Office of the Washington State Climatologist

April 2, 2009

Cold Winter

In this Issue

Meteorological winter (December through February) was cold in Washington this year, and March continued the cold spell. According to the National Climatic Data Center (NCDC), Washington's DJF average temperature was 31.5°F which is below the 1895-2008 average of 32.6°F, ranking as the 32nd coldest DJF in the record. Figure 1 shows the graph from NCDC of Washington DJF average temperatures from 1895 through 2009. Recent winters, though cooler than most in the last 20 years, are close to the period-of-record average, and not near the coldest winters (eg. 1949, 1929, 1950, and 1979). The past three cooler winters relative to the past 20 years may be attributed to the string of La Niña events, but it is important to remember that we cannot deduce a global warming influence or lack thereof from this record alone.

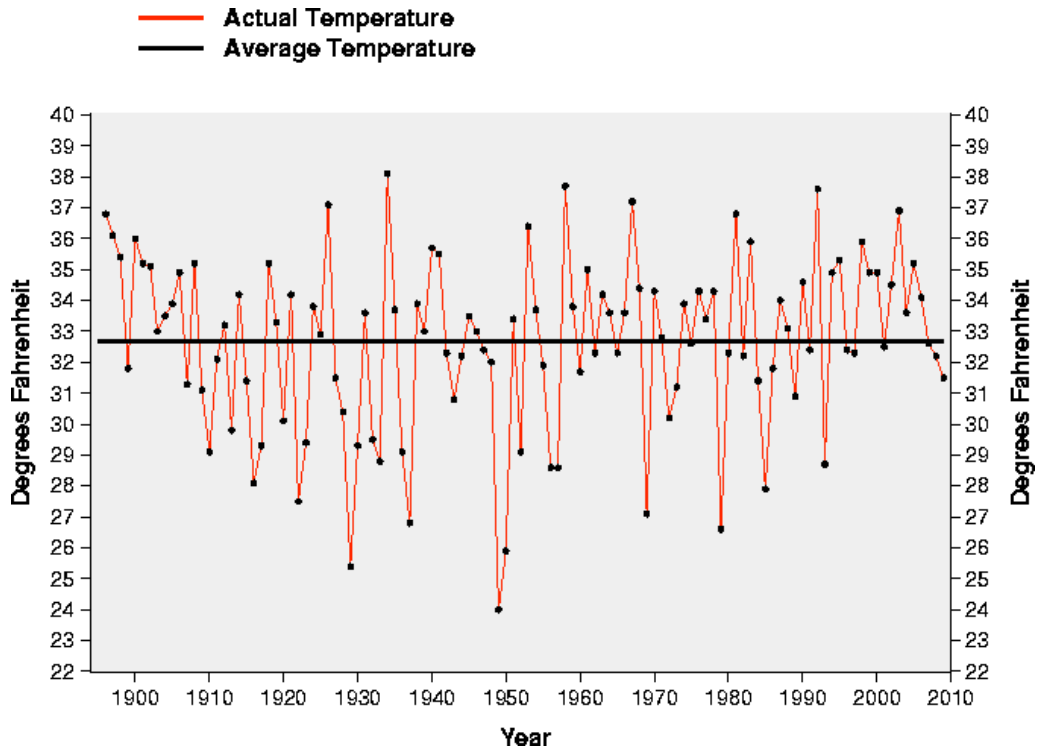


Figure 1: Average Washington December-January-February temperature from 1895-2009. The entire period of record average is denoted by the thick, black line.

The cool weather continued into March, making March the 7th coldest March at SeaTac Airport (41.7°F) since the records began in 1945, the 3rd coldest March at Quillayute (40.3°F) since 1966, the 3rd coldest at Hoquiam (41.6°F) since 1953, and the 3rd coldest at Olympia (40.2°F) since 1948. Cooler temperatures led to precipitation that fell as snow, with Spokane Airport receiving 9.5 inches of snow this month (March normal is 3.7 inches) and SeaTac Airport receiving 3.0 inches (March normal is 0.6 inches). Significant snow fell in the Cascades as well, drastically improving the snowpack. The first bout of snow came in on March 5 as a strong front moved through the state: a situation that was all too common in March. Even the Puget Sound lowlands received snow accumulations from March 7 through the 9, illustrated nicely the CoCoRaHS map in Figure 2. Daily record low high temperatures and daily record low temperatures were recorded in eastern WA on March 11, and many of them were the lowest temperatures recorded that late in the winter season. The remainder of the month was busy weather-wise with modest rainfall around the state, more snow in the Olympics and the Cascades, and even some more lowland snow.

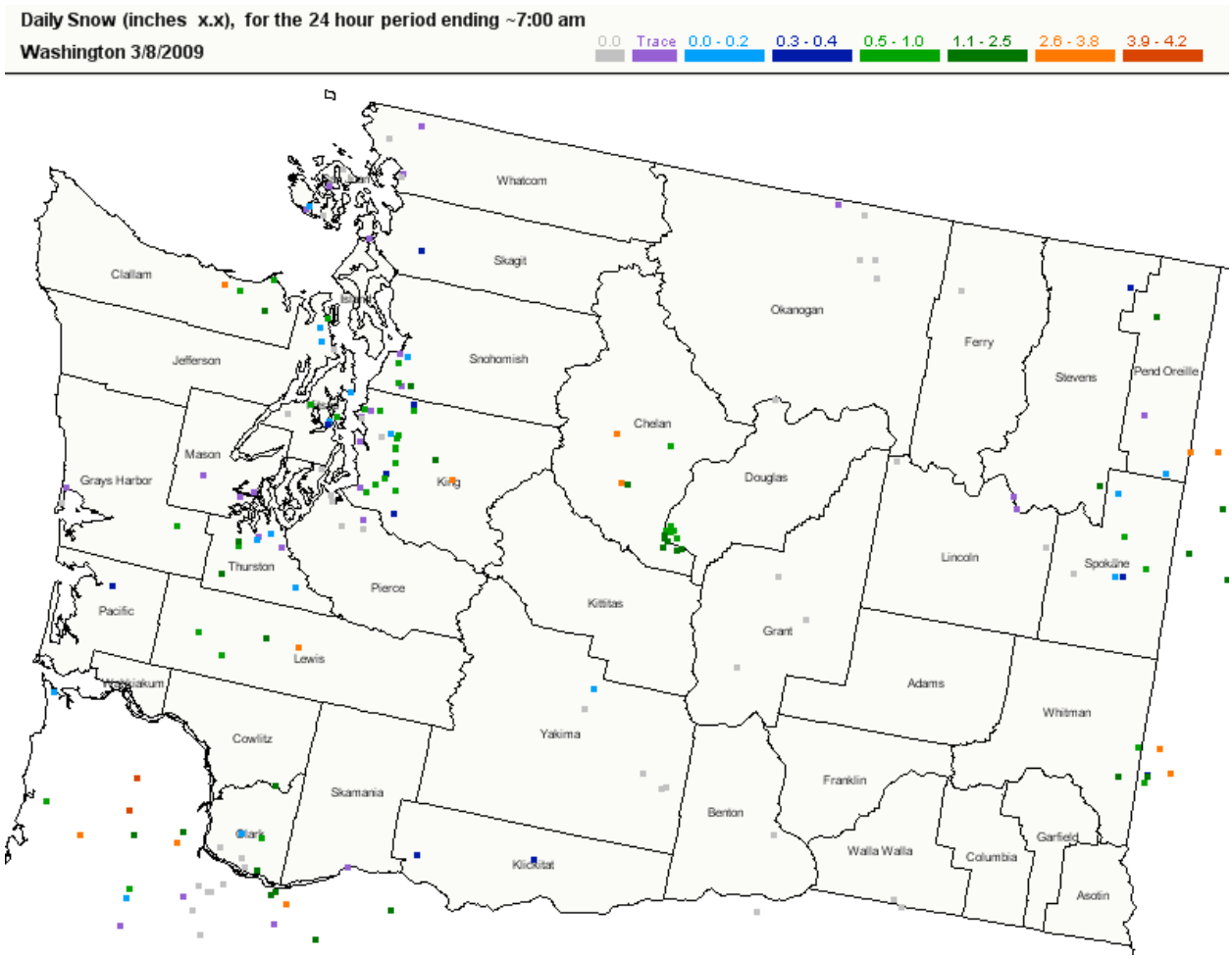


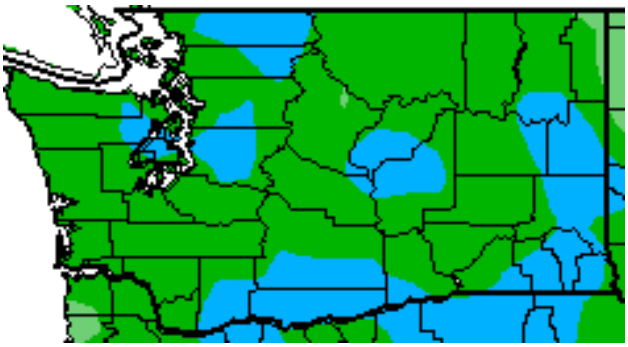
Figure 2: New snow on the morning of March 8, 2009 from the CoCoRaHS network. Snowfall ranged from a trace to 4.2 inches around the entire state.

As of March 29, the 2008-09 snow season (defined unofficially as October 15 through April 15) was tied for the 6th snowiest at SeaTac Airport with 23.3 inches. The snowiest year at SeaTac was 1968-69 with 67.5 inches, the climate normal is 11.8 inches, and records began in 1945. Also as of March 29, the 2008-09 snow season at Spokane International Airport by-passed 1949-50 record to take the crown as the snowiest winter since records began in 1893 with 93.6 inches of snow. The total snowfall for this year will climb higher since more snow fell after the initial record was broken.

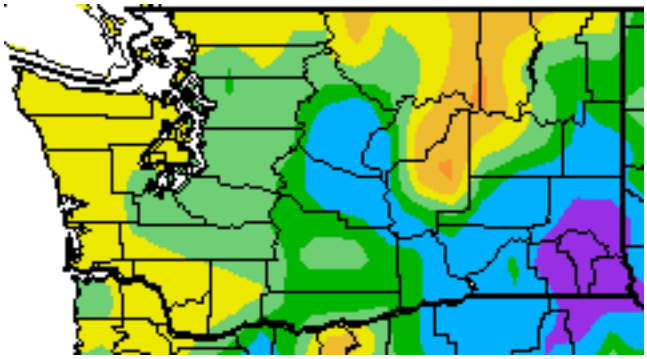
Climate Summary

Consistent with the records explained above, the departure from normal temperature image from the High Plains Regional Climate Center shows below normal temperatures across the entire state for the month of March. Temperatures were at least 2°F below the 1971 to 2000 climate normal, and reached up to as much as 6°F cooler than normal. Table 1 shows more detailed departures from normal for select locations.

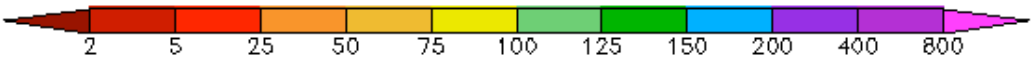
After the very dry February, WA received much-needed precipitation in March. The eastern Puget Sound was just above normal precipitation for the month, while most of eastern Washington received above normal precipitation. The Olympic Peninsula and parts of Okanogan and Douglas counties received below normal precipitation for March, but mostly in the 75-100% of normal range, and not as below as in February. Ephrata was drier than normal, only receiving 61% of normal (Table 1). The normal baseline on the charts below is from 1971-2000.



Temperature (°F)



Precipitation (%)



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

	Temperature (°F)			Precipitation (inches)		
	Avg	Normal	Departure from Normal	Total	Normal	% of Normal
Olympia	40.2	43.6	-3.4	5.75	5.29	109
Seattle	42.8	45.9	-3.1	3.87	3.84	101
Sea-Tac	41.7	46.2	-4.5	4.16	3.75	111
Vancouver	45.3	46.2	-0.9	2.95	4.21	70
Spokane	34.6	39.5	-4.9	2.43	1.53	160
Omak	37.7	40.6	-2.9	0.93	1.00	93
Ephrata	39.2	43.4	-4.2	0.46	0.75	61
Pasco	43.0	47.0	-4.0	1.43	0.77	186
Yakima	38.9	42.5	-3.6	0.84	0.70	120

Table 1 - March Climate Summaries from locations in western Washington and eastern Washington (highlighted in orange) from NWS (climate normal baseline is 1971-2000).

Snowpack

The snowpack situation has improved greatly throughout Washington thanks to the moist systems that continually moved through in March. The snow water content (SWE) in the majority of the central and southern Cascades is greater than normal, ranging up to 125% of normal. The northern Cascades and the Upper Columbia Basin are still areas of concern, with SWE ranging from 67-76% of normal. Snowpack in the Olympics has improved from a month ago, but it is still only 68% of normal. April 1st SWE is typically used as the magic date for assessing summer impacts of potential drought, and whether a drought will be declared for the areas with snowpack less than 75% of normal will be decided in the next couple weeks.

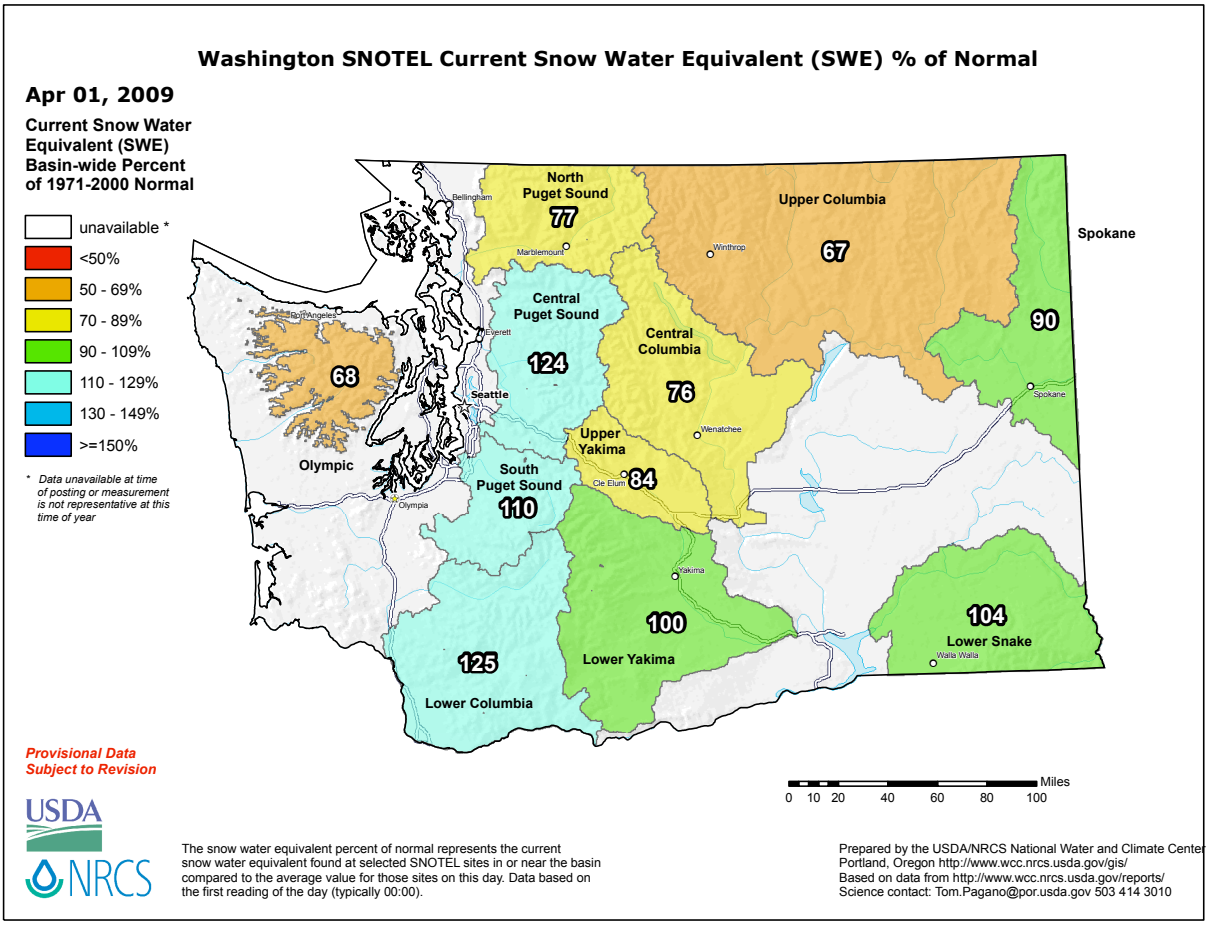


Figure 3: Percent of average snow water content in the Washington (from NRCS).

Howard Hanson Dam

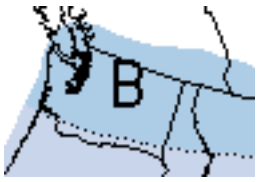
According to the Army Corps of Engineers, damage has been found in the Howard Hanson Dam, located in King County on the Green River. The damage was most likely caused during the heavy rain and flooding event in early January of this year, and further investigation is ongoing to determine the extent of the damage. Currently, the storage capacity of the dam is reduced during the evaluation. Because of the restricted capacity, residents in the Green River Valley have been advised that increased flooding may occur in the face of an extreme rainfall event. In the case of an extreme precipitation event, residents in the immediate area should be ready to evacuate. A timeline of when the depression will be fixed has not yet been released. Figure 4 shows a close up of the damage. For more information, please visit: http://www.nws.usace.army.mil/PublicMenu/Doc_list.cfm?sitename=HHD&pagename=Pool_Restriction.

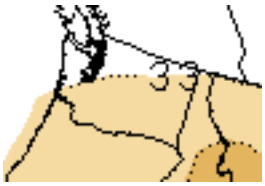
Figure 4: Photo of the depression in Howard Hanson Dam from Army Corps of Engineers. The photo can be found at the webpage cited above.

Outlook

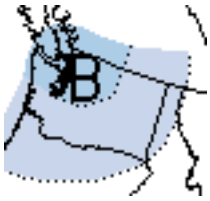
The seasonal climate forecast by the NOAA Climate Prediction Center for April-May-June (AMJ) calls for a continuation of the cooler than normal temperatures in Washington. There is at least a 40% chance of below normal temperatures. The AMJ outlook also calls for at least a 33% chance of below normal precipitation for a majority of the state.

The outlook for May-June-July (MJJ), calls for a 40% chance of below normal temperatures for northwestern WA and a 33% chance of below normal temperature for the rest of the state. The MJJ precipitation outlook calls for at least a 33% chance of below average precipitation for eastern WA.





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



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

The projected below average temperatures are likely a result of the continued La Niña characteristics in the Pacific Ocean. According to the Climate Prediction Center, the La Niña has weakened and is expected to continue weakening through the spring (http://www.cpc.noaa.gov/products/precip/CWlink/MJO/enso.shtml).

CoCoRaHS Update

The Community Collaborative Rain, Hail, and Snow (CoCoRaHS) Network's nationwide March Madness contest came to a close on March 31. Texas emerged as the winning state, gaining 86 new volunteers! California and Kansas tied at 2nd place with 41 new observers, and South Carolina took 3rd place with 34 new volunteers. Unfortunately, Washington did not place in the top 10, but we came in at a respectable 13th place, gaining 16 new observers in the month of March. A total of 637 new volunteers were recruited nationwide, short of the goal of 1,000 but still something worth celebrating. If you're interested in becoming an observer, please register at www.cocorahs.org.

Pacific Northwest Weather Workshop

An OWSC staff member, Karin Bumbaco (Assistant State Climatologist), presented research conducted by Philip Mote and herself at the Pacific Northwest Weather Workshop in March. The 2-day conference took place at the NOAA Western Regional Campus in Seattle and was attended by approximately 150 local weather and climate professionals and enthusiasts. Karin presented on recent droughts in the Pacific Northwest, describing 3 different ways drought can unfold in the region and using 2001, 2003, and 2005 as examples. Karin's talk can be downloaded and viewed at: http://www.climate.washington.edu/Bumbaco_NWW.ppt