



# Office of the Washington State Climatologist

## May 2018 Report and Outlook

May 4, 2018

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

### April Event Summary

Mean April temperatures were near-normal throughout WA State. Total April precipitation, on the other hand, was much above normal and is the more interesting climatological story for the month. April 2018 ranked as the 2nd or 3rd wettest April on record for several stations in western WA (Table 1). While the amount of precipitation relative to normal was higher in parts of eastern WA (about 2.5 times the normal amount; see “Climate Summary” section), the rankings were not as high there. In other words, there have been much wetter Aprils. Two examples - Mazama and Ellensburg - are listed in Table 1 where the 2018 precipitation ranked as the 6th wettest April. Many other stations (e.g., Spokane, Walla Walla, Yakima, etc.) did not break into the top ten.

The timing of April precipitation was also notable since the majority fell during the first half of the month. Figure 1 illustrates this for SeaTac Airport: the first half of the month was wet and cool while the second half was much drier with a substantial warm period. Of the wet days in early April, several of them had quite heavy precipitation. Bellingham set a daily maximum precipitation record on the 5th with 0.78” while many more stations set maximum daily precipitation records

### In this Issue

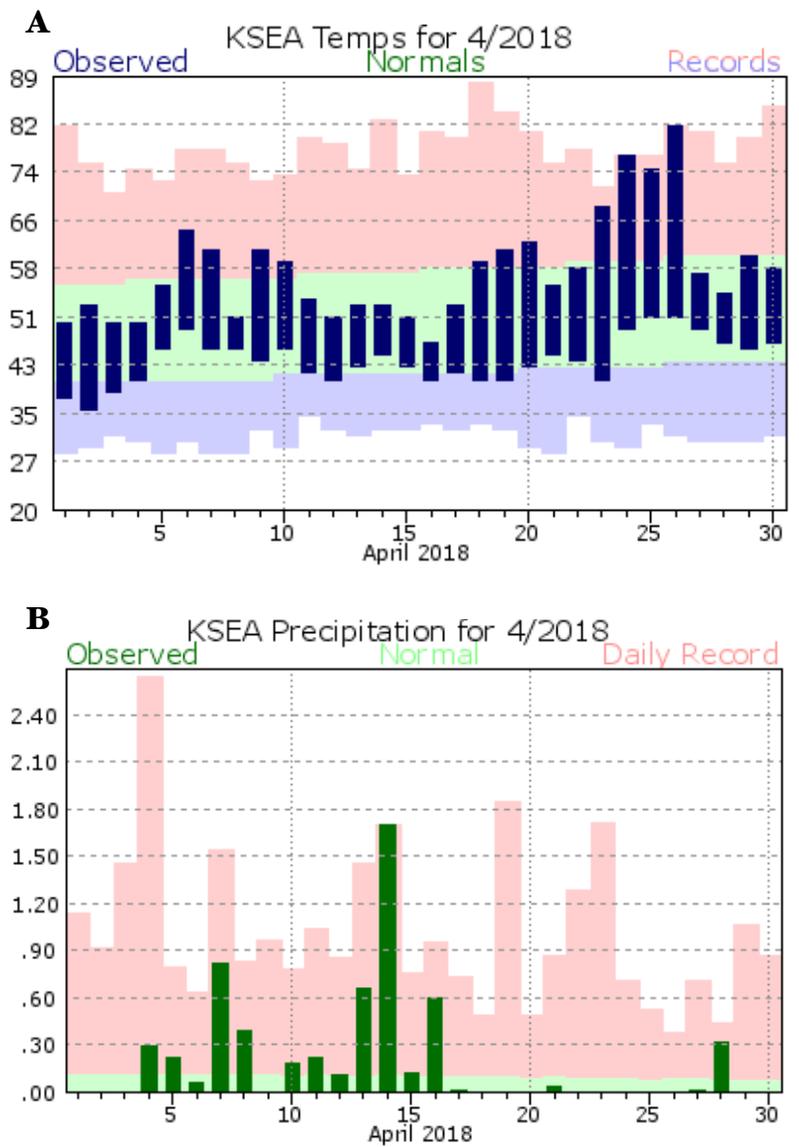
April Event Summary.....	1
Snowpack Update.....	3
CoCoRaHS Note.....	3
Winter 2017-18 Review.....	4
Climate Summary.....	7
Climate Outlook.....	9

Station	April Precip (in)	Rank	Record (Precip; Year)	Records Began
<b>SeaTac</b>	5.69”	3	6.53”; 1991	1945
<b>Olympia</b>	7.24	3	7.80”; 1991	1941
<b>Hoquiam</b>	10.14	2	10.27”; 1996	1953
<b>Cushman Powerhouse #2</b>	11.63	2	13.42”; 1996	1973
<b>Mazama</b>	2.17	6	3.17”; 2003	1950
<b>Ellensburg Bowers Field</b>	1.07	6	1.77”; 2017	1940

**Table 1: Total April precipitation, the ranking (wettest to driest) in the historical record, the record April precipitation amount and the year, and the year that records began for selected WA stations.**

on the 7th as a strong Pacific cyclone moved into our region: Wenatchee (0.45" - tie), Walla Walla (0.50"), Olympia (0.92"), Hoquiam (1.08"), and Vancouver (1.23"), for example. Strong coastal winds were associated with this storm as well. Moderate winds and heavy precipitation (along with snow in the mountains) continued through the following week as more low pressure systems impacted WA State. More maximum precipitation records were set on the 14th; for example, Hoquiam (1.61"), SeaTac Airport (1.70"), and Olympia (2.03") all set daily records.

Despite the wet start to the month, high pressure settled over WA State from the 23rd to the 26th, bringing unseasonably warm weather and an early taste of summer. Record high maximum daily temperatures were set at Hoquiam (81°F), Olympia (79°F), SeaTac Airport (77°F), and Quillayute (76°F) on the 24th, for example, and Bellingham (75°F) and SeaTac Airport (82°F) set or tied daily record highs on the 26th. Lest we forgot that it wasn't mid-July, the month ended on a wet note with a daily maximum precipitation record set at Wenatchee (0.27") on the 28th for good measure.

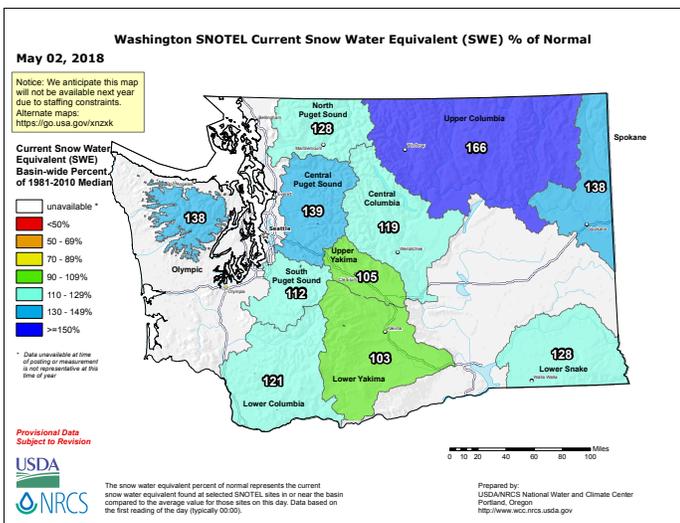


**Figure 1: A). Daily April 2018 temperatures (dark blue bars) for SeaTac Airport with the normal range of temperatures (green envelope) and historical records (red and blue envelopes). B). Daily April 2018 precipitation (dark green bars) with the historical daily records (red bars) for SeaTac Airport.**

# Snowpack Update

The wet start to April actually helped build snowpack in many locations around the state. The basin average snow water equivalent (SWE) percent of normal as of May 2 is shown in Figure 2. Most of the state has much above normal SWE, with most basins ranging between 112 and 166% of normal. The Upper and Lower Yakima basins are the exception, with near-normal SWE at 105 and 103% of normal, respectively. Even with the current high SWE amounts relative to normal, melting appears to have begun during April. Figure 3 shows the SWE trace for Stevens Pass (dark blue) as an example. The SWE began to melt during the warm spell at the end of April as signified by the downturn in the trace. This is a week or two later than usual for this particular station and the spring weather will determine how fast the snow continues to melt.

The U.S. Drought Monitor is not showing any areas of dryness at this point, and the water supply forecast from the NWS Northwest River Forecast Center (featured below in the “Winter Review” piece) shows a promising forecast.



**Figure 2: Snowpack (in terms of snow water equivalent) percent of normal for WA as of 2 May 2018 (NRCS).**

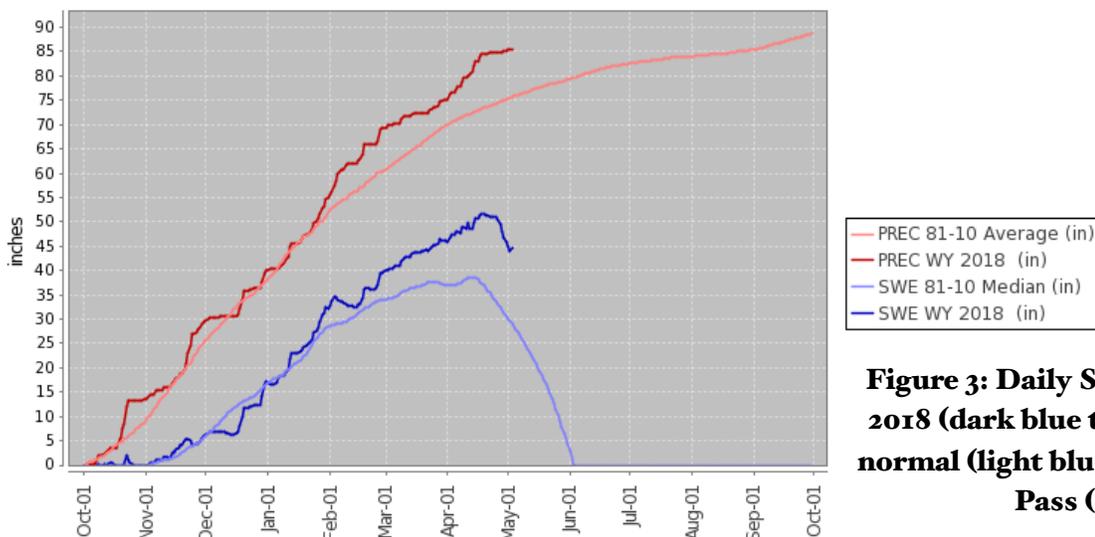


photo by Henry Reges, CoCoRaHS

## Community, Collaborative Rain, Hail, and Snow (CoCoRaHS) Network

Thank you, CoCoRaHS observers, for continuing to record your precipitation observations! As a reminder, there are wonderful training videos available on the [CoCoRaHS YouTube channel](#).

These are short and informative, and can help describe CoCoRaHS to those that may be interested as well as help motivate yourself to get out and set up your rain gauge if you haven't already. As always, new observers can sign up at [www.cocorahs.org](http://www.cocorahs.org).



**Figure 3: Daily SWE for water year 2018 (dark blue trace) compared to normal (light blue trace) for Stevens Pass (NRCS).**

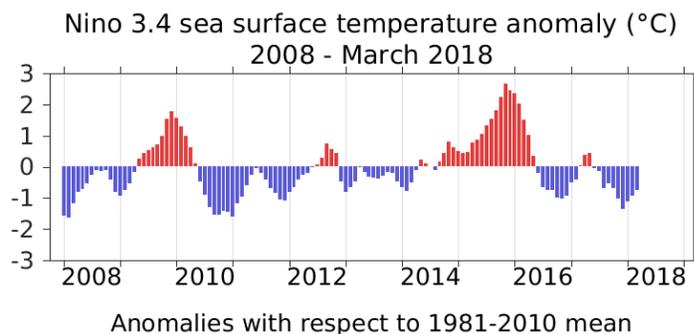
## A Review of Winter 2017-18

### A message from the State Climatologist

Seasonal weather forecasts from the Climate Prediction Center made in fall 2017 for the winter of 2017-18 were generally indicating cool and wet conditions, in line with the expected development of La Niña. Did that actually occur in WA State? Here we review the winter of 2017-18, defined as the 6 months from October through March.

Figure 4 shows the sea surface temperature (SST) anomalies from January 2008 through March 2018 in the Niño3.4 region of the equatorial Pacific Ocean. SST anomalies exceeded  $-1^{\circ}\text{C}$  for the winter, classifying it as a La Niña winter. It was a stronger La Niña than the winter of 2016-17; it turns out that it is fairly common to have two back-to-back La Niña winters. La Niña is currently weakening in terms of both its atmospheric and oceanic signatures, and near-neutral conditions are expected for this spring and summer. At the time of this writing, there is about an equal chance (40-45% each) of either neutral conditions or El Niño conditions for Fall 2018. There will be more

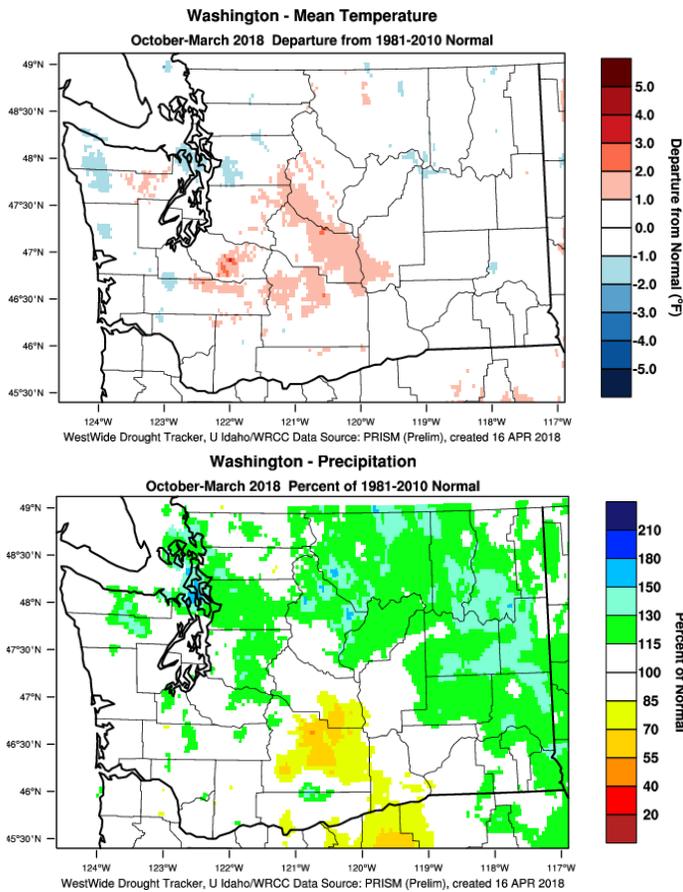
confidence in the ENSO forecasts later this summer.



**Figure 4: SST anomalies from January 2008 through March 2018 in the Niño3.4 region of the tropical Pacific (figure by Todd Mitchell - JISAO).**

Average statewide October-March temperatures were exactly normal ( $36.7^{\circ}\text{F}$ ;  $0.0^{\circ}\text{F}$  anomaly from 1981-2010), and most regions were near-normal as well. Figure 5a shows a few areas in central WA with warmer than normal temperatures, but otherwise Oct-Mar temperatures were within  $1^{\circ}\text{F}$  of normal. For precipitation, most of the state was

wetter than normal (Figure 5b) and the average over the state was 3.11” wetter than the 1981-2010 normal. The exception is the majority of Yakima county, where winter precipitation was below normal.



**Figure 5: October-March 2017-18 temperature anomalies (top) and precipitation percent of normal (bottom) compared to the 1981-2010 normal (WWDT).**

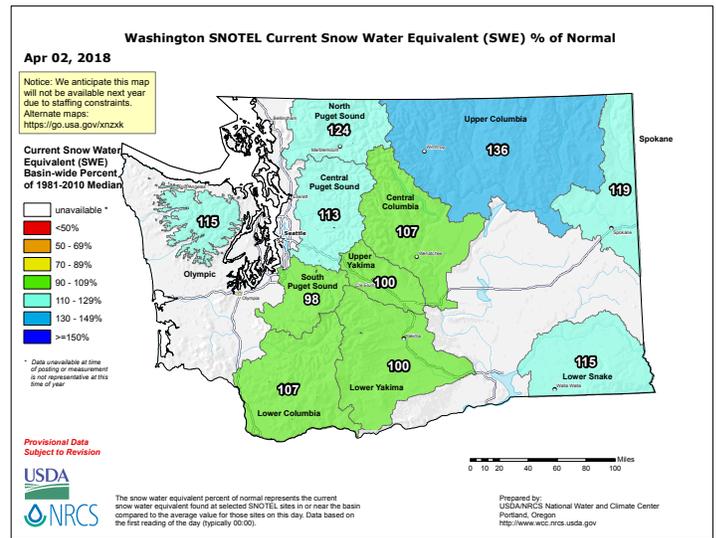
The average winter conditions provide one perspective on the past winter, but it is also worthwhile to consider the progression of the weather over the course of the season, and the notable weather events. October was colder and wetter than normal, with the interesting distinction that the above normal precipitation was largely due to a few very wet days. Regardless, the precipitation helped alleviate some of the areas of dryness that were depicted on the US

Drought Monitor resulting from the warm and dry summer of 2017. Wetter than normal conditions continued in November, and any areas of dryness depicted on the Drought Monitor were gone by mid-month. Overall, November had near-normal temperatures, but consisted of a very cold start (with lowland snow to boot) and an anomalously warm ending. For December, an area of high pressure set up over the region causing an inversion that brought cold temperatures to the lowlands and warmer than normal temperatures at higher elevations. The pattern was so persistent that that temperature pattern was evident on the monthly scale. December was also drier than normal due to the blocking ridge suppressing the usual parade of landfalling storms. The inversion moved out of our region in time for a return to more active winter weather, including snow on Christmas Day for nearly the entire state – a rare occurrence, especially for western WA. January was warmer and wetter than normal for a majority of the state while February’s precipitation was variable and temperatures colder than normal. There were also several occurrences of lowland snow during February, and in many parts of the state the coldest temperatures of the season occurred in late February. The colder than normal conditions persisted through March, which was also drier than normal except for north central WA.

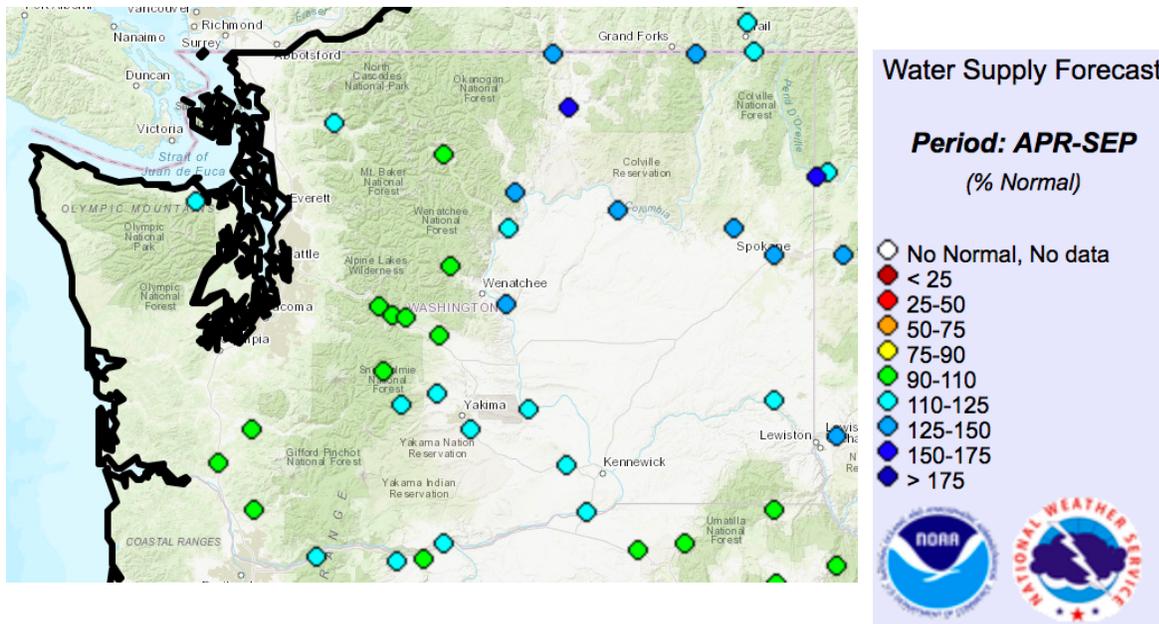
The winter conditions were consistently favorable for high elevation snow as well (aside from the stagnant air conditions in December), and the April 1 snow water equivalent (SWE) was normal to above normal throughout the state (Figure 6). Mountain snows can cause closures of the state’s highways crossing the Cascades due to avalanche risk and control, but fortunately, these types of closures were minimal during the winter of

2017-18. The healthy snowpack has aided in a favorable April-September water supply forecast from the Northwest River Forecast Center. Figure 7 shows the forecast made on April 27 indicating normal to above normal streamflow throughout WA state.

In conclusion, overall winter WA conditions included near-normal temperatures and above normal precipitation. La Niña in the tropical Pacific Ocean is often accompanied by a relatively wet and cool winter in WA state, but the below normal temperatures did not come into fruition. Importantly, a healthy snowpack indicates there should be plenty of water for the upcoming summer.



**Figure 6: Snowpack (in terms of snow water equivalent) percent of normal for WA as of April 2, 2018 (NRCS).**

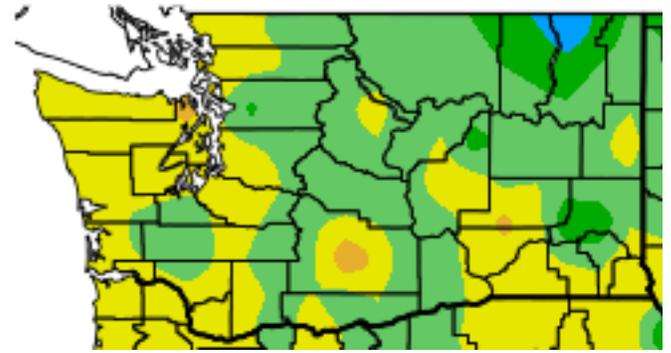


**Figure 7: April through September 2018 water supply forecast for WA as of April 27, 2018 from the NWS Northwest River Forecast Center.**

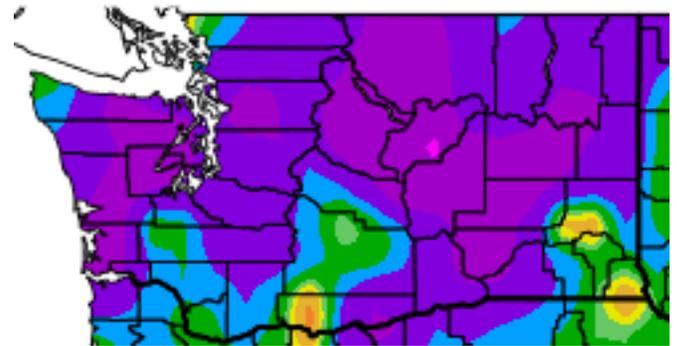
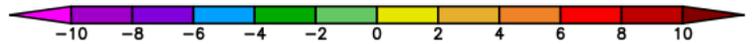
## Climate Summary

Mean April temperatures were near-normal throughout WA State, with temperatures mostly within 1°F of normal. There are a few exceptions to this, however, with parts of northeastern WA slightly colder than normal for the month. Hoquiam is an exception in the other direction, with April temperatures 1.7°F above normal. In general, a cool first half of the month was balanced by a warm second half, resulting in typical values for the monthly means.

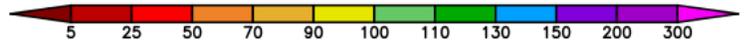
Total April precipitation was above normal statewide, with some locations receiving more than double their normal amount. Ephrata and Wenatchee had nearly three times their normal precipitation, with 285 and 287% of normal, respectively (Table 2). In terms of actual amount of precipitation, the Peninsula locations of Quillayute and Hoquiam have the most of the locations listed in Table 2 with over 10" of April precipitation. Those totals amount to 139 and 199% of normal, for Quillayute and Hoquiam, respectively.



Temperature (°F)



Precipitation (%)



**April temperature (°F) departure from normal (top) and precipitation percent of normal (bottom). (High Plains Regional Climate Center; relative to the 1981-2010 normal).**

	Mean Temperature (°F)			Precipitation (inches)		
	Average	Normal	Departure from Normal	Total	Normal	% of Normal
Western Washington						
Olympia	48.7	48.3	0.4	7.24	3.54	205
Seattle WFO	50.6	50.5	0.1	5.75	2.77	208
SeaTac AP	51.3	50.3	1.0	5.69	2.71	210
Quillayute	47.5	46.7	0.8	10.95	7.85	139
Hoquiam	50.4	48.7	1.7	10.14	5.10	199
Bellingham AP	49.3	48.4	0.9	3.21	2.69	119
Vancouver AP	52.6	52.1	0.5	3.32	3.01	110
Eastern Washington						
Spokane AP	46.8	47.0	-0.2	2.03	1.28	159
Wenatchee	50.3	51.6	-1.3	1.32	0.46	287
Omak	49.4	50.0	-0.6	2.19	1.04	211
Pullman AP	46.6	46.1	0.5	2.38	1.56	153
Ephrata	51.4	50.4	1.0	1.37	0.48	285
Pasco AP	53.6	52.9	0.7	1.35	0.65	208
Hanford	53.8	53.5	0.3	1.25	0.55	227

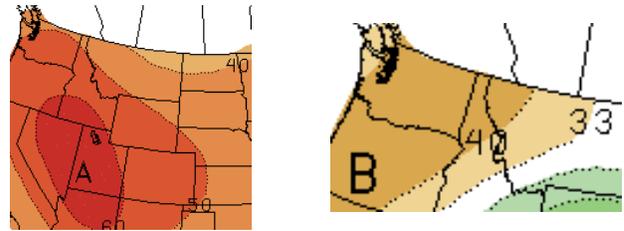
**Table 2: April 2018 climate summaries for locations around Washington with a climate normal baseline of 1981-2010. Note that the Vancouver Pearson Airport and Seattle WFO 1981-2010 normals involved using surrounding stations in estimating the normal, as records for these station began in 1998 and 1986, respectively.**

# Climate Outlook

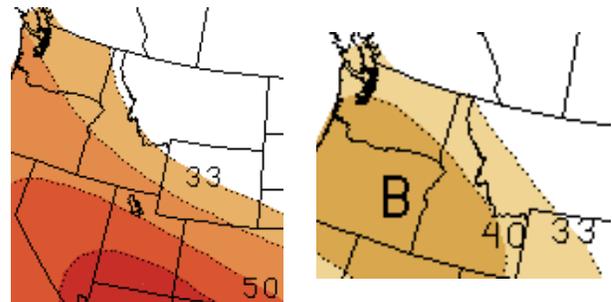
La Niña conditions have continued to weaken over the last month. While the “La Niña Advisory” is still in effect from the Climate Prediction Center (CPC), ENSO-neutral conditions are expected to develop over the next month and persist through the summer. Forecasts of the ENSO state for next fall will become more reliable in the coming months. As of now, there are about equal chances of either neutral conditions persisting or of El Niño conditions developing for Fall 2018.

The May temperature outlook from the CPC has higher chances of above normal temperatures for the entire state. The May precipitation outlook is consistent throughout the whole state as well, with increased chances of below normal precipitation for the month.

The three-month May through July (MJJ) CPC seasonal outlook is similar to the outlook for May. There are increased chances of above normal temperature and below normal precipitation for the period, though the chances are less than those for the single month outlook.



**May outlook for temperature (left) and precipitation (right)**



**May-June-July outlook for temperature (left) and precipitation (right)**

**([Climate Prediction Center](#))**