Office of the Washington State Climatologist

June 2021 Report and Outlook

June 8, 2021

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

May Event Summary

Average May temperatures were near normal for a majority of WA State. Precipitation was below normal for nearly the entire state, with the exception being parts of the northern and central Puget Sound region that received near-normal precipitation. Eastern WA was especially dry, and a handful of weather stations reported all-time low totals. Specifically, Prosser, Lind, Odessa, and Ritzville had their driest May on record, and more stations that rank among the top ten driest Mays are shown in Table 1. Notably, Friday Harbor in the San Juan Islands reported its second driest May on record with just one-hundredth of an inch, recognizing the period of observation there is relatively short.

The dry May marks the 3rd consecutive month with precipitation much lower than usual statewide. Temperature and precipitation maps for meteorological spring (March through May) are shown in Figure 1. Spring temperatures were generally above normal in the higher elevations and on the eastern slopes of the Cascades. The WA coast and some areas of the Puget Sound had below normal spring temperatures. Spring precipitation was below normal statewide, with a large area of eastern WA receiving less than 20% of normal precipitation. Lind, Ritzville, Mazama, Entiat, and Boundary Dam all recorded their driest spring on record, and many other stations in eastern WA ranked within the top 5 driest (Figure 2). Averaged statewide, March-May precipitation ranks as the 2nd driest on record (since 1895), receiving only 47% of normal precipitation (using the 1981-2010 average).

As for the progression of weather during the month, there were very few notable events. Figure 3 shows the monthly temperatures for SeaTac Airport. The month started a bit warmer than normal and that was generally the case for the first half of the month. Pullman-Moscow Airport had a record high temperatures of 85°F on the 6th, for example. There was a pattern shift of the 17th/18th to temperatures that were cooler than normal

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Station	May Precipitation (in)	Rank	Record (Amount; Year)	Records Began
Prosser	0.00"	1	-	1926
Lind 3 NE	0.00”	1	-	1931
Odessa	T	1	-	1903
Ritzville 1 SSE	0.02”	1	-	1899
Pullman 2 NW	0.20”	2	0.16”; 1947	1941
Davenport	0.15”	2	0.10”; 1982	1909
Friday Harbor AP	0.01”	2	T; 2015	1998
Walla Walla AP	0.30”	2	0.26”; 1992	1949
Pasco Tri Cities AP	0.19”	3	0.14”; 1946	1998
Spokane AP	0.20	5	0.06; 1935	1881
Wenatchee Pangborn	0.08”	5	T; 1992 & 1969	1960
Dayton	0.22”	5	0.12”; 1935	1893
Richland	0.11”	6	0.01”; 1966	1944
Kennewick	0.04”	7	T; 1924 & 1920	1894

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

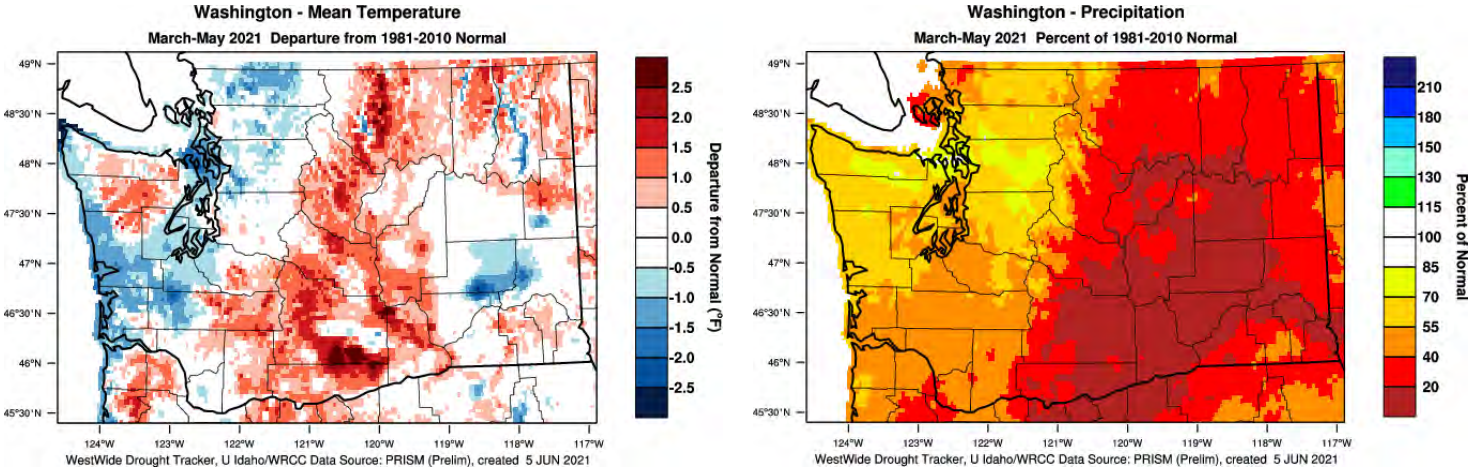

Figure 1: March-April-May 2021 temperature departures from normal and precipitation percent of normal (1981-2010) for WA (WestWide Drought Tracker).

with the passage of a cold front and the weak disturbances that followed. Quillayute recorded a record low temperature of 33°F on the 19th. This period was when most precipitation, if any, fell around the state. The end of the month warmed up again, and SeaTac Airport reported the first 80 degree day of the month on the 31st.

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Public Information Statement
National Weather Service Spokane WA
256 PM PDT Fri Jun 4 2021

...Meteorological Spring...March through May...driest on record for several locations...

Here is a look at March through May 2021 precipitation totals across the region and how each one ranks historically in terms of driest on record.

City	March – May 2021 Precip total (inches)	Driest Rank	Records Began
Lind, WA	0.10"	1st	1931
Ritzville, WA	0.19"	1st	1899
Mazama, WA	0.50"	1st	1969
Entiat, WA	0.63"	1st	1990
Boundary Dam, WA	1.81"	1st	1966
Priest River, ID	2.05"	1st	1898
Ephrata, WA	0.32"	2nd	1949
Odessa, WA	0.35"	2nd	1903
Davenport, WA	0.49"	2nd	1910
Wilbur, WA	0.56"	2nd	1900
Coulee Dam, WA	0.58"	2nd	1935
Lewiston, ID	0.62"	2nd	1882
Spokane Arpt, WA	0.67"	2nd	1881
Colville, WA	0.75"	2nd	1900
Bonners Ferry, ID	1.67"	2nd	1907
Chelan, WA	0.48"	3rd	1892
Pullman, WA	1.59"	3rd	1893
Omak, WA	0.62"	4th	1909
Winthrop, WA	0.45"	4th	1906

Figure 2: Public Information Statement from the National Weather Service Spokane office on March-May 2021 precipitation rankings.

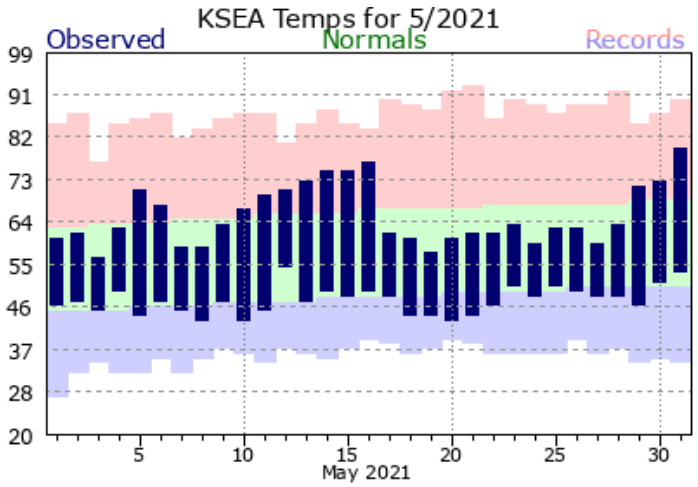


Figure 3: May 2021 maximum and minimum temperatures for SeaTac AP compared to the 1991-2020 normal (green envelope) and records (blue and red). NWS

Snowpack and Drought Summary

An interesting drought picture has emerged in WA, and there appears to be quite a divide between the potential winners and losers. Let's start off with the winners. Figure 4 shows the value of snow water equivalent at the Natural Resources Conservation Service (NRCS) Snotel sites as of June 1. Many sites in the Olympics and Cascades still have between 6 and 35" of snow water equivalent on the ground and the snowmelt is occurring as typical (examples: Rainy Pass, Stampede Pass, and June Lake). Snowpack on April 1 was above normal, and large water municipalities such as Seattle and Tacoma were able to fill reservoirs as normal, meaning there isn't currently concern for water supplies for large utilities on the west side. Most irrigated districts will also do well, even east of the Cascades, thanks to the above normal winter snowpack.

On the other hand, the station circles filled in with white (Figure 4) have melted completely,

which in some locations is a couple weeks earlier than usual (examples: Touchet and Salmon Meadows). Spring has been remarkably dry and impacts are emerging for some dryland agriculture. For example, spring wheat is already showing signs of stress and some crop loss is expected. In addition, the City of Spokane has asked for voluntary outdoor watering reductions to limit potential impacts later in the summer. The U.S. Drought Monitor (Figure 5) is reflecting the recent dry conditions as well as the long-term dry conditions in the Lower Columbia Basin. Since our last newsletter, an area of "extreme drought" (D3) has been introduced, with "severe drought" (D2), "moderate drought" (D1), and "abnormally dry" (D0) conditions expanding throughout the state. Currently, 87% of the state is in moderate drought or worse.

WA State has an official definition of drought, and there has not been an emergency drought declaration made on the state level yet this year. A "drought advisory", however, was announced on May 24 for a majority of the state to raise awareness of the dry spring conditions. More information can be found here.

Report Your Drought Impacts

Are you experiencing a drought impact? Your on-the-ground observations are critical in helping us understand the broad picture of drought in the state. The National Drought Mitigation Center and partners have developed Condition Monitoring Observer Reports on Drought (CMOR-drought), a short survey that allows the public to enter their observations regarding crops, water supply, fire, etc. We would greatly appreciate your input, and there's now a mobile app to make reporting easier!

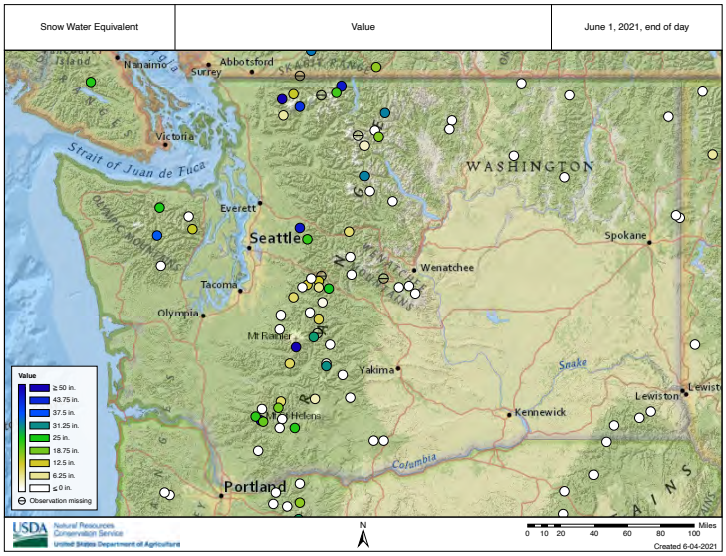


Figure 4: June 1, 2021 values of snow water equivalent in inches (from NRCS).

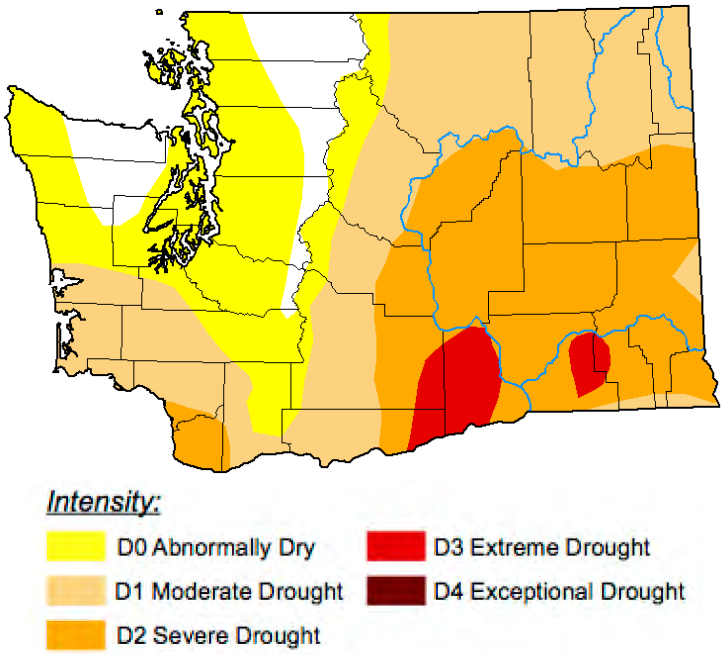


Figure 5: The June 3, 2021 edition of the U.S. Drought Monitor.

The Ideal Climate Index Results Are In!

A message from the State Climatologist

Readers of this newsletter may recall the piece in the January 2021 edition featuring a link to a survey aimed at determining the location in Washington state with the best climate. Our idea was to follow-up on an effort by Jan Null (Certified Consulting Meteorologist, Golden Gate Weather Services) to score U.S. locations based on an "ideal" climate, i.e., the so-called Camelot Climate Index. His scheme favored locations with mild temperatures, little precipitation and relatively few extremes, acknowledging those are not everyone's preferences. We thought it would be interesting to see both what kind of weather that a larger group of people prefer, and how different parts of the state stack up with these preferences in mind. Our survey had 183 entries. We requested that entrants indicate their county of residence, and the vast majority of the responses were from Pierce, King or Snohomish counties. This was no great surprise in that the participation must have swelled substantially by the announcement of the survey on the popular weather blog maintained by Scott Sistek (formerly of KOMO and now with FOX Weather and Q13 FOX), and his audience is presumably largely drawn from the Puget Sound metro area. Only about 10 entries were from residents of counties east of the Cascade crest; more about that later.

Category	Rank	Mean	Median	Standard Deviation
Summer High Temperature (°F)	1	76.6	77	6.0
Days of 90°F	2	4	2	5.7
Winter High (°F)	3	43.6	42	11.9
Yearly Precipitation (in)	4	37.61	34.50	16.98
Winter Low (°F)	5	30.79	32	9.9
Yearly Snowfall (in)	6	20.9	12	24.5
Nights of 20°F	7	7	2	8.0
Cloudy Days	8	170	157	36.8
Days with Precip >0.25"	9	29	25	16.20
Precip Days	10	105	112	50.6
Summer Wind Speed (mph)	11	6.6	7	4.3

Table 2: The ranking of categories by importance and mean, median, and standard deviation of the selections made by the 183 survey participants.

The survey included solicitation of a name for our ideal climate index, and we appreciate all the contributions. Special recognition goes to the tortured acronym represented by the "Calculation Of Feelings From Environmental Elements (COFFEE)" index. Also of note are the two ends of the spectrum reflected by "Sucks most gloomy depressing place on Earth", and "Winters Bliss and Summer Delight". I want what the latter participant has for breakfast. The first runner-up for the name, with 4 entries, is "Evergreen Index". The top honor goes to Goldilocks, which was included in some form in 8 separate entries. The official name will be the Goldilocks Climate Index.

We begin with the results from the survey in terms of the preferred value for each of the 11 categories as summarized in Table 2. Included for each weather element are a measure of the spread in the responses, and

their relative rank of importance. There are a variety of takeaways from these results. First, folks care most about summer mean high temperatures, and prefer them on the moderate side, with a median of 77°F. Similarly, there are also not many hot day fans (pun intended), with the number of 90+ F days ranked 2nd in importance and coming in with a median of only 2. Not many care much about how windy it is in summer, which is no real surprise. But the second and tied for third least important categories were the number of days per year of measurable (>0.01") and significant (>0.25") precipitation, respectively, and that result is unexpected. Certainly there is plenty of grousing by the general public during the stretches of wet weather that can prevail on the west side of the Cascades. On the other hand, perhaps the people that filled out our survey are cut from a different cloth. Consistent with this supposition are the results for the category of number of cloudy days per year, which tied for 3rd least important, and mean (median) values of 170 (157) days, which we suppose are substantially greater than for the populace as a whole. Also interesting are the results for the winter weather categories. There appears to be a fair amount of tolerance for cold temperatures and snow; we note the large spread in the responses in the latter category. This makes sense given the widely divergent feelings about snowstorms. At least in the Puget Sound lowlands, after even minor snowstorms you don't have to go into work, but after major snowstorms you can't get to the liquor store!

Given the survey choices summarized above, we now turn our attention to ranking the overall climate of 15 locations across Washington state; the climate averages for each are shown in Table 3. Our scoring system is like golf rather than bowling; the lower the number the better. Without further ado, we now can state that the location with the best climate – drum roll please – is Sea-Tac Airport (Figure 6). Bellingham ended up second with Olympia and Vancouver not far behind, based on the medians of the choices in each category. We are unsure of what to make of the results. Conceivably it merely reflects that most of the entries were from the Puget Sound lowlands, and folks have gotten accustomed well enough to its weather to consider it ideal. But the coastal locations of Hoquiam and Quillayute ended up with scores in the middle of the pack

Station	Summer Average High Temperature	Winter Average High Temperature	Winter Average Low Temperature	Days Above 90 F	Nights Below 20 F	Annual Precipitation	Precip Days > 0.01"	Precip Days > 0.25	Annual Snowfall	Summer Windspeed (1996-2006)	Number of Cloudy Days (1973-2000)
Bellingham	70.4	46.3	33.7	0	5	34.71	159	45	10.4	7.7	201
Ephrata	86.1	38.4	24.8	40	27	7.58	69	8	18.9	9.5	152
Hoquiam	66.5	48.4	38.0	1	0	68.76	189	86	2.9	8.4	226
Olympia	75.6	46.7	32.6	6	7	50.62	163	65	3.9	5.4	184
Omak	86.3	35.4	22.9	41	40	11.60	80	15	22.3	8.2	66
Pasco Tri Cities	89.4	44.2	27.9	54	20	7.62	76	7	6.1	7.1	143
Pullman	80.4	38.4	26.0	22	23	20.41	113	28	32.7	5.3	161
Quillayute	66.9	48.0	35.4	1	1	101.32	203	107	8.9	4.5	213
SeaTac	74.5	47.4	36.9	4	1	39.34	156	52	6.3	6.9	204
Spokane	80.7	35.8	24.2	21	31	16.45	113	21	45.4	8.8	181
Vancouver	78.9	48.1	34.9	14	2	37.47	160	49	1.5	5.3	222
Walla Walla	86.2	43.1	30.8	39	11	18.74	103	22	6.5	9.1	172
Wenatchee	85.5	38.5	26.6	36	16	9.00	66	11	16.5	9.8	130
Winthrop	83.2	32.9	16.8	26	68	15.19	97	19	59.4	8.6	105
Yakima	86.1	41.3	24.2	40	33	8.01	72	9	20.3	7.3	131

Table 3: The 1991-2020 climate averages for the 15 locations scored. The average period used for the summer wind speed (1996-2006), number of cloudy days (1973-2000), and annual snowfall (either 1981-2010 or 1991-2020, depending on the station) differed from the rest of the categories.

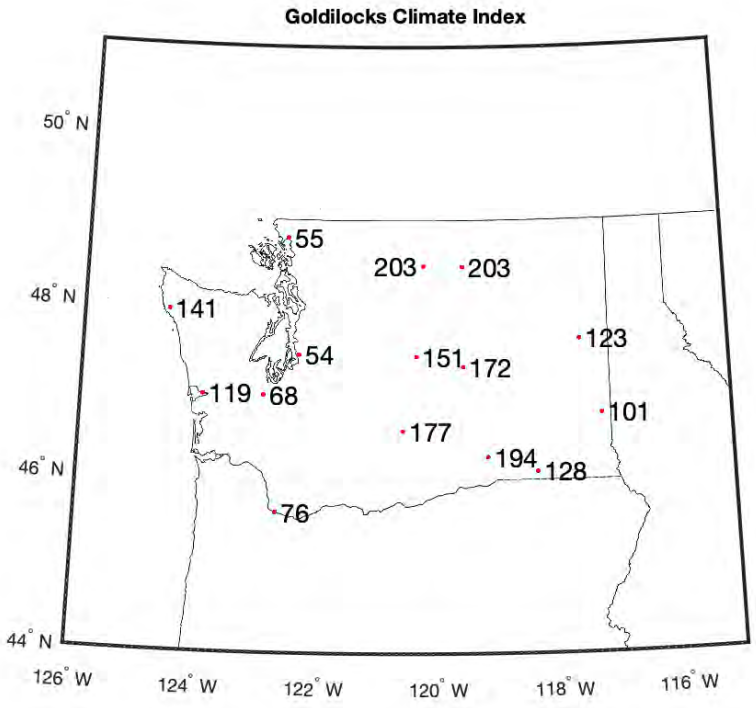


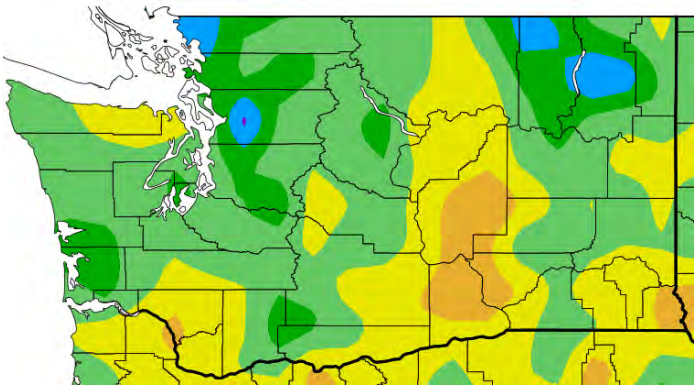
Figure 6: The Goldilocks Climate Index for 15 locations in WA with scores based on the median preferences of 183 survey respondents. The lower the score the more ideal the climate is.

and that is kind of suspicious. One cannot help but wonder if transplanted to the coast, how well most individuals would cope with its frequent deluges. The locations in eastern Washington seemingly have considerably less favorable climates. Because of its cold and snowy winters, Winthrop has the dubious distinction of tying for last place. Due to the outsized influence of this newsletter, the residents of the Methow Valley may be looking at a nosedive in property values. The dry spots of Omak, Yakima and the Tri-Cities did not fare much better. Pullman took top honors on the east side of the state, and hence somebody knew what they were doing in locating WSU. Note that the relative ranking of the climate of the Seattle area and Pullman mirrors their schools' records in the Apple Cup, so there is that. A spot check of individual survey entries from east of the Cascades reveals a taste for warmer summers, colder winters and lesser precipitation relative to those for the entrants as a whole. So again, is this a case of people choosing the weather they experience over the weather they actually favor? We can only speculate, of course. We conclude with a big thank-you to everyone who took the trouble to fill out the survey, and we hope all those that participated enjoy seeing how it all turned out.

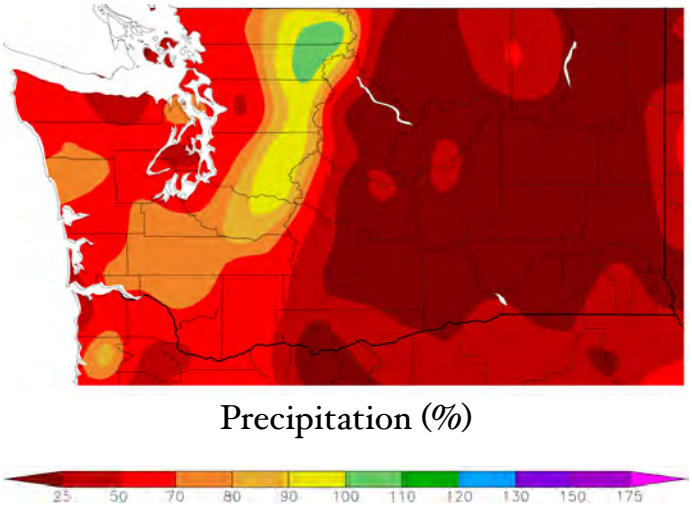
Climate Summary

Average May temperatures were near-normal for a majority of WA state. Note that both the maps from the High Plains Regional Climate Center and Table 4 use the updated 1991-2020 normals as the baseline. The Seattle Weather Forecasting Office (WFO) May temperature exactly matches this new normal, and most of the stations listed in Table 4 fall within 1°F of normal. Parts of the northern Puget Sound, WA coast, and NE WA had below normal May temperatures. For example, Hoquiam was 1.1°F below normal. On the other hand, temperatures were on the warmer side of normal just east of the Cascade Mountains. Pasco and Hanford, for example, were 1.8 and 1.6°F warmer than normal, respectively (Table 4).

Total May precipitation was much below normal for nearly the entire state. It was particularly lacking east of the Cascade Mountains, where totals amounted to less than 25% of normal. Omak and Hanford measured a dismal 1 and 2% of normal with just one-hundredth of an inch for the entire month (Table 4). Precipitation totals and percentages of normal were better in western WA, but still below normal with most of the cities in Table 4 checking in with between 50 and 70% of normal. The western slopes of the northern and central Cascades were the exception, recording near-normal May precipitation.



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



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

Station	Mean Temperature (°F)			Precipitation (inches)		
	Average	Normal	Departure from Normal	Total	Normal	Percent of Normal
Western Washington						
Olympia	54.3	54.5	-0.2	1.81	2.26	80
Seattle WFO	56.8	56.8	0.0	1.37	2.16	63
SeaTac AP	56.9	57.5	-0.6	1.12	1.88	60
Quillayute	51.5	51.7	-0.2	2.40	4.25	56
Hoquiam	52.3	53.4	-1.1	1.52	2.99	51
Bellingham AP	55.1	55.5	-0.4	1.53	2.23	69
Vancouver AP	59.3	58.3	1.0	1.04	2.51	41
Eastern Washington						
Spokane AP	56.5	56.0	0.5	0.20	1.55	13
Wenatchee	60.2	60.1	0.1	0.08	0.77	10
Omak	59.4	58.8	0.6	0.01	1.19	1
Pullman AP	53.9	54.9	-0.6	0.35	1.41	25
Ephrata	61.2	60.4	0.8	0.22	0.75	29
Pasco AP	63.2	61.4	1.8	0.19	0.71	27
Hanford	64.5	62.9	1.6	0.01	0.61	2

Table 4: May 2021 climate summaries for locations around Washington with a climate normal baseline of 1991-2020.

Climate Outlook

According to the Climate Prediction Center (CPC), the La Niña has dissipated and neutral ENSO conditions are now present in the equatorial Pacific Ocean. Neutral conditions are expected to persist through the summer. ENSO forecast models indicate higher chances of La Niña (53%) developing by October-November-December compared to neutral (39%). El Niño conditions during the winter of 2021-22 seem unlikely (8%) currently. We will continue to monitor the ENSO forecasts through the summer.

The CPC outlook for June (Figure 13) has increased chances of above normal temperatures for most of WA State. The Olympic Peninsula and southwest WA have equal chances of below, equal to, or above normal temperatures for June. For precipitation, there are increased chances of below normal precipitation statewide.

The three-month outlook for summer (June-July-August; JJA) shown in Figure 14 has increased chances of above normal temperatures statewide. The chances are higher for the eastern two-thirds of the state with the probability exceeding 50%. Summer precipitation is expected to be below normal statewide, with chances exceeding 40% on the three-tier scale.

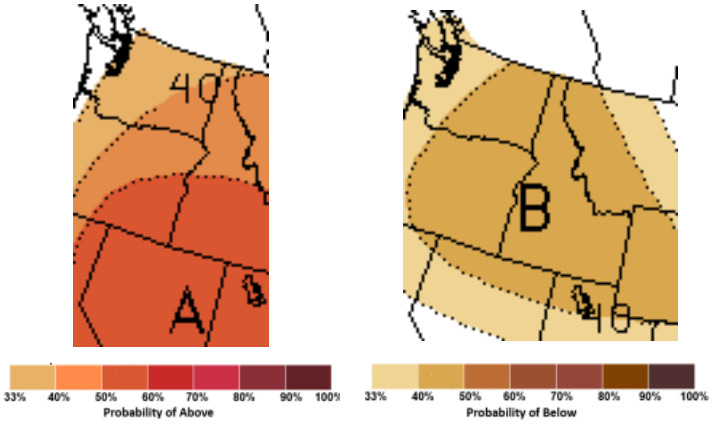


Figure 13: June outlook for temperature (left) and precipitation (right).

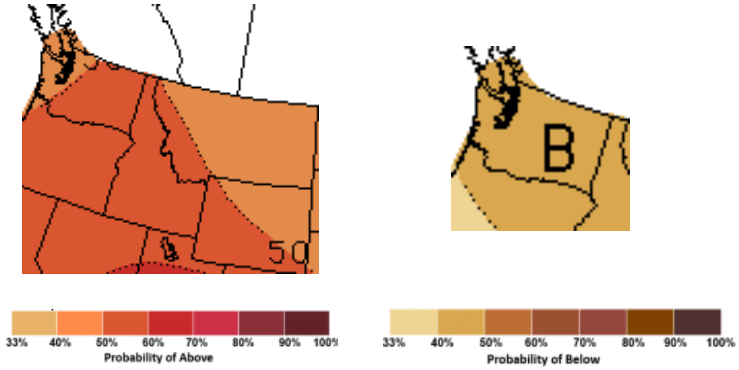


Figure 14: June-July-August outlook for temperature (left) and precipitation (right) (Climate Prediction Center).