025 (NRCS).

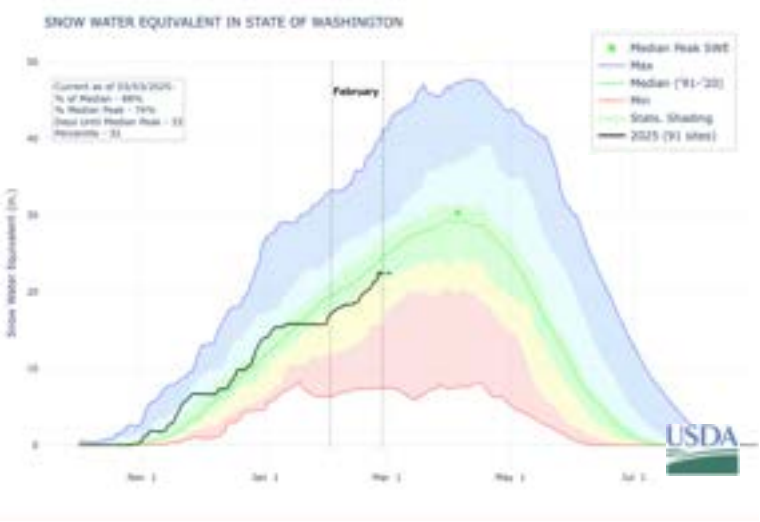


Figure 6: Statewide SWE time series for the 2024-2025 water year (NRCS).

Overall, we are in a very similar place compared to the end of last month in terms of Snow Water Equivalent (SWE) percent of 1991-2020 median (Fig. 5). Most basins saw only minor changes in percent of median SWE (on the order of ± 10%). For example, we saw very slight increases in percent of median SWE in the Central Puget Sound basin and in the Olympics, but slight reductions in the Yakima River Basin.

As of the end of February, the central and northern Cascade Mountains show SWE values near 65-85% of median, while the southern Cascades show values near median, with the exception of a few outlier, lower elevation stations in the southern WA Cascades. The Blue Mountains/ Lower Snake-Walla Walla basin has held on to slightly above normal SWE (119%). Figure 6 represents SWE statewide for our current water year. Despite the snowy start to the month in the lowlands, much of this early February precipitation was fairly light and brought only minimal SWE gain in the mountains, as seen in the relatively slow increases in SWE statewide until mid-month.

More appreciable SWE increases then arrived toward the latter half of the month as stronger and wetter systems impacted the state. However, this snowfall was just enough to keep pace with seasonal normals and did not erase the deficits we saw emerge by the end of January.

A look at reservoir storage levels tells a similar story of below normal mountain water resources. In the Yakima Basin, reservoirs are only 16-29% full, and total system storage is not doing much better with only around 36% of average storage capacity. Figure 7 shows Yakima Basin reservoir system storage for the current water year. We are currently running behind last year's water storage levels and well below our average water storage levels for this time of year (Note: data are provisional).

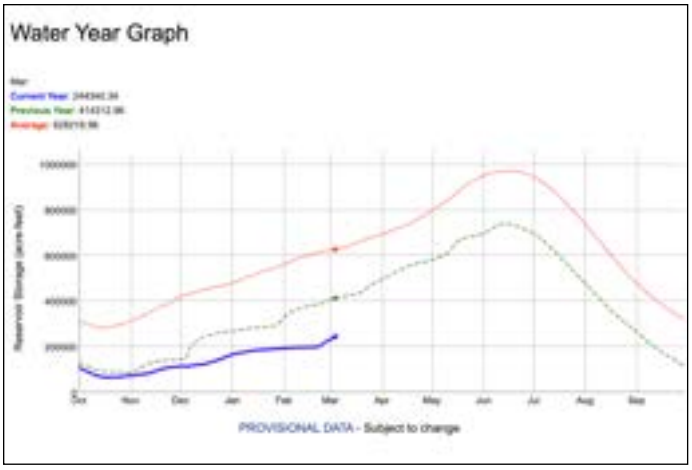


Figure 7: Yakima Basin Total System Storage for water year 2024-2025 (blue line), last water year (green dashed line), and the long-term average (red line) (U.S. BoR).

As of March 6th, the U.S. Bureau of Reclamation (USBR) has announced that junior water rights holders in the Yakima Basin are expected to receive only 48% of their allotments this year. There is still time for reservoir storage levels to improve if spring precipitation is plentiful, but for now water resources are strained in this important irrigation basin. The USBR's forecasts will be updated monthly to reflect changing conditions. Along with mountain snowpack and SWE, reservoir storage is a key indicator of drought conditions as we head toward the end of the wet season.

According to the U.S. Drought monitor, drought conditions have also worsened across western Washington. D1 (Moderate Drought) has developed across the NW Olympic Peninsula and across the Cascade Mountains (Fig. 8). Across eastern Washington, conditions have remained free of drought and there are only small areas of abnormally dry conditions in far northeast and southeast Washington.

Figure 9 shows the change in U.S. Drought Monitor classification over the past 12 weeks (since December 3, 2024). Orange shading across the Cascades and Olympic Mountains indicates a degradation of two drought classifications, and darker green shading near Wenatchee and Ellensburg as well as near the Blue Mountains are the result of consistent wetter than normal conditions over the past 3 months. State and federal agencies will monitor drought conditions closely over the next few months to determine if the current drought emergency will need to be extended into summer 2025.

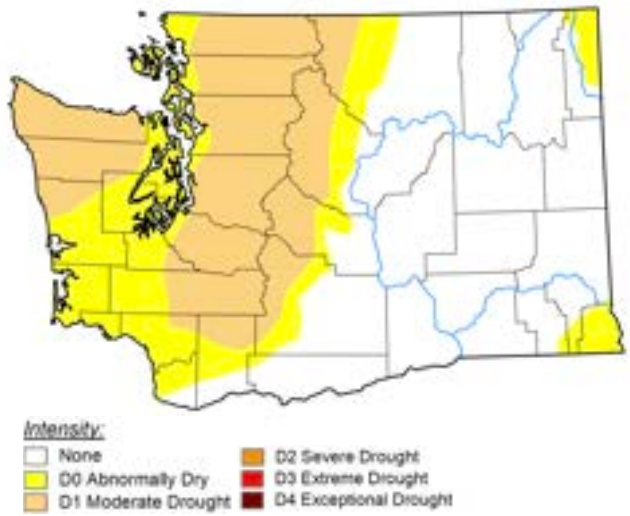


Figure 8: U.S. Drought Monitor classifications. Valid on March 4 and released on March 6. D1 Moderate Drought has developed across much of western Washington (U.S. Drought Monitor).

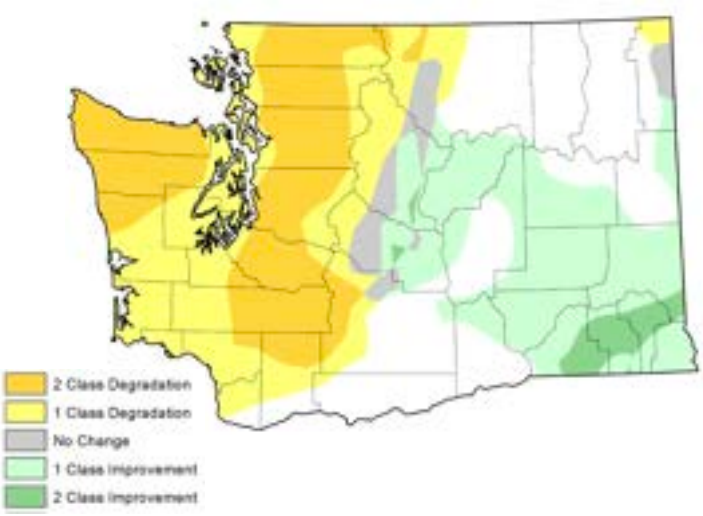


Figure 9: U.S. drought monitor classification change since December 10th, 2024. Yellows and oranges represent worsening drought conditions, and greens represent improving drought conditions (U.S. Drought Monitor)

Has it seemed cold and snowy during February in recent years?

Climate Matters Series Author: Nick Bond

Some folks have been remarking on how often it has been cold and sometimes snowy in February during the past decade or so. In part this can probably be attributed to the just-completed February of 2025, which has been the snowiest month of the winter for much of the state, especially at lower elevations on both sides of the Cascade Mountains. And the remarkable weather of February 2019 may still reside in many of our memory banks, even if the specific year it happened does not come immediately to mind. So it seems timely to determine whether February in recent years has actually been an unusually wintry month, and how the past decade or two stacks up with those earlier in the historical record. Towards that end, we consider both mean temperatures for the month of February and for the winter as a whole, and short time scale events, with a focus on snowfall in the two population centers of Seattle and Spokane.

Long-term air temperature records for WA state as a whole for the entirety of winter (defining the season in an inclusive manner to run from November through March), and for just the month of February, are shown in Figures 10a and 10b, respectively. It should be no surprise that there has been an overall increase in winter air temperatures in WA state, with plenty of year-to-year variability (Fig. 10a, top). A linear fit to the February temperature record results in the same

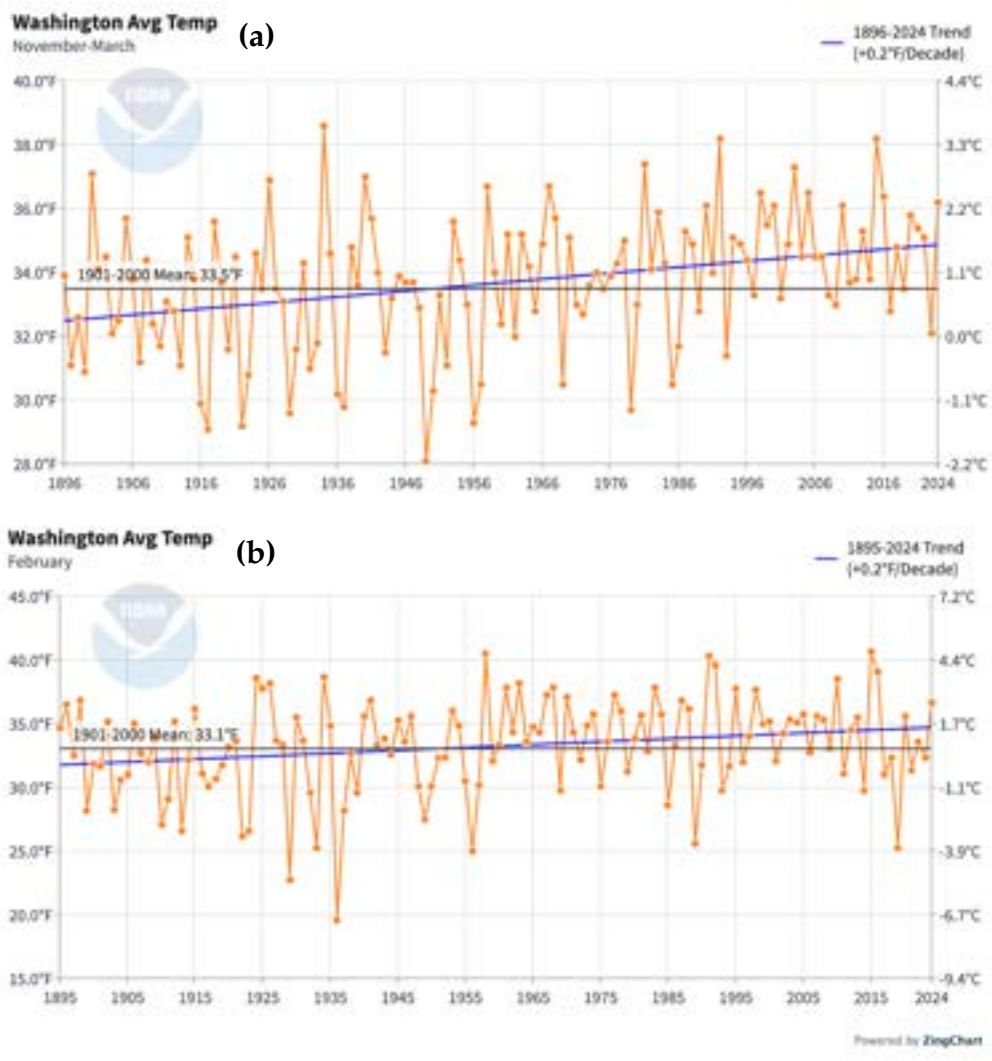


Figure 10: (a) November through March average temperatures from 1896 to 2024 (top) and (b)February average temperatures from 1895 to 2024 (bottom) averaged across Washington. Linear trend lines (blue) and the long-term 1901-2000 average (black) are also included (NCEI Climate at a Glance).

temperature trend of about 0.2°F per decade (Fig. 10b, bottom).

Note the vertical scales of Figures 10a and 10b are different; the variability is greater for the February temperatures since there is less averaging. Although the long-term trend in February temperatures is clear, the trend seems to be almost non-existent over the last 4-5 decades. This is in contrast with air temperatures for winter as a whole, which show a clear increase in this time period. We simply have not experienced a really cold winter for quite some time. Moreover, while the warmer winters in the recent past have had mean temperatures comparable to those of the warmer winters in the distant past, we have a lot more warm winters now than before. But maybe there is something to the idea that February by itself does not fit the pattern for winter as a whole. February 2019 stands out as particularly cold, but many years since 2011 have had February temperatures below the average value for the 20th century.

We now turn our attention to snowfall in Seattle (as measured at Sea-Tac Airport) and Spokane (as measured at Spokane International Airport). First, considering Seattle, and winters as a whole (Fig. 11a), what is striking are the two really big winters of 1949-50 and 1968-69, with nothing comparable in recent decades. There were numerous low snow years in the first half of the record, but there's a hint that they are somewhat more frequent lately. With regards to the percentage of the winter snowfall in Seattle that occurred in the month of February, there is no clear trend. The notably snowy months in February of 2017, 2019 and 2021 dominated winter totals in those years, but given the variability in the record, those years appear to be a fluke. The snowfall record for Spokane (Fig. 11b) is broadly

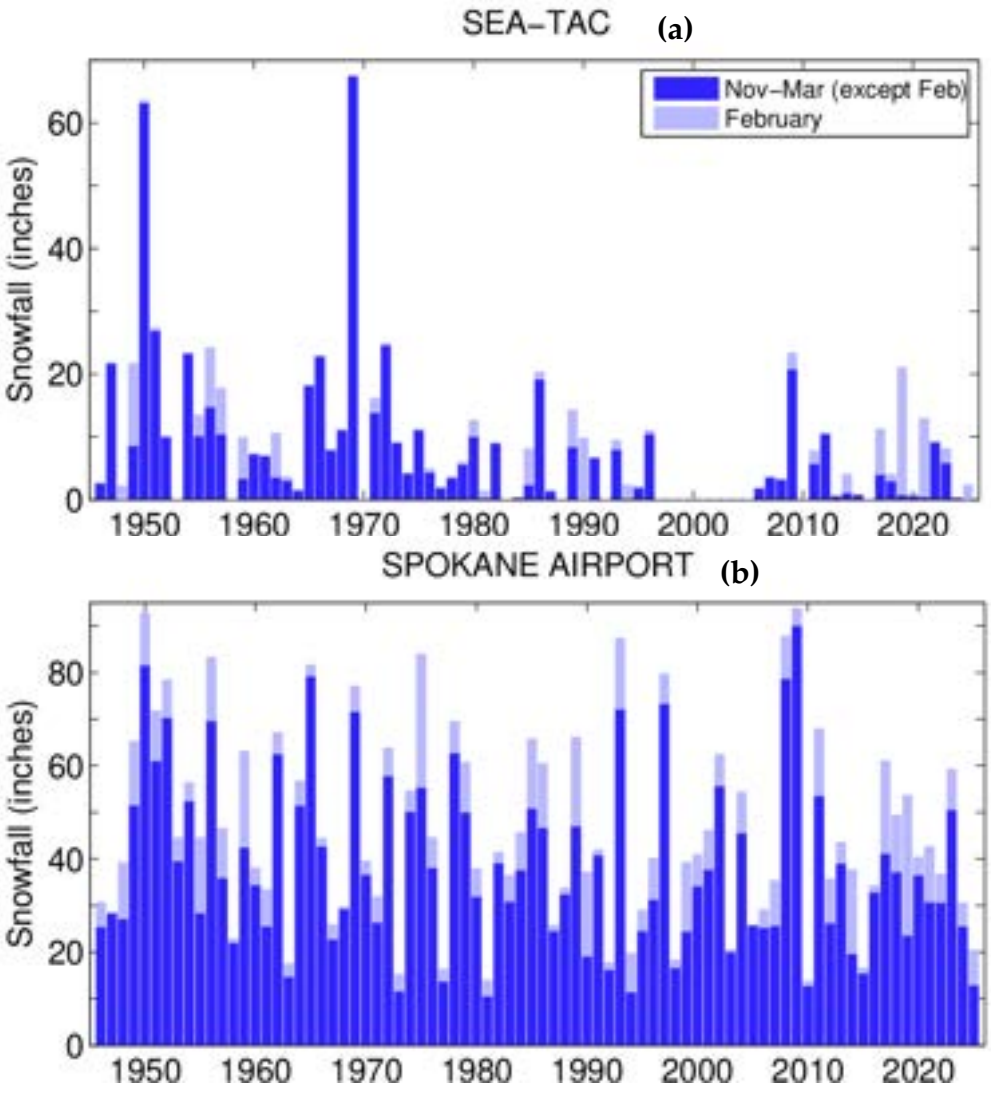


Figure 11: A stacked bar graph showing the total winter snowfall for November through March, excluding February (dark blue) and the total monthly snowfall for February (light blue) since 1945 at Seattle (SeaTac Airport; top) and Spokane (Spokane International Airport; bottom). The light and dark blue bars together show the total winter snowfall from November through March.

consistent with that of Seattle. There is an overall downward trend in Spokane's snowfall for winter as a whole, with the recent big years of 2008-09 and 2009-10 being exceptions. Considering the proportion of the total winter snow in Spokane falling in the month of February, an eyeball test suggests an overall increase, in part because of some sizable fractions in 2014, 2019, and the present winter of 2025. But again, we should be careful about "over-interpreting" a noisy time series. Either way, a handful of unusual years can impact climatological norms, generally defined in terms of 30 year averages. For example, at Seattle the month of February is the snowiest winter month in the 1991-2020 normals, with an average of 2.2 inches. For the overlapping period of 1981-2010, February averaged 1.7 inches of snow, which ties it with December as the snowiest winter month for that particular set of years. Worth noting: both sets include the stretch of years from 1997 through 2003 for which snowfall totals for Seattle are unavailable (annoying!).

Our primary intention has been to show how temperatures and snowfall have varied over past decades. But we did take a foray into why February recently has tended to include more snow. In particular, we took a look into how many days featured strong flow from the north. More specifically, for the location of 55° N, 125° W (in northern British Columbia), we determined how many days in February there was a northerly component of the flow in the middle atmosphere (at 500 mb) greater than 20 m/s. While it might seem arbitrary, this selection is motivated by the composite flow pattern at 500 mb associated with snowstorms in the Puget Sound area as documented by Ferber et al. (1993). They found that northerly flow at this location is associated with the development of a short-wave trough, and accompanying cold air, needed for most instances of lowland snow in Puget Sound.

Although their analysis did not consider snowstorms in the Spokane area, often snowy periods in the Puget Sound area are also accompanied by cold weather in eastern WA. Using the NCEP reanalysis, we found that on average there are about 2 days each February with a northerly component meeting that criterion from 1960 through about 2017. Since 2017, the month of February has had about 4 days on average with northerly flow exceeding 20 m/s at 500 mb. Again, this is almost certainly more a short-term quirk rather than any sort of systematic shift in the regional circulation. Bottom line: while perhaps there is no harm in hoping, do not count on February being as wintry in future years!

Reference:

Ferber, G.K., C.F. Mass, G.M. Lackmann and M.W. Patnoe, 1993: Snowstorms over the Puget Sound Lowlands. Wea. Forecasting, 8, 481-504.

Climate Summary

Temperatures across the state were well below normal for the month of February. Eastern Washington experienced temperatures around 5-7˚F below normal while areas along the I-5 urban corridor experienced temperatures closer to 1-3˚F below normal (Fig. 12). This includes temperature departures of -2.0˚F in Olympia and -1.4˚F at Seattle WFO. The Olympic Peninsula and areas along north Puget Sound experienced cooler conditions relative to normal including departures of -4.7˚F in Bellingham and -2.6˚F in Hoquiam. Across the eastern slopes of the Cascades and much of eastern Washington, anomalies were closer to 4-6˚F below normal (Table 1).

These cold anomalies were largely brought on by very cold arctic air in the first half of the month before temperatures moderated a bit for the second half of the month. In terms of precipitation, the Cascade Mountains, Okanogan Mountains and western Washington saw largely near-normal precipitation (Fig. 13).

Showery lowland snow from Feb 1-10 brought near daily light snow accumulations amounting to 2.2" at SeaTac. Spokane also recorded 15.9" of snow, nearly double the station's normal monthly snowfall. Drier conditions were experienced in the far northern Olympic Peninsula where precipitation was below normal. Quillayute recorded about 71% of normal precipitation and areas near Sappho saw only around 50-70% of normal precipitation. The Cascades saw some areas of slightly below normal precipitation as well, but no steady or widespread deficits in precipitation were observed for the month.

Across eastern Washington, and especially the lower Columbia River Valley and the Snake River Valley/Blue Mountains, precipitation was well above normal. Large areas of this region observed over 150% of their normal precipitation for the month. This included Spokane AP (142% of normal), Pullman AP (182% of normal), and Pasco AP/Tri Cities (164% of normal).

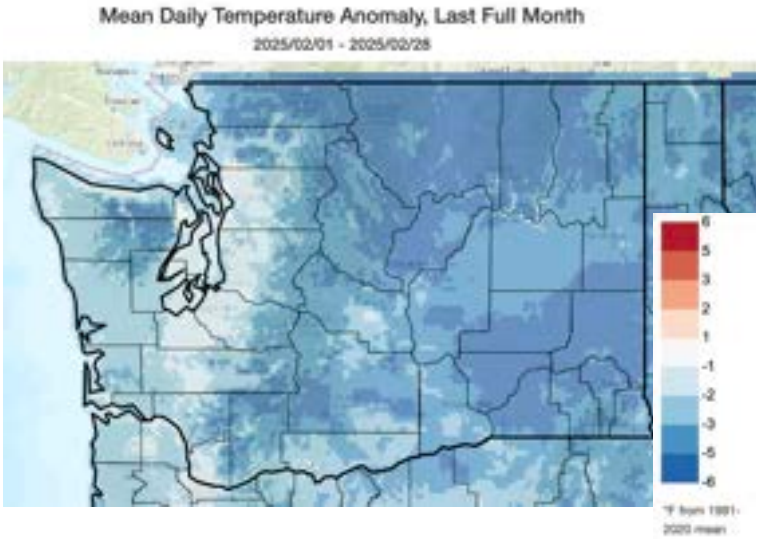


Figure 12: February 2025 temperature departure (in ˚F) relative to 1991-2020 normals (Climate Toolbox).

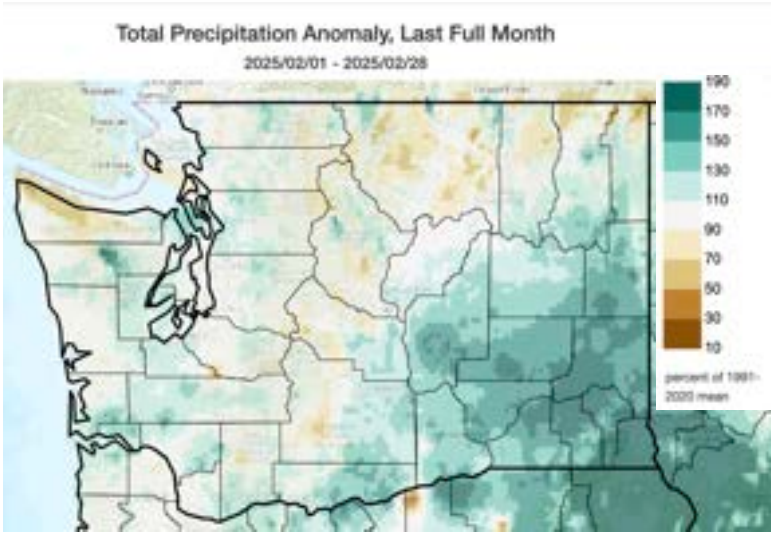


Figure 13: February 2025 Precipitation departure (in %) from 1991-2020 normals (Climate Toolbox).

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	38.7	40.7	-2.0	4.71	5.09	93	M	2.0	-
Seattle WFO	42.0	43.4	-1.4	3.88	3.54	110	2.6	1.0	260
SeaTac AP	40.4	44.0	-3.6	3.48	3.76	93	2.3	2.2	105
Quillayute	40.0	42.1	-2.1	6.92	9.73	71	M	M	-
Hoquiam	40.9	43.5	-2.6	8.49	8.58	99	M	M	-
Bellingham AP	37.0	41.7	-4.7	3.34	2.85	117	M	M	-
Vancouver AP	41.2	43.1	-1.9	4.12	3.77	109	M	M	-
Eastern Washington									
Spokane AP	28.6	32.9	-4.3	2.05	1.44	142	15.9	7.8	204
Wenatchee	29.2	34.5	-5.3	0.72	0.76	95	M	M	-
Omak	27.5	32.5	-5.0	0.77	0.91	85	M	M	-
Pullman AP	29.1	35.4	-6.3	2.89	1.59	182	M	M	-
Ephrata	29.4	34.9	-5.5	0.77	0.64	120	M	M	-
Pasco AP	33.3	38.4	-5.1	1.03	0.63	164	M	M	-
Hanford	33.5	37.6	-4.1	1.11	1.01	110	5.9	2.6	226

Table 1: February 2025 climate summaries for locations around Washington with a climate normal baseline of 1991-2020. M denotes missing data.

Climate Outlook

A La Niña advisory is still in place according to the Climate Prediction Center (CPC). La Niña conditions in the Tropical Pacific have begun to weaken a bit over the past month, but are expected to persist in the short term. There is a 66% chance that neutral conditions will return during the March-April-May period. La Nina's effects on the weather of the Pacific Northwest often linger into spring while the tropical Pacific transitions into near-normal conditions.

The CPC's March outlook (Fig. 14) shows higher chances of below normal temperatures and above normal precipitation across the state and region. Chances of below normal temperatures are higher (40-50%) across western Washington compared to eastern Washington (33-40%). Chances of above normal precipitation are around 40-50% across the entire state. Similar to last month, these are not very high probabilities, but we will likely lean toward wetter and cooler conditions through March.

The CPC's seasonal outlook (Fig. 15) shows similarly cooler and wetter conditions for the March-April-May period. Chances of cooler than normal temperatures are a bit higher across northern Washington (40-50%) compared to southern Washington (33-40%). As for precipitation, chances of above average precipitation are a bit higher in western Washington and the Okanogan Mountains westward (40-50%) compared to far eastern and southeastern Washington (33-40%).

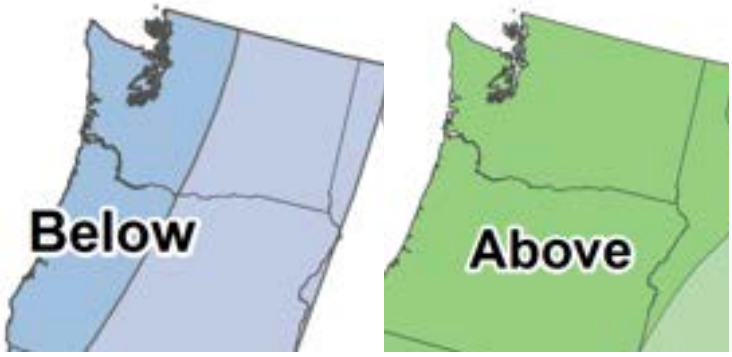
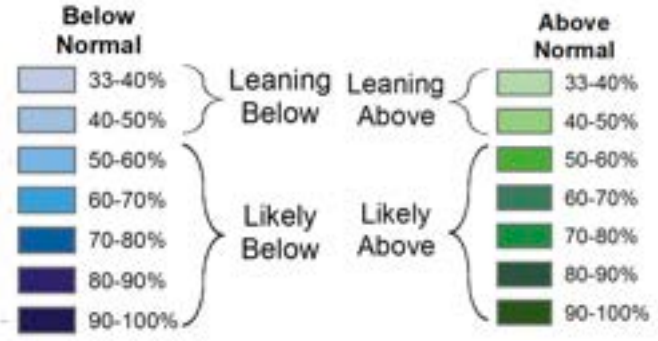


Figure 14: March outlook for temperature (left) and precipitation (right) (Climate Prediction Center).



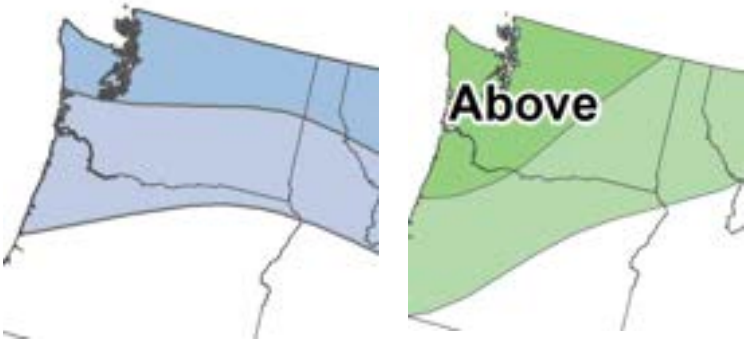


Figure 15: March-April-May seasonal outlook for temperature (left) and precipitation (right) (Climate Prediction Center).