Office of the Washington State Climatologist

July 3, 2014

June Event Summary

Averaged over the month, June temperatures were near-normal statewide. Total June precipitation was less than normal for much of the state, with northeastern WA representing an exception. For locations west of the Cascade Mountains, June marked the first month since January in which below normal precipitation fell. The Lower Columbia Basin was especially dry in June, and a few of the stations in those locations rank among the top ten driest Junes on record (Table 1). Though it was drier than normal in most of western WA, the extent of the dryness was not that unusual.

In this Issue

Station	June 2014 Precipitation	Ranking	Record and Year	Records Began
Pasco	0.18"	4	0.01" in 2003 and 1999	1945
Yakima AP	0.08"	10	T in 2003	1946
Ellensburg	0.11"	5 (tie)	0.05" in 1949	1940

Table 1: June precipitation totals, the ranking (driest to wettest), the amount and year of the record, and the year records began for a few stations in the Lower Columbia Basin.

The weather during June was relatively uneventful with few records, as is often the case when mean temperatures are near-normal and the month is dry. The first week of the month was typical for June, with morning clouds and afternoon sun the norm in western WA. The month started out dry and there were multiple red flag warnings in the Wenatchee area as a result of the gusty winds and dry conditions. Showers finally moved into the state beginning on the 12th for western WA and the 13th for eastern WA, and continued for the next several days. Temperatures cooled and some locations in southeastern WA even set daily records for low maximum temperatures on the 16th (Ephrata; 60°F) and 17th (Pullman; 49°F and Walla Walla; 56°F). Eastern WA had particularly rainy days on the 17th and 18th, in association with moisture in the northerly flow on the backside of an upper-level trough.

Weather around the state warmed and dried just in time for summer solstice - June 21 - and lasted through the weekend. More showery weather returned for the last full week of June, though very little precipitation was associated with the showers in most cases. The biggest exception was the heavy and localized precipitation that fell in the Portland area on the evening of the 25th (Figure 1). A maximum daily precipitation record was set at Vancouver on the 26th (0.66") as more widespread precipitation moved across western WA.

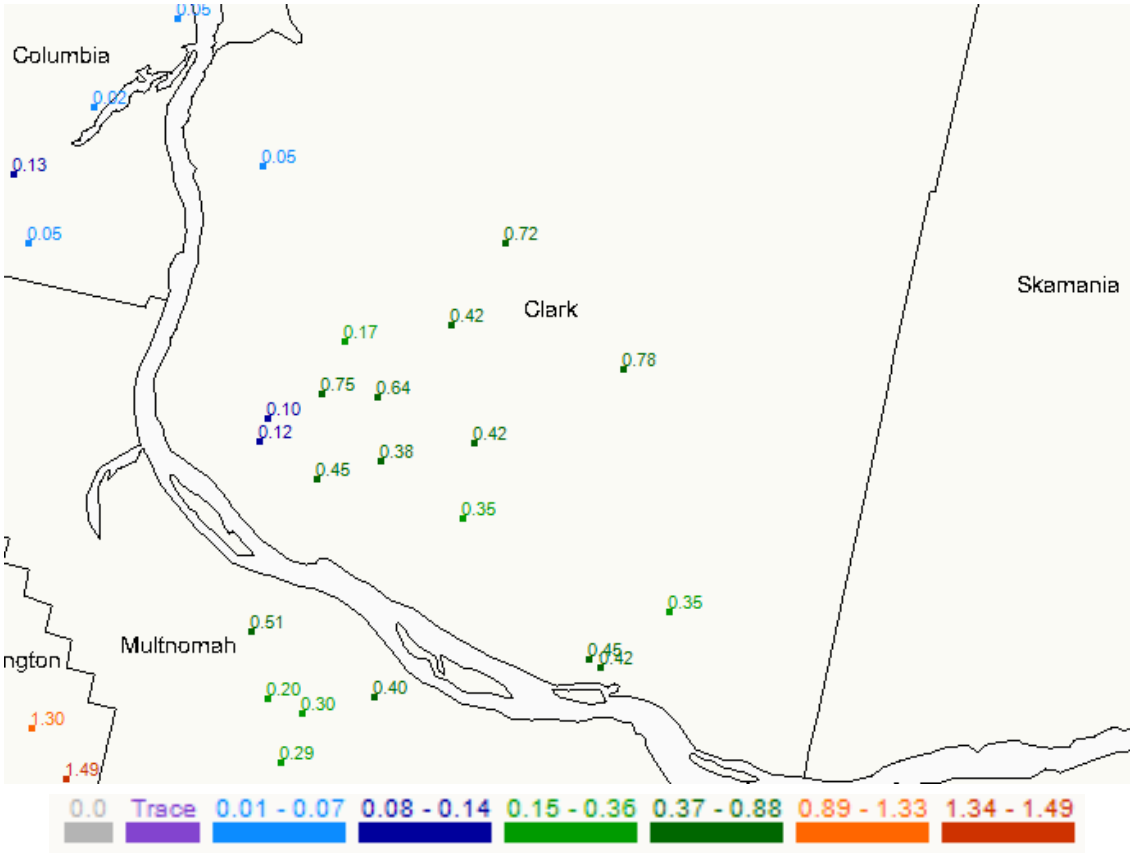


Figure 1: 24-hour CoCoRaHS measurements ending on the morning of June 26, 2014 in Clark County, Washington.

CoCoRaHS

Thank you, Community Collaborative Rain, Hail, and Snow Network observers, for continuing to send in your reports! Even though June as a whole was dry for most of the state, your reports are still useful, especially when heavy precipitation does fall like shown in the map above. Please continue to enter your reports as we enter our dry season. Zeros are important too. OWSC on the University of Washington campus received 1.03" for June, more than what was reported at SeaTac Airport but less than our northern neighbors at the NWS office on Lake Washington near Sandpoint.

The Precipitation Winners and Losers in Major League Baseball

A message from the State Climatologist

Seattle's rainy reputation is difficult to combat, especially among those that have never lived in the Pacific Northwest. The dry Washington summers are often overlooked. In that context, OWSC was pleased to have recently heard a "rumor" that during the regular baseball season, Seattle is one of the driest cities of those that have a Major League Baseball team. Statistics are part of baseball, so we decided to take a closer look at our specialty - weather statistics - to determine the validity of this rumor.

The total 1 April through 30 September 30-year (1981-2010) average precipitation and the average number of days with measurable precipitation (0.01" or greater) is shown for each MLB team location in Table 2. The records for the Toronto Blue Jays are for essentially the entire 20th century for the mean rainfall, and for the decade of the 1960s for the average number of days with measurable precipitation, but are apt to be representative of the present climate for that location. The Seattle Mariners only receive about 11" of precipitation, on average, during the season, which ranks as the 7th driest MLB location overall, and the 3rd driest in the American league. The top 5 driest are all of the California teams, and excluding those would rank Seattle second to only the Arizona Diamondbacks, who play in Phoenix. Most of the cities with MLB teams receive between 20 and 25" of precipitation during the season, which is double the normal amount that Seattle receives. In terms of the probability of measurable precipitation, Seattle is 10th lowest, but is more comparable to the majority of stadiums that have between 55 and 65 days with precipitation during the season. Many of the locations that have a similar number of days with rain receive a considerably greater amount of rain than Seattle. This is testament to the common occurrence of light rains in Seattle. For example, while Seattle and Houston have about the same number of rainy days during the six months considered here, a bit less than one-half of these days have rainfall greater than of equal to 0.10" in Seattle (Boeing Field), while about two-thirds of the rainy days in Houston meet or exceed this threshold.

Only seven of the MLB stadiums have retractable or stationary roofs, so how does this match with the precipitation climatology? The three teams with the rainiest season – Miami Marlins, Tampa Bay Rays, and Houston Astros – have stadiums with roofs, which is practical for keeping fans and the field dry. It is interesting that many of the stadiums that receive double the amount of precipitation as Seattle do not have roofs. The remaining three that do – Milwaukee Brewers, Toronto Blue Jays, and Arizona Diamondbacks – are more due to the temperatures, that is, keeping fans warm in Milwaukee and Toronto, and cool in Phoenix. So why does the Seattle Mariners stadium have a roof? To perpetuate stereotypes, of course! All kidding aside, it is the outlier among the rest of the group that has roofs, though it can be useful, especially early in the season.

This summary confirms that there is some truth to the rumor. Seattle is in the driest one-third of cities that have a MLB team, and the 3rd driest in the American League with regards to precipitation amounts. For frequency of precipitation, Seattle also ranks in the top one-third

driest and the 5th less frequent in the American league (though admittedly, by very slim margins here). The next time someone comments on Seattle's rain, you might just want to have these weather stats ready. The combined staff at OWSC has been to 9 different stadiums, and the home of the Seattle Mariners is the overwhelming and completely unbiased favorite.

Team	League	Average Season Precipitation (in)	Average Number of Days of Precipitation	Has roof?
San Diego Padres	National	1.17	9	
Los Angeles Angels	American	1.45	6	
Los Angeles Dodgers	National	1.55	7	
Oakland Athletics	American	2.48	14	
San Francisco Giants	National	2.59	15	
Arizona Diamondbacks	National	3.10	15	Yes
Seattle Mariners	American	10.54	55	Yes
Colorado Rockies	National	11.95	45	
Toronto Blue Jays	American	16.7	64	Yes
Detroit Tigers	American	18.68	62	
Texas Rangers	American	20.80	35	
Boston Red Sox	American	21.13	62	
Washington Nationals	National	21.21	59	
Milwaukee Brewers	National	21.33	62	Yes
Cleveland Indians	American	21.92	69	
Pittsburgh Pirates	National	21.99	80	
Baltimore Orioles	American	22.08	61	
Chicago Cubs	National	22.32	62	
Philadelphia Phillies	National	22.33	59	
Chicago White Sox	American	23.14	61	
Cincinnati Reds	National	23.24	65	
Minnesota Twins	American	23.54	60	
New York Mets	National	24.08	59	
St. Louis Cardinals	National	24.22	56	
Atlanta Braves	National	24.62	57	
New York Yankees	American	26.16	57	
Kansas City Royals	American	29.46	61	
Houston Astros	American	30.03	52	Yes
Tampa Bay Rays	American	34.34	71	Yes
Miami Marlins	National	43.39	87	Yes

Table 2: The average amount of precipitation and number of days of measurable precipitation from 1 April through 30 September at every city that has a MLB team.

Drought Update

The US Drought Monitor (Figure 2) has changed since the last edition of the newsletter. The June rains experienced in northeastern WA alleviated some of the dryness there and led to improvements in the short and long term precipitation deficits. The continued lack of precipitation in the Lower Columbia Basin, however, has caused the water-year-to-date precipitation to decrease compared to normal. The area of D2 - or severe drought - has been expanded further into Chelan, Kittitas, and Yakima Counties to better represent this long term dryness. Even some of the precipitation that did fall in these areas was too late to be beneficial for the dry land winter and spring wheat. The latest USDA Crop Bulletin reports that below average yields are expected, especially in Lincoln and Whitman Counties. The US Department of Agriculture has designated Benton, Franklin, Walla Walla, Adams, Grant, Chelan, Douglas, Lincoln, and Okanogan Counties as primary disaster areas due to the dryness, making residents of those and adjacent counties eligible for emergency aid. It is worth reiterating that the rebound in snowpack during the second half of the winter has put irrigated crops in much better shape than the dry land crops, and that the USDA Crop Bulletin had positive reports in that regard.

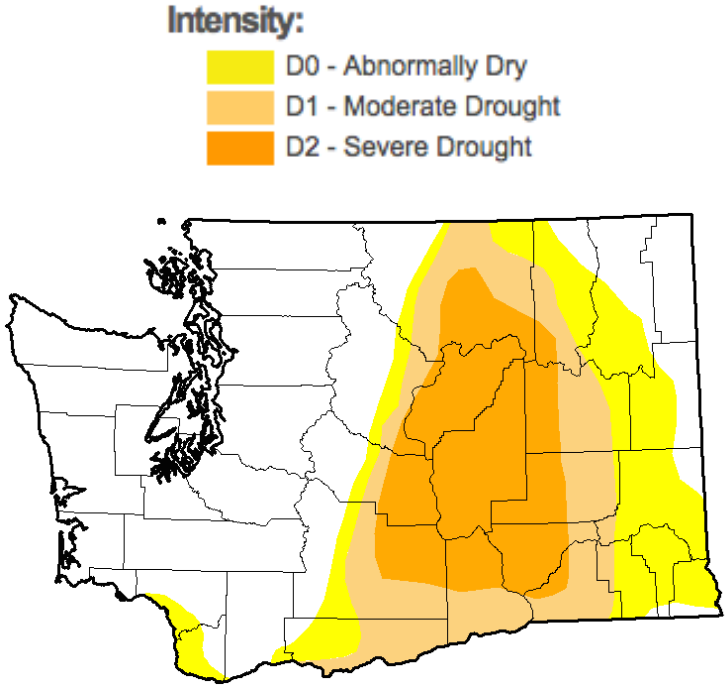
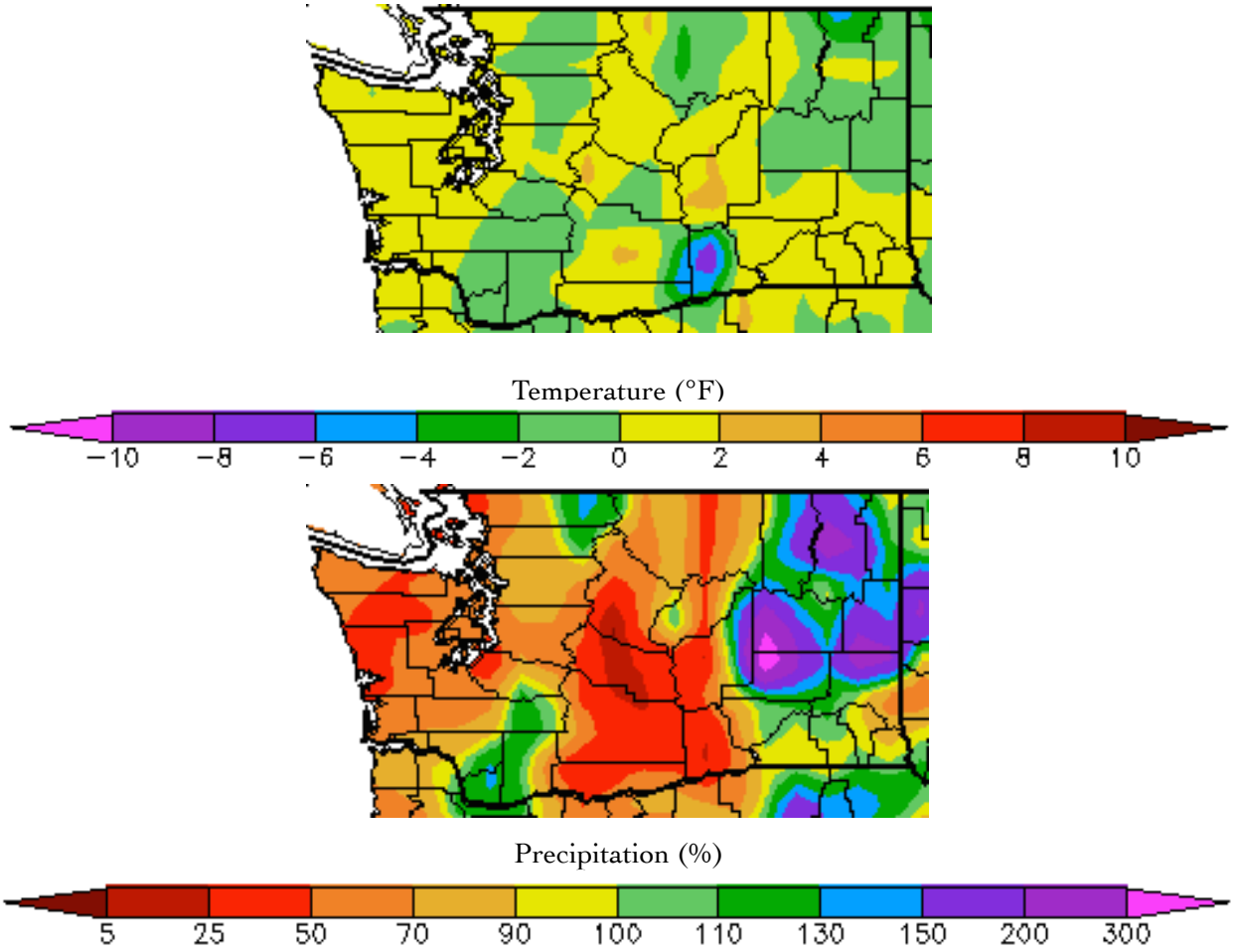


Figure 2: The 24 June 2014 edition of the US Drought Monitor (from the National Drought Mitigation Center).

Climate Summary

Mean June temperatures were within 2°F of normal throughout most of WA State, as shown in the map from the High Plains Regional Climate Center below. There is a cooler station reading (between 6 and 8°F below normal) in Benton County that is suspicious and may be incorrect as these maps use preliminary data. At any rate, many of the stations in towns and cities (Table 3) had monthly average temperatures that were close to normal, with a tendency for most stations to be on the warmer side.

Total June precipitation was much below normal through western and central WA, but above normal in parts of eastern WA. Most western WA locations received between 50 and 70% of normal precipitation (Table 3) though the map shows that parts of the Olympic Peninsula were farther behind normal, with values between 25 and 50% of normal. Similar deficits were seen on the eastern slopes of the Cascades and in central WA. Ephrata and Omak, for example, only received 43 and 47% of normal precipitation for the month (Table 3). There are some wetter than normal spots further east, mostly due to a period of frequent rain showers mid-month.



June temperature (°F) departure from normal (top) and June precipitation % of normal (bottom). (High Plains Regional Climate Center (http://www.hprcc.unl.edu); relative to the 1981-2010 normal).

	Mean Temperature (°F)			Precipitation (inches)		
	Average	Normal	Departure from Normal	Total	Normal	Percent of Normal
Western Washington						
Olympia	59.6	59.1	0.5	0.88	1.76	50
Seattle WFO	62.1	61.0	1.1	1.25	1.63	77
SeaTac AP	62.0	60.9	1.1	0.73	1.57	46
Quillayute	56.4	55.3	1.1	2.15	3.50	61
Hoquiam	57.9	56.8	1.1	1.14	2.24	51
Bellingham AP	60.3	58.5	1.8	1.08	1.86	58
Vancouver AP	62.7	63.3	-0.6	2.20	1.79	123
Eastern Washington						
Spokane AP	61.7	62.1	-0.4	1.84	1.25	147
Wenatchee	69.4	66.7	2.7	0.44	0.60	73
Omak	65.7	65.5	0.2	0.58	1.23	47
Pullman AP	57.9	58.6	-0.7	0.93	1.08	86
Ephrata	68.8	66.6	2.2	0.26	0.61	43
Pasco AP	67.9	67.5	0.4	0.18	0.68	26
Hanford	70.9	69.6	1.3	0.26	0.51	51

Table 3: June climate summaries for locations around Washington with a climate normal baseline of 1981-2010. Note that the Vancouver Pearson Airport and Seattle WFO 1981-2010 normals involved using surrounding stations in NCDC's new normal release, as records for these station began in 1998 and 1986, respectively.

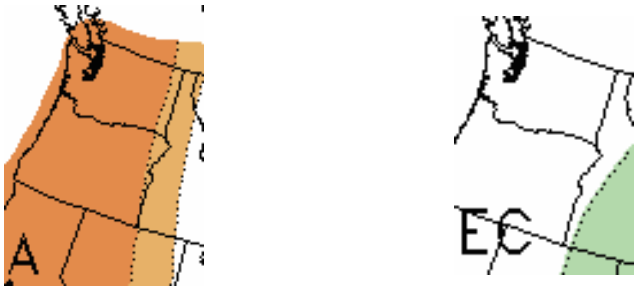
Climate Outlook

The equatorial Pacific Ocean is still in the ENSO-neutral category, according to the Climate Prediction Center (CPC): http://www.cpc.ncep.noaa.gov/. Averaged over the last month, sea-surface temperatures (SSTs) were above normal throughout the entire equatorial Pacific Ocean, and the SSTs remain above normal in each Niño region. There is a consensus among the model predictions that an El Niño will develop as early as this summer. The chances of the El Niño developing this summer have increased to about 70% and the chances of the El Niño developing during the fall or winter is 80%. The "El Niño Watch" that was initially released by the CPC in early March is still in effect.

The Climate Prediction Center seasonal outlook for July has increased chances of warmer than normal temperatures statewide. The chances of warmer than normal temperatures exceed 50% in parts of WA, indicating fairly good confidence; there is a consensus among the seasonal forecast models that anomalously high pressure will occur over the western US. For precipitation, there are equal chances of below, equal to, or above normal precipitation statewide.

The three-month July-August-September (JAS) outlook is very similar to the July outlook. There are increased chances of warmer than normal temperatures throughout the entire state (exceeding at least a 40% chance using the three-tiered outlook system). For precipitation, there are equal chances ("EC") of below, equal to, or above normal precipitation.

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



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