



Office of the Washington State Climatologist

March 4, 2010

February Highlights

February temperatures were warmer than normal for the entire state, but, unlike January, the average temperatures were not record-breaking. Precipitation was below normal for a majority of the state, and a period of sunny and dry days (February 17-22 for most of the state) contributed to that.

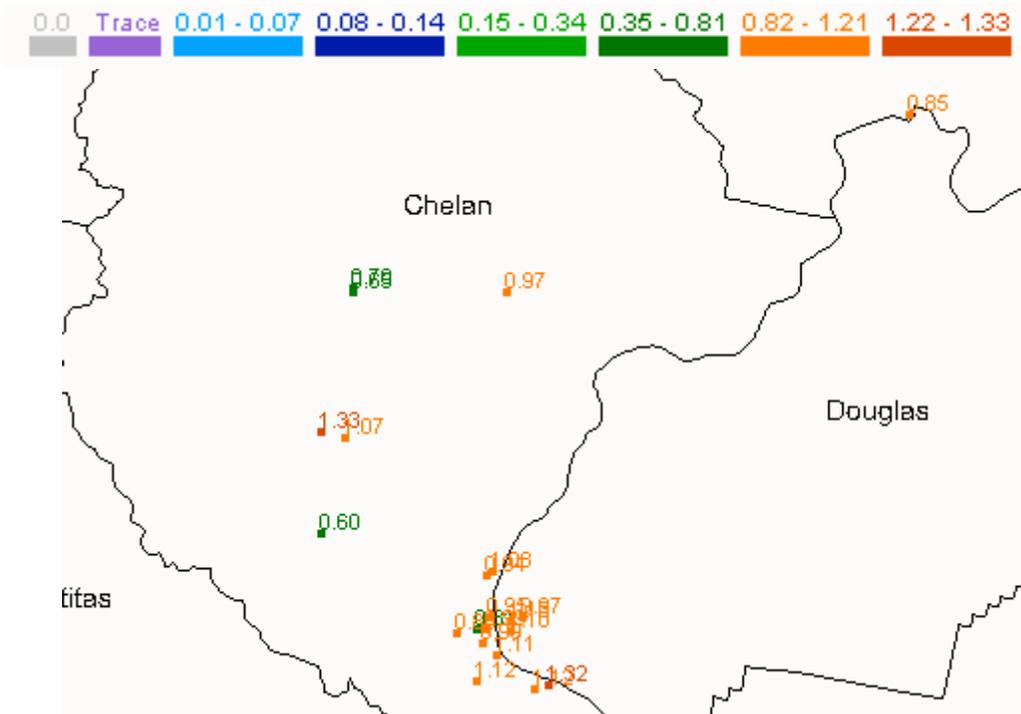
There was one particular rain event of interest during February, however. The Wenatchee ASOS recorded 1.24" of precipitation on February 26 - more rain in one day than expected for the entire month! This rain event ranks as the wettest February day since records began in 1959. It is also the 8th wettest day on record when considering all 12 months of the year (wettest was 1.51" on August 18, 1975). Other cities nearby broke daily precipitation records (i.e. Yakima, Ellensburg, etc.) on Feb 26 as

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well, resulting from a low pressure system with strong southerly winds. Figure 1 shows more measurements from our reliable CoCoRaHS observers on the morning of February 27.

Figure 1: CoCoRaHS observations taken at 7 am on February 27, 2010 for the previous 24 hours near Wenatchee, WA.



Assistant State Climatologist works with the Pacific Science Center

Karin Bumbaco, our Assistant State Climatologist, debuted her hands-on activities at Seattle's Pacific Science Center (<http://www.pacsci.org/>) in February. Karin had participated in a series of 3 workshops to help develop her research into activities that could be facilitated on the Pacific Science Center floor. She joined forces with Guillaume Mauger, of the UW's Climate Impacts Group, to develop an activity that gets Pacific Science Center guests to think about the best place in WA state to put rain gauges. The guests have a chance to place rain gauges (modeled as test tubes!) on a map of WA state while guests discuss potential strategies for designing a network with Karin and Guillaume. They then can choose a winter or summer plexi-glass overlay that has holes drilled in sizes that match the amount of precipitation received. Guests make it rain over the state with a watering can filled with water to test their network. It was a huge hit!

Karin and Guillaume also each developed individual activities. Karin designed an experiment using black beans to represent year-to-year precipitation totals that ultimately explains the difference between weather and climate, and Guillaume used wooden puzzle pieces to represent the different components that go into climate models that then leads to a discussion of the forecasted climate change impacts for WA state.

The Pacific Science Center will continue to have the Scientist Spotlight event the first Saturday of every month, where local scientists are on the floor explaining their research. Karin and Guillaume will participate in these intermittently throughout the year.



CoCoRaHS March Madness

It's time for our friendly, nationwide CoCoRaHS competition again. During the month of March, each state will be competing to gain the most new CoCoRaHS volunteers. Now is the time to mention CoCoRaHS again to your friends and family so that our CoCoRaHS program can gain the respect and envy of the nation! To sign up, visit www.cocorahs.org. If you're living in an area of the state that lacks CoCoRaHS volunteers, such as most of eastern WA, you may qualify for a free rain gauge. To find out, please email wash.cocorahs@gmail.com.

Snowpack Report

A combination of the warm temperatures and the low mountain precipitation in January and February has left most of snowpack in WA state below normal (Figure 2). The Cascades, Blue Mountains, and parts of northeastern WA are doing particularly poorly, and only have between 49 and 66% of normal. The basins on the eastern side of the Cascades are in slightly better shape, but are still below normal, and range between 77 and 82% of normal. The Olympics are the exception, and have normal snowpack. This is likely because of the persistent south and southwesterly flow that has been present this winter. Not only has it brought moisture to the Olympic Mountains, but east of the Cascades has had moisture where it would normally be in the rainshadow of the Cascades during the typical westerly flow. The warm temperatures are also playing a role in the low snowpack, especially in the Upper Columbia and Lower Yakima basins. The precipitation has actually been above normal in those areas since January 1, but the warm temperature anomalies have been larger and are likely the cause of the low snowpack.

Lowland snow had also been very low this year around the state. In contrast to the record-breaking snowfall season in Spokane last winter, this winter's snowfall has been arguably the lowest since records began there. According to the Spokane National Weather Service office, as of February 25, Spokane has only measured 13.7" of snow for the 2009/2010 winter. This ranks as the third least snowy winter since records began in 1892. The two that have had less snow (9.5" in 1933/34 and 11.1" in 1904/05) were not measured at Spokane International Airport so it's difficult to compare. This year is so far the least snowiest since records started being kept at Spokane International Airport in 1947.

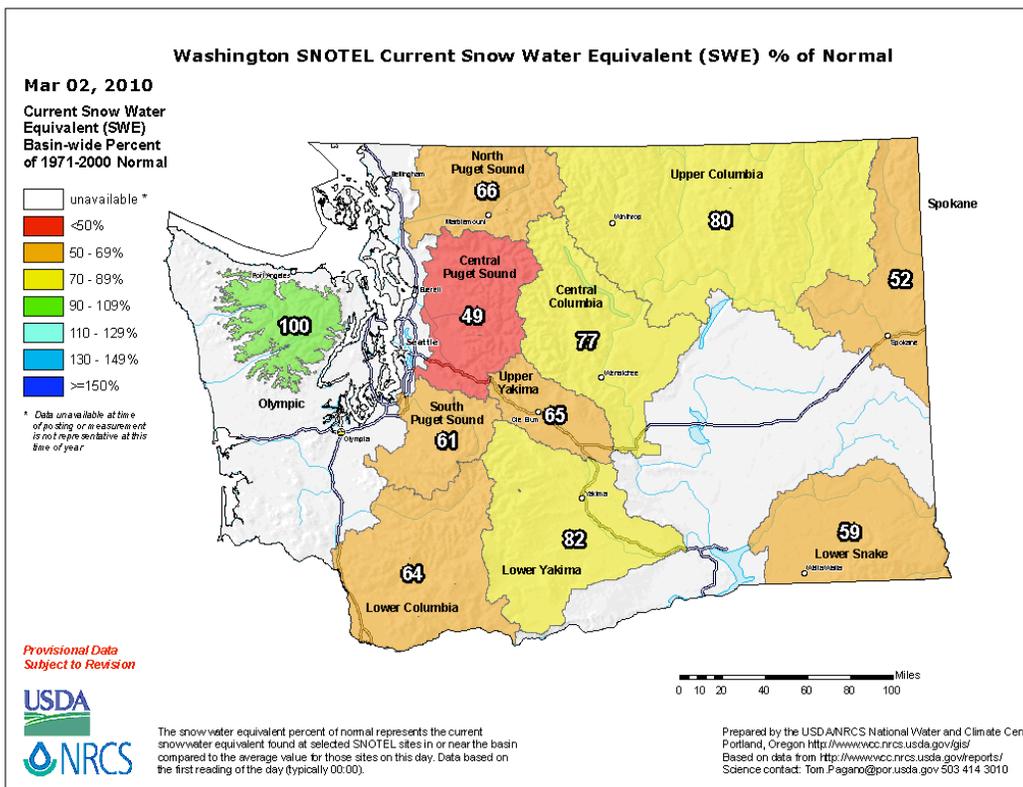
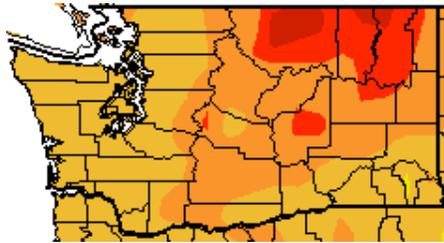


Figure 2: Snowpack (in terms of snow water equivalent) percent of normal for Washington as of March 2, 2010. Image is from the National Resources Conservation Service.

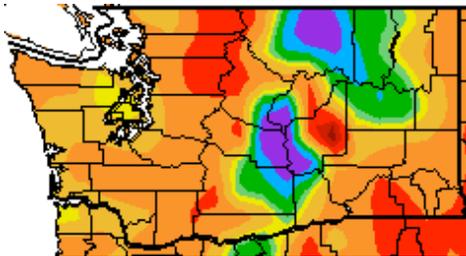
Climate Summary

Consistent with the warmer than normal temperatures experienced in January, average temperatures in February were also above normal for the entire state. The top map below from the High Plains Regional Climate Center shows that most of the state had an average February temperature that was between 2 and 4°F above normal. Olympia, Seattle, Quillayute, and Pasco had average temperatures that fell into this bracket (Table 1). Some stations in eastern WA had temperatures that were between 6 and 8°F above normal, with Omak's average temperature 7.6°F above normal (Table 1).

Most of WA state had below normal precipitation for February (bottom map), with a majority of western WA only receiving between 50 and 90% of normal precipitation. Quillayute only received 58% of their normal February precipitation. The northern Cascades were especially dry, with February precipitation only between 25 and 50% of normal. Southeastern WA and the Spokane area through the northeastern border of the state also received below normal precipitation for the month. There were some wet spots in the state, with the Yakima area, Wenatchee, and Omak receiving between 110 and 200% of normal precipitation for February.



Temperature (°F)



Precipitation (%)



(February temperature (°F) departure from normal (top) and February precipitation % of normal (bottom). Source: High Plains Regional Climate Center (<http://www.hprcc.unl.edu>).

	Mean Temperature (°F)			Precipitation (inches)			Snow (inches)		
	Avg	Norm	Departure from Normal	Total	Norm	% of Normal	Total	Norm	% of Normal
Western Washington									
Olympia	43.2	40.5	2.7	4.53	6.17	73	M	3.9	M
Seattle	46.6	43.0	3.6	2.79	3.67	76	0.0	M	M
Sea-Tac	46.8	43.3	3.5	3.52	4.18	84	0.0	1.3	0
Quillayute	45.7	42.2	3.5	7.18	12.35	58	M	3.0	M
Vancouver	47.5	42.0	5.5	3.77	4.86	78	M	M	M
Eastern Washington									
Spokane	37.9	32.5	5.4	1.28	1.51	85	0.9	8.0	11
Wenatchee	38.9	34.2	4.7	1.31*	0.86	152	M	4.7	M
Omak	38.0	30.4	7.6	1.84	1.24	148	M	2.8	M
Pasco	41.6	39.1	2.5	0.50	0.79	63	0.0	0.4	0
Yakima	40.8	35.1	5.7	1.01	0.80	126	0.0	3.3	0

Table 1 - February Climate Summaries from around Washington from NWS (climate normal baseline is 1971-2000). M denotes missing data. *Wenatchee February precipitation was at least 1.31". That is the total precipitation for 13 days in February as there are 15 days of missing data.

Climate Outlook

The El Niño conditions have persisted in the tropical Pacific Ocean as the most recent 4-week equatorial sea-surface temperature (SST) anomalies are more than 1°C. The Climate Prediction Center (<http://www.cpc.noaa.gov/products/precip/CWlink/MJO/enso.shtml>), forecasts that the El Niño will last through spring. This situation provides some skill in predicting the rest of the winter season in the Pacific Northwest and much of North America. On average, winters during El Niño years are warmer and drier than typical conditions for WA state. This is not always the case, however, as some El Niño winters have been near normal, or cooler and wetter than average. Consequently, the seasonal prediction should be interpreted as a tilting of the odds towards a warm, dry winter. Remember that when the odds are even, or there is lack of guidance, there is still a 33% chance each for above average,

normal, or below average conditions. The seasonal prediction has thus far come to fruition as January and February temperatures were warmer than normal for the entire state, and it has been dry in general. December was also generally dry, but was colder than normal for the entire state.

The spring (March-April-May; MAM) outlook reflects the continued presence of El Niño conditions and has the chances of above normal temperatures exceeding 50% for the entire state. There is at least a 40% chance of below normal spring precipitation for the western third of the state. The central portion of the state has at least a 33% chance of below normal precipitation for MAM. Eastern WA has equal chances of below, equal to, or above normal spring precipitation.

The outlook for April-May-June (AMJ) calls for at least a 40% chance of above normal temperatures for the entire state. The precipitation outlook reflects the weakening relationship between El Niño conditions and associated impacts during spring and has equal chances of below, equal to, or above normal precipitation for AMJ.



(March-April-May outlook for temperature (left) and precipitation (right) from the CPC).



(April-May-June outlook for temperature (left) and precipitation (right) from the CPC).