



Office of the Washington State Climatologist

December 3, 2008

Introduction

Greetings! In this issue of the December Newsletter, the focus will be on November climate and weather. A specific event that is reported on is the flooding that occurred last month. In addition, this issue also includes the monthly climate summary, the seasonal outlook, and a highlight on WA climatology. I am also pleased to announce a new feature that will now be included in our newsletters. Impacts that the weather and/or climate have on society for the previous month can now be found in every newsletter. This issue focuses on the November flooding, which affected many residents.

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November Floods

Heavy rainfall across the Puget Sound Region on November 11th and 12th on top of heavy rainfall in the beginning of the month resulted in significant flooding. Flood warnings were issued for 18 rivers (Carbon, Cedar, Chehalis, Cowlitz, Deschutes, Naselle, Newaukum, Nisqually, Nooksack, Puyallup, Satsop, Skagit, Skokomish, Skykomish, Snohomish, Snoqualmie, Stillaguamish, and Tolt) and recommended evacuations were issued for King, Pierce, and Snohomish counties. Shelters were opened in those counties and in Whatcom county due to the flooding. Numerous road closures resulted from the floods around the state, and Mt. Rainier National Park even closed down on the 12th due to the flooding of the main road by an overflow of Kautz Creek. Many of the counties involved issued proclamations of emergency (Chelan, King, Lewis, Pierce, Skagit, Snohomish, and Whatcom), and the flooding made headlines across the country.

Notable damage occurred in Pierce county due to a levee breach, and the Mill Creek Dam was damaged in Cosmopolis. According to the Dartmouth Flood Observatory, the flooding affected 75,160 km² in Washington. Most of the counties that were affected by the floods reported the damage to the Washington State Emergency Management Division*, and these estimated damage costs are shown in Figure 1 below. Keep in mind that the reporting is voluntary so more damage may have occurred. Damages from the flooding are estimated to be between \$6-8 million statewide, but that amount of damage does not compare to other floods experienced in recent Washington history, nor does it qualify the counties for federal FEMA aid.

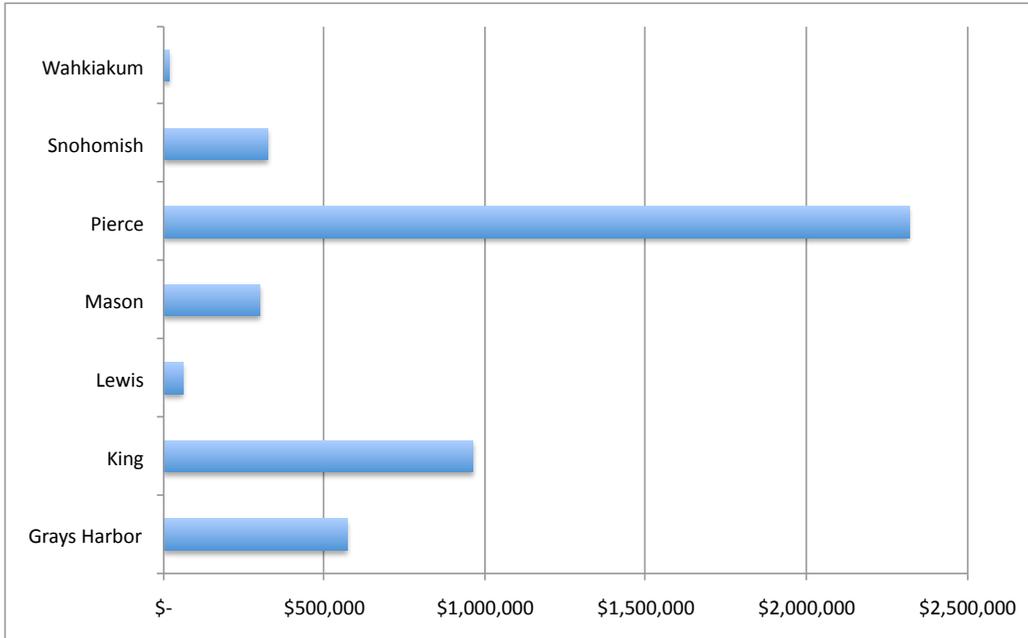


Figure 1 - Estimated damage from the early November flooding for the counties that reported damage (from the Washington State Emergency Management Division*).

Two figures help to visualize what kind of precipitation led to the flooding seen in early November. Figure 2 shows the daily precipitation amounts at the Seattle-Tacoma Airport for the entire month of November (from The Climate Prediction Center). Heavy rain on November 6th and 7th was just as responsible for the flooding that occurred later in the month. In fact, the greatest 24-hour precipitation total for the month occurred from November 6th to November 7th for both Olympia (2.89 inches) and Sea-Tac Airport (2.74 inches). Figure 3 shows daily precipitation totals from around the state on November 12, 2008. The image is from the CoCoRAHS network of weather observers.

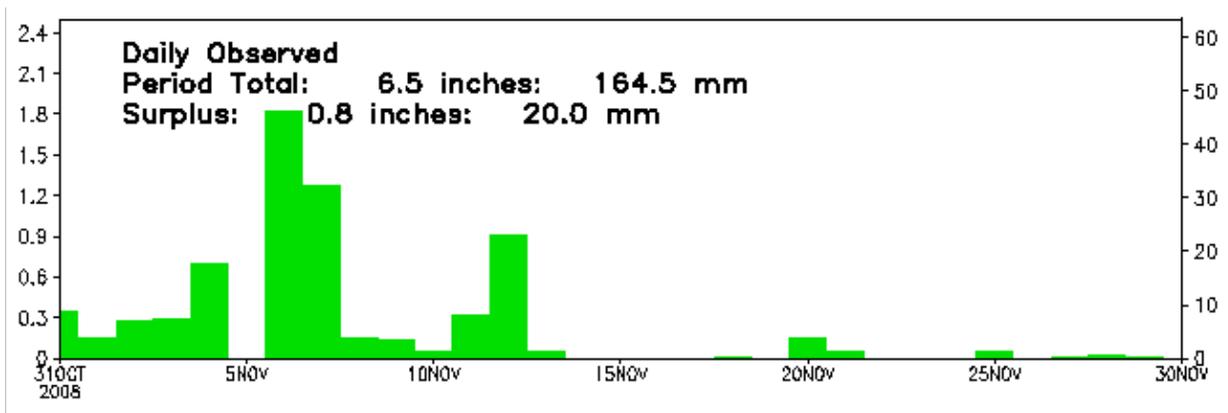


Figure 2 - Total Daily Precipitation for the Sea-Tac Airport for November 2008 (from CPC).

Daily Precipitation (inches x.xx), for the 24 hour period ending -7:00 am

Washington 11/12/2008

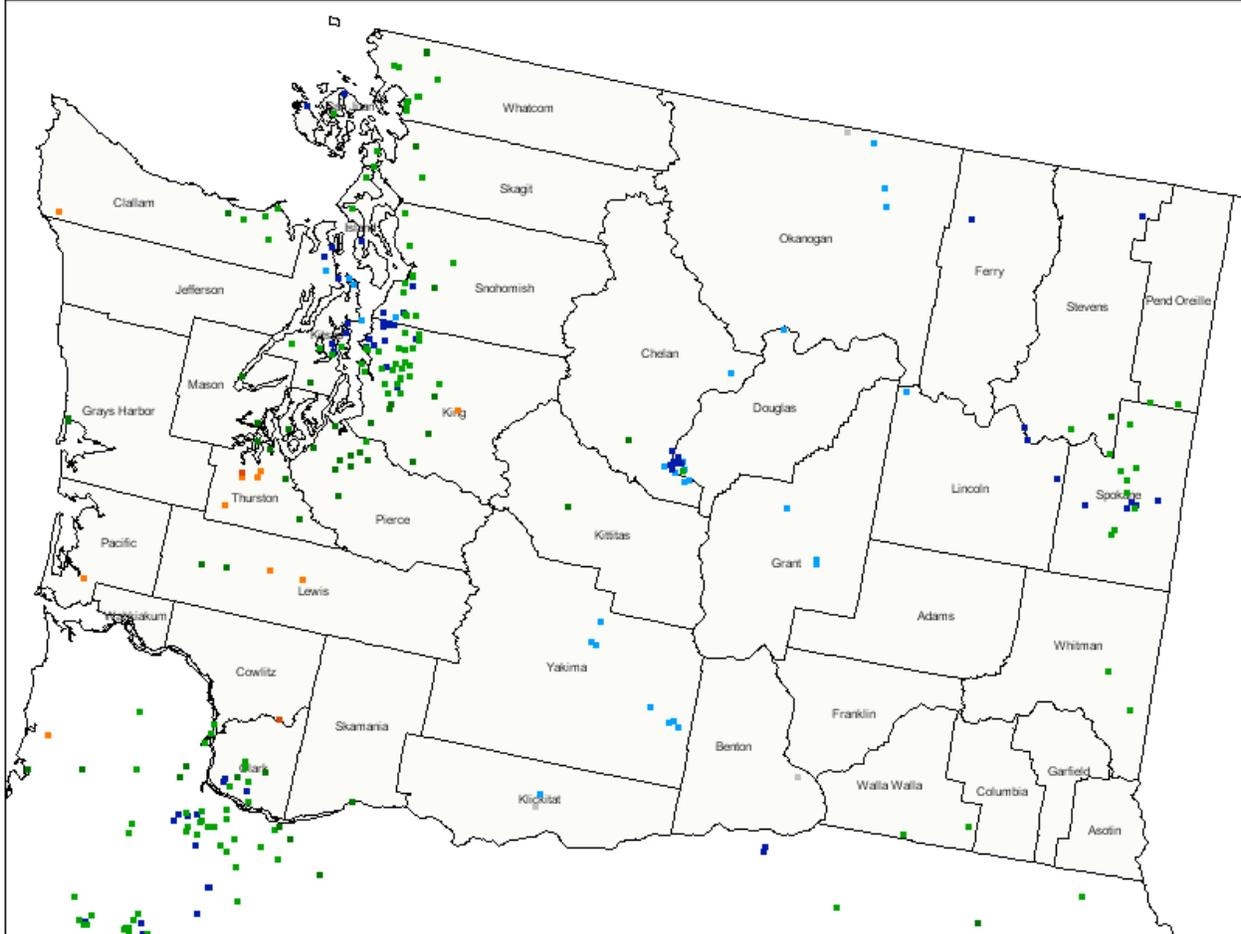
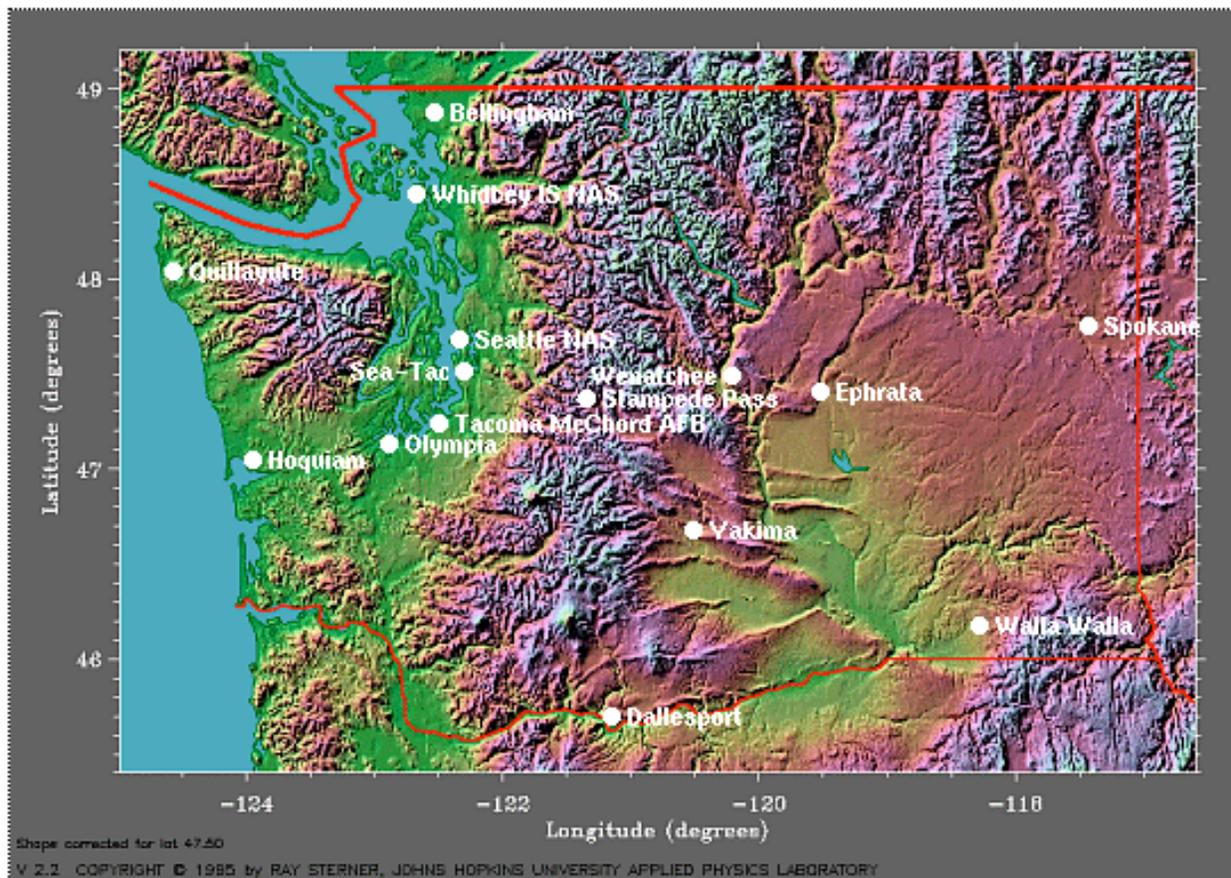


Figure 3 - CoCoRAHS total daily precipitation for November 12, 2008.

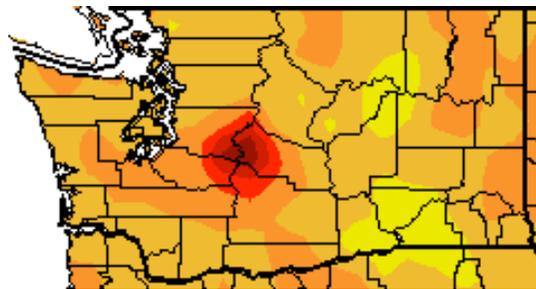
Highlight - Climatology of Washington

Access climate normals to 15 sites around Washington from the Climate Diagnostics Center! Graphs with the long-term average maximum temperature, minimum temperature, precipitation, and snowfall as well as maximum and minimum temperature extremes are available for various locations around the state. To get to it, go to the OWSC website, <http://climate.washington.edu>, and click on "Climate Data". Then click on "Line Graphs of Long-term Averages & Recent Data". The 1st link, "Daily Climate Graphs" brings you to the CDC website with an interactive map (shown below) indicating the available sites in Washington. Simply click on a location on the map to view line graphs of the information described above.

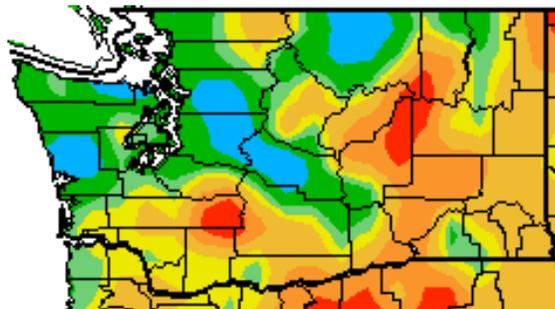


Climate Summary

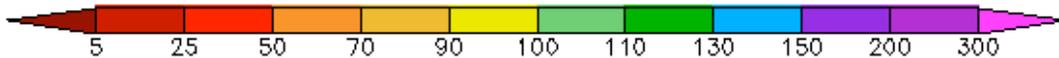
November was unanimously warmer than normal across the entire state! Pictured below in the departure from normal temperature plot from the HPRCC (normal baseline from 1971-2000), is a bull's eye of warmer than normal temperatures by about 10°F at Stampede Pass. We are skeptical of the bull's eye since it is only one station (Stampede Pass) reporting for that area. No other extreme temperature departures from normal occurred elsewhere, as the rest of the state experienced warmer than normal temperatures within the range of 1-6°F. Precipitation was above normal through the western flank of the Cascades in King and Snohomish counties and also around the Puget Sound area, thus contributing to the flooding. Above normal precipitation amounts also fell in Grays Harbor county which experienced flooding as well. Below normal precipitation, however, occurred in the Cascades in Lewis and Skamania counties and also in eastern Washington.



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>).*

	Temperature (F)			Precipitation (inches)		
	Average	Normal	Departure from Normal	Total	Normal	% of Normal
Olympia	46.5	42.4	4.1	9.37	8.13	115
Seattle	49.7	45.9	3.8	4.91	4.92	100
Sea-Tac	49.2	45.2	4.0	6.52	5.90	111
Spokane	38.5	34.9	3.6	1.69	2.24	75
Lewiston	44.4	40.4	4.0	0.90	1.21	74
Omak	37.4	34.6	2.8	1.84	1.45	127
Pullman	42.2	36.8	5.4	3.45	2.83	122
Ephrata	40.0	37.7	2.3	0.61	1.03	59

Table 1 - November Climate Summaries from locations in Western Washington and Eastern Washington (highlighted in orange) from NWS (climate normal baseline is 1971-2000).

Consistent with the images above, the monthly summaries (Table 1) show that temperatures were warmer than normal statewide, and that precipitation was greater than normal around the Puget Sound. The stations in eastern Washington reveal that precipitation was below normal in some areas especially in Ephrata, where precipitation was only 59% of the normal.

Outlook

The seasonal climate forecast by the NOAA Climate Prediction Center for winter (December-January-February) calls for an equal chance of below, equal to, or above normal temperatures and precipitation amount for the entire state. For 2009 (January-February-March), however, the current outlook calls for at least a 40% chance of below normal temperatures for the majority of the state, and at least a 33% chance of below normal temperatures for the southeastern part of the state. The cooler temperatures that were modeled for the JFM period may be related to the Pacific-Decadal Oscillation (PDO). For precipitation, there is an equal chance of below, equal to, or above normal amounts for the entire state.



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

The ENSO status is still neutral, and these neutral conditions are expected to last through the new year (<http://www.cpc.noaa.gov/products/precip/CWlink/MJO/enso.shtml>).

CoCoRAHS

Thank you, CoCoRAHS observers! Are you interested in becoming a daily weather observer or do you know someone who is? See cocorahs.org to find out how to become an observer and what's involved, or contact us at wash.cocorahs@gmail.com.



*OWSC would like to thank Gary Urbas from the Washington State Emergency Management Division for information regarding the damage estimates for the November flooding.