



Office of the Washington State Climatologist

April 5, 2011

March Precipitation

If you thought that March seemed wetter than usual, then you were right. The total precipitation for the month ranked as one of the top ten wettest Marches at many stations across the state. Table 1 shows the total March precipitation, the ranking when compared to other years, and the year that the records began for numerous WA stations. The March 2011 precipitation for several north central WA stations was even a new record high.

In this Issue

March Precipitation.....	1
Snowpack & Streamflow..	2
CoCoRaHS.....	3
Winter Review.....	3
Climate Summary.....	4
Climate Outlook.....	6

Station	March 2011 Precipitation	Ranking	Records Began
Holden Village	10.00	1	1930
Leavenworth	7.13	1	1914
Mazama	5.24	1	1948
Winthrop	4.54	1	1906
Colville	3.41	2	1899
Omak	2.72	2	1931
Plain	5.94	2	1937
Spokane AP	3.25	3	1881
Quillayute	17.95	4	1967
Hoquiam	12.89	4	1954
Olympia	9.00	5	1948
SeaTac AP	6.29	6	1948

Table 1: Total March precipitation, the ranking when compared to other years, and the year records began.

Plenty of daily precipitation records were broken throughout the month. On March 9, SeaTac Airport, the Seattle Weather Forecasting Office, and Olympia all broke daily precipitation records with 1.47", 1.35", and 1.82", respectively. More notable, however, was the heavy rain and flooding event at the end of the month. Heavy mountain rainfall on top of the recent snow caused extreme avalanche danger. An avalanche even caused the closure of Highway 2 through Stevens Pass. The most significant impact, however, was the major flooding throughout the state. The magnitude of the flooding was quite unusual for so late in the season, but not unprecedented. Many of the flooded rivers had higher flows in late March of 1997. Daily precipitation records were also

broken at the end of the month (e.g., Quillayute measured 3.58” on March 30).

Though not a weather or climate phenomenon, it is still worth noting that the March 10 earthquake and tsunami in Japan caused tsunami advisories and warnings for coastal WA locations on March 11. Some evacuations occurred in the coastal areas (Seattle Times, 3/11/11), but thankfully there were not any WA fatalities reported. As a timely reminder of our vulnerability to natural disasters, April is disaster preparedness month in WA. For more information, check out www.emd.wa.gov/preparedness/prep_infocus.shtml.

Snowpack & Projected Streamflow

The wetter than normal month brought many periods of heavy snow to the mountains, greatly benefiting the snowpack. Figure 1 shows the percent of normal snow water equivalent (SWE) for 11 WA basins from the National Resources Conservations Service. The snowpack in the Olympic Mountains as of April 1 is much above normal at 179% of normal. The north and south Cascades are also above normal, ranging between 115 and 124% of normal. The central Cascades and Spokane basin are near-normal for this time of year. The Northwest River Forecast Center issued their water supply forecast on March 31 for projected streamflow from now through September (Figure 2), and is expecting normal (90-110%) to above normal (110-125%) streamflow.

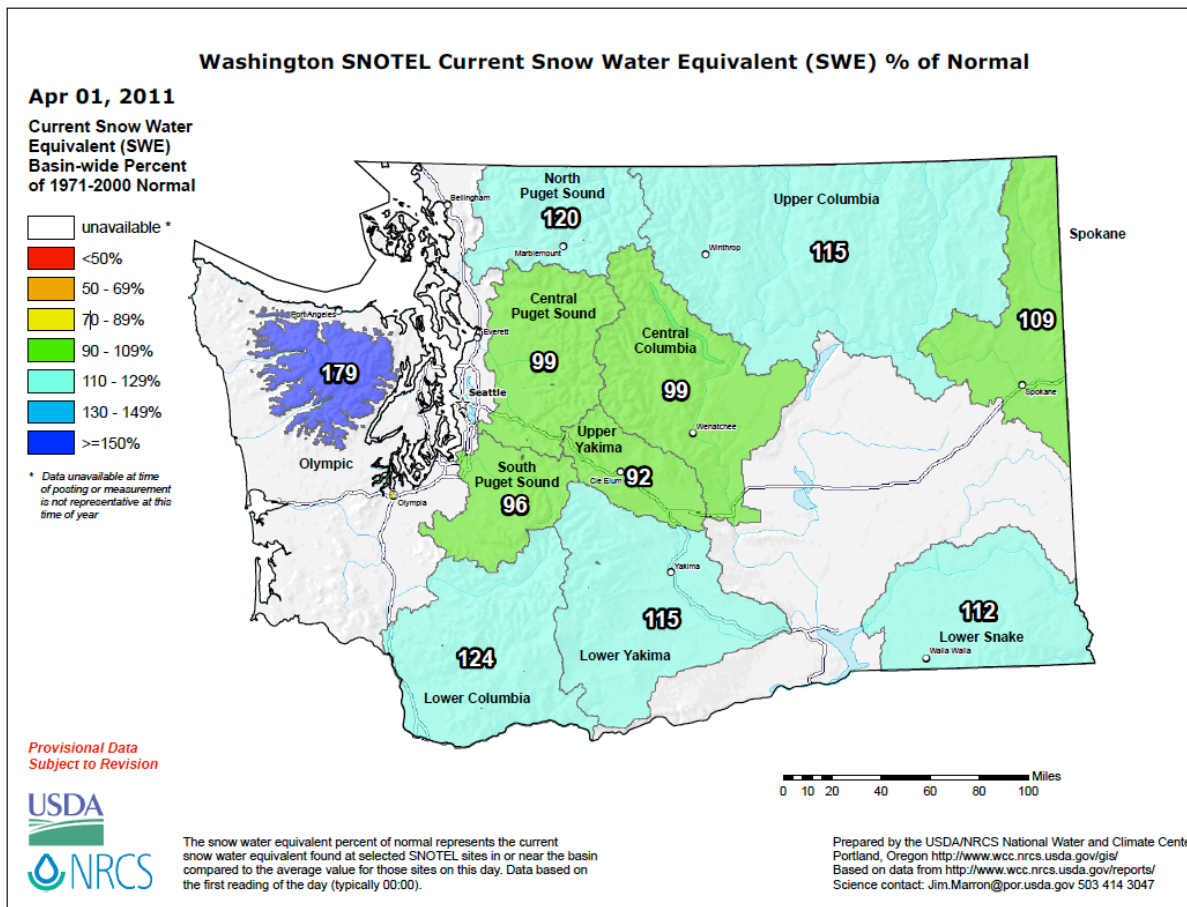


Figure 1: Snowpack (in terms of snow water equivalent) percent of normal for WA as of April 1, 2011 (from NRCS).

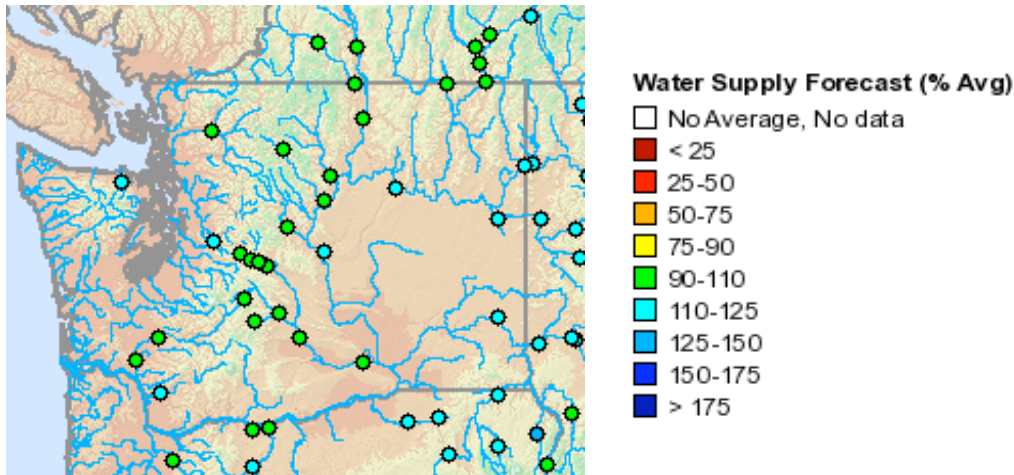


Figure 2: April through September water supply forecast for WA as of March 31, 2011 from the National Weather Service Northwest River Forecast Center (http://www.nwrfc.noaa.gov/water_supply/ws_fcst.cgi).

CoCoRaHS March Madness

And the winners are.... North Carolina and Indiana! North Carolina won the traditional March Madness count with 129 new volunteers for the month of March. Indiana was close behind with 128 new volunteers, but won in the per capita standings once its smaller population was taken into account. Congratulations are well-deserved. Washington, on the other hand, had only a modest increase with 3 new volunteers in March, but we're already off to a good start with a new volunteer in April. There's always next year. Find out more information about the program here: www.cocorahs.org.

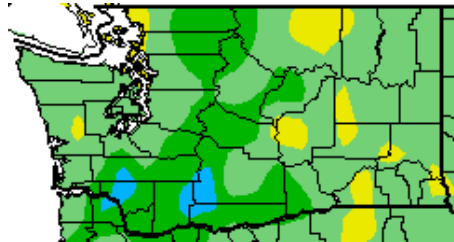
A Review of Winter 2010-2011

A report on how the 2010-2011 La Niña winter stacked up compared to our expectations will be available on our website this week. We are waiting for some additional data, and expect the report to be complete by the end of this week. Highlights will include discussion on the overall strength of the La Niña, the temperature and precipitation anomalies for WA, and the pattern of regional atmospheric circulation this winter compared to other La Niña years.

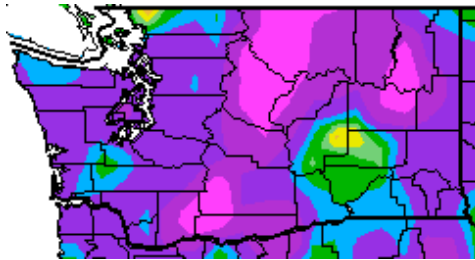
Climate Summary

Mean March temperatures were within 2°F of the 1971-2000 normal for most of WA as illustrated by the temperature departure map from the High Plains Regional Climate Center below. In general, temperatures were on the cool side, with temperature departures from normal, for example, of -1.1°F, -0.5°F, and -0.2°F at SeaTac, Olympia, and Spokane, respectively (Table 2). The Cascade Mountains, especially the southern portions, and parts of central WA, had greater departures from normal. Wenatchee, for example, was 2.6°F below normal for the month (Table 2).

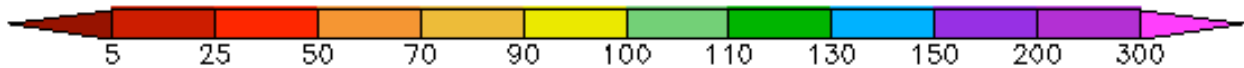
Total March precipitation was at or above normal for the whole state. Many locations had much more precipitation than normal, such as Wenatchee (278% of normal) and Omak (272% of normal) in north central WA. A majority of the rest of the state received between 150 and 200% of normal precipitation (e.g., SeaTac had 168% of normal and Yakima had 159% of normal - Table 2). The wet March prompted the United State Drought Monitor to remove the D0 designation (signifying abnormally dry conditions) from the southern portion of the Cascade Mountains.



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>).*

	Mean Temperature (°F)			Precipitation (inches)			Snowfall (inches)		
	Avg	Norm	Departure from Normal	Total	Norm	% of Norm	Total	Norm	% of Norm
Western Washington									
Olympia	43.1	43.6	-0.5	9.00	5.29	170	0	1.0	0
Seattle	46.5	45.9	0.6	6.00	3.84	156	0	M	M
Sea-Tac	45.1	46.2	-1.1	6.29	3.75	168	0	0.6	0
Quillayute	43.2	43.9	-0.7	17.95	10.99	163	0	1.6	0
Bellingham	45.9	44.7	1.2	3.23	3.03	106	M	0.6	M
Vancouver	46.4	47.1	-0.7	6.78	3.55	191	M	M	M
Eastern Washington									
Spokane	39.3	39.5	-0.2	3.25	1.53	212	3.3	3.1	106
Wenatchee	41.0	43.6	-2.6	1.89	0.68	278	M	1.3	M
Omak	40.6	40.6	0.0	2.72	1.00	272	M	0.5	M
Pullman	40.0	39.9	0.1	3.15	2.01	157	M	M	M
Ephrata	41.7	43.4	-1.7	1.02	0.75	136	M	M	M
Yakima	42.3	42.5	-0.2	1.11	0.70	159	0.9	1.2	75

Table 2 - March climate summaries for locations around Washington. The climate normal baseline is 1971-2000 except for Seattle WFO (1986-2000) and Vancouver (1998-2010). Please be aware that the Seattle WFO and Vancouver climate normal periods are shorter than the 30-year period that is typically used for climatology. M denotes a missing value.

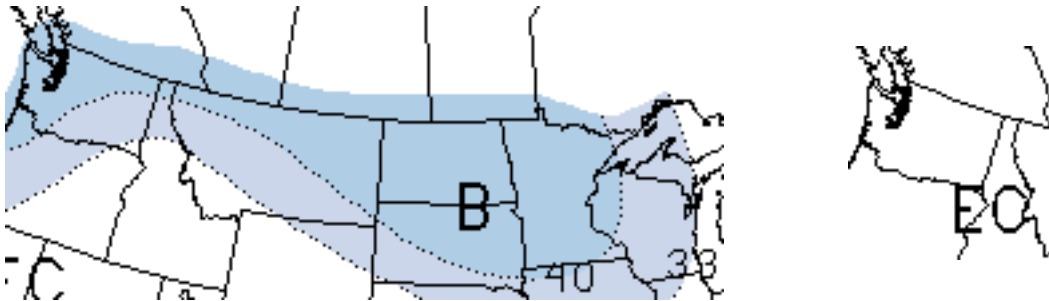
Climate Outlook

La Niña conditions are continuing to weaken across the equatorial Pacific, and sea surface temperatures are even slightly above average in portions of the eastern Pacific, according to the Climate Prediction Center

(<http://www.cpc.noaa.gov/products/precip/CWlink/MJO/enso.shtml>). The La Niña is expected to continue to weaken with models indicating near-neutral ENSO conditions by June.

The April-May-June (AMJ) outlook calls for chances of colder than normal temperatures. The probabilities exceed 33% for the southeastern half of the state and exceed 40% for the remainder of the state using a three-class system. There are equal chances of below, equal to, or above normal precipitation for AMJ.

The May-June-July (MJJ) CPC three-class outlook has equal chances of below, equal to, or above normal temperatures. There is at least a 33% chance of below normal precipitation for MJJ in 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.