



## Office of the Washington State Climatologist

September 2, 2011

### August Event Summary

The average temperatures during August were generally within 1°F of normal in the western half of the state, and between 1 and 3°F above normal for much of eastern WA. More notable was the lack of precipitation during August, with very dry conditions for nearly the entire state. No precipitation at all was recorded for several stations in eastern WA (see Climate Summary below) and there was very little in most locations west of the Cascade crest as well. There were 25 consecutive days without measurable precipitation at Everett Snohomish Airport ending on Aug 31. This ranks as the 4th longest stretch of dry days since records began in 1950. It is worth noting, however, that the record at Everett of 52 days ending on August 26, 1951 is about twice as long as this year's stretch. The dry stretch was 27 days at SeaTac Airport ending on August 21, only ranking as the 23rd longest stretch of dry days since 1950. Other stations had similar stretches and many were about half as long as the record. Two more examples: Olympia had 31 dry days ending on August 21 and Spokane had 36 dry days ending on August 30, ranking 27th and 21st since 1950, respectively. These are also not of near-record duration, but still rather long for Washington State, especially compared to some of the wet conditions seen earlier in the year.

#### In this Issue

<b>August Event Summary....</b>	<b>1</b>
<b>Disaster Assistance.....</b>	<b>2</b>
<b>Cool Conditions.....</b>	<b>3</b>
<b>Climate Summary.....</b>	<b>5</b>
<b>NOAA Weather Radio.....</b>	<b>6</b>
<b>Climate Outlook.....</b>	<b>8</b>

The dry conditions were conducive to the ignition of several wildfires during the month. According to the Department of Natural Resources, several counties (Asotin, Chelan, Douglas, Ferry, Garfield, Kittitas, Klickitat, Lincoln, Okanogan, Spokane, Stevens, Walla Walla, and Yakima) have a "High" risk of fire danger. As of September 2, one fire is burning near Okanogan according to the Northwest Interagency Coordination Center. You can view more details here: <http://www.nwccweb.us/information/firemap.aspx>. The other notable August event was the frontal passage on the 22nd, bringing heavy rain to the coast and northern Puget Sound region. Quillayute received an impressive 3.22 inches of rain and most of the precipitation that was measured in August in western WA fell on that day. The reports of 24-hour total precipitation from CoCoRaHS observers ending at 7 am on August 23 (Figure 1) resemble those more commonly seen in the fall and winter months.

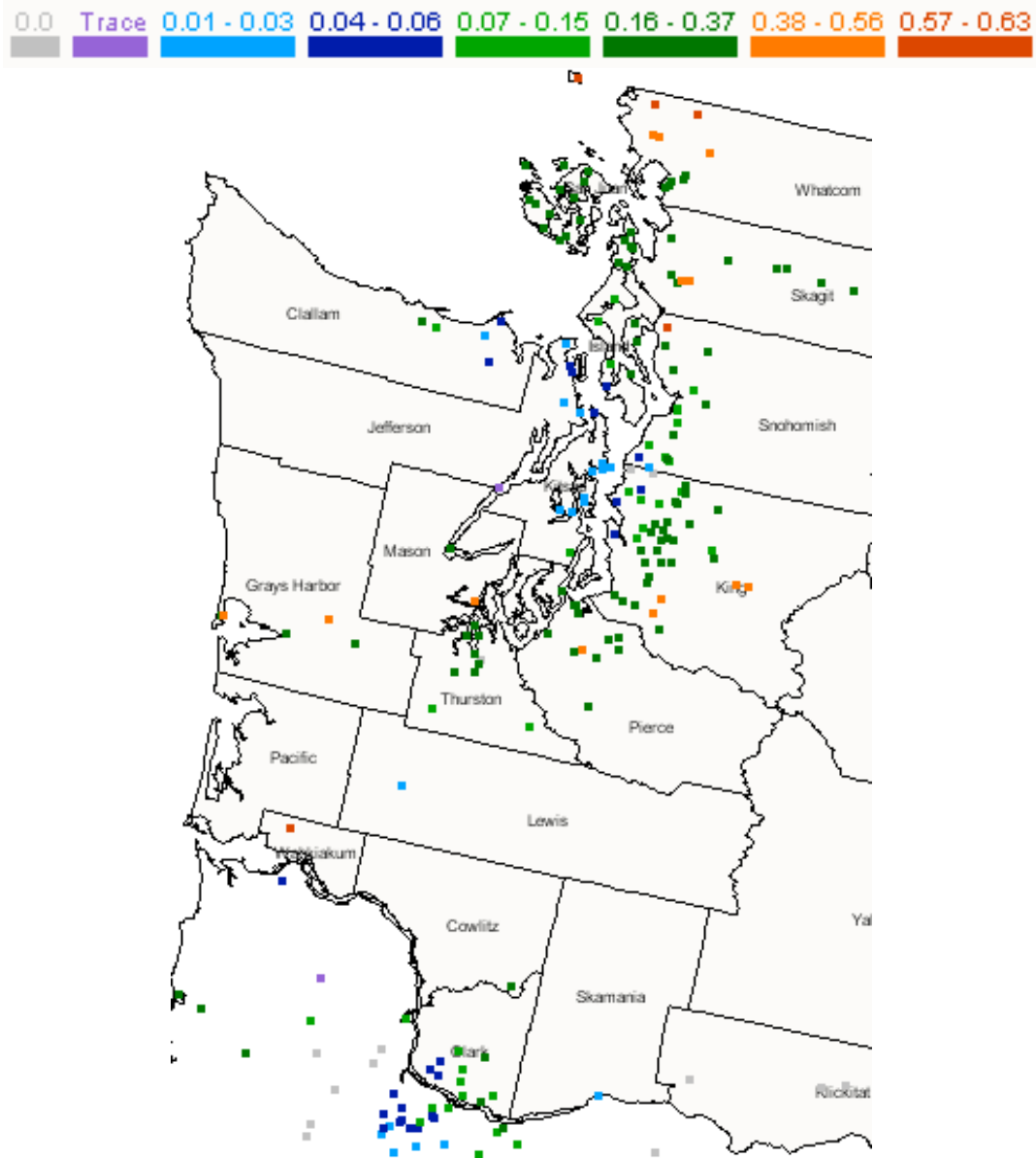


Figure 1: 24-hr total precipitation ending on August 23 at 7 am from CoCoRaHS observers.

## Cool Spring & Summer Prompt Request for Disaster Assistance

The cool and wet spring and early summer conditions that have been highlighted in previous editions of this newsletter have prompted Governor Gregoire to request federal assistance for farmers whose crops have been adversely affected by the poor weather conditions. You can read more on the request here:

<http://www.governor.wa.gov/news/news-view.asp?pressRelease=1755&newsType=1>.

## On the Recent Cool Temperatures in WA State

### A message from the State Climatologist

It is widely appreciated that relatively cool weather has plagued, or blessed, depending on your point of view, Washington State since the end of February 2011 as illustrated in the temperature time series for Seattle and Spokane (Figure 2). According to climate division data from the National Climatic Data Center (NCDC), the mean statewide temperature for April through July 2011 (53.2°F) was the second coldest in a record extending back to 1895. This spell of below normal temperatures is on the heels of a cool spring and summer in 2010, and in 2008. While recent temperature anomalies have been especially prominent in spring, they are not restricted to that season. Annual average temperatures during the last few years have been colder than typical of the last few decades (Figure 3). The objective here is to provide perspective on this unusual, and perhaps puzzling, aspect of our climate of the last few years.

First and foremost, it is important to recognize that the climate is far from static. Just like the weather varies from day to day, the climate fluctuates on time scales ranging from years to decades. These fluctuations are largely intrinsic. In other words, the climate is a chaotic system, and its internal workings can bring about remarkably persistent deviations from long-term (multi-decadal) averages. Our ability to predict these swings is minimal. The state of the tropical Pacific atmosphere-ocean system, specifically El Nino-Southern Oscillation (ENSO),

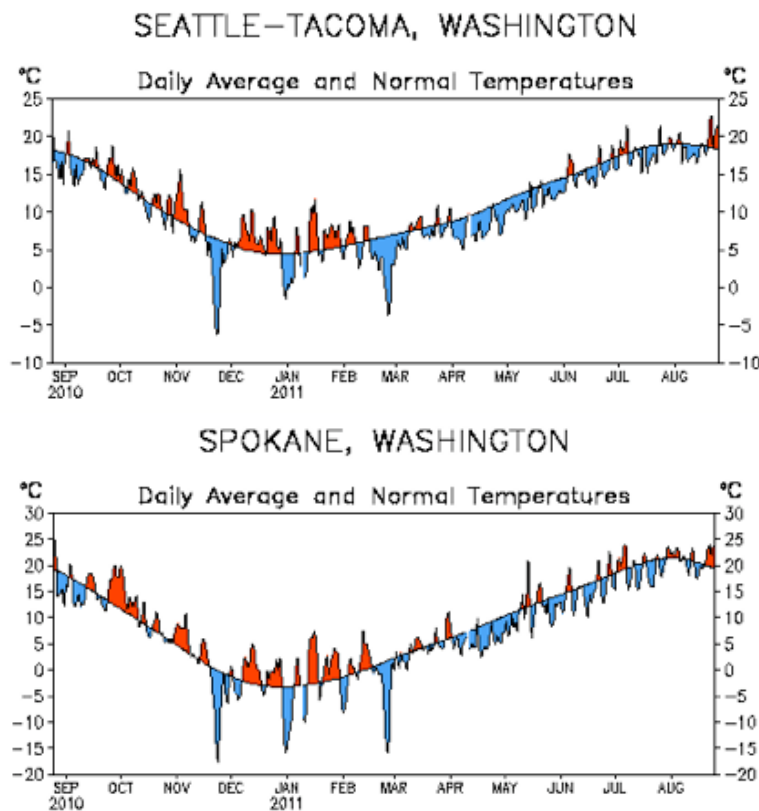


Figure 2: Temperature departures from normal for the last 12-months for Seattle (top) and Spokane (bottom) from the Climate Prediction Center.

has systematic influences on the seasonal mean weather in many parts of the world including the Pacific Northwest, and we now have some skill in predicting ENSO on time horizons of 6-12 months. But aside from ENSO, there is very little for us to hang our hats on, again because the climate system makes its own deviations out of thin air (pun intended). It has been pointed out that interannual variations in the temperature and precipitation in the Pacific Northwest correspond with variations in the leading pattern of North Pacific sea surface temperatures, the Pacific Decadal Oscillation (PDO). Nevertheless, this does not imply that the PDO is necessarily a useful predictor of our weather. To a large extent the PDO merely reflects the ocean's response to the weather that has occurred - just as a conference championship is a

result rather than a cause of a team winning more of their games. The situation is not completely hopeless in that the atmosphere appears to have some sensitivity to slow-evolving surface conditions outside of the tropical Pacific, i.e., sea surface temperature, soil moisture, and snow and ice cover anomalies. Information on these anomalies is being used in seasonal weather prediction, and there is a substantial ongoing effort to derive as much as possible from these sources of predictability. The limitations here are illustrated by the present example; there was no indication during the middle 2000s that it would turn cooler. The bottom line is that the climate has plenty of tricks up its sleeve, and simply it should not be much of a surprise when the weather becomes weird.

The fluctuations in the climate can serve to obscure long-term trends, especially in places like the Pacific Northwest for which the magnitudes of these trends are modest. Readers are encouraged to explore this for themselves using an application on the OWSC website (<http://www.climate.washington.edu/trendanalysis/>). This user-friendly interface allows one to quickly assess mean trends in temperature, precipitation and snowpack for different times of year and intervals and to plot time series from individual stations. It is striking how sensitive trends are to the years that are used for the endpoints of a record. This issue is by no means trivial. It would be very useful for planning purposes to know when global climate change is liable to overwhelm the climate variability or “noise”. Since we cannot anticipate these variations, especially on a regional basis, estimates of a time scale for climate change are necessarily tentative, and in broad terms.

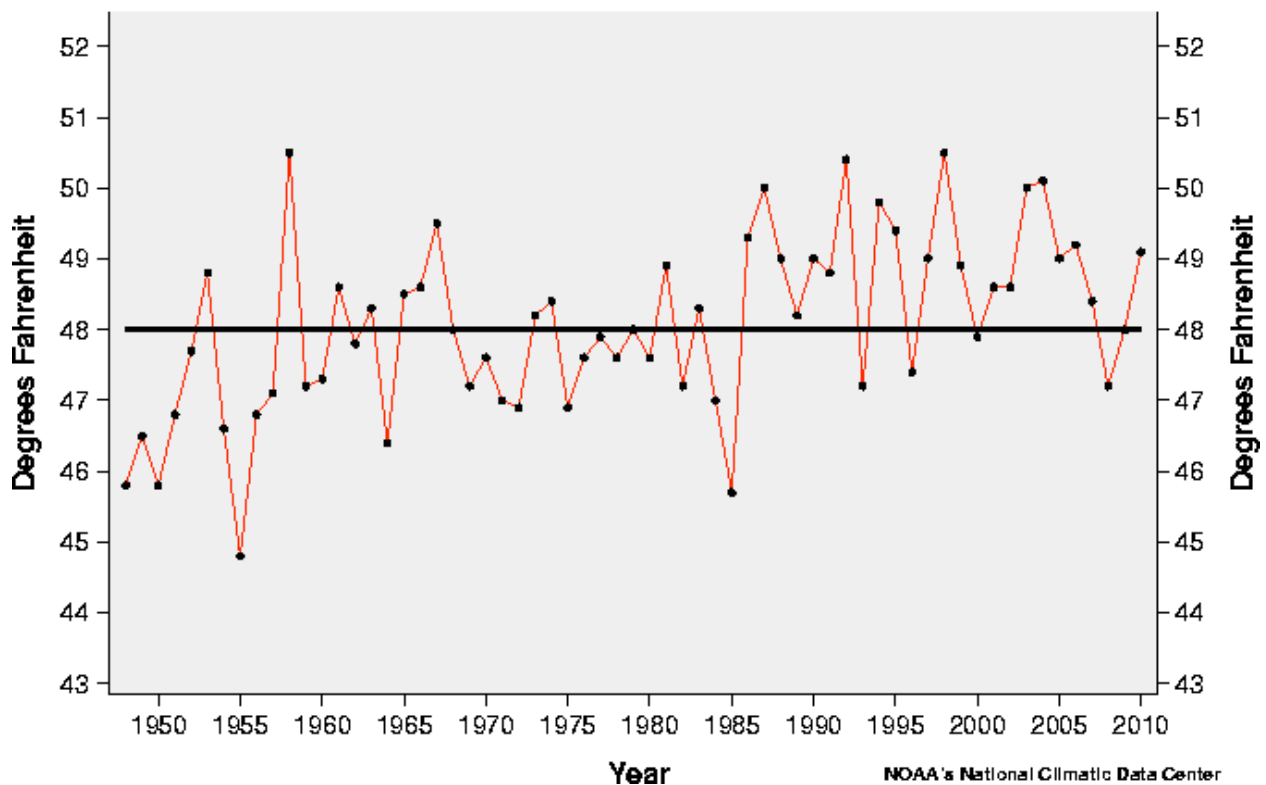
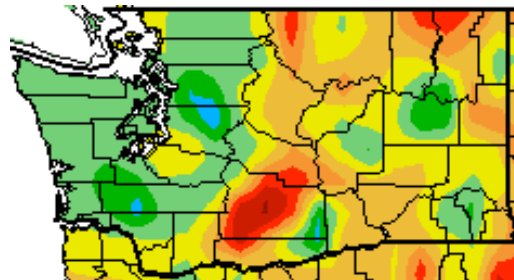


Figure 3: Annual average temperatures for WA from 1948 through 2010 from the National Climatic Data Center.

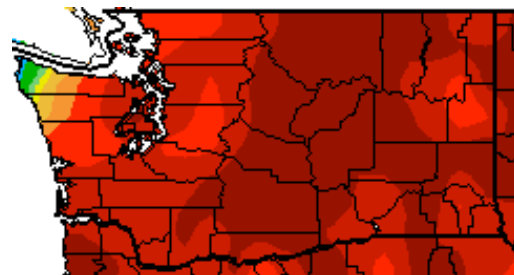
## Climate Summary

For the first time since the April newsletter (focusing on March conditions), the temperature departure from normal map of WA is not completely colored blue, purple, and dark green. Temperatures were finally above normal throughout most of eastern WA for August, with the warmest locations about 3°F above normal (e.g., Yakima was 3.1°F warmer than normal; Table 1). Locations west of the Cascade Mountains were close to normal, generally within 1°F of normal (Table 1; page 7).

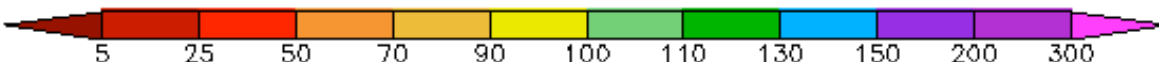
August was extremely dry throughout the whole state with the exception of the northwestern tip of the Olympic Peninsula. Quillayute was the aberration with 165% of normal precipitation (Table 1) that mostly fell on the day with the frontal passage described above. Otherwise, there was several locations that did not receive any precipitation at all. Wenatchee and Ephrata tied records for the driest August on record with totals of zero precipitation. In Wenatchee, no precipitation was also measured for August in 2006, 2000, 1974, and 1967. Ephrata did not receive any August precipitation in 2002, 2000, 1969, and 1955. August is the driest month of the year climatologically, so the lack of precipitation for the month is not a huge concern. The departure from normal precipitation map also displayed below shows that the monthly deficit of precipitation for the month is only about 1 inch for eastern WA and up to 2 inches for western WA and the Cascade Mountains.

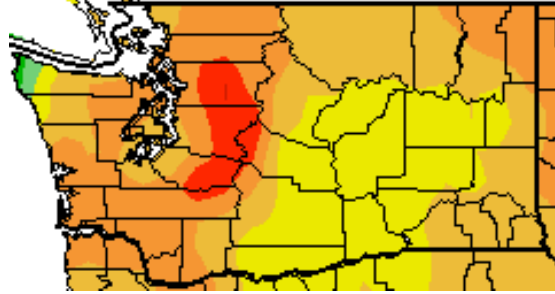


Temperature (°F)



Precipitation (%)





Precipitation (in)



*August temperature ( $^{\circ}$ F) departure from normal (top), August precipitation % of normal (middle), and August precipitation (inches) departure from normal (bottom). Source: High Plains Regional Climate Center (<http://www.hprcc.unl.edu>).*

## NOAA Weather Radio Awareness

September is weather radio awareness month. An all-hazards weather radio not only informs you of potential danger regarding weather-related events, but notifies you of the latest information regarding earthquakes, tsunamis, volcanic activity, and AMBER child abduction alerts. More information about NOAA weather radios can be found on the WA Emergency Management Division site: [http://www.emd.wa.gov/preparedness/prep\\_infocus.shtml#noaa](http://www.emd.wa.gov/preparedness/prep_infocus.shtml#noaa), including where to purchase one. At 10:15 am on September 21, a statewide test of the Emergency Alert System via the NOAA weather radio will occur in the form of an earthquake drill in addition to a tsunami warning for the coast only.

	Mean Temperature (°F)			Precipitation (inches)		
	Average	Normal	Departure from Normal	Total	Normal	% of Normal
Western Washington						
Olympia	63.0	64.1	-1.1	0.25	0.94	27
Seattle WFO	66.4	66.5	-0.1	0.11	0.97	11
Sea-Tac	65.8	66.1	-0.3	0.13	0.88	15
Quillayute	59.2	59.6	-0.4	3.27	1.98	165
Bellingham Airport	63.1	62.5	0.6	0.44	1.23	36
Vancouver	69.6	69.2	0.4	0.05	0.77	6
Eastern Washington						
Spokane AP	70.8	69.3	1.5	0.23	0.59	39
Wenatchee	74.7	73.5	1.2	0	0.20	0
Omak	72.1	72.4	-0.3	T	0.46	0
Pullman	66.0	65.7	0.3	T	0.63	0
Ephrata	73.6	72.9	0.7	0	0.19	0
Pasco AP	73.9	72.8	1.1	0.03	0.27	11
Yakima AP	72.4	69.3	3.1	T	0.26	0

**Table 1 - August climate summaries for locations around Washington with a climate normal base-line of 1981-2010. Note that the Vancouver Pearson Airport 1981-2010 normal involved using surrounding stations in NCDC's new normal release, as records for this station began in 1998.**

## Climate Outlook

The equatorial Pacific Ocean is still in an ENSO-neutral state, according to the Climate Prediction Center (<http://www.cpc.noaa.gov/products/precip/CWlink/MJO/enso.shtml>; CPC), though negative sea-surface temperature (SST) anomalies have been emerging. The SST anomalies have been between  $-0.5$  and  $-1.0^{\circ}\text{C}$  for most of the equatorial Pacific in the last 4 weeks, with some small areas of positive SST anomalies on the order of  $0.5^{\circ}\text{C}$ . Model forecasts indicate that the neutral ENSO conditions will continue through summer, and many of the models even predict the neutral conditions to persist through winter 2011-12. Other models indicate a return to La Niña conditions, however, and the CPC released a “La Niña Watch” on August 4

([http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/enso\\_advisory/ensodisc.html](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/ensodisc.html)). Present projections from CPC indicate about a 50-50 chance of either neutral or La Niña conditions developing and a much lower likelihood of an El Niño developing for next winter.

The CPC seasonal outlooks reflect aspects of a cooler tropical Pacific Ocean. The fall (September-October-November; SON) temperature outlook calls for equal chances of below, equal to, or above normal temperatures for the entire state. The SON precipitation forecast indicates a higher chance of above normal precipitation for the west side of the Cascade Mountains.

The October-November-December (OND) CPC three-class outlook has equal chances of below, equal to, or above normal temperatures, but the precipitation outlook indicates at least a 33% chance of higher than normal precipitation for most of the state.



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



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