

The Month In Review August 2023



National Weather Service,
Pendleton, Oregon

August 2023 Climate Conditions Summary

The first half of August 2023 was mostly hot and dry, except for a cooler day on the 7th. A significant heat wave began on the 12th and 13th with high temperatures reaching 100 to 110 degrees at many stations across the forecast area. Some regular reporting stations had record breaking high temperatures on the 15th and 16th. Wildfires continued to burn actively over the region, which resulted in widespread smoke and created unhealthy air quality. This prompted Air Quality Advisories and Alerts to be issued for some areas of OR and WA. There were a few thunderstorms, one of which produced golf ball-sized hail in Grant County on the 3rd. On the 7th, a thunderstorm with heavy rain caused flooding in the city of Lone, OR with water-covered roads, leaving thick mud behind, after the flood waters receded.

During the latter half of August, beginning on the 19th, conditions became more variable. Moisture from the remnants of a strong eastern Pacific hurricane was pulled northward and supported record rainfall amounts to some locations on the 21st and 22nd. Significant rainfall amounts include 3.63 inches at Elgin, OR, 2.19 inches near Joseph, OR, and 1.5 inches at Redmond, OR. The Blue Mountain Foothills received a few tenths of an inch to less than a tenth of an inch elsewhere. Temperatures varied from cooler than normal, hot again, then cooler with showers and high relative humidity at the end of the month. Hot temperatures returned on the 26th - 28th with the 28th breaking high temperature records at some locations. This was followed by a strong cold front with showers and thunderstorms, breezy to windy conditions, and cooler temperatures.

Below and on the next slide are images of weather and climate conditions during the month.



Left over mud after heavy rain flooded Lone, OR



Gerkin Flat Fire seen from OR Highway 11



Reduced visibility in smoke from area wildfires

More Images Representing August 2023 Weather/Climate Conditions



Fire on the north hill in Pendleton, OR, seen from a distance



Burnt fields along Interstate 84 in the Columbia Basin, OR



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Photo by: John Clement

Cloud to ground lightning in a thunderstorm, Wallula Gap, WA



A very rare occurrence of dense fog on the night of the 31st

Significant Weather Events - Local Storm Reports for August 2023

Significant Weather Events					
Date	Location	State	Event Type	Magnitude	Source
August 3, 2023	21 SSE Prairie City	OR	HAIL	1.75	Federal
August 7, 2023	lone	OR	FLOOD	Thunderstorm	Emergency Mngr
August 21, 2023	18 E Joseph	OR	RAIN	2.19	Mesonet
August 21, 2023	9 SE Redmond	OR	RAIN	1.56	Cocorahs
August 21, 2023	7 SSE Joseph	OR	RAIN	1.45	Mesonet
August 21, 2023	5 S Joseph	OR	RAIN	1.21	Mesonet
August 22, 2023	Elgin	OR	RAIN	3.63	Public
August 26, 2023	15 ESE Moro	OR	RAIN	0.52	Mesonet
August 26, 2023	1 SW Enterprise	OR	RAIN	1.75	Trained Spotter
August 26, 2023	Enterprise	OR	HAIL	0.50	Public
August 26, 2023	1 WSW Enterprise	OR	HEAVY RAIN	2.50	Trained Spotter

Please note: Magnitude units are either inches, mph, degrees F, or miles.

Most of the significant weather reports that warranted Local Storm Reports (LSRs) were significant amounts of rain. These occurred mostly in the northeast mountains, including the Grande Ronde Valley, and Wallowa County. However, there was also a report of 1.56 inches in east central OR, at a location 9 miles SE Redmond, at a Cocorahs station. Most of the significant rainfall amounts were from 1 to 2 inches, with one station reporting as much as 3.63 inches (at Elgin, OR). There were also two reports of large hail, one of which was 1.75 inches in size from a thunderstorm that occurred on the 3rd in east central OR (21 miles SSE of Prairie City), and another hail report of 0.50 inch in size at Enterprise, OR, which occurred on the 26th. On the 7th, there was a thunderstorm, with very heavy rain over the city of lone, OR, which flooded roadways and left thick mud after flood waters receded.

Record Weather Events for August 2023

Record Weather Reports					
Event	Date	Where	Previous Record	New Record	Records Began
High Temperature	August 14, 2023	Dallesport, WA	105 / 1953	109	1929
High Temperature	August 14, 2023	Redmond, OR	101 / 1998	102	1941
High Temperature	August 14, 2023	Pasco, WA	105 / 1992	105 (tie)	1942
High Temperature	August 15, 2023	Ellensburg, WA	102 / 2008	107	1934
High Temperature	August 15, 2023	Hermiston, OR	104 / 1933	107	1906
High Temperature	August 15, 2023	Pasco, WA	104 / 2021	109	1942
High Temperature	August 15, 2023	Redmond, OR	103 / 2020	105	1941
High Temperature	August 15, 2023	Yakima, WA	103 / 2021	105	1909
High Temperature	August 15, 2023	Dallesport, WA	107 / 2008	107 (tie)	1929
High Temperature	August 16, 2023	Ellensburg, WA	105 / 2008	105 (tie)	1934
High Temperature	August 16, 2023	Hermiston, OR	105 / 1933	107	1906
High Temperature	August 16, 2023	Pasco, WA	106 / 1942	107	1942
High Temperature	August 16, 2023	Yakima, WA	102 / 2020	104	1909
High Temperature	August 16, 2023	Dallesport, WA	109 / 2008	110	1929
High Temperature	August 27, 2023	Ellensburg, WA	96 / 1017	98	1934
High Temperature	August 28, 2023	Pasco, WA	103 / 1972	103 (tie)	1942
High Temperature	August 28, 2023	Hermiston, OR	102 / 1916	104	1906
High Temperature	August 28, 2023	Ellensburg, WA	99 / 2006	100	1934
Maximum Rainfall	August 31, 2023	Dallesport, WA	0.08 / 1971	0.34	1929

There were a total of 19 record weather events recorded. All of them, except for one, were high temperature records either broken or tied. The one exception was a record rainfall amount at Dallesport, WA, with 0.34 of an inch on the 31st. Most record high temperatures occurred during a significant heat wave during the middle, and also near the end of the month.

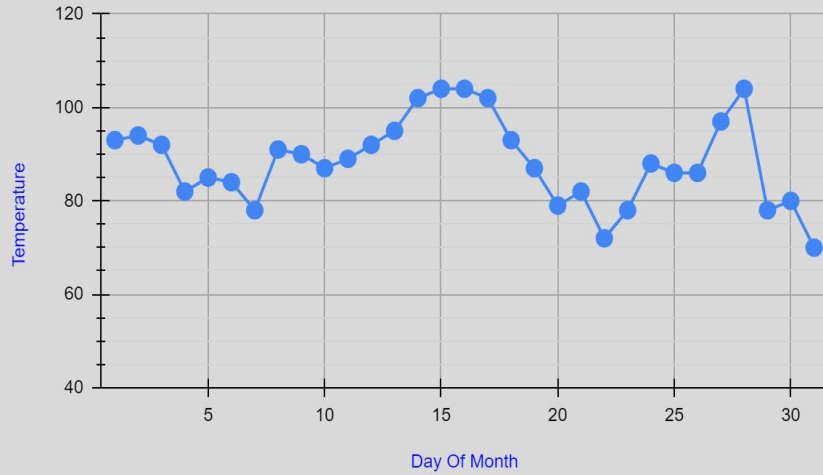
August 2023: Observed Monthly Maximum & Minimum Temperatures

Location <small>Source: ASOS, or otherwise stated</small>	Highest Maximum	Lowest Minimum
Pendleton, OR	104	49
Redmond, OR	105	38
Pasco, WA	109	48
Yakima, WA	105	44
Walla Walla, WA	103	52
Bend, OR CoOp	97	37
Ellensburg, WA	107	44
Hermiston, OR	107	48
John Day, OR CoOp	99	42
La Grande, OR CoOp	106	49
Dallesport, WA	110	52
Meacham, OR	97	37
MT Adams R.S., WA	103	40

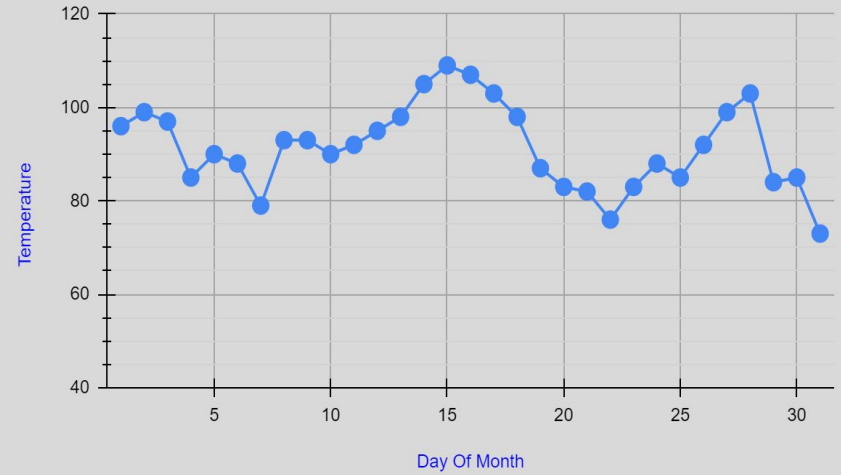
The highest maximum temperature was 110 degrees at Dallesport, WA and the lowest highest maximum temperature was 97 degrees at two locations (Bend, OR CoOp, and Meacham, OR). Of the lowest minimum temperatures, the warmest was at Walla Walla, WA and Dallesport, WA with 57 degrees. The coldest was 37 degrees at both the Bend, OR CoOp and at Meacham, OR. These values are not atypical for August as the nights can begin to get cooler (into the 30s for low temperatures) as the days become shorter, especially toward the end of the month.

August 2023 - Daily Maximum Temperatures For Select Cities

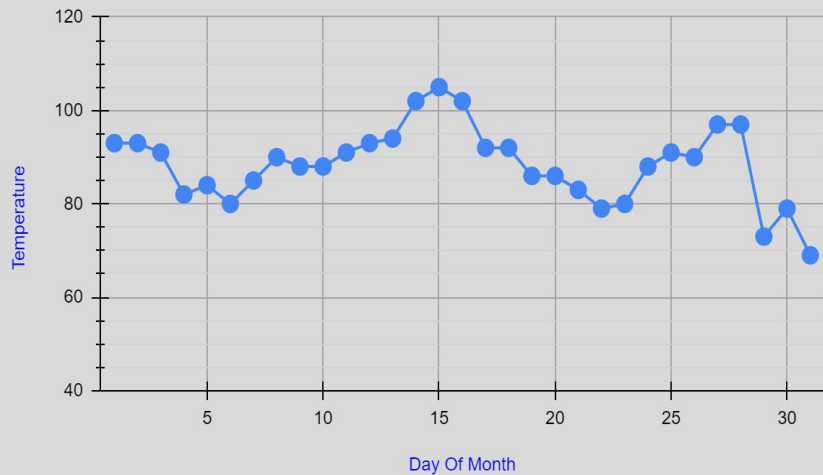
Pendleton, OR - August 2023 Daily Maximum Temperatures



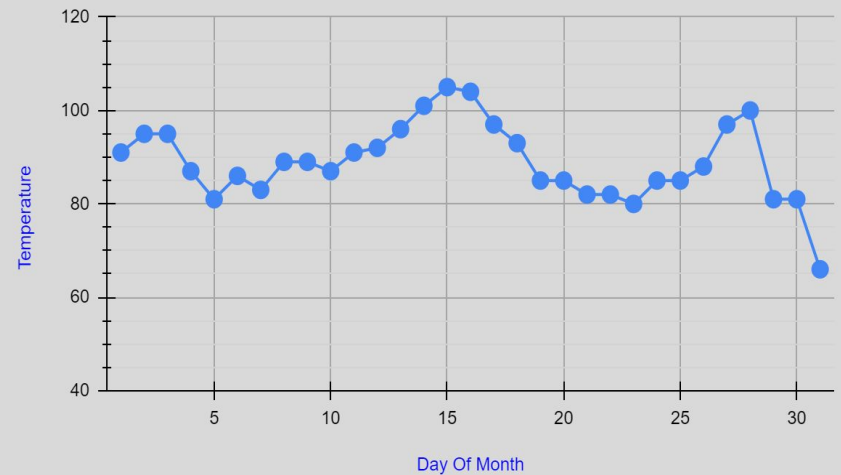
Pasco, WA - August 2023 Daily Maximum Temperatures



Redmond, OR - August 2023 Daily Maximum Temperatures



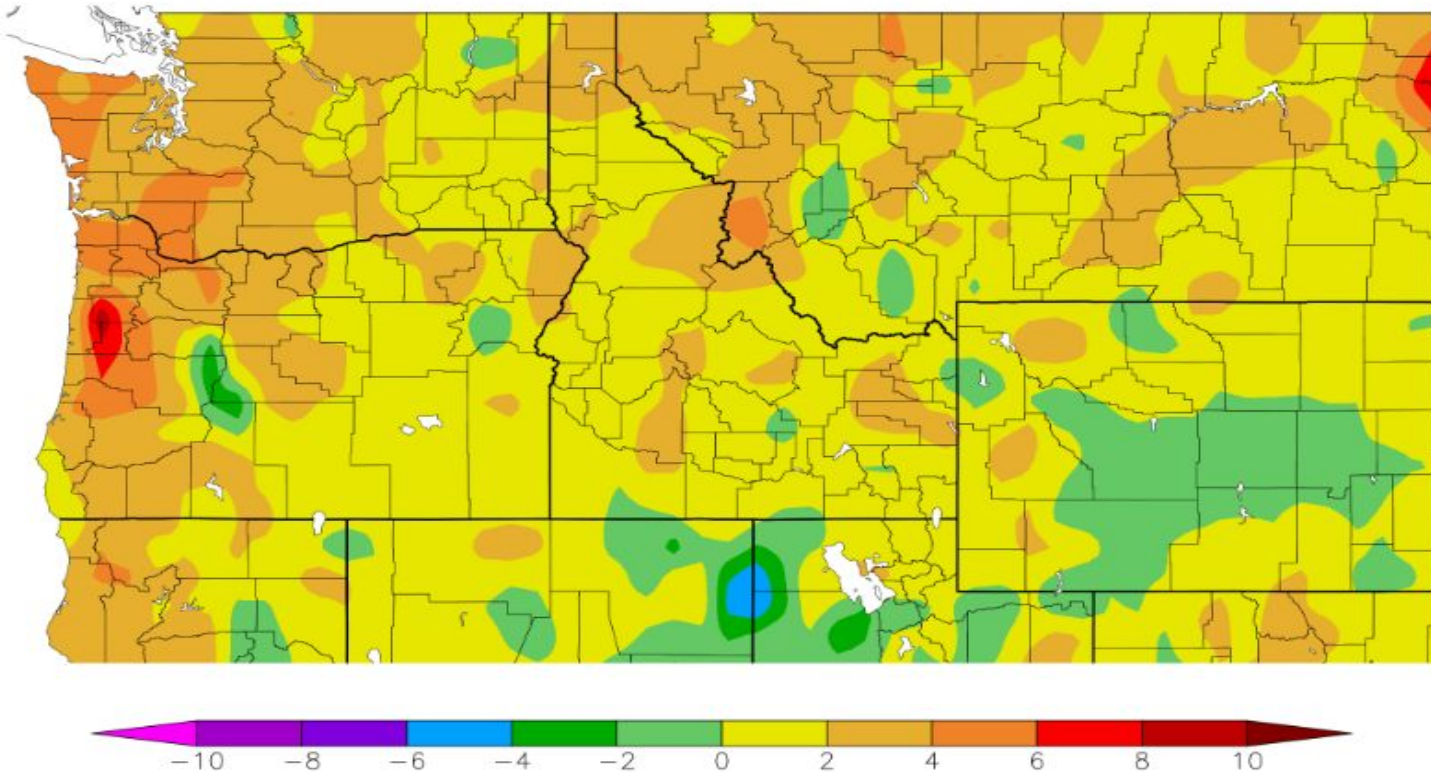
Yakima, WA - August 2023 Daily Maximum Temperatures



As can be seen from these charts, there was greater variability in temperatures during the second half of the month, while the first half still had some variability, but not as amplified until after the 15th.

August 2023: Departure from Normal of Average Temperatures

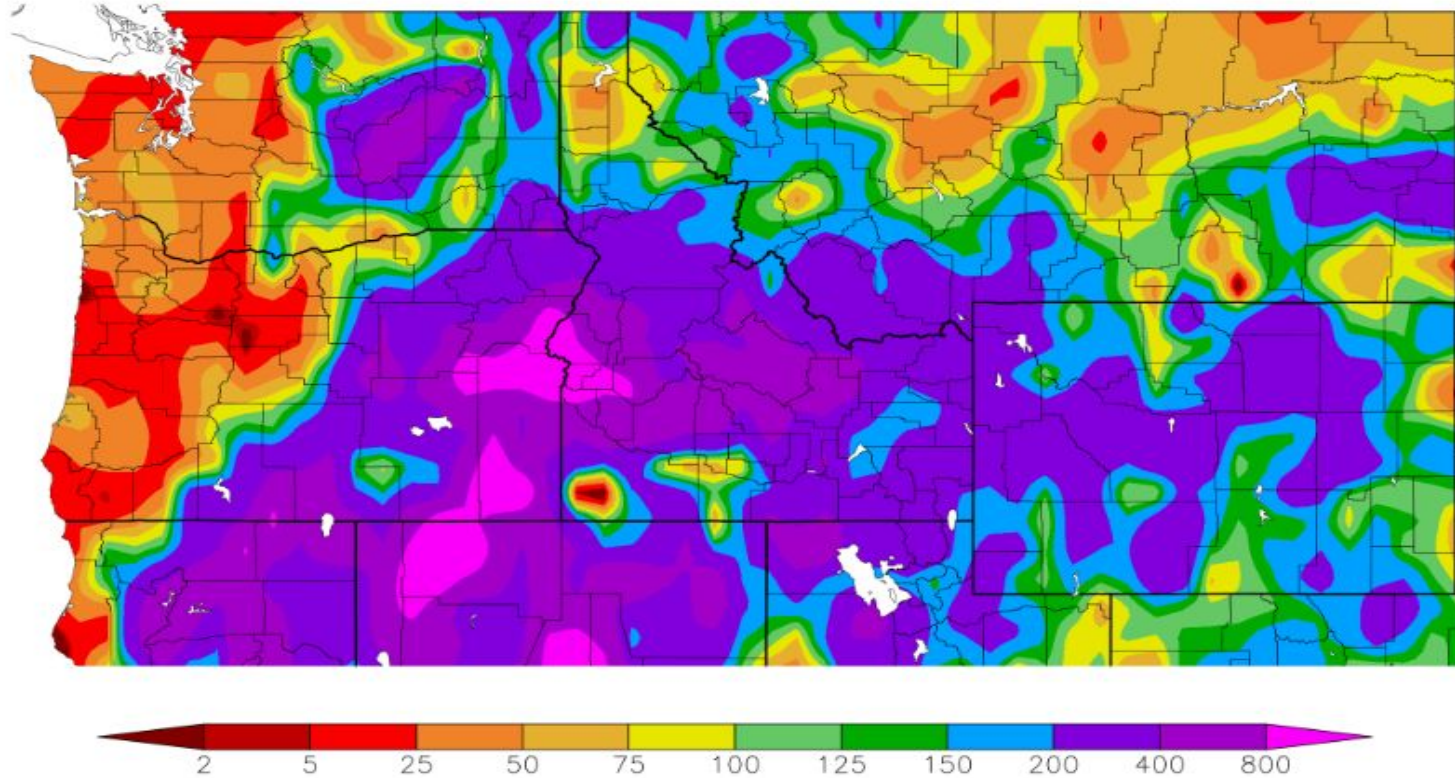
Departure from Normal Temperature (F)
8/1/2023 – 8/31/2023



Most of the forecast area (central OR to northeast OR, and south central and southeast WA), were above normal for August. However, the extremes were not too great with departures from normal mostly ranging from 2 to 4 degrees above normal. The only location that had cooler than normal temperatures for the month was a small area in southwest Deschutes County in central OR, with a departure from normal of -2 to -4 degrees.

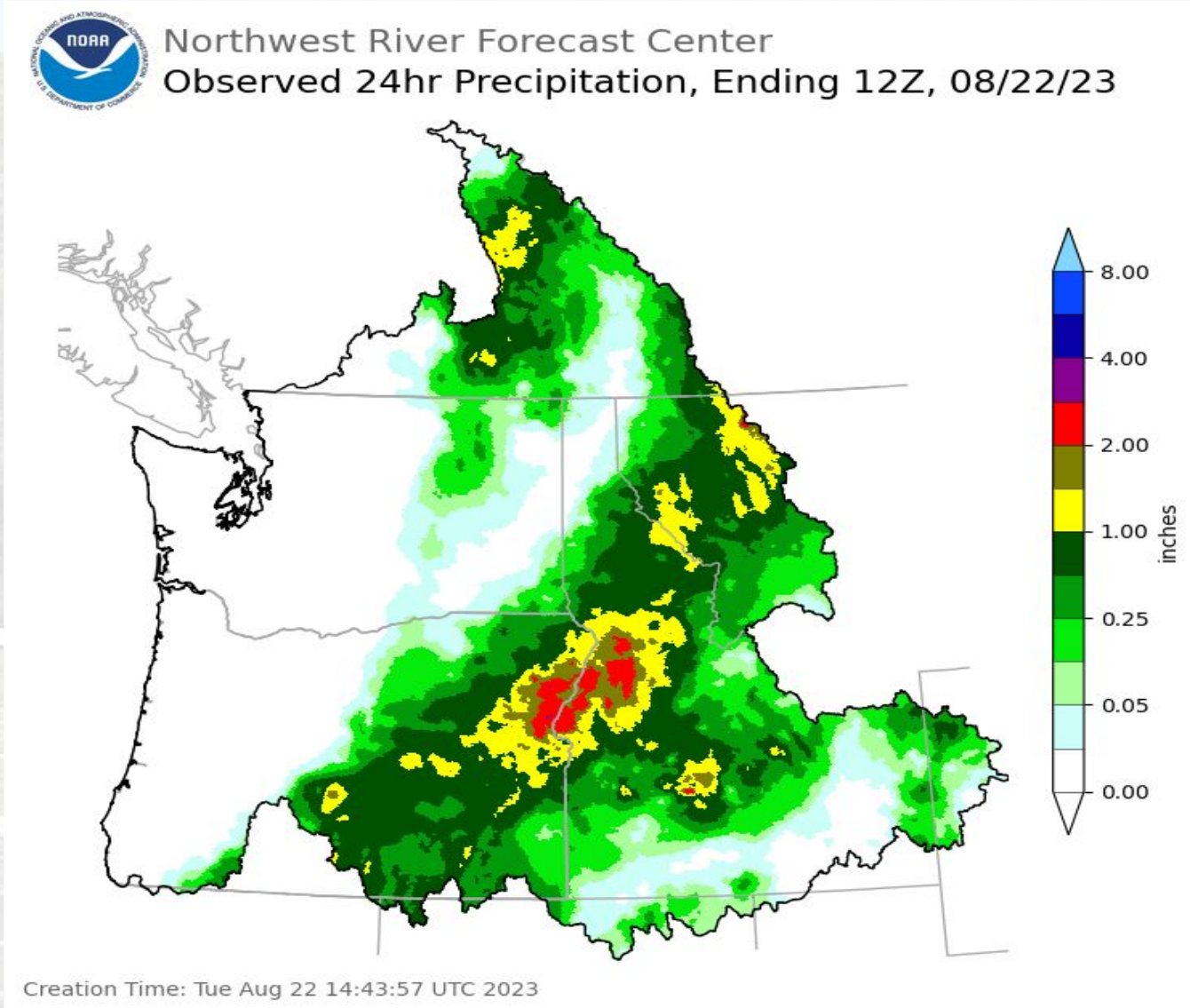
August 2023: Percent of Normal of Precipitation

Percent of Normal Precipitation (%)
8/1/2023 – 8/31/2023



The percent of normal precipitation was very high over eastern and northeast portions of the forecast area due to the abundant moisture from the remnants of a strong Pacific hurricane during the latter half of the month. Departures ranged from as high as 200-400% of normal. Areas along the Cascade east slopes had mostly a negative percent of normal precipitation (as low as 2 to 25% of normal) in far western Jefferson County, in north central OR.

Unusual Heavy Rain From The Remnants Of A Tropical Cyclone



Shown above are the observed 24 hour precipitation amounts, ending at 12Z on the 22nd, across the Pacific Northwest from the remnants of a strong Pacific tropical cyclone discussed in the previous slide. There was significant rainfall amounts (> 0.50 inch) from S. central to northeast OR, into ID & MT.

August 2023: Departures from Normal Means/Sums for Select Cities

Source: ASOS, or otherwise stated	Max T	Max T D	Min T	Min T D	Ave T	Ave T D	PCPN	PCPN D
Yakima, WA	89.0	0.5	57.0	3.7	73.0	2.1	0.46	0.25
Kennewick, CoOp	90.4	0.1	64.5	3.2	77.5	1.7	0.22	0.05
Walla Walla, WA	87.2	-1.4	63.6	1.9	75.4	0.2	0.43	0.03
Dallesport, WA	90.2	2.3	62.9	2.6	76.5	2.4	0.34	0.18
Redmond, OR	88.5	2.0	51.3	4.1	69.9	3.1	0.05	-0.41
Pendleton, OR	88.5	0.9	60.1	4.1	74.3	2.5	0.39	0.08
La Grande, CoOp	90.5	3.5	56.5	3.7	73.5	3.6	1.25	0.58
John Day, CoOp	83.7	-2.1	51.5	5.4	67.6	1.7	1.45	0.95

Most of the stations had a positive departure from normal for mean maximum temperatures. The exceptions were at Walla Walla, WA and the John Day CoOp station. The greatest departure was at the La Grande, OR CoOp station with 3.5 degrees above normal. All of the departures from normal of the mean minimum and mean average temperatures were positive. The John Day, OR CoOp station had the greatest departure of 5.4 degrees for the mean maximum temperatures, and the La Grande, OR CoOp station had the greatest departure of the mean average temperatures. All of the stations, except Redmond, OR, had a positive departure from normal precipitation, with the greatest also at the John Day, OR CoOp station of 0.95 of an inch. It can be said that the forecast area had warmer than normal and wetter than normal conditions during August.

The greatest departures are outlined in black boxes.

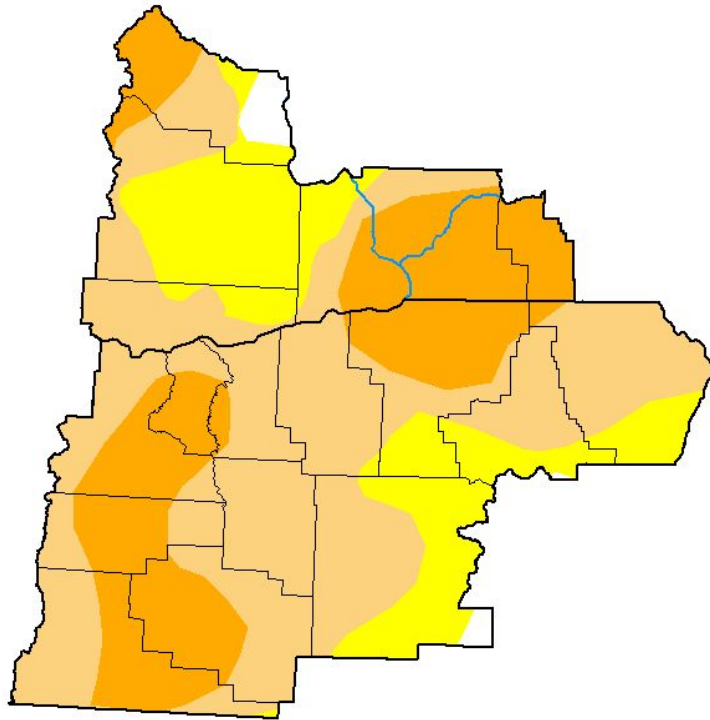
August 2023: Observed Total Precipitation and Total Snowfall / Hail

Location <small>Source: ASOS, or otherwise stated</small>	Total Precipitation (inches)	Total Snow/Hail (inches)
Pendleton, OR	0.39	0.0
Redmond, OR	0.05	M
Pasco, WA	0.31	M
Yakima, WA	0.46	M
Walla Walla, WA	0.43	M
Bend, OR CoOp	0.20	0.0
Ellensburg, WA	0.03	M
Hermiston, OR	0.16	M
John Day, OR CoOp	1.45	M
La Grande, OR CoOp	1.25	0.0
The Dalles, OR	0.34	M
Meacham, OR	1.11	M
Mt. Adams R.S., WA	0.25	0.0

The greatest reported total precipitation for August was at the John Day, OR CoOp station with 1.45 inches, and the least was at Ellensburg, WA with only 0.03 of an inch. Most of the stations had precipitation amounts from several tenths of an inch to near a half inch. Of the available total snowfall reports, it is not surprising that all had 0.0 inches of snow. However, there was one location that had hail, 21 SSE of Prairie City, OR(not listed), and recorded a size of 1.75 inches (See slide #4, Significant Weather events).

August 2023 - Drought Monitor – Pendleton Forecast Area

U.S. Drought Monitor Pendleton, OR WFO



August 29, 2023
(Released Thursday, Aug. 31, 2023)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	1.47	98.53	77.57	28.29	0.00	0.00
Last Week <small>08-22-2023</small>	1.47	98.53	73.44	26.70	0.00	0.00
3 Months Ago <small>05-30-2023</small>	24.28	75.72	44.60	19.59	0.00	0.00
Start of Calendar Year <small>01-03-2023</small>	29.80	70.20	39.93	22.93	15.24	3.17
Start of Water Year <small>09-27-2022</small>	0.00	100.00	46.03	24.98	17.46	3.17
One Year Ago <small>08-30-2022</small>	33.39	66.61	40.48	24.74	17.46	3.17

Intensity:



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

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Western Regional Climate Center



droughtmonitor.unl.edu

For additional drought and water supply information, please check out the NWS Pendleton [Drought Summary / Water Supply Outlook](#) for September, which will be released soon.



The Pendleton, OR forecast area no longer had any “Extreme” or a greater drought conditions. Even though there were not any “Extreme” or greater drought category areas shown above, the locations east of the OR Cascades and most, if not all, of the Lower Columbia Basin had D2 (“Severe”) drought conditions. The least drought areas were over Yakima County, WA and along the southeast border of the forecast area.

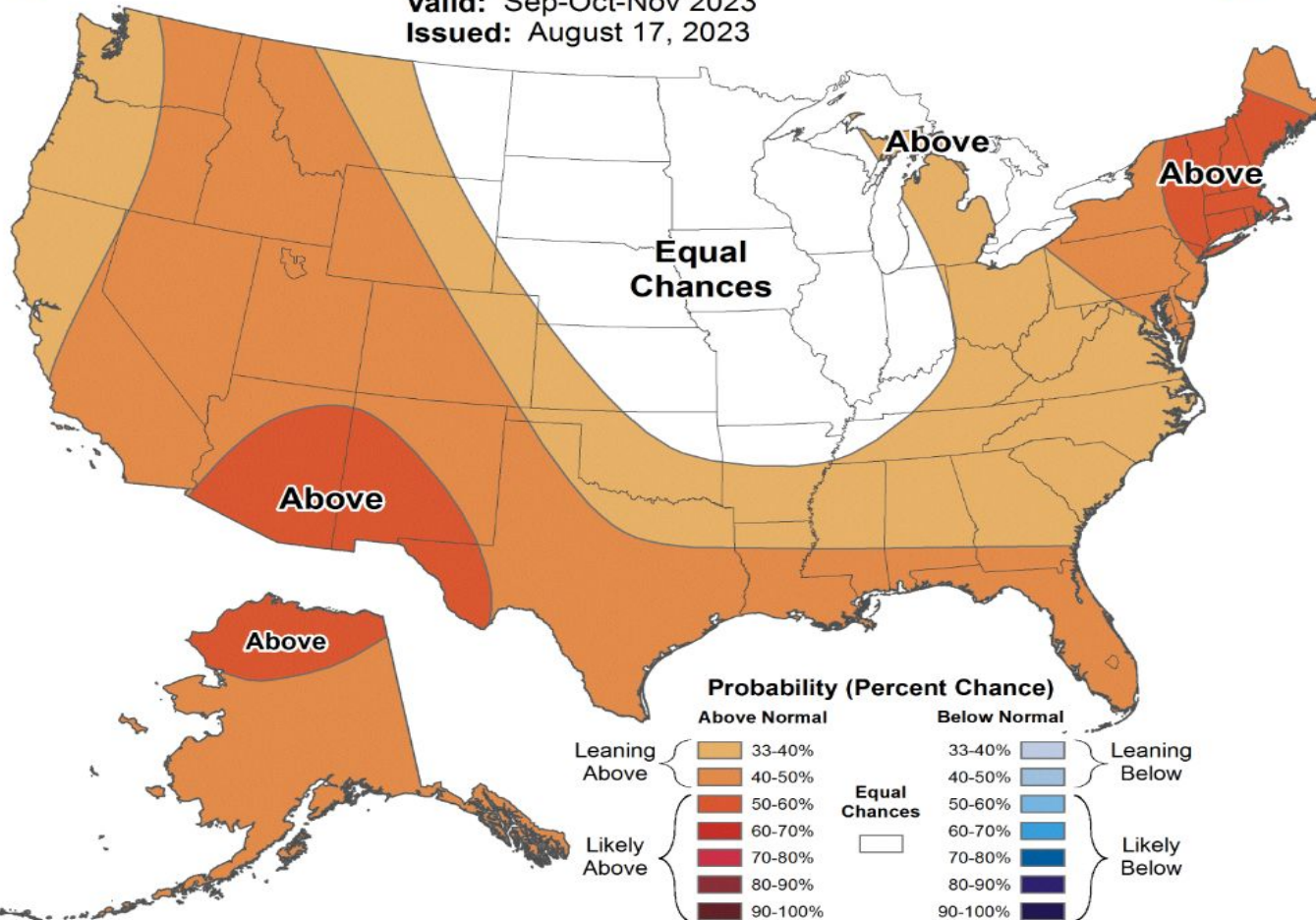
USA Three Month Temperature Outlook



Seasonal Temperature Outlook



Valid: Sep-Oct-Nov 2023
Issued: August 17, 2023



The three month outlook for the period September through November over the Pacific Northwest shows temperature probabilities leaning towards above normal (33-50%). This is not much of a change from July. It should be noted that warmer than normal conditions are not always dependent on El-Nino events, of which one is currently ongoing.

USA Three Month Precipitation Outlook

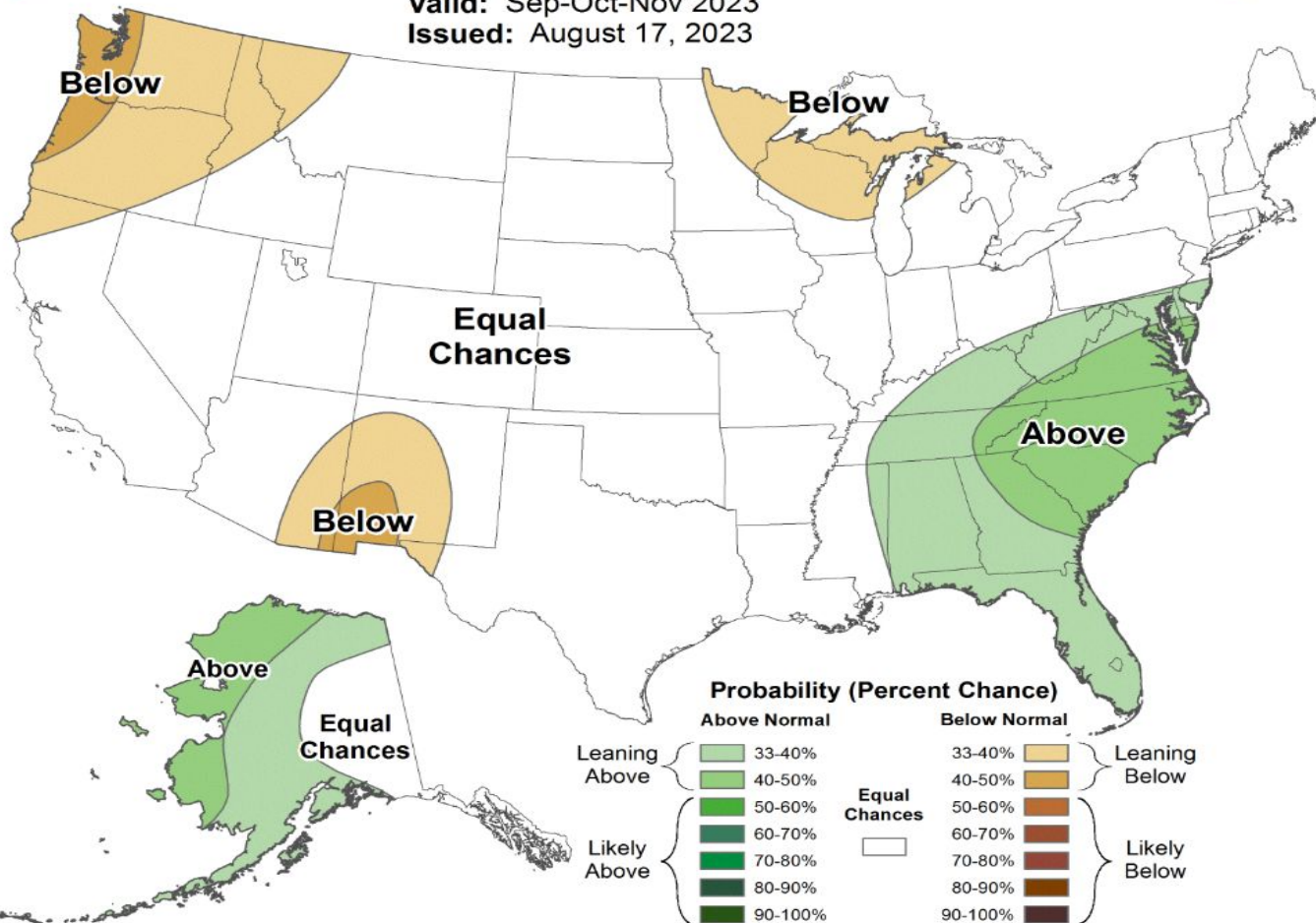


Seasonal Precipitation Outlook



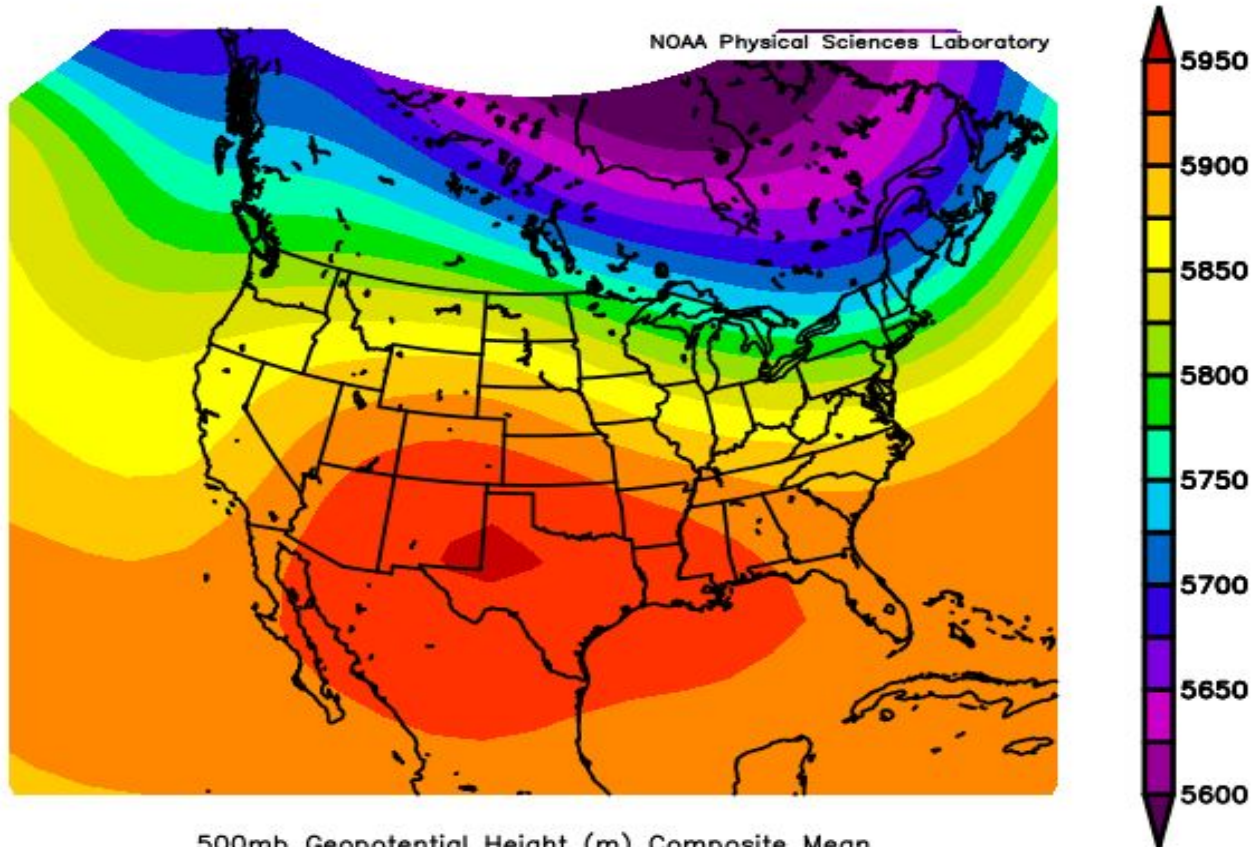
Valid: Sep-Oct-Nov 2023

Issued: August 17, 2023



The three month outlook for the period September - November over the Pacific Northwest shows precipitation amounts leaning mostly towards slightly below normal (33-40%). Again, as with temperatures, precipitation is not always dependent on El-Nino events, of which one is currently ongoing.

August 2023 Average 500 MB Pattern



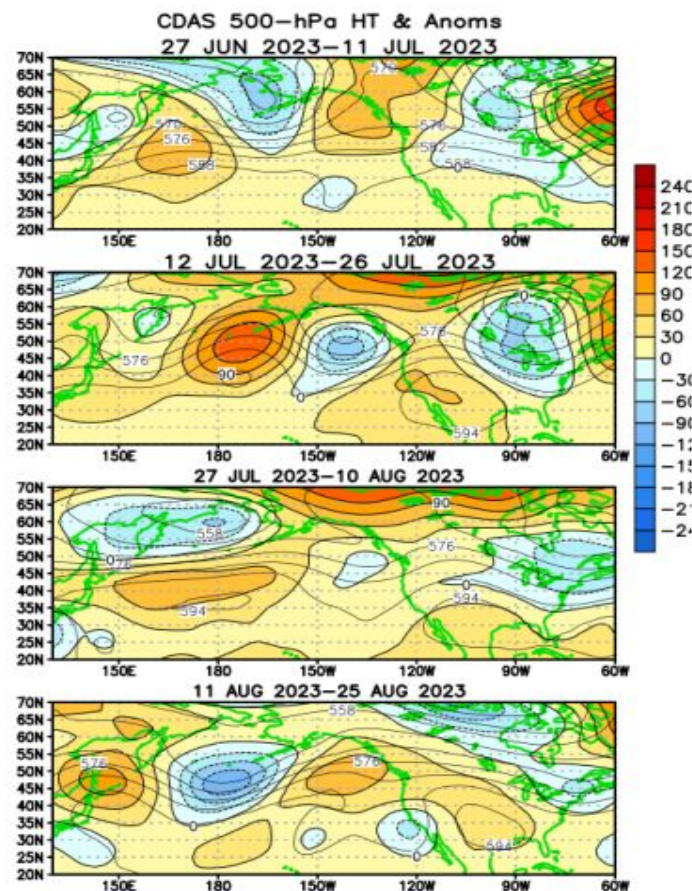
500mb Geopotential Height (m) Composite Mean
8/1/23 to 8/31/23
NCEP/NCAR Reanalysis

The average 500 mb flow pattern for August was a southwest flow over the Pacific Northwest. There were not any extremely amplified ridges or troughs. However, there were a number of upper troughs and ridges that were amplified enough to create a month with more variability in weather conditions than in July. Unlike July, there were also more precipitation events across the northwest USA, which also allowed for more periods of cooler temperatures. Remnants of a strong Pacific hurricane also brought abundant precipitation to eastern and northeast areas.

Two Month, average Bi-weekly 500 MB Plots for July - August 2023

These are more detailed bi-weekly average 500 mb pattern plots that were sampled from the end of June through almost the end of August. These images are updated on the 2nd Thursday of each month.

The area of focus is the Pacific Northwest (OR & WA). The land boundaries are shown by the green lines. Yellow and orange colored areas represent areas of high pressure or ridges at 500 mb. The blue colors show areas of low pressure systems or troughs at 500 mb.

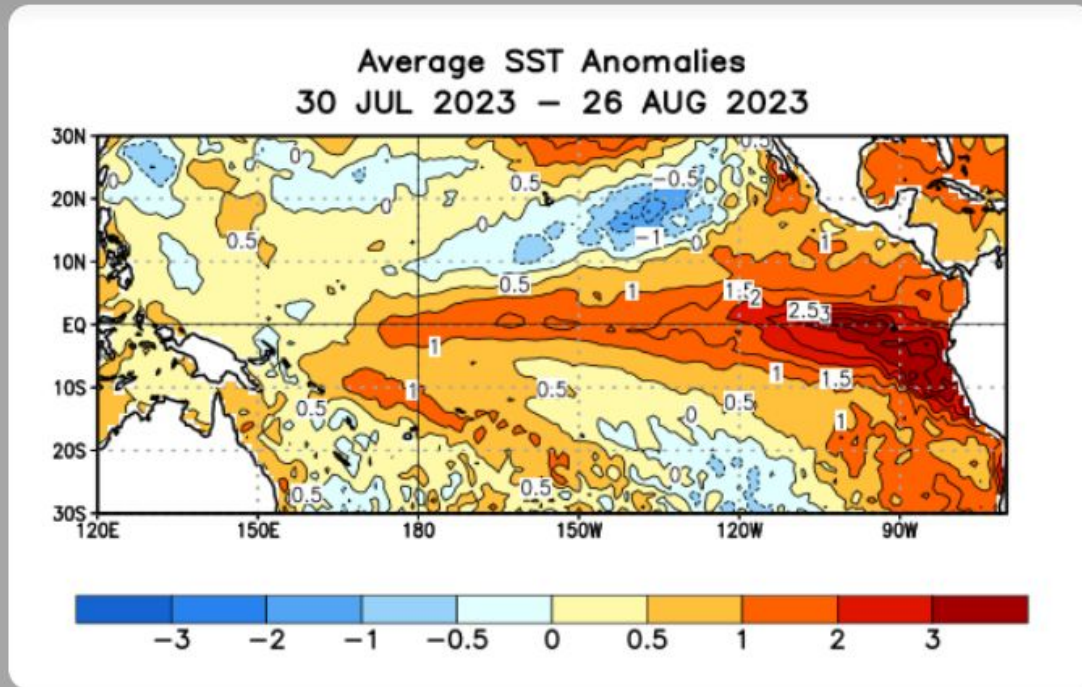


From June 27th through the 10th of August, each bi-weekly average 500 mb pattern plot showed either a weak upper ridge pattern or a mean southwest flow over the Pacific Northwest. In July this resulted in more stagnant hot (even excessively hot) and dry conditions. The 500 mb pattern became more of a broad upper ridge/zonal flow over the Pacific Northwest by August 11th. This latter pattern was likely the cause of more significant heat events, but also, since it was more zonal, it allowed more Pacific weather systems to move across the region. This resulted in more variability of weather conditions from very hot conditions to cooler conditions.

Sea Surface Temperature (SST) Anomalies for August 2023

SST Departures (°C) in the Tropical Pacific During the Last Four Weeks

In the last four weeks, equatorial SSTs were above average across most of the Pacific Ocean, with near average SSTs present in the western Pacific Ocean.



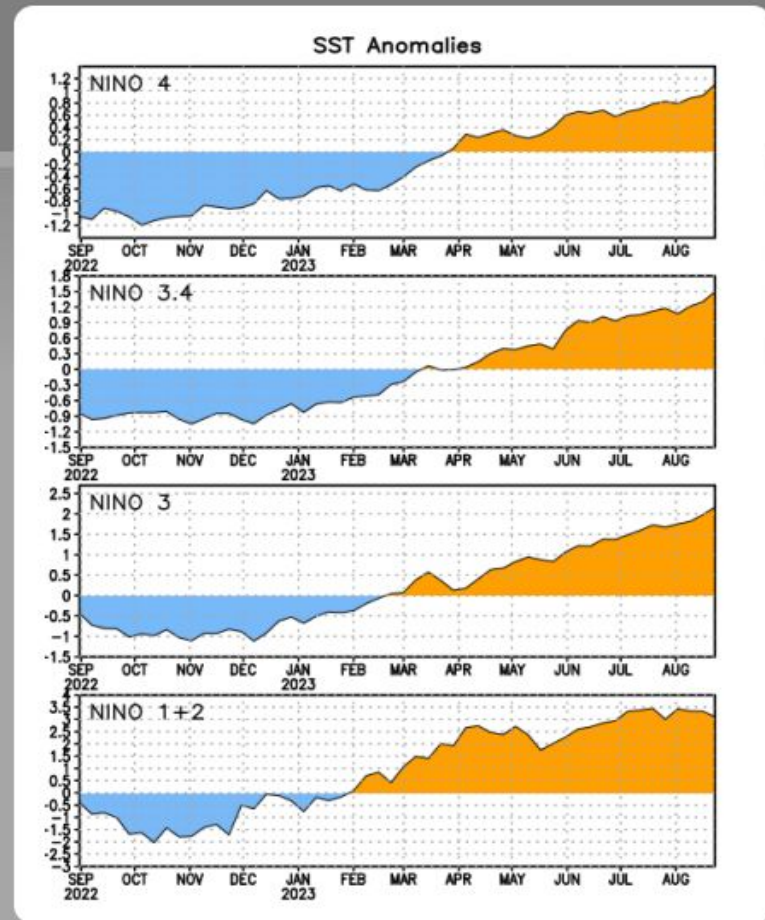
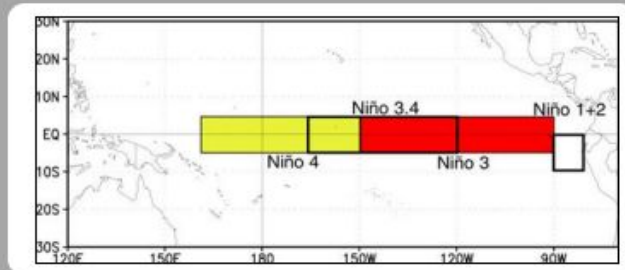
During the last four weeks, equatorial Sea Surface Temperatures (SSTs) were again above average over most of the Pacific Ocean (especially across the eastern equatorial Pacific, where SSTs are now even higher than they were at the end of July). These persistent, above normal SSTs continue to show the presence of an El Niño event that is currently taking place and is forecast to continue through at least the winter of 2023 - 2024.

ENSO Niño Regions SST Anomalies Ending in August 2023

Niño Region SST Departures (°C) Recent Evolution

The latest weekly SST departures are:

Niño 4	1.1°C
Niño 3.4	1.5°C
Niño 3	2.2°C
Niño 1+2	3.1°C



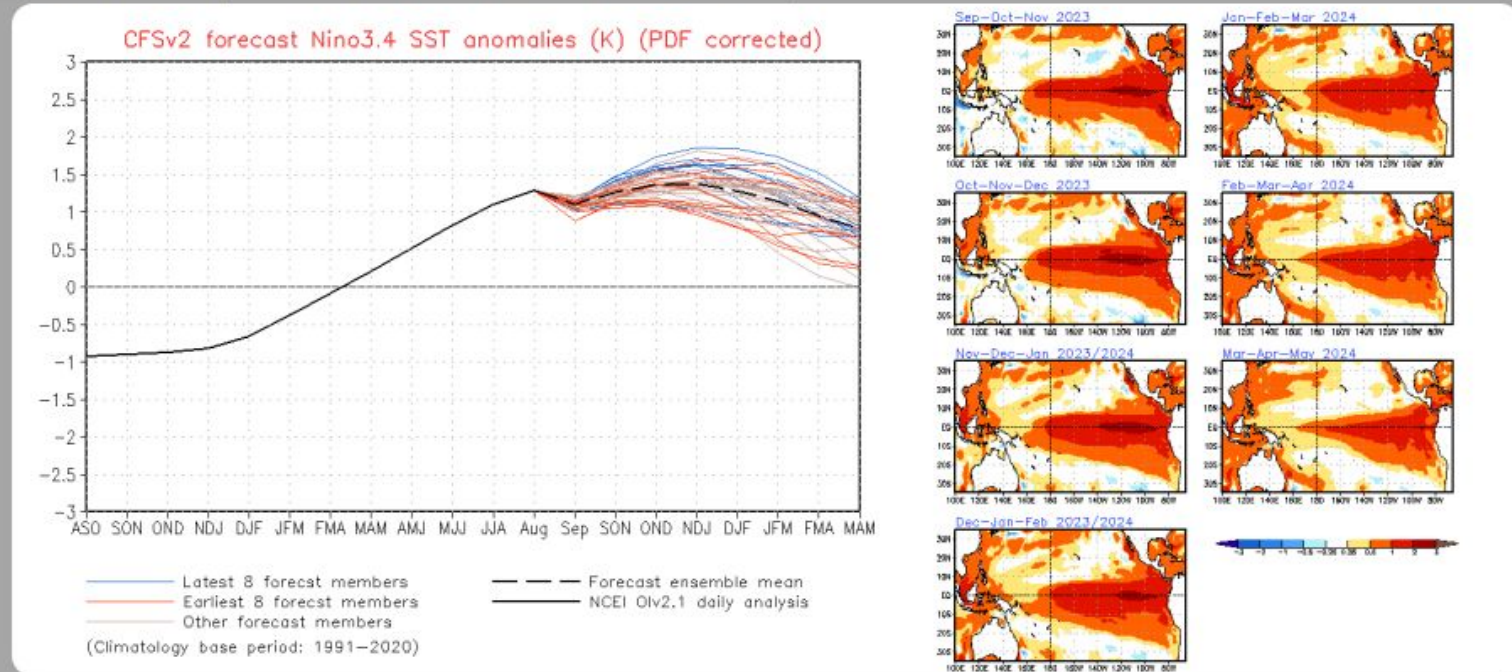
All Niño Regions continued to show warmer than normal SSTs in August with the areas of orange shading on the chart continuing to increase over time (increasing SST anomalies). Niño regions 3, 3.4, and 4 all showed continued rising of SSTs, while Niño region 1+2 showed steady or slightly decreasing SSTs. However, the overall trend is still upward, resulting in reinforcing evidence that the current El-Niño event may still be strengthening.

Sea Surface Temperature (SST) NCEP CFS.v2 Ensemble Mean Outlook

SST Outlook: NCEP CFS.v2 Forecast (PDF corrected)

Issued: 28 August 2023

The CFS.v2 ensemble mean (black dashed line) indicates El Niño will continue through the Northern Hemisphere winter 2023-24. A moderate-to-strong El Niño is favored (ONI between 1.0°C and 2.0°C).



The SST CFS.v2 forecast ensemble mean (the black dashed line) shows that El Niño is forecast to continue through the Northern Hemisphere winter of 2023-2024. This is still favored to become a moderate to strong El Niño. Also, all of the thumbnail images to the right consistently show that well above normal SSTs will continue throughout the winter, but begin to decrease in the spring.

Current ENSO (El Niño Southern Oscillation) Alert System Status

Summary

ENSO Alert System Status: **El Niño Advisory**

El Niño conditions are observed.*

Equatorial sea surface temperatures (SSTs) are above average across the central and eastern Pacific Ocean.

The tropical Pacific atmospheric anomalies are consistent with El Niño.

El Niño is anticipated to continue through the Northern Hemisphere winter (with greater than a 95% chance through December 2023-February 2024).*

The current ENSO Alert System Status is still “**El Niño Advisory**”. El Niño conditions are still observed with equatorial SSTs above average across the central and eastern Pacific Ocean. The tropical Pacific atmospheric anomalies remain consistent with El Niño. El Niño is expected to continue through the Northern Hemisphere winter of 2023-2024 (with a greater than a 95% chance through December 2023 - February 2024).



Thank You!