



# Office of the Washington State Climatologist

December 3, 2010

## November Event Summary

Although November registered on the cool side for most locations around WA, the beginning of the month was rather mild. The highest November temperature ever recorded at SeaTac Airport was tied on the 3rd: 74°F. The last and only other time 74°F was recorded in November since records began at SeaTac was on November 4, 1949. Other locations had high temperatures in the 60's (i.e., Bellingham, Yakima, etc.) for the first few days of November and Spokane and other eastern WA locations had highs in the upper 50's. The unusually snowy and cold period in the latter half of the month, however, is the big story for the month. In fact, the range of temperatures experienced during the month of November is quite impressive. Seattle, for example, had a 44°F spread in high temperatures and Spokane had 51°F spread (Figure 1). The low temperature in Spokane on the 23rd was 37°F below normal (-10°F, normal: 27°F).

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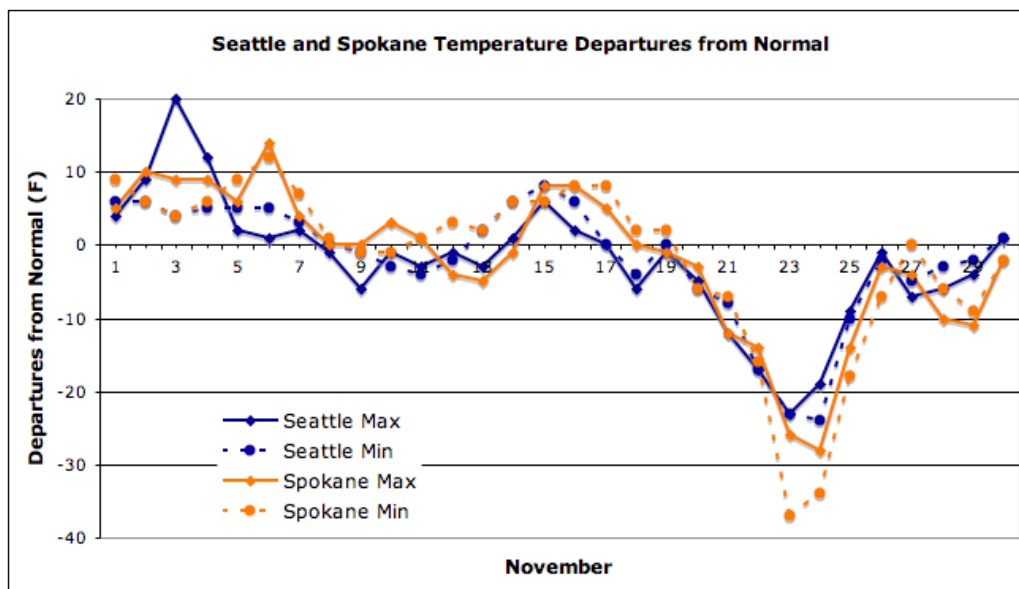


Figure 1: Seattle (blue) and Spokane (orange) maximum (solid) and minimum (dashed) temperature departures from the 1971-2000 normal during November 2010.

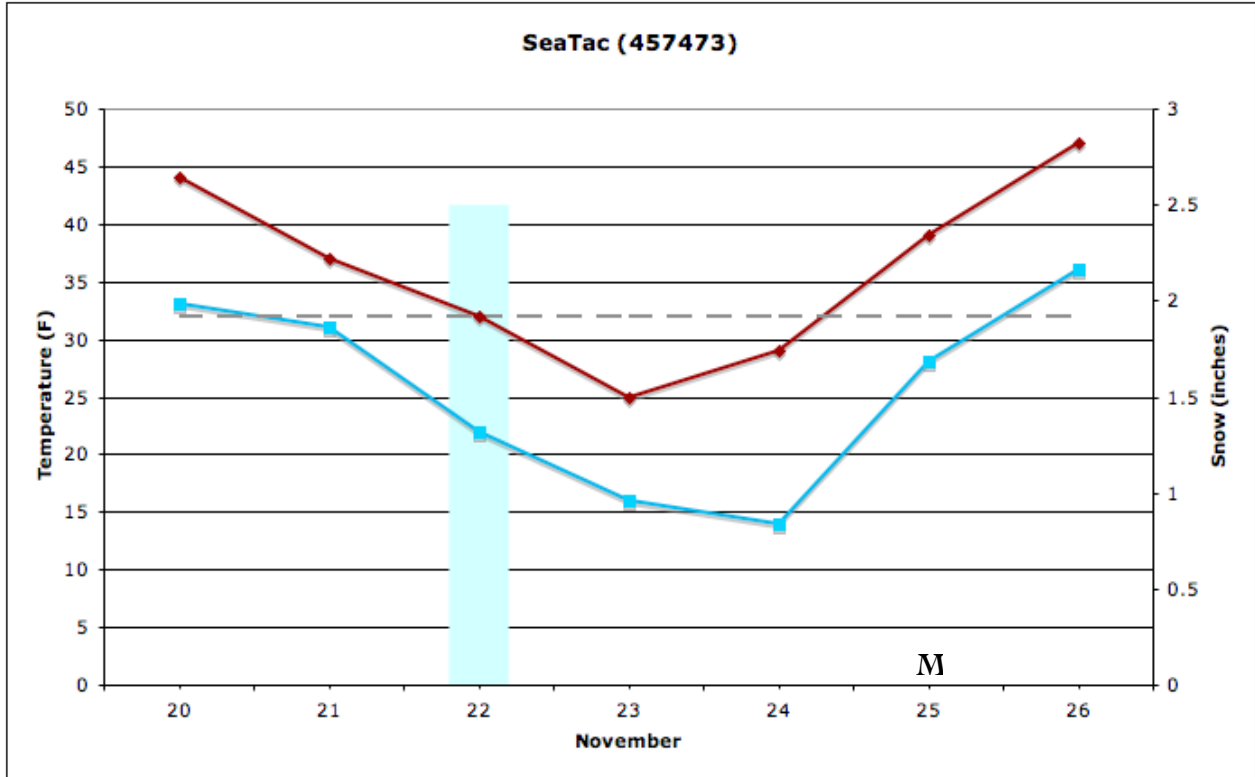
As seen in Figure 1, WA experienced a switch to temperatures much below normal around November 20th as arctic air moved in from Canada. Several daily records were broken (Table 1), many of them low temperature records. November 24th was especially cold, with the low

Location	Date	Record Type	Record	Previous Record	Previous Record Year
SeaTac AP	22-Nov	Daily Snowfall	2.5	1.5	1977
Mullan Pass	22-Nov	Low Temperature	6	10	1957
Seattle WFO	23-Nov	Low Temperature	19	24	1993
Omak	23-Nov	Low Temperature	-1	6	1961
SeaTac AP	24-Nov	Low Temperature	14	16	1985
Seattle WFO	24-Nov	Low Temperature	18	20	1993
Omak	24-Nov	Low Temperature	-6	2	1993
Ephrata	24-Nov	Low Temperature	-14	-10	1985

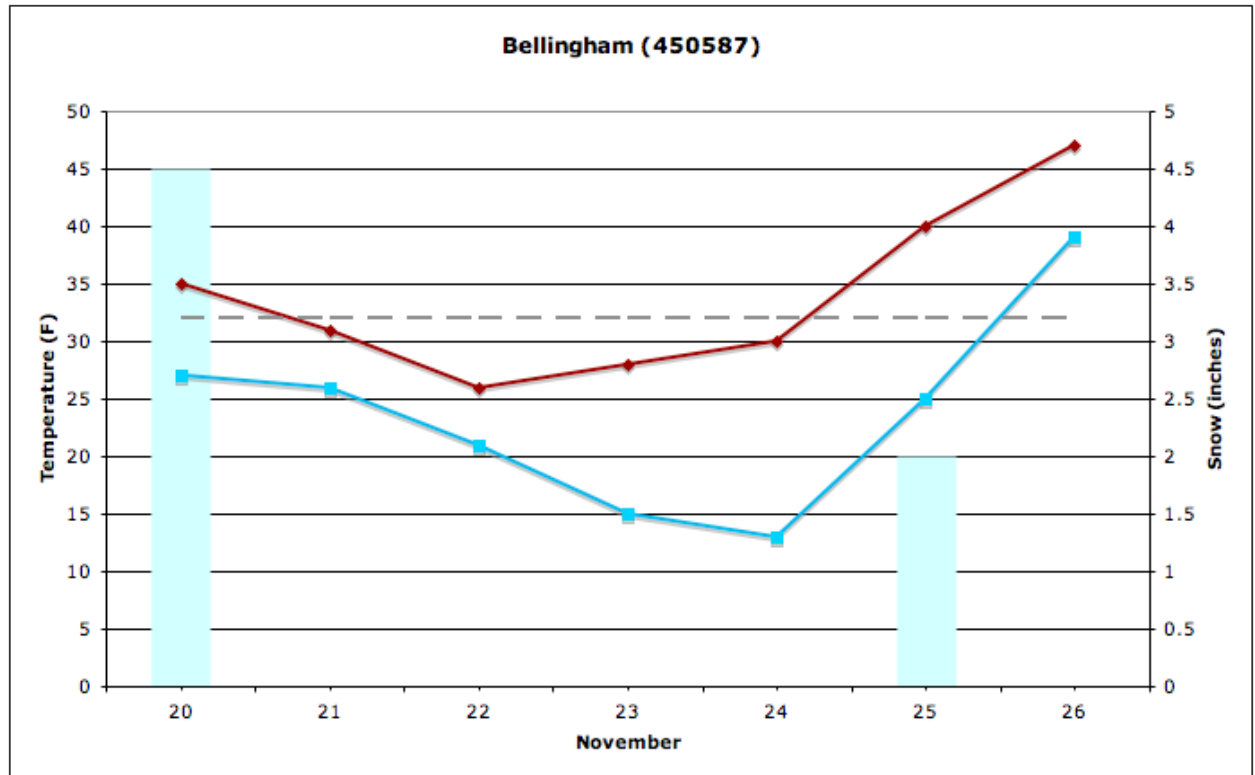
Table 1: A sample of daily records broken during the cold and snowy period in November. Snowfall is in inches and temperature in Fahrenheit.

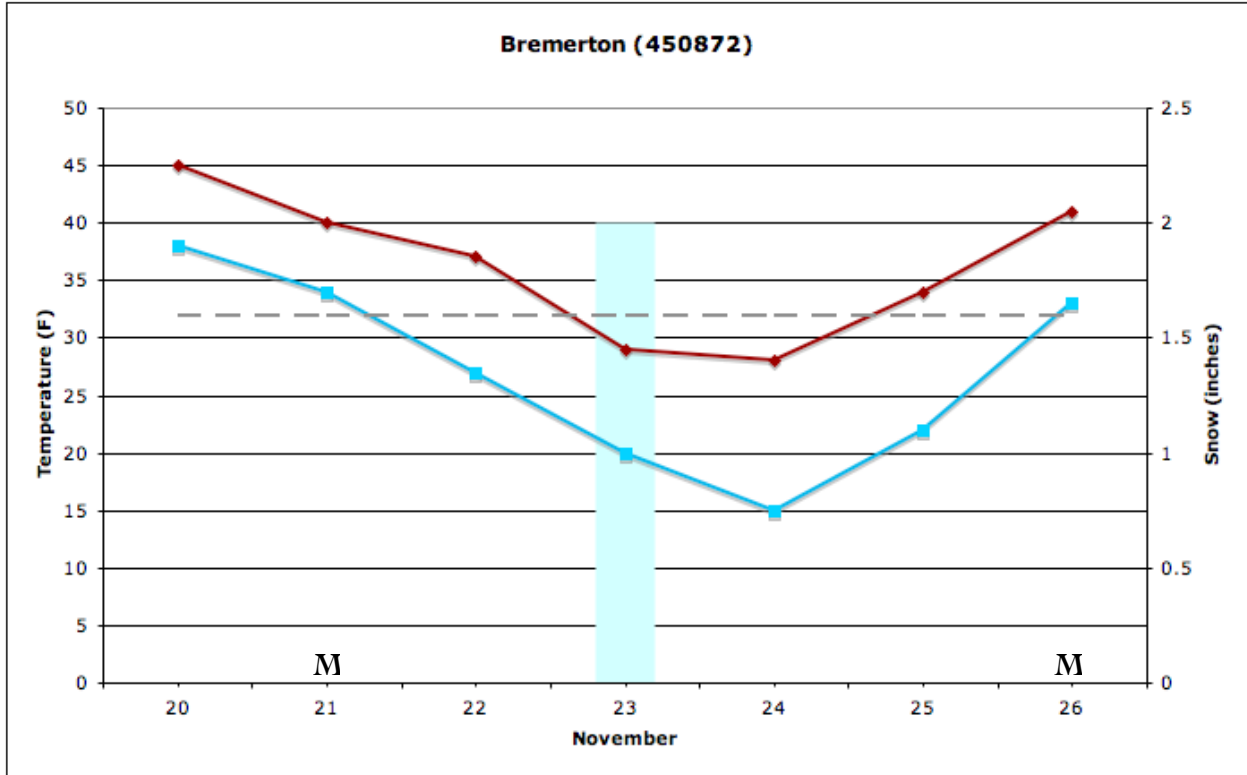
temperatures dropping down to  $-6^{\circ}\text{F}$  and  $-14^{\circ}\text{F}$  in Omak and Ephrata, respectively. The coldest temperatures lasted from roughly Nov 21 to Nov 25 on both sides of the Cascades. The temperatures were cold enough so that any precipitation that came through the state fell as snow. Eastern WA got much more snow than the west side, and with the below freezing temperatures lingering longer there, snow fell through the end of the month. Spokane actually broke a record for the snowiest November since records began in 1893 with 25.9 inches. The amount of snow received in Spokane in November has already exceeded the amount of snow measured during the entire 2009/2010 winter season (14.4”).

The 6 charts below show the evolution of this cold and snow event for three west side stations (Bellingham, Bremerton, and SeaTac) and three east side stations (Spokane, Yakima, and Walla Walla). Each chart shows the high temperatures (red), low temperatures (blue), the freezing line (gray, dashed) corresponding to the left y-axis, and the daily snow total (blue bars) corresponding to the right y-axis. Some of the snow data were missing: Nov 25 for SeaTac, Nov 21 & 26 for Bremerton, and Nov 27 for Walla Walla, which are denoted by a bold “M” on the chart. More daily snow totals can be found on the CoCoRaHS site (<http://www.cocorahs.org/Maps/ViewMap.aspx?state=usa>). Select “New Snow” as the “Map Type” and pick the date. Clicking on individual counties gives a zoomed in view of the snowfall totals.

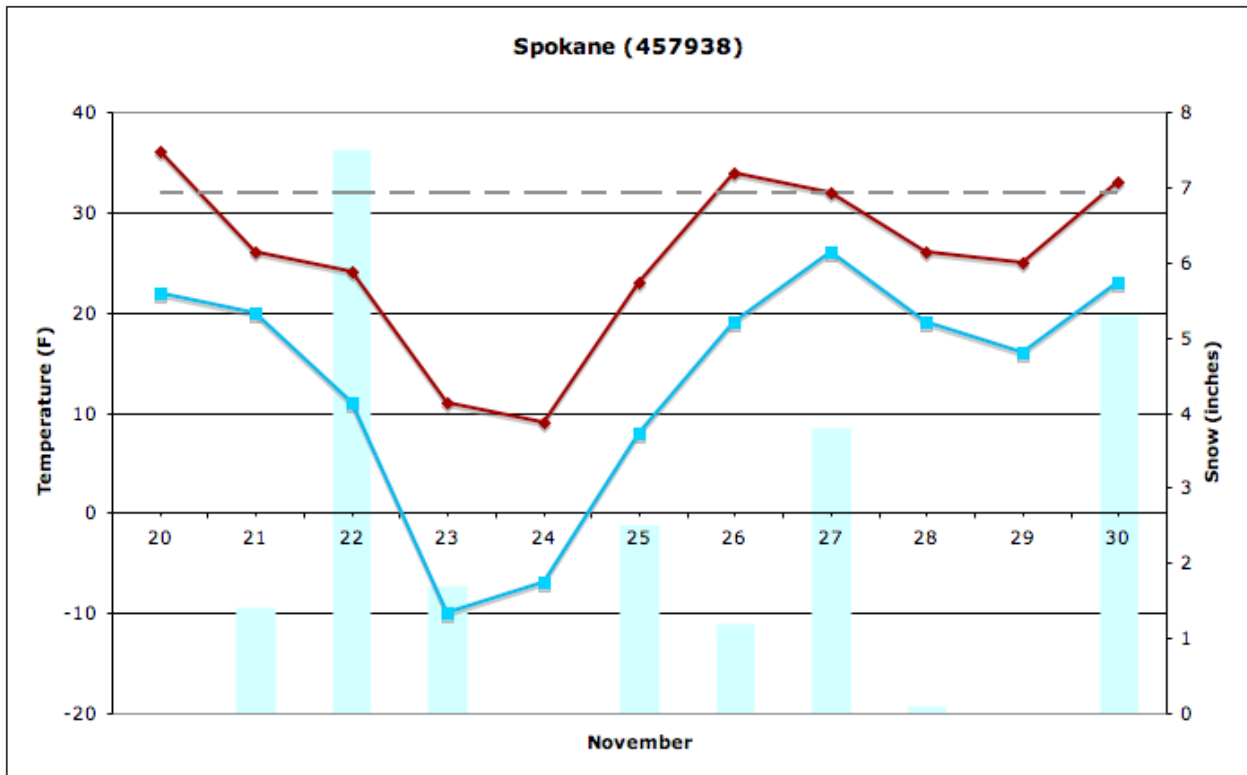


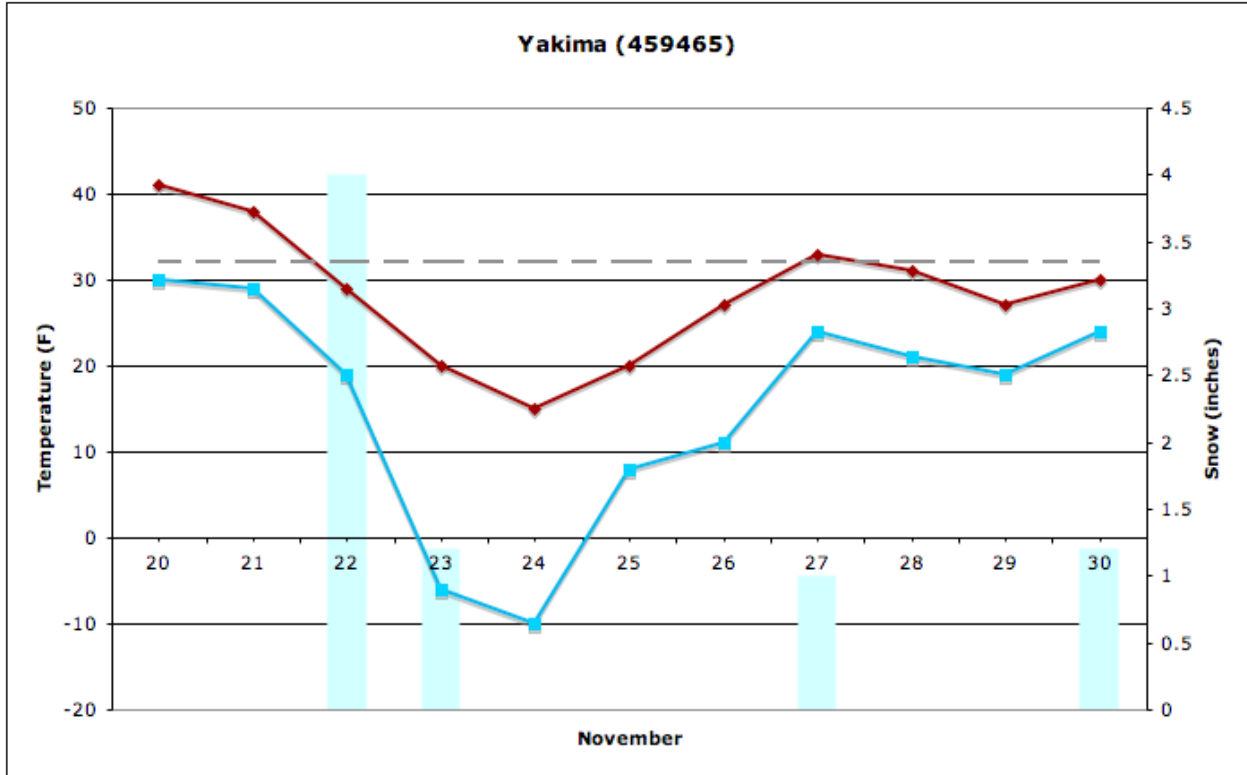
- Snow
- Max T
- Min T
- Freezing Line



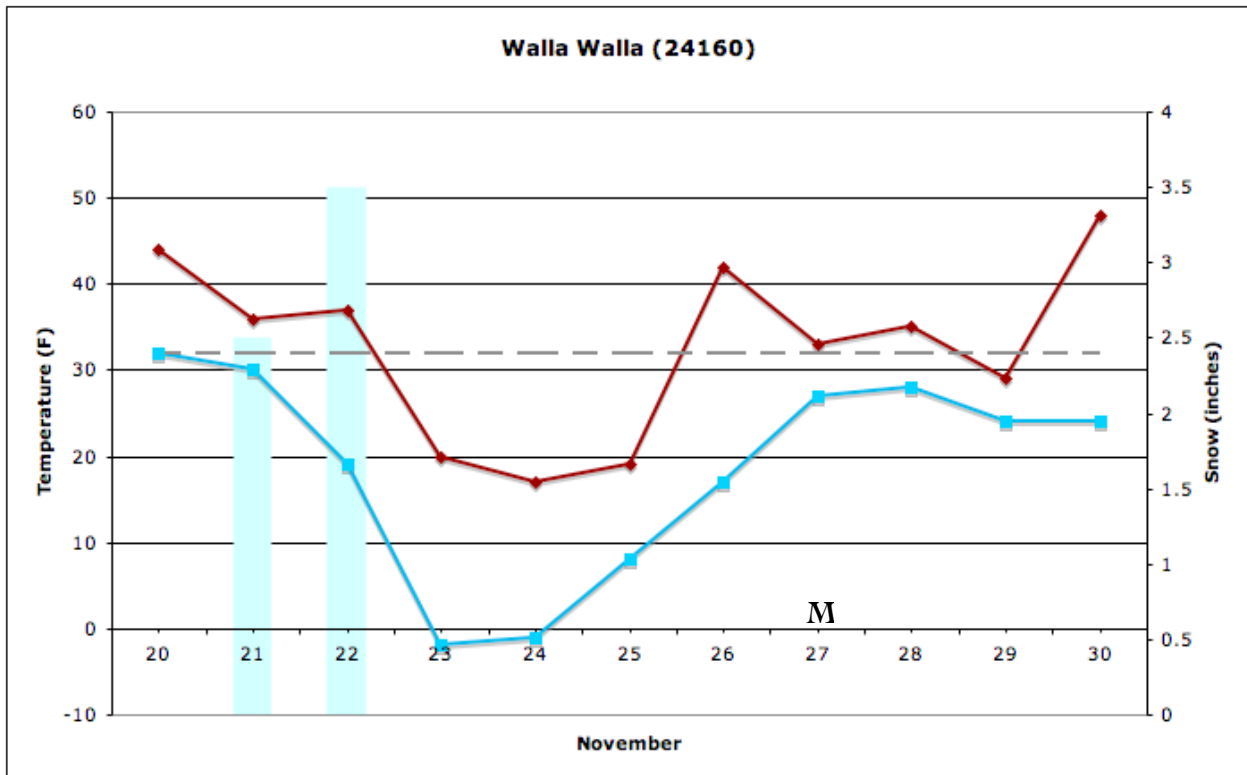


- Snow
- Max T
- Min T
- Freezing Line





- Snow
- Max T
- Min T
- Freezing Line



Another notable November event was a strong low pressure system with high winds that moved into the state on the 15th. Some of the maximum wind gusts are listed below:

Bellingham, Boeing Field 35 mph  
Everett, Friday Harbor 38 mph  
Olympia, Quillayute 45 mph  
SeaTac 50 mph  
Anacortes 57 mph  
Whidbey Island 61 mph  
Mt. Rainier (Paradise) 70 mph  
Snoqualmie Pass 93 mph  
White Pass 112 mph

## CoCoRaHS

The CoCoRaHS observations we received during November were very valuable for documenting the weather conditions throughout the state. The lack of an observation can actually give us useful information as well; David Hannon, an observer in Clallam County, had a large branch of an evergreen tree from approximately 100 yards away **smash** his gauge as a result of 60 mph winds overnight on November 15. The picture below was taken after most of the mess was cleaned up, but you can see the post in which the gauge used to be mounted and part of the guilty branch. Thanks for sharing, David!



Photo taken by David Hannon and used with permission.

## Snowpack

The month end storm that brought rain for the western WA lowlands was very beneficial for the snow in the mountains. As shown in Figure 2, the snow water equivalent (SWE) for the Lower Columbia and the Olympic Basins is currently above normal. The Central and South Puget Sound and Lower Yakima Basins have near normal SWE for this time of year. The northern Puget Sound and the other basins east of the Cascades, however, are below normal. The Central Columbia and Upper Yakima Basins are only at 63 and 69%, respectively, corresponding to the dry conditions experienced at those locations in November (see next section).

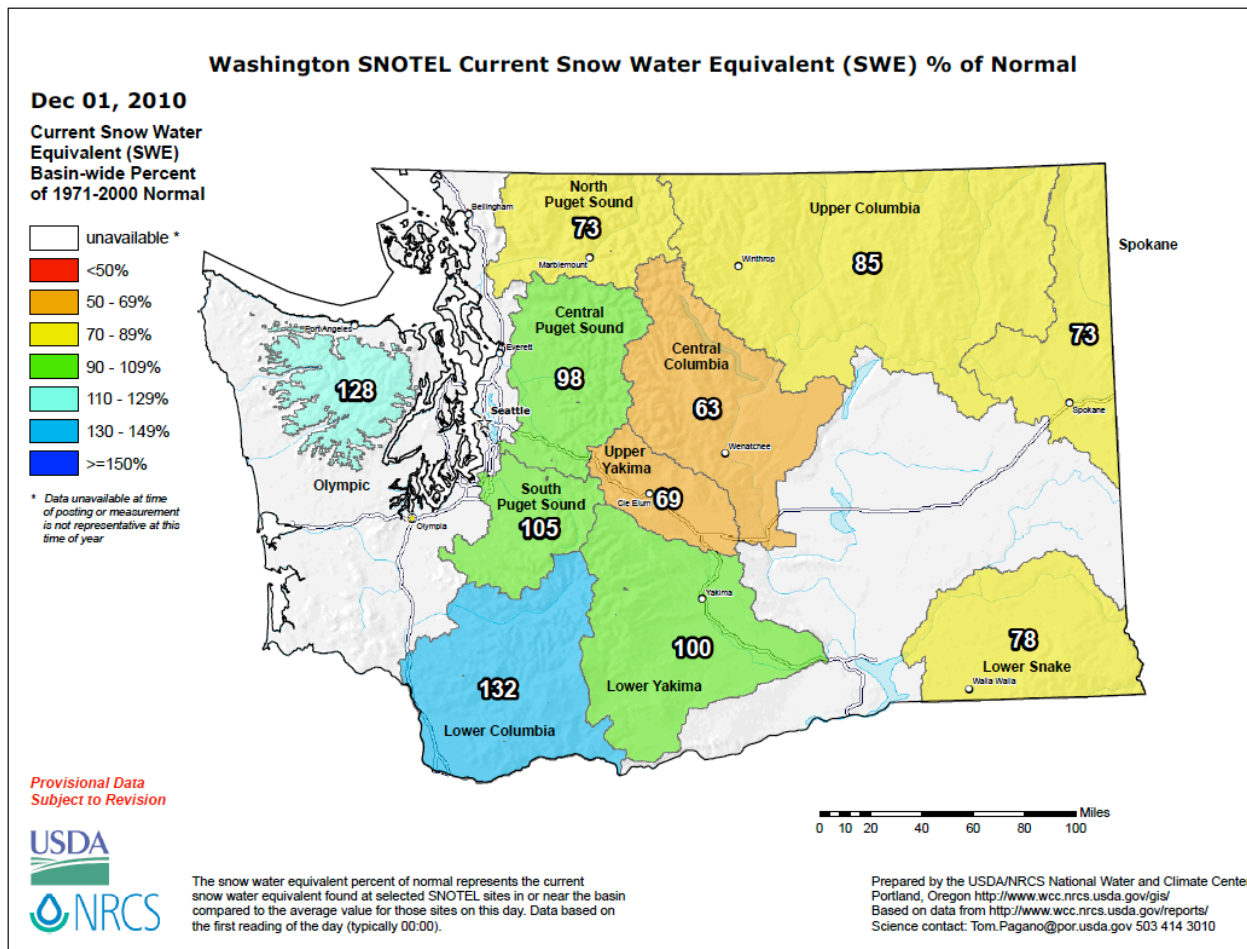
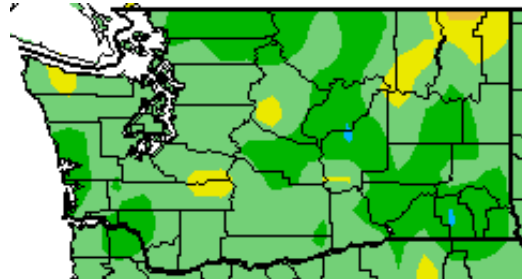


Figure 2: Snowpack (in terms of snow water equivalent) percent of normal for Washington as of December 1, 2010. Image is from the National Resources Conservation Service.

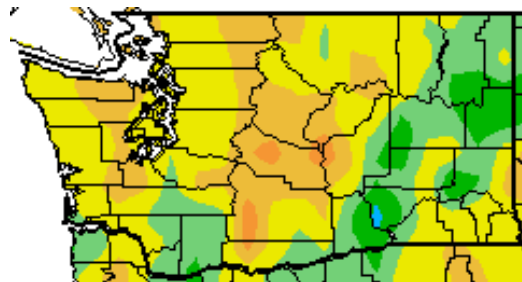
## Climate Summary

Temperatures around the state were generally below normal for November, as shown in the High Plains Regional Climate Center (HPRCC) map displayed below. The northern Puget Sound and portions of eastern WA were the coolest with temperatures between 2°F and 4°F below normal. Ephrata, for example, was 3.8°F below normal for the month (Table 2).

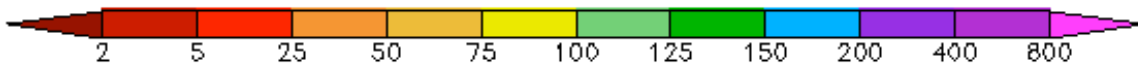
Total precipitation for November was below normal for a majority of the state, with the driest locations, such as some eastern Cascade locations like Wenatchee, only receiving between 50 and 75% of normal precipitation. Parts of eastern WA (i.e., Spokane, northwestern WA and Benton County) and southwest WA (i.e., Vancouver and Skamania County) were the exception and had above normal precipitation. Snowfall was also above normal for the stations that had measurements. Spokane's record snowfall was a whopping 367% of normal, and even SeaTac's 2.5" was more than the November normal (Table 2).



Temperature (°F)



Precipitation (%)



*November temperature (°F) departure from normal (top) and November 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	41.9	42.4	-0.5	6.20	8.13	76	M	1.5	M
Seattle	44.7	45.9	-1.2	4.87	4.92	99	3.8	M	M
Sea-Tac	43.2	45.2	-2.0	5.05	5.90	86	2.5	1.1	227
Quillayute	42.7	44.2	-1.5	12.34	14.82	83	M	1.2	M
Vancouver	44.9	46.5	-1.6	6.67	5.52	121	M	M	M
Eastern Washington									
Spokane	33.1	34.9	-1.8	3.10	2.24	138	25.9	6.7	387
Wenatchee	34.4	37.2	-2.8	0.61	1.15	53	M	4.3	M
Omak	31.9	34.6	-2.7	1.08	1.45	74	M	M	M
Ephrata	33.9	37.7	-3.8	0.99	1.03	96	M	M	M
Pullman	35.0	36.8	-1.8	1.79	2.83	63	M	4.5	M
Yakima	35.5	37.0	-1.5	0.83	1.05	79	7.4	3.3	224

**Table 2 - November climate summaries for locations around Washington. The climate normal baseline is 1971-2000 except for Seattle WFO (1986-2000) and Vancouver (1998-2009). 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.**

## Climate Outlook

La Niña conditions are present across the equatorial Pacific according to the Climate Prediction Center (<http://www.cpc.noaa.gov/products/precip/CWlink/MJO/enso.shtml>). Models ([http://iri.columbia.edu/climate/ENSO/currentinfo/SST\\_table.html](http://iri.columbia.edu/climate/ENSO/currentinfo/SST_table.html)) are in agreement that a moderate La Niña will persist through the boreal winter. Figure 3, from the Climate Prediction Center (CPC), shows the current Oceanic Niño Index (ONI) in relation to the ONI from 1990. The La Niña is reflected in the CPC seasonal outlooks featured below.

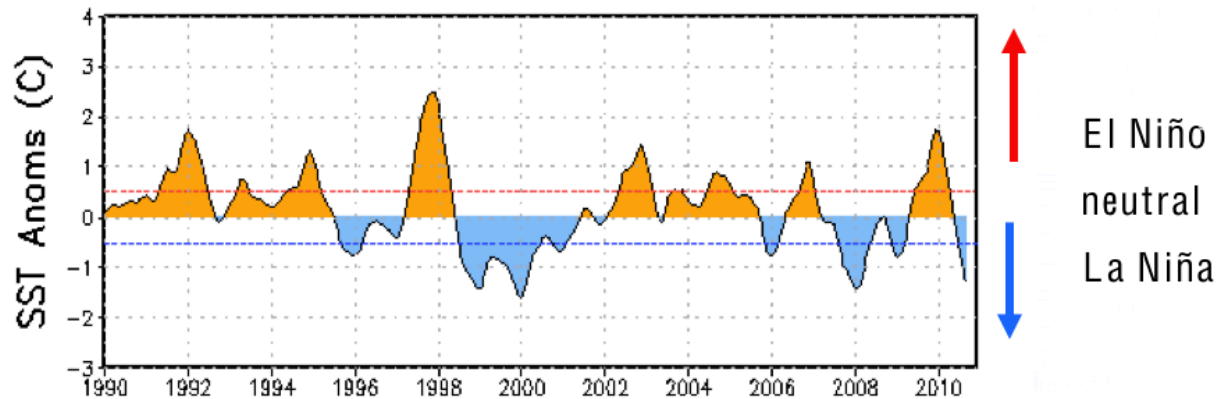


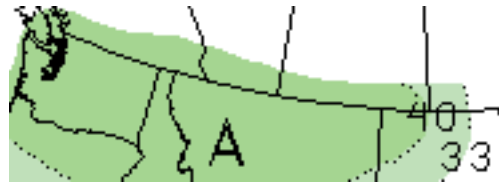
Figure 3: Oceanic Niño Index from 1990 to present from the Climate Prediction Center.

The December-January-February (DJF) three-class outlook calls for colder than normal temperatures for the western half of the state, particularly on the Olympic Peninsula. The eastern portion of the state has equal chances of below, equal to, or above normal temperatures. With regards to precipitation, the entire state is relatively likely to be significantly wetter than normal (i.e., at least a 40% chance using the three-class system).

The January-February-March CPC three-class outlook has even stronger odds for colder than normal temperatures for the entire state. The western half chances exceed 50% on the three-class system, and the chances of a colder than normal JFM exceed 40% on the eastern side of the Cascades. The precipitation outlook has higher odds than usual for above normal precipitation for the entire state (i.e., at least 40%).



*December-January-February outlook for temperature (left) and precipitation (right) from the CPC.*



*January-February-March outlook for temperature (left) and precipitation (right) from the CPC.*

## WeatherFest in Seattle

WeatherFest, an interactive science and weather fair held by the American Meteorological Society, is coming to WA! Though many of the activities are geared toward young people, people of all ages will likely enjoy the event. WeatherFest will be on Sunday, January 23, 2011 at the Washington State Convention Center in Seattle. The OWSC staff will be split between two booths, one representing CoCoRaHS and one with the OWSC activities designed for the Pacific Science Center. More information can be found here: <http://www.ametsoc.org/meet/annual/weatherfest.html>

OWSC would like to organize an event after WeatherFest for CoCoRaHS volunteers statewide to meet one another. We are in the early planning stages, and would like to get a count of CoCoRaHS volunteers that would likely make the trip out to Seattle to attend the CoCoRaHS event. If this is something you would like to do, please email [wash.cocorahs@gmail.com](mailto:wash.cocorahs@gmail.com) so that we have an idea of how much space we will need. The sooner you notify us, the sooner we can plan an enjoyable meet-and-greet! Thank you.