Recent temperature, precipitation, and streamflow conditions are shown here for WA State. The precipitation percent of normal maps are the story for this week, as we finally see blues and purples, representing above normal rain, west of the Cascade Mountains. Over the last week, the Puget Sound area received between 130 and 200% of normal precipitation. This was all due to the cold frontal passage that occurred on the 14th, bringing heavy rain and thunderstorms to the region. The rain was unusual for the time of year, and ranked among the wettest August days throughout western WA. East of the Cascades the frontal passage caused strong winds, blowing dust, and thunderstorms with little rain, igniting some serious fires. The map on the bottom right shows the active fires as of the 19th, which have caused property damage and tragically resulted in 3 firefighter deaths on the 19th. The rain in the Puget Sound region over the last week was heavy enough to show above normal precipitation in the area over the last 30 days as well; as for temperature, much of the state was near-normal, though still on the warm side. The last 7 days show warmer than normal temperatures (2-6°F above normal) for most of the state except for the Puget Sound where the 2 cooler than normal days on the 14th and 15th brought temperatures to within 2°F of normal. Despite the heavy rainfall in parts of the state over the last week, the response in the 7-day average streamflow is limited as many stream gauges remain much below normal. The US Drought Monitor has expanded the area of “extreme drought” in central and eastern WA this week due to the continued dry conditions, low streamflow, and active fires there.

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Statewide Drought Declared

On May 15, Governor Inslee declared a statewide drought; more information can be found at WA State [Department of Ecology](http://www.ecy.wa.gov/drought). This section will focus on a few areas of the state in a little more detail.

Puget Sound

The cold frontal passage on August 14 brought thunderstorms and heavy rain to the Puget Sound area, with more precipitation in 1 day than what is typically seen in the entire month of August. At SeaTac Airport, for example, it was the 6th wettest day in August with an impressive 1.20” of rain; the 30-year normal August rainfall is 0.88”. Strangely, the rain at SeaTac was not a daily record for the calendar day of August 14. The 2nd wettest August day on record was on August 14 in 1968 (1.60”). The map on the right shows 24-hour precipitation totals measured on the morning of August 15 from the [Community, Collaborative, Rain, Hail, and Snow network](http://www.climate.washington.edu), and totals over half an inch were widespread. This rain came on the heels of the announcement last week that Seattle, Tacoma, and Everett water districts should voluntarily conserve 10% of their water. While the precipitation leveled out reservoir levels slightly - about 0.80” fell over the Cedar River and South Fork Tolt River watersheds - the rain far from bailed us out of our deficit. In fact, [Anacortes Public Works](http://www.anacortespw.org) is the latest to jump on the conservation bandwagon, and requested a voluntary 10% reduction in water use beginning on the 18th.

Olympic Peninsula

The nature of the precipitation on August 14 was such that the Olympic Peninsula did not receive nearly as much as the Puget Sound. Quillayute and Port Angeles, for example, only recorded 0.04” and 0.02”, respectively. Shelton, further south on the Peninsula, recorded more with 0.39”. The 7-day precipitation percent of normal map on page 1 shows a gradient of decreasing precipitation percent of normal as you move from east to west across the Olympic Peninsula. The streamflow at the Dungeness River at Sequim shows a temporary increase after the precipitation on the 14th, but flows are now lower than they were at this time last week (bottom left). The flows rank as the record minimum flow for this time of year and are about 40% of normal at this site. The Dungeness River has been the site of some intervention to help fish pass through the river to spawning grounds, and the work has been funded by the Department of Ecology (bottom right). The work includes moving stones to create deeper channels on the river, and is aimed at aiding pink salmon and chinook. The pink salmon return is forecast to be much larger than usual this year, and the assistance is needed to be sure that they have the best chance of survival. In addition to helping improve flows on the Dungeness, the [Jamestown S’Klallam Tribe](http://www.jamestownsklallamtribe.org) has also received approval to fish for pinks at the mouth of the river.

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The 8-14 day forecast from NOAA/CPC for 27 August – 2 September indicates cooler than normal temperatures and above normal precipitation. This forecast is based on the presence of an unusually deep upper-level trough over Vancouver Island, as indicated in many recent numerical weather prediction (NWP) runs. But there is another cluster of runs showing this trough over Montana instead. It turns out that what happens in the subtropical western North Pacific probably will play a key role in our weather many thousands of kilometers away.

There are two strong typhoons in the western North Pacific. The western typhoon (Goni) is taking aim at Northern China and should spin down rapidly over land. The eastern typhoon (Atsani) is very likely to take a turn to the north near the end of the week, and undergo a transition from a tropical to an extra-tropical cyclone. Because of the vigor and high water contents of these types of storms, small variations in the timing and location of their transitions tend to have profound impacts on the atmospheric circulation at mid-latitudes, with these impacts propagating towards the east. This is illustrated by the differences in the 9-day forecasts valid at 12 UTC (5 am PDT) 28 August from NOAA's Global Forecast System (GFS) model as compared with the medium range model from the European Center for Medium Range Weather Forecasts (ECMWF). The 500 hPa geopotential height (Z) and sea level pressure (SLP) map from the GFS model indicates an upper-level trough over western WA with a weak surface low just off the coast (below left), while the ECMWF has a less prominent trough farther east over Montana (below right). In both cases, the predictions for the PNW relate to how the models handle the ridge upstream south of Alaska, with the remnants of Typhoon Atsani playing an important role in determining the characteristics of this ridge. From a bottom line perspective, the GFS solution suggests cooler, wetter weather for WA state than the ECMWF at the extended range. Minimal precipitation amounts should be expected if the ECMWF is correct while amounts between 0.10 and 0.50", with higher amounts in the mountains, should be expected should the GFS be correct. Forecasters have long recognized that typhoons in the western North Pacific represent a sort of “wild card” factor for extended forecasts in North America. While it is difficult to pick which of the two models is more likely to be correct (if either), here’s hoping that the GFS has the right idea this time.

GFS 500 hPa height (shading) and sea level pressure (lines) forecast for 8/28:

ECMWF 500 hPa height (shading) and sea level pressure (lines) forecast for 8/28:

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