



Office of the Washington State Climatologist

July 2, 2009

Farewell, Phil!

Philip Mote, our WA State Climatologist, is leaving this month to become the director of the newly-established (2007) Oregon Climate Change Research Institute located at Oregon State University, and also to become the OR State Climatologist and a Professor in the College of Oceanic and Atmospheric Sciences.



Although we're sad to see him go, we would like to congratulate him on this great opportunity! OWSC would like to thank Phil for his dedication to our operation, and wish him the best with his new endeavors. While we will miss him, we are comforted to know that Phil is staying in the Pacific Northwest and will continue to collaborate with us. At this time, University of Washington's College of Environment and the Joint Institute for the Study of the Atmosphere and Ocean (JISAO) are working on finding a replacement. OWSC is confident that we can keep our operations running smoothly during this transition.

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Warm and Dry June

The Climate Prediction Center's seasonal climate outlook for June-July-August that we published in our May Newsletter came into fruition this June, as in general, the state was warm and dry. The second two weeks of May were dry throughout the state as well, and May 20th marked the first day of an extended dry spell at Seattle-Tacoma International Airport (SeaTac). There were 29 days without measurable precipitation at SeaTac (May 20-June 17), tying the record set in 1982 for dry days in May and June. The all-time number of consecutive days without precipitation at SeaTac is 51 days and was set from July 7-Aug 26, 1951. June has been even drier than in 2003 when there were record or near-record streamflows in western WA. Summer droughts are possible despite adequate snowpack (like in 2003), and OWSC is concerned about our recent dry spell. Table 1 shows the total June precipitation for a few locations around western WA, the normal June value, the percent of normal, the most recent year and June precipitation value lower than this year's precipitation total, and the June 2003 total precipitation value for comparison. Hoquiam Bowerman

Airport hasn't had less than this year's June total precipitation (0.33 inches) since it started recording in 1953.

Station	June 2009 Total Precipitation (in)	June Normal (in)	% Normal	Most Recent Lower June Total Precipitation	Year Occurred	June 2003 Total Precipitation (in)
Bellingham AP	0.47	1.95	24.1	0.25	1977	1.14
Hoquiam Bowerman AP	0.33	2.32	14.2	-	-	0.65
Olympia	0.22	1.78	12.4	0.14	1970	0.28
Quillayute AP	1.02	3.50	29.1	0.40	1967	1.24
SeaTac AP	0.18	1.49	12.1	0.16	1987	0.51
Seattle	0.27	1.68	16.1	0.04	1987	0.95

Table 1: June total precipitation (in) for several western WA locations, the normal June precipitation, and the percent of the 1971-2000 normal. Also shown is the most recent June precipitation total that is lower than the 2009 total and the year that it occurred. The 2003 June precipitation total is also shown since a significant hydrologic drought occurred in the summer of that year.

The beginning of June was also very warm with temperatures climbing into the 90's across the state. The unseasonably warm temperatures caused continued minor flooding in Kittitas and Yakima county due to rapidly melting snow. Heat advisories were issued for Seattle, Tacoma and Everett areas on June 3 and 4. Daily record high temperatures were reached on June 4 at SeaTac (91°F; old record 88°F in 1989), Seattle Sandpoint (85°F; old record 82°F in 1989), Olympia (92°F, tied in 1978), Bellingham (84°F; old record 83°F in 1989), and Quillayute (90°F; tied in 1989 and 1978). Cooler air finally moved into western WA on the evening of June 4 as a strong low pressure system came onshore on the border of OR and CA, forcing cooler, marine air into the region all the way up through western WA. It took the cooler air until June 5 to reach eastern WA, causing severe thunderstorms over the southern Cascades and the southeastern side of the state. While unusually hot weather did not occur for the remainder of the month, temperatures were still mostly above normal and precipitation was few and far between. One area that did receive heavy precipitation, however, was Clark county on June 19 where CoCoRaHS observers reported up to 2 inches of rain.

The warm and dry conditions have caused fuel moisture (percent water content of vegetation) to decrease across the state, with values lower than last year, and generally below normal. Figure 1 shows the western WA fuel moisture as of June 30. Charts for other portions of the state can be found at the WA state Department of Natural Resources (DNR) website (http://www.dnr.wa.gov/RecreationEducation/Topics/FireInformation/Pages/rp_fire_fireinformation.aspx). As of June 30, fire danger is classified as "High" by DNR in Lincoln, Okanogan, Pend Oreille, San Juan, Spokane, and Stevens counties.

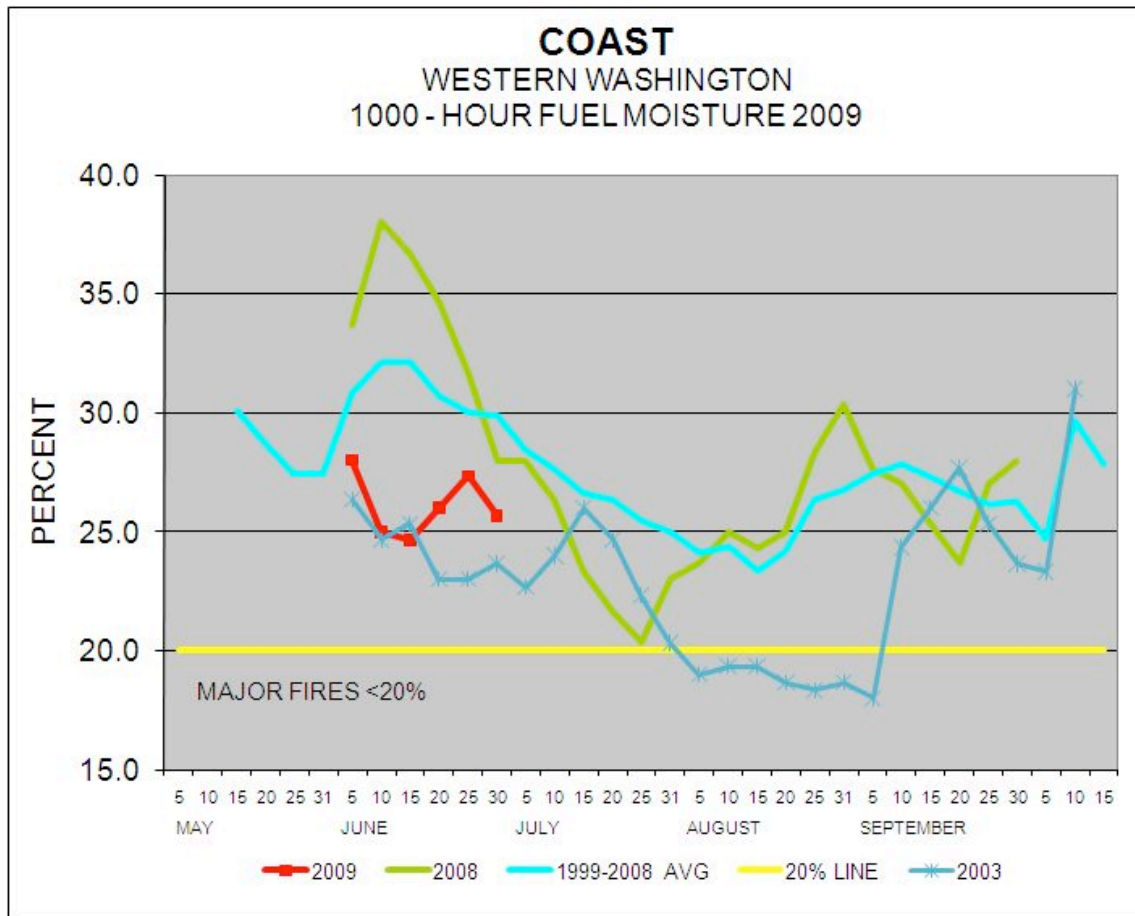


Figure 1: Fuel moisture for western WA as of June 30. The red line is this year (http://www.dnr.wa.gov/RecreationEducation/Topics/FireInformation/Pages/rp_fire_fireinformation.aspx).

Howard Hanson Dam Update

Heavy rains in January damaged Howard Hanson Dam (located on the Green River in King County) as discussed in the April edition of the OWSC newsletter. Limited information was available at that time, but the final environmental assessment was released in June. During the heavy rains in January, water was stored in the dam at a record high elevation of 1,189 ft. As a result of that, two depressions were formed in the right abutment of the dam. Concern over whether the depressions jeopardized the structure brought on the recently released environmental assessment. A plan has been proposed that includes constructing new roads to better access the right abutment and provide better measurements, modifying how much water is held in the dam during the spring, installing a new alternative route for drainage along the right abutment, and constructing a “grout curtain” (i.e. a secondary measure to help reduce seepage) along the right abutment. More information and updates can be found at: http://www.nws.usace.army.mil/PublicMenu/Doc_list.cfm?sitename=HHD&pagename=Pool_Restriction.

Low Streamflow

The streamflow forecasts through September have improved slightly for a few locations, but these rivers are still experiencing low flows. Figure 2 shows the NWS River Forecast Center's latest predictions on snowmelt-dominated summer streamflow for Washington. The June 18th forecast made improvements for the Stehekin River at Stehekin and Yakima River at Cle Elum (now normal as opposed to 75-90% of normal) and the Chelan River by Lake Chelan Dam (now 87% of normal instead of 79% of normal). The forecast is the same for the other locations of concern as last month's.

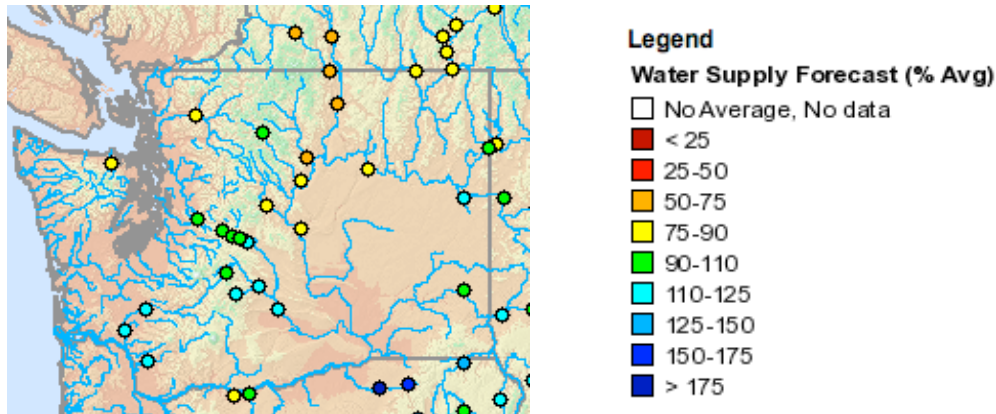


Figure 2: Predicted streamflow for June through September from NWS Northwest River Forecast Center (http://www.nwrfc.noaa.gov/water_supply/ws_fcst.cgi).

The dry June conditions in western WA has caused concern for other rivers in the area. Even areas that weren't affected by low snowpack this winter could see low streamflows as shown by an OWSC study that illustrates how western WA can be adversely affected by summer-time drought. In 2003, there were record or near-record low streamflows in western WA as a result off a hydrologic summer drought despite snowpack being near-normal that year. Figure 3 shows how the 2003 June-July-August-September streamflow ranked compared to 55 other years, and it is clear that summer-time drought has an impact. We are most concerned with the northern Puget Sound region as that region has been affected by low snowpack and a dry June.

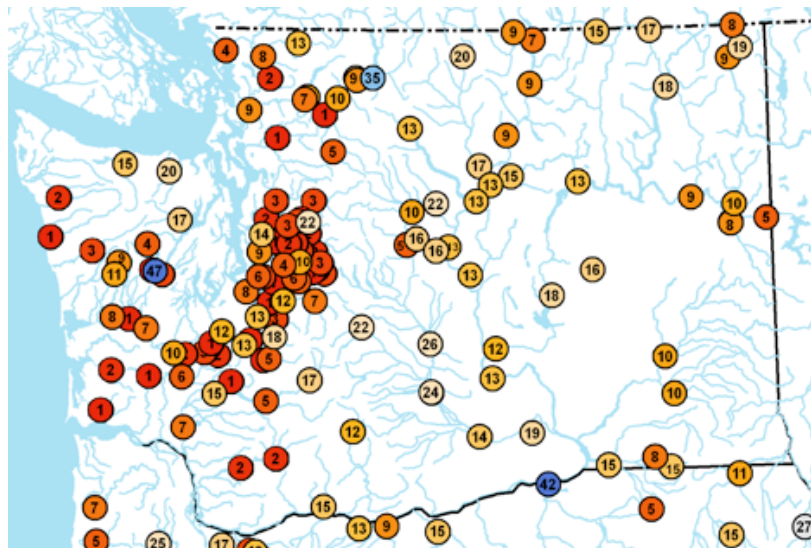
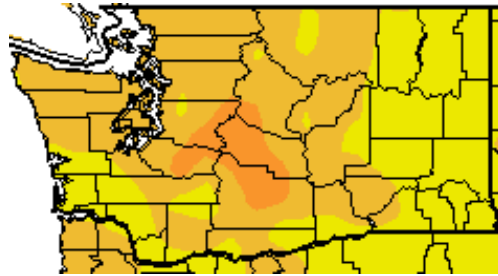


Figure 3: Ranking of 2003 streamflow compared to 55 years. Darker reds denote lower rank. Figure by Rob Norheim.

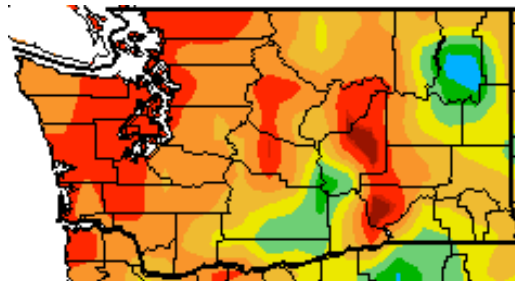
Climate Summary

The entire state of Washington experienced above normal temperatures for June as shown in the plot of temperature departures from normal from the High Plains Regional Climate Center. Last month, temperatures hovered around normal, and temperatures were below normal for quite a few months before that, so the above normal temperatures are a big change from recent weather patterns. Eastern Washington's temperatures were closer to normal, falling in the 0-2°F bracket, but most of the state had temperatures 2-4°F above normal. There were even a few stations in the central Cascades that recorded temperatures 4-6°F above normal for June.

June was very dry across Washington, with most areas receiving less than 50% normal precipitation. The Seattle area only received between 12-16% of normal (Table 2). Eastern Yakima county, Klickitat, and parts of Stevens, Lincoln, and Spokane counties are the only locations that had above normal precipitation for the month. Spokane actually received its exact normal precipitation amount, making it a rare 100% of normal for June. Pullman was also near-normal, with 94% of normal for the month. The normal baseline used in the graphs below is 1971-2000.



Temperature (°F)



Precipitation (%)



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

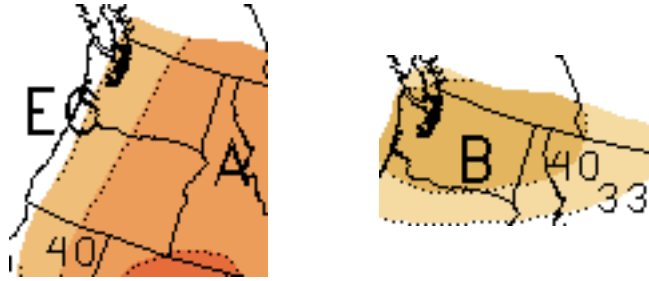
	Temperature (°F)			Precipitation (inches)		
	Avg	Normal	Departure from Normal	Total	Normal	% of Normal
Olympia	60.8	58.2	2.6	0.22	1.78	12
Seattle	63.4	60.6	2.8	0.27	1.68	16
Sea-Tac	63.8	60.7	3.1	0.18	1.49	12
Vancouver	65.4	60.7	4.7	1.07	1.73	62
Spokane	63.2	61.6	1.6	1.18	1.18	100
Omak	67.0	64.6	2.4	0.52	1.22	43
Ephrata	69.8	67.7	2.1	0.04	0.51	8
Pullman	60.0	59.2	0.8	1.22	1.30	94
Yakima	67.4	62.9	4.5	0.52	0.62	84

Table 2 - June Climate Summaries from locations in western Washington and eastern Washington (highlighted in orange) from NWS (climate normal baseline is 1971-2000).

Outlook

The seasonal climate forecast by the NOAA Climate Prediction Center for July-August-September (JAS) calls for at least a 33% chance of warmer than normal temperatures throughout central WA including the the Puget Sound and most of the Cascades. Eastern Washington has at least a 40% chance of above normal temperatures, while the western Olympic peninsula has equal chances for below, equal to, or above normal temperatures for JAS. The JAS precipitation outlook calls for at least a 40% chance of below average precipitation for most of the state, except for the very southeastern portion where there is a 33% chance of below normal precipitation.

The outlook for August-September-October (ASO) calls for equal chances of below, equal to, or above normal temperatures for the entire state. There is at least a 33% chance of below normal precipitation for most of the state for ASO, and at least a 40% chance of below normal precipitation for the very southwestern portion of the state.



(July-August-September outlook for temperature (left) and precipitation (right) from the CPC).



(August-September-October outlook for temperature (left) and precipitation (right) from the CPC).

According to the Climate Prediction Center, the ENSO-neutral state in the Pacific Ocean is continuing to transition to El Niño conditions. The transition to El Niño conditions is expected to last through the summer

(<http://www.cpc.noaa.gov/products/precip/CWlink/MJO/enso.shtml>).

CoCoRaHS News



Thank you, observers, for continuing to make precipitation observations during this very dry period. Your observations are just as important now, as they can give insight into precipitation that isn't just falling at standard weather stations and airports. If you have any questions about CoCoRaHS, then please contact wash.cocorahs@gmail.com or your regional coordinator. We are always looking for new volunteers, so if you're interested in observing or know someone who is, please register at www.cocorahs.org. One of our members, Sean Kiaer with CoCoRaHS station WA-SN-2, has started a Yahoo! Group for Washington CoCoRaHS observers where volunteers can get updates, ask questions, and share data. To join the discussion group, go to http://groups.yahoo.com/group/cocorahs_wa/.