



# Office of the Washington State Climatologist

July 6, 2011

## June Event Summary

June was rather uneventful regarding weather and climate, with cooler than normal conditions persisting, and precipitation below normal in most locations. Very few daily records were set during the month, as illustrated by the daily maximum and minimum temperatures from Spokane International Airport that were generally within the normal range (Figure 1). It was also quite chilly on the west side during the middle of the month, with Olympia, for example, experiencing lows dipping into the 30s. A record low temperature was recorded at Spokane Airport on the 9th (39°F) and a record low maximum temperature was measured at Omak on the 8th (57°F).

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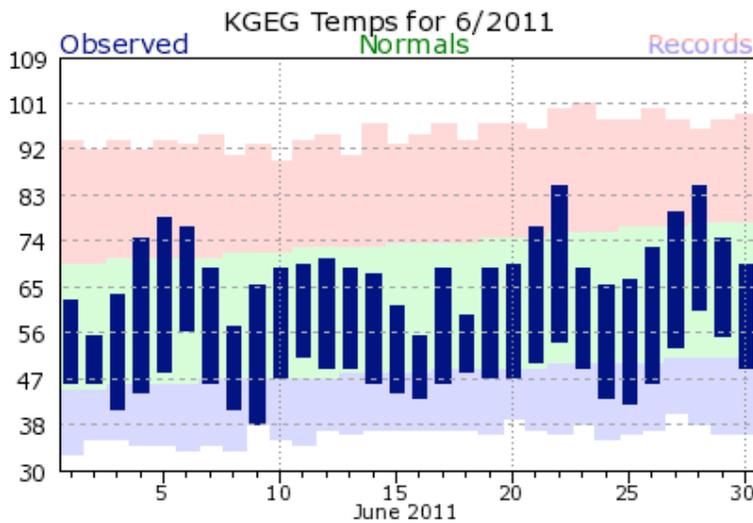


Figure 1: Observed daily maximum and minimum temperatures at Spokane International Airport with the normal temperature range in green and records in blue or red (from NWS).

## CoCoRaHS

As always, thank you, CoCoRaHS observers, for your dedicated measurements. CoCoRaHS unfortunately did not make the goal of 10,000 measurements nationwide in one day during the June challenge. You may have noticed a count above the daily precipitation map on the home page though, and that feature has since been added so volunteers can easily see the nationwide tally. Questions regarding CoCoRaHS should be directed to [wash.cocorahs@gmail.com](mailto:wash.cocorahs@gmail.com), and you can sign up at [www.cocorahs.org](http://www.cocorahs.org).

## Spring Summary

According to the National Climatic Data Center’s temperature and precipitation data set, the spring (defined as March 1 through May 31; MAM) was cooler and wetter than normal across the state of WA. It was the 3rd coolest spring in the 117-year record with an average statewide temperature of 44.2°F, 3°F cooler than the long-term (1901-2000) average (Figure 2a). The average statewide total precipitation (13.59 inches) for spring was the wettest in the 117-year record (Figure 2b), and is 5.66 inches more than the long-term average (1901-2000).

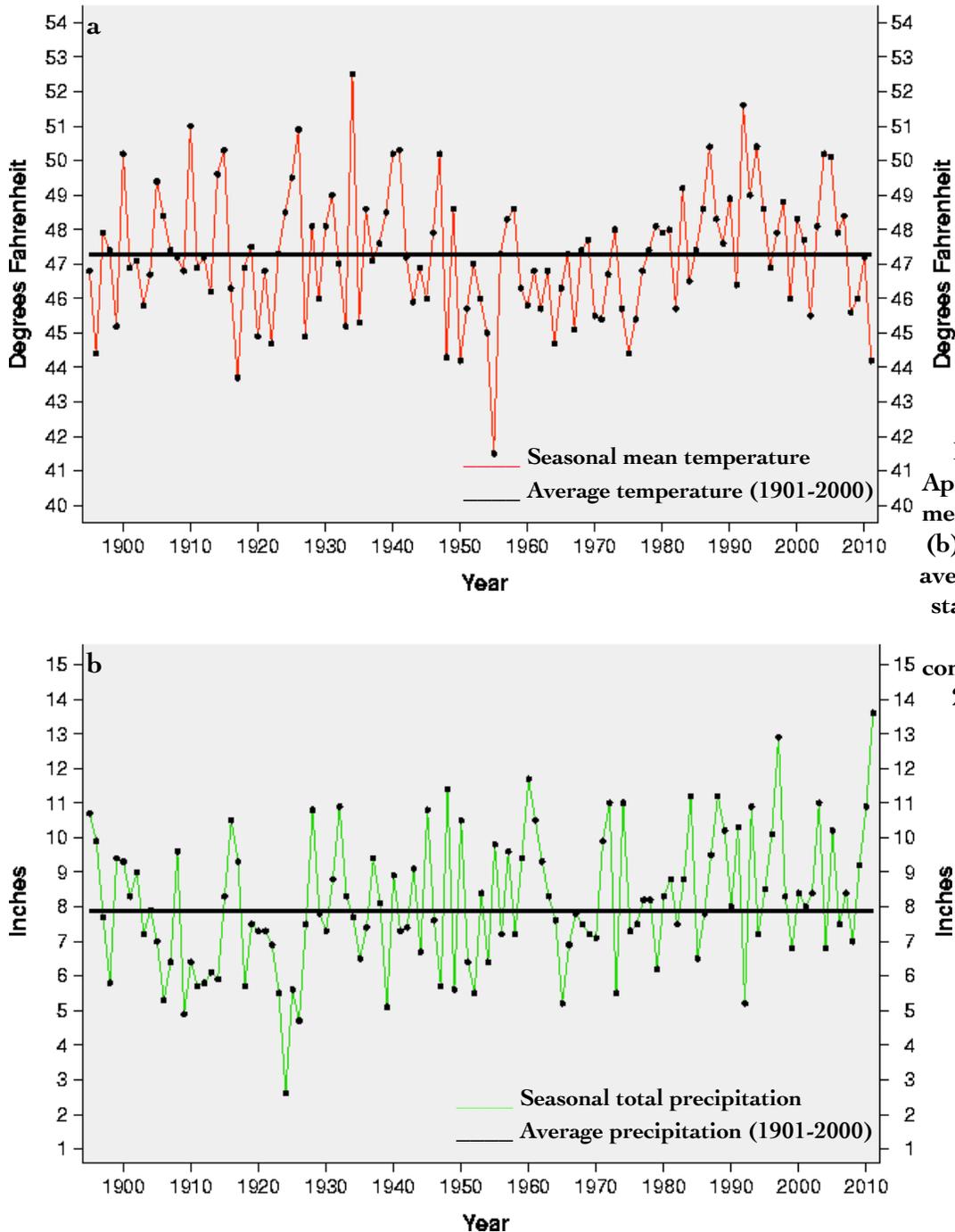


Figure 2: March-April-May (MAM) (a) mean temperature and (b) total precipitation averaged for the entire state of WA for 1895 through 2011 compared to the 1901-2000 mean (from NCDC).

## Snowpack & Projected Streamflow

The cool spring temperatures and high snowpack for the winter season has caused the snowpack to remain longer than usual producing abnormally high percent of normal snow water equivalent values for this time of year. Minor flooding for several rivers persisted through much of June, with high water occurring on the Okanogan River near Tonasket (Okanogan County), Pend Oreille River below Albeni Falls (Pend Oreille County), and the Naches River near Naches (Yakima County). The Columbia River near Vancouver (Clark County) even experienced some minor flooding due to the abundant runoff. The Northwest River Forecast Center issued its most recent water supply forecast on June 29 for projected streamflow from now through September (Figure 3), and is expecting above normal (110-125%) to much above normal (>175%) streamflow throughout the state.

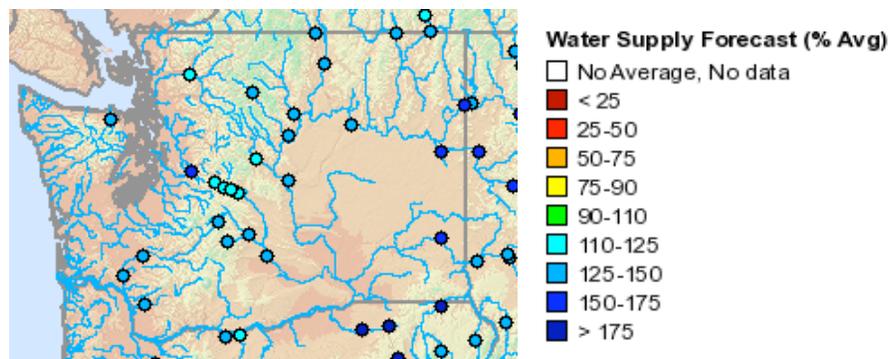


Figure 3: July through September water supply forecast for WA as of June 29, 2011 from the National Weather Service Northwest River Forecast Center ([http://www.nwrfc.noaa.gov/water\\_supply/ws\\_fcst.cgi](http://www.nwrfc.noaa.gov/water_supply/ws_fcst.cgi)).

## NOAA's New Climate Normals

The standard climate normal, or the 30-year average of weather conditions, is changing. Most anomalies and comparisons to normal conditions have been considered using the average conditions between 1971 and 2000, but NOAA's National Climatic Data Center (NCDC) has unveiled the "new normals" on July 1. The new normals essentially drop the oldest decade in favor of the more recent decade, and will consist of the averages in the variables between 1981 and 2010. The change in the normals is consistent with the World Meteorological Organization's (WMO) recommendations to update the normals every 10 years.

NCDC is recalculating hourly, daily, monthly, seasonal, and annual normals, and those are available for temperature, precipitation, snowfall, and snow depth as of July 1. Some of the other products will not be available until Jan 1, 2012, and those include the frost/freeze date normals, climate division normals, and the heating or cooling degree day normals. This iteration of normals brings some new products that have not been included before. For example,

“count normals” will be provided, which are the total number of days above or below a certain threshold in a month, season, or year. Another product included in this suite is the “pseudo-normals”, which are estimates of the normal for stations that have less than a 30-year record. This is based on neighboring stations as described in Sun and Peterson (2005) and will be available for the Climate Reference Network (CRN) stations.

Though not an official indicator of climate change, you may expect the new normals to be warmer than the 1971-2000 averages. This is primarily because the warm decade of 2001-2010 is now used to calculate the normals in place of the cooler 70’s (that’s temperature-wise, not a reference to bell bottoms). Figure 4, produced by NCDC, shows the difference between the new normals and the old for January (a) and July (b). As shown in the figure, most of the normals are now warmer for the US. It should be noted that some changes to the method of computing the normals has occurred with this iteration, but the comparisons in Figure 4 take into account those changes for an accurate comparison. The warmer normals should be kept in mind as the transition is made because hot temperatures will tend to be not as extreme since they are referenced to the new normals while cold temperatures may seem more anomalous.

Additional information on the new normals can be found here:

<http://www.ncdc.noaa.gov/oa/climate/normals/newnormals.html>. Changes to several of the products on our website that use the 30-year normals will be implemented in the coming months. It should be noted that the change in several of the products featured in this newsletter will take some time, and the normals are still in reference to the 1971-2000 time period for this edition.

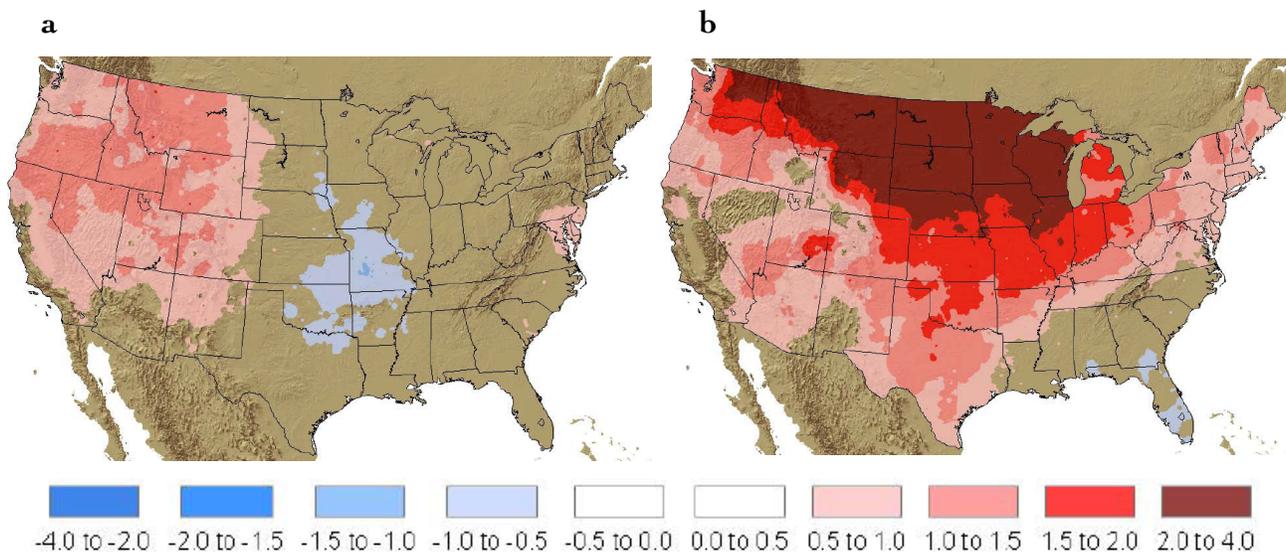
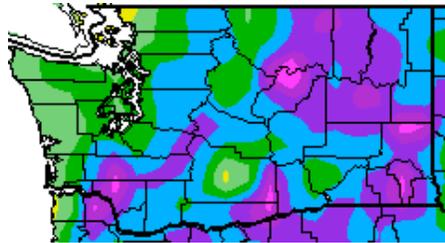


Figure 4: The difference between the 1981-2010 normals and the 1971-2000 normals for the July maximum temperature (a) and the January minimum temperature (b) nationwide (1981-2010 minus 1971-2000). These figures were produced by the National Climatic Data Center.

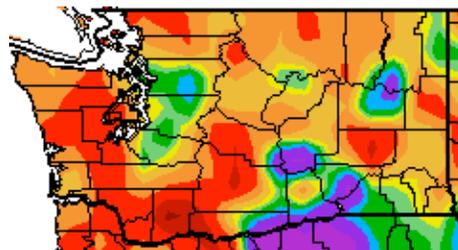
## Climate Summary

The cool spring temperatures persisted into June for WA State, as shown in the map below from the High Plains Regional Climate Center. Several locations, such as southwestern WA and northeastern WA, had temperatures between 3 and 4°F below normal. In particular, Omak and Ephrata were 3.7 and 3.2°F cooler than normal, respectively (Table 1). Temperatures were much closer to normal on the Olympic Peninsula and in northern Puget Sound. The average June temperature was exactly normal at Bellingham Airport (Table 1), and was less than a degree different at Quillayute.

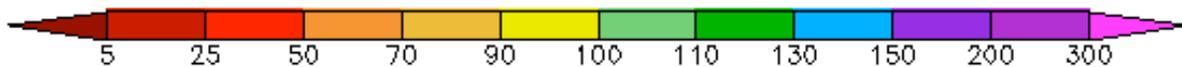
In contrast to the above average monthly precipitation totals reported in the last three newsletters, June precipitation was actually below normal for most of the state. The HPRCC map shows that most of the state received between 25 and 90% of normal precipitation. Quillayute, Vancouver, Spokane, Bellingham, Omak, and Pullman all received about half of their normal June precipitation (Table 1). Yakima and Olympia were some of the driest locations for June, receiving only 34 and 38% of normal precipitation, respectively. Precipitation in the central portion of the Puget Sound, including the Seattle metro area, and parts of southeastern WA was closer to normal for the month.



Temperature (°F)



Precipitation (%)



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

	Mean Temperature (°F)			Precipitation (inches)		
	Average	Normal	Departure from Normal	Total	Normal	% of Normal
Western Washington						
Olympia	56.8	58.2	-1.4	0.67	1.78	38
Seattle WFO	59.4	60.6	-1.2	1.53	1.68	91
Sea-Tac	59.4	60.7	-1.3	1.42	1.49	95
Quillayute	54.5	54.9	-0.4	1.87	3.50	53
Bellingham Airport	58.7	58.7	0	1.00	1.95	51
Vancouver	61.6	62.6	-1.0	0.77	1.60	48
Eastern Washington						
Spokane AP	59.0	61.6	-2.6	0.57	1.18	48
Wenatchee	63.7	66.4	-2.7	0.26	0.64	41
Omak	60.9	64.6	-3.7	0.67	1.22	55
Pullman	56.6	59.2	-2.6	0.56	1.30	43
Ephrata	64.5	67.7	-3.2	0.40	0.51	78
Yakima	62.5	62.9	-0.4	0.21	0.62	34

Table 1 - June 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.

## Climate Outlook

Neutral ENSO conditions are present in the equatorial Pacific Ocean. According to the Climate Prediction Center (CPC), the sea-surface temperature anomalies were normal across most of the equatorial Pacific with some above average SSTs in the eastern Pacific during the last 4 weeks (<http://www.cpc.noaa.gov/products/precip/CWlink/MJO/enso.shtml>). There is high confidence that the neutral conditions will last through the summer, and the majority of models indicate that the neutral conditions are liable to continue through January 2012.

The late summer (July-August-September; JAS) temperature outlook has equal odds of below, equal to, or above normal temperatures. The JJA precipitation forecast is essentially the same, except for at least a 33% chance of below normal precipitation in a small portion of southwest WA. The August-September-October (ASO) outlook has even odds of below, equal to, or above normal temperatures and precipitation.



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



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