

The Month In Review

July 2023

National Weather Service,
Pendleton, Oregon

July 2023 Climate Conditions Summary

The main weather hazards of July 2023 were active Fire Weather conditions, and lengthy periods of hot and dry weather. Some of the major wildfires include the Tunnel 5 Fire (which burned down approximately 7 structures), the Boulder Fire, and the Newell Road Fire. These fires burned actively for an impressive amount of time and consumed a significant amount of acreage. July 2023 was also one of the driest on record, with some stations receiving very little, if any, precipitation. Most stations received less than a tenth of an inch for the month. At the Pendleton, OR Airport, only 0.02 of an inch of rain fell from a very localized shower, with most other areas of Pendleton remaining dry. There were a few thunderstorms in the forecast area, however, none were severe.

There were a total of 21 days in which the high temperature officially reached or exceeded 90 degrees at the Pendleton ASOS, including 3 days of 100+ degrees. Other stations (especially in the Lower Columbia Basin) had a greater number of days with high temperatures of 90+ and/or 100+. There was a brief cool down near the end of the month, in which lower elevation high temperatures were in the mid and upper 80s. The hottest period during July, was from the 19th to the 21st, of which Pendleton, OR had a high of 103, Pasco, WA 104, and Dallesport, WA 105, to name a few. These hot and dry conditions contributed to the rapid increase in wildfire activity. There were not a lot of record high temperatures reported, however, the heat was persistent for long periods of time, with very low relative humidity, allowing vegetation to become very dry.

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



Plume dominated wildfire over south central WA



Elevated smoke at sunset in Pendleton, OR



Most fine fuels are cured and ready to burn

More Images Representing July 2023 Weather/Climate Conditions



Boulder Fire on the east slopes of the northern OR Cascades



Accas clouds in the morning indicate unstable air aloft



Very localized shower over the Pendleton Airport - 0.02 inch



Crepuscular rays of the sunrise through mid level clouds

Significant Weather Events - Local Storm Reports for July 2023

Significant Weather Events					
Date	Location	State	Event Type	Magnitude	Source
None	N/A	N/A	N/A	N/A	N/A

In the forecast area, there were not any weather events in July which were significant enough to warrant a Local Storm Report (LSR) being issued. There were a few weak thunderstorms, and a few Red Flag events, but these were not significant enough to result in any LSRs. This is the first time in at least 5 years in which there were not any significant weather events worthy of an LSR, during any month of the year. As mentioned earlier, large wildfires, and persistent hot and dry conditions were the primary weather concerns during July.

Record Weather Events for July 2023

Record Weather Reports					
Event	Date	Where	Previous Record	New Record	Records Began
Maximum Rainfall	July 10, 2023	Yakima, WA	0.14 / 1947	0.20	1909
High Temperature	July 15, 2023	Dallesport, WA	105 / 2018	105 (tie)	1929
High Temperature	July 15, 2023	Redmond, OR	99 / 1973	100	1941
High Temperature	July 20, 2023	Ellensburg, WA	101 / 1946	101 (tie)	1934
Low Temperature	July 26, 2023	Walla Walla, WA	52 / 1992	52 (tie)	1930

There were also few record weather events recorded (only 5) which broke or tied previous records. Three of them were record high temperatures, one record low temperature, and one record maximum rainfall, which was only 0.20 of an inch. Except for the persistent heat and wildfires, the month was fairly benign.

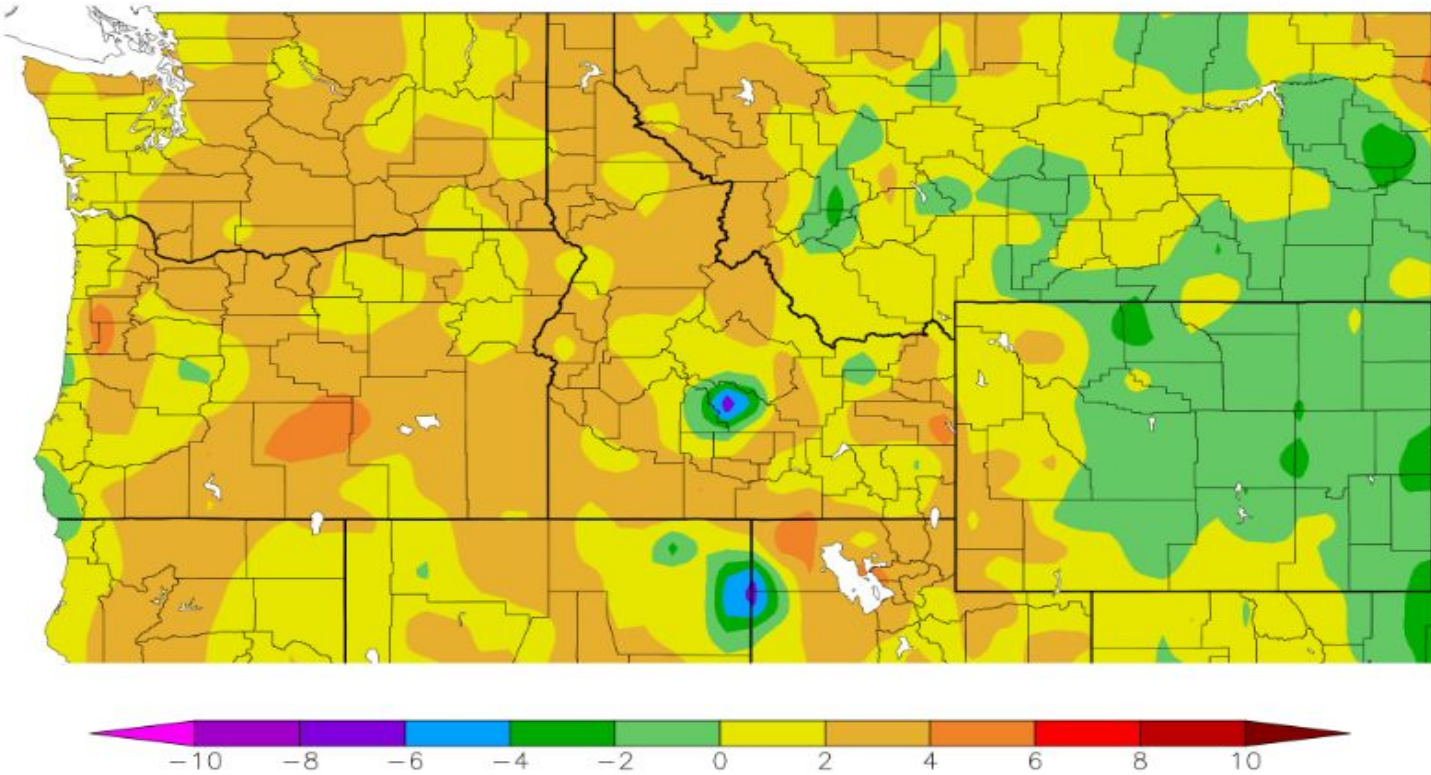
July 2023: Observed Monthly Maximum & Minimum Temperatures

Location <small>Source: ASOS, or otherwise stated</small>	Highest Maximum	Lowest Minimum
Pendleton, OR	103	52
Redmond, OR	100	43
Pasco, WA	104	51
Yakima, WA	100	47
Walla Walla, WA	102	52
Bend, OR CoOp	93	44
Ellensburg, WA	101	48
Hermiston, OR	104	50
John Day, OR CoOp	102	50
La Grande, OR CoOp	100	44
Dallesport, WA	105	56
Meacham, OR	91	35
MT Adams R.S., WA	94	41

The highest maximum temperature (in the list above) was 105 degrees, which occurred at The Dalles, OR (Dallesport, WA ASOS). Dallesport, WA is just across the Columbia River from the city of The Dalles, OR. The highest minimum temperature was 56 degrees, which was also recorded by the Dallesport, WA ASOS. Meacham, OR reported both the lowest maximum and the lowest minimum temperatures. There were no temperatures that were at or below freezing. All but 3 stations had highest maximums at or greater than 100 degrees.

July 2023: Departure from Normal of Average Temperatures

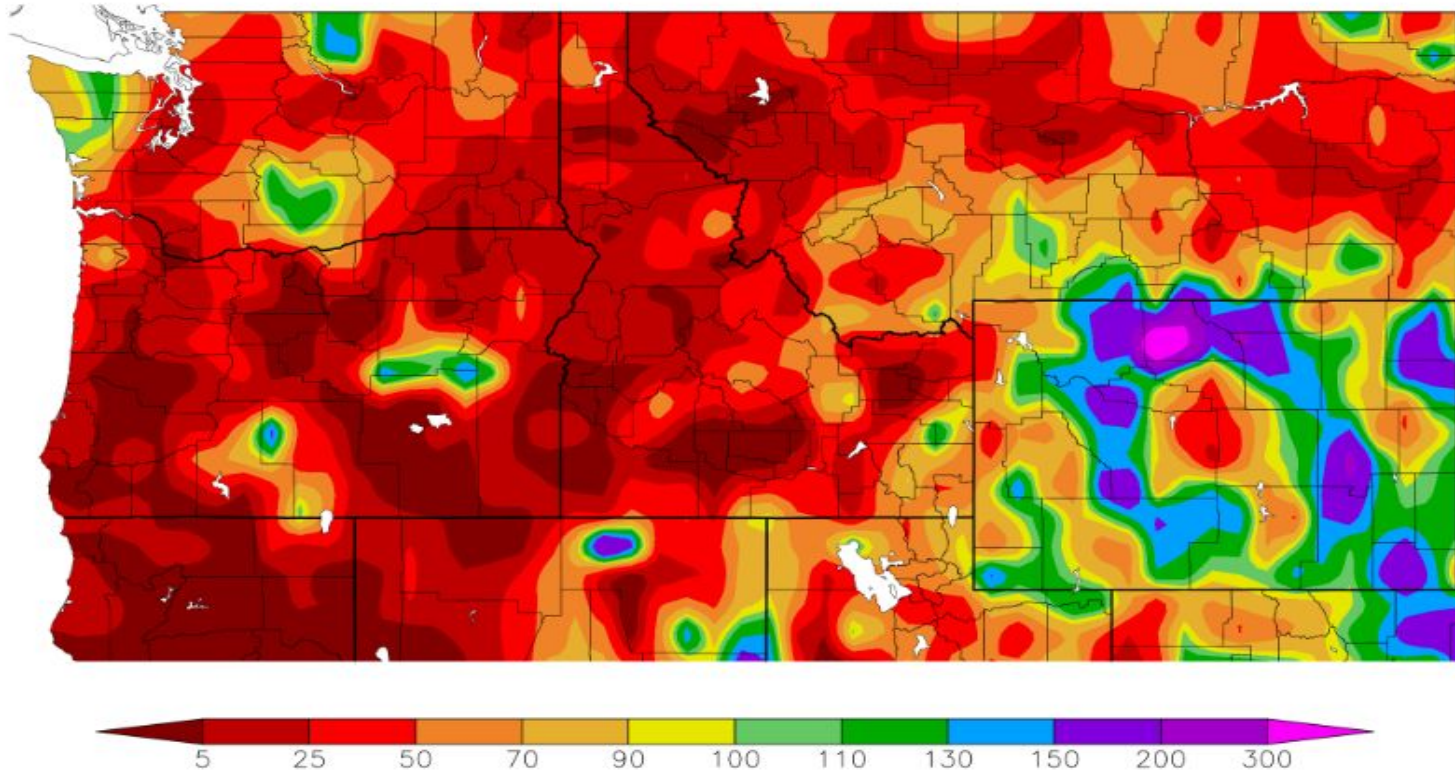
Departure from Normal Temperature (F)
7/1/2023 - 7/31/2023



The entire forecast area had above normal temperatures (warm color shades of yellow to orange) in the above graphic. The distribution of these temperature anomalies was fairly even. A very small area in extreme southeast Deschutes County, OR had the greatest departure from normal (at least 4 degrees above normal according the color scale). The rest of the forecast area had departures that ranged between zero and +4 degrees (above normal), on the color scale.

July 2023: Percent of Normal of Precipitation

Percent of Normal Precipitation (%)
7/1/2023 – 7/31/2023



Just by glancing at the graphic, one can see that most of OR and WA had well below normal precipitation (as low as 5 percent or less). There were a couple small areas that did receive above normal precipitation. These locations include extreme southern Grant County, OR, and most of Yakima County, WA. This graphic emphasizes that July 2023 was one of the driest on record.

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

Source: ASOS, or otherwise stated	Max T	Depart	Min T	Depart	Ave T	Depart	PCPN	Depart
Yakima, WA	91.9	2.0	57.4	2.4	74.6	2.2	0.22	0.02
Kennewick CoOp	94.5	3.2	64.7	2.4	79.6	2.8	0.10	-0.11
Walla Walla, WA	91.6	1.5	63.0	0.6	77.3	1.0	0.02	-0.45
Dallesport, WA	91.6	3.2	63.2	2.2	77.4	2.7	0.05	-0.11
Redmond, OR	91.6	4.1	49.5	1.0	70.6	2.6	0.00	-0.40
Pendleton, OR	92.8	3.6	59.0	2.3	75.9	2.9	0.02	-0.24
La Grande CoOp	91.2	5.0	52.4	-2.1	71.8	1.5	0.03	-0.57
John Day CoOp	89.5	3.3	49.9	2.1	69.7	2.7	0.01	-0.42

Every station in the list above had above normal **mean monthly maximum** temperatures, with the greatest departure being at the La Grande Airport (+5.0 degrees). Every **mean monthly minimum** temperature, except for the La Grande Airport, were also above normal, with the greatest departure being a tie between the Yakima Airport and the Kennewick COOP (+2.4 degrees). Only the La Grande Airport had a negative departure (-2.1 degrees). Every station had above normal **mean average temperatures**, with the greatest departure being at the Pendleton Airport (+2.9 degrees). Every station had below normal **precipitation**, except for the Yakima Airport, with the greatest departure being at La Grande (-0.57 inch). The Yakima Airport had +0.02, or slightly above normal.

The greatest departures are outlined in black boxes.

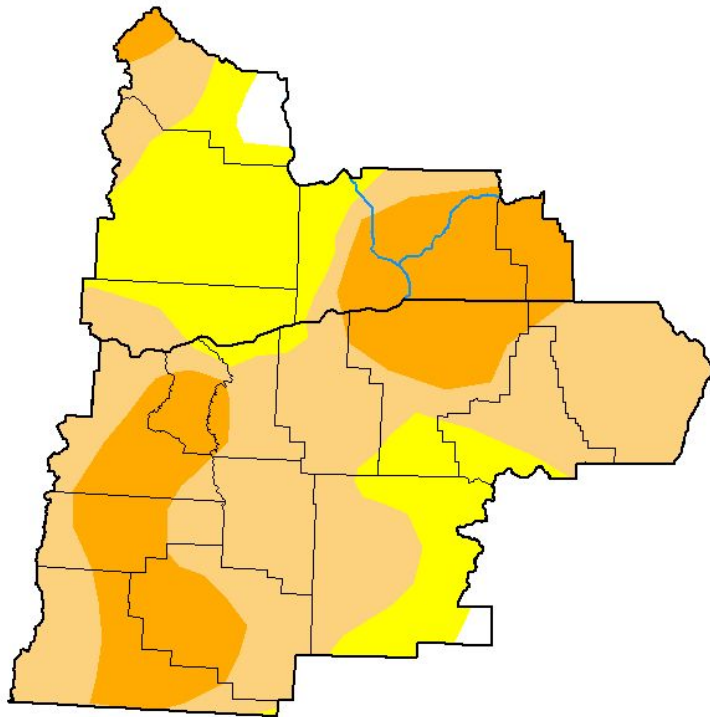
July 2023: Observed Total Precipitation and Total Snowfall / Hail

Location <small>Source: ASOS, or otherwise stated</small>	Total Precipitation (inches)	Total Snow/Hail (inches)
Pendleton, OR	0.02	0.0
Redmond, OR	0.00	M
Pasco, WA	0.04	M
Yakima, WA	0.22	M
Walla Walla, WA	0.02	M
Bend, OR CoOp	0.00	0.0
Ellensburg, WA	T	M
Hermiston, OR	T	M
John Day, OR CoOp	0.10	M
La Grande, OR CoOp	0.03	M
The Dalles, OR	0.05	M
Meacham, OR	T	M
Mt. Adams R.S., WA	0.00	0.0

The greatest reported precipitation of the stations listed above was only 0.22 of an inch at Yakima, WA. There were 3 stations that did not receive any precipitation at all, which were Redmond, OR, the Bend Co-Op station, and the Mt. Adams Ranger Station. Most precipitation amounts in the list ranged from a trace to a tenth of an inch. All three of the stations which report snow or hail had zero snow or hail. There may have been some hail during the month at some locations, but were not over any of these reporting stations.

July 2023 - Drought Monitor – Pendleton Forecast Area

U.S. Drought Monitor Pendleton, OR WFO



August 1, 2023

(Released Thursday, Aug. 3, 2023)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	1.52	98.48	73.93	26.70	0.00	0.00
Last Week <i>07-25-2023</i>	1.52	98.48	69.45	15.77	0.00	0.00
3 Months Ago <i>05-02-2023</i>	38.14	61.86	45.46	26.29	11.34	0.00
Start of Calendar Year <i>01-03-2023</i>	29.80	70.20	39.93	22.93	15.24	3.17
Start of Water Year <i>09-27-2022</i>	0.00	100.00	46.03	24.98	17.46	3.17
One Year Ago <i>08-02-2022</i>	36.21	63.79	41.68	27.83	22.24	4.01

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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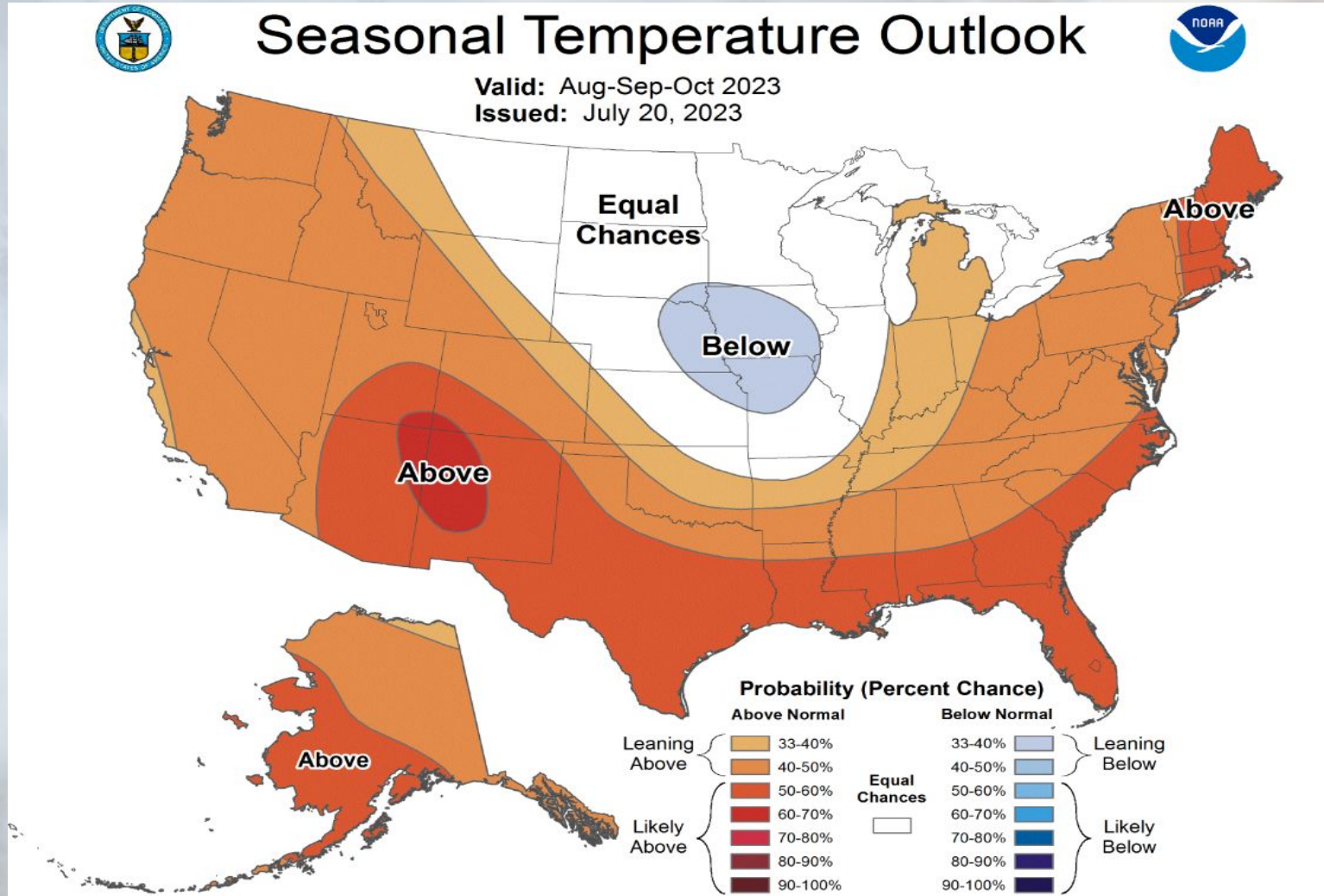
droughtmonitor.unl.edu

*For additional drought and water supply information, please check out the NWS Pendleton **Drought Summary / Water Supply Outlook** that was released on **August 12, 2023.***



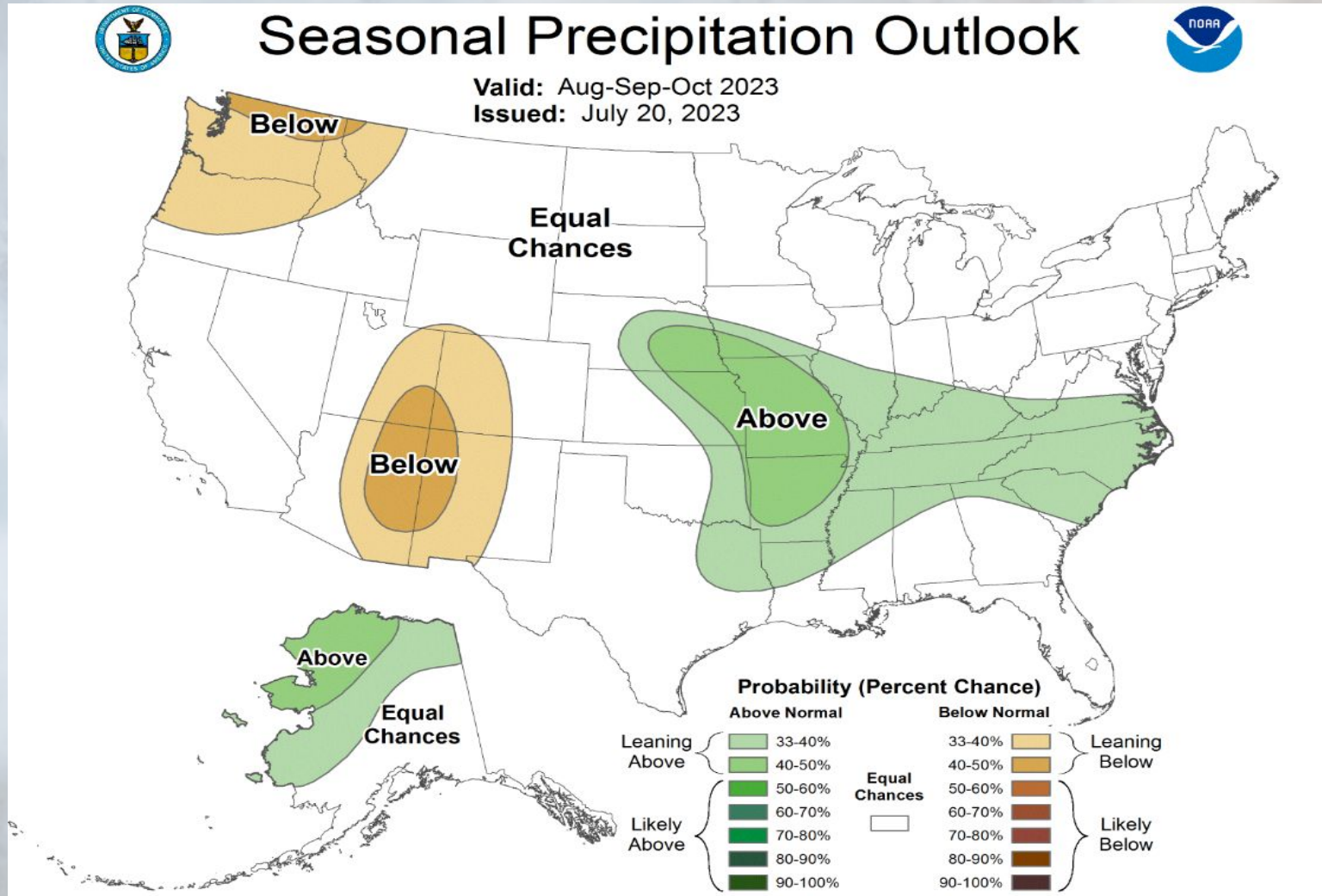
Unlike in many previous months, as of August 1st, the entire forecast area now has a drought intensity of at least D0 (Abnormally Dry), except for far eastern Kittitas County, WA, which had a “None” drought intensity. However, the “Extreme” drought conditions that existed in central OR in previous months, east the Cascades, now has fallen to a D2 (Severe) drought category. Most of the Lower Columbia Basin and the Northern Blue Mountains now also have a drought intensity of D2 (Severe).

USA Three Month Temperature Outlook



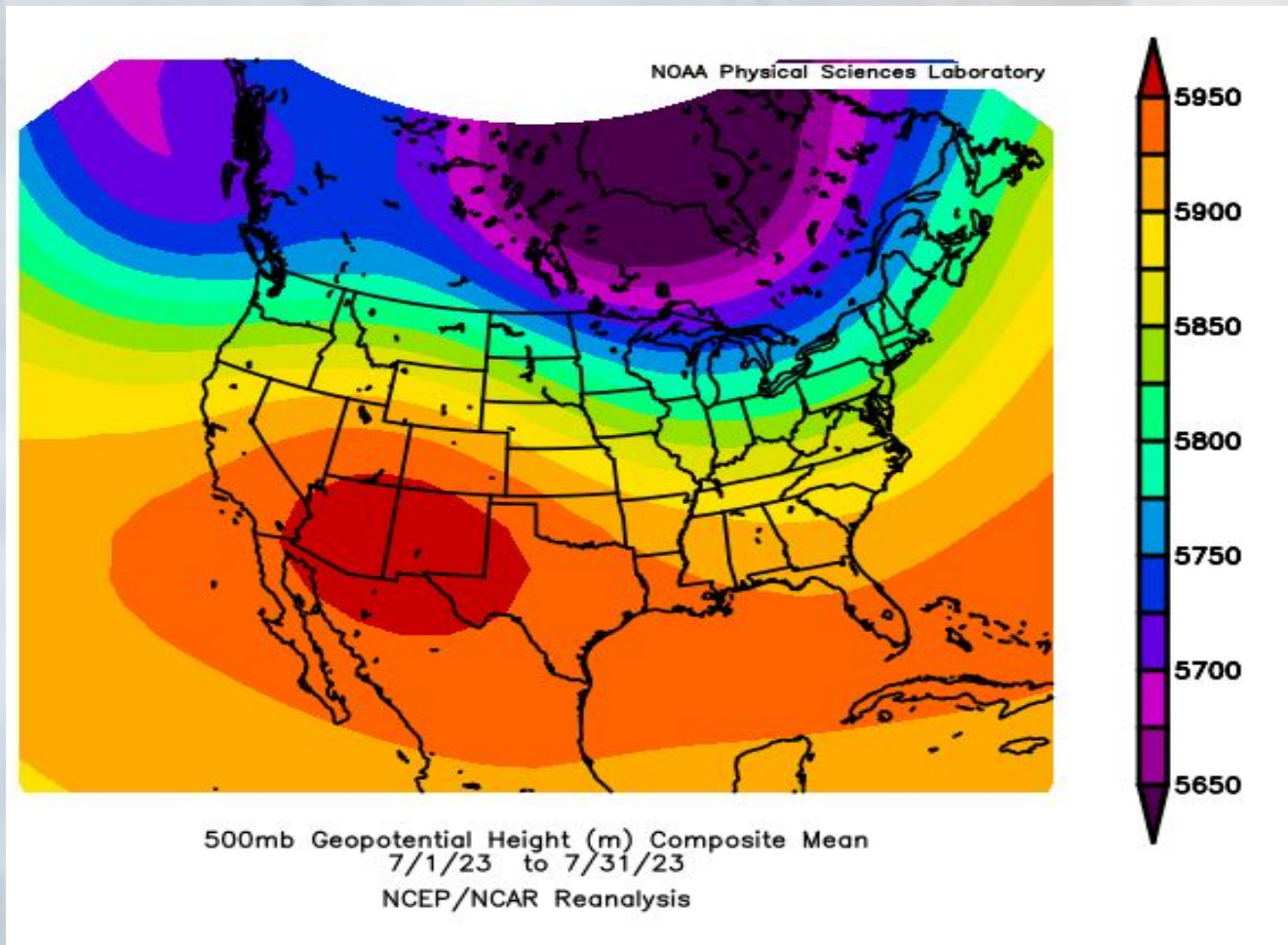
The three month outlook for the period August through October over the Pacific Northwest shows temperature probabilities leaning towards above normal (40-50%). This is not much of a change since June, except that the probabilities are slightly lower, and with a solid coverage area in this probability range.

USA Three Month Precipitation Outlook



The three month outlook for the period August - October over the Pacific Northwest shows precipitation amounts leaning mostly towards slightly below normal (33-40%). Only the extreme southeast portions of the forecast area are expected to lean toward equal chances (33%), of above or below normal precipitation.

July 2023 Average 500 MB Pattern

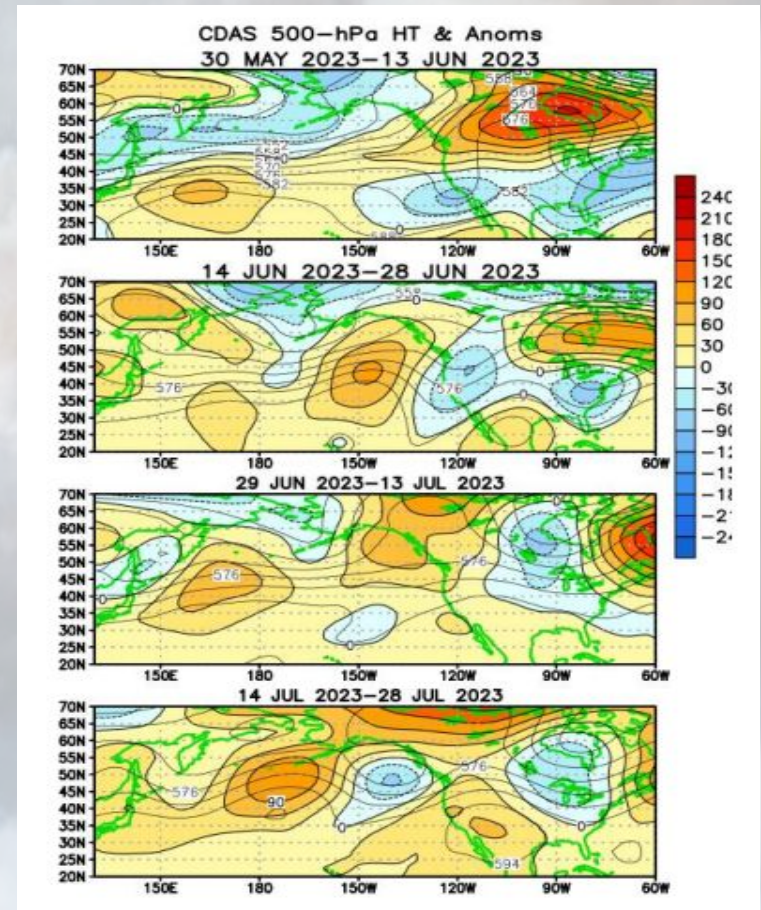


The average 500 mb flow pattern for July was an upper ridge axis centered over the Rocky Mountains, with the Pacific Northwest on the southwest flow side (the west side). This kept conditions warm, and mostly dry, except for occasional periods of showers and some weak thunderstorms. This pattern overall led to a warmer to hotter than normal, and a drier than normal month. However, since the upper ridge was not too amplified, the heat, though persistent, was not unusual record breaking heat, as was the case in 2021 and 2022.

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

These are more detailed bi-weekly average 500 mb pattern plots that were sampled from the very end of May through the end of July.

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.

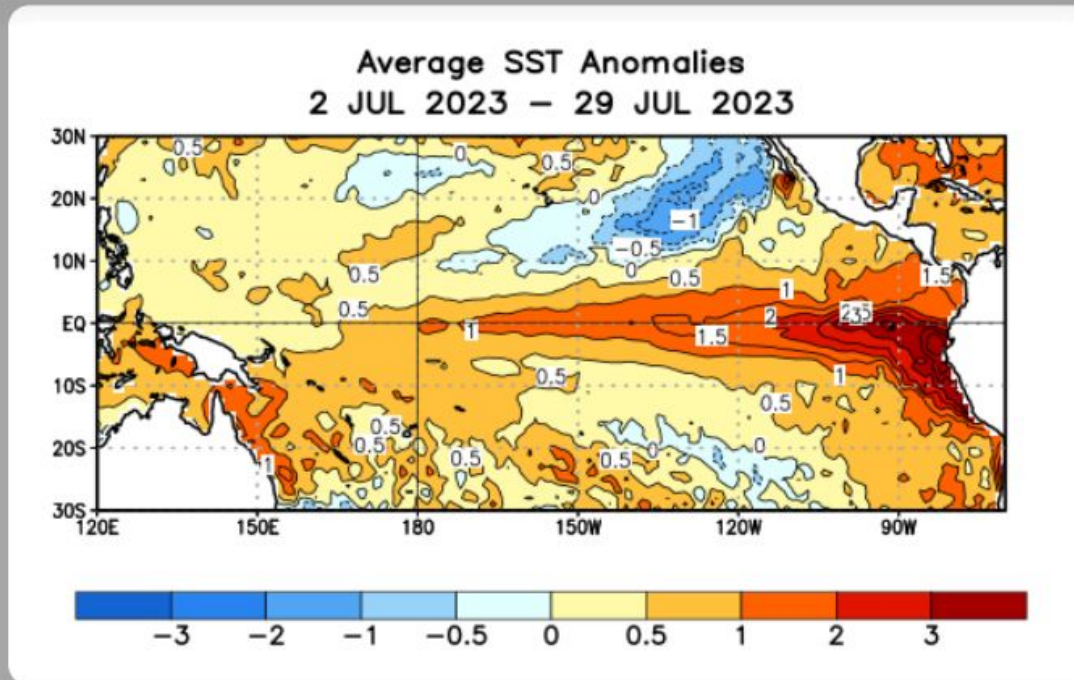


For the first bi-weekly period (May 30th - June 13th) there was mainly a westerly flow aloft, with a strong upper high pressure system over northeast Canada, which stretched west-southwest to the Pacific Northwest. Then an upper trough developed from June 14th - June 28th, which lead to a cooler period with some rain. From June 29th - July 13th, an upper ridge began developing over the intermountain west, with OR and WA being mostly on the west side of the ridge. And finally, from July 14th - July 28th, the western upper ridge amplified over the Rocky Mountains, leaving the forecast area in a warm and mostly dry southwest flow aloft.

Sea Surface Temperature (SST) Anomalies for July 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.



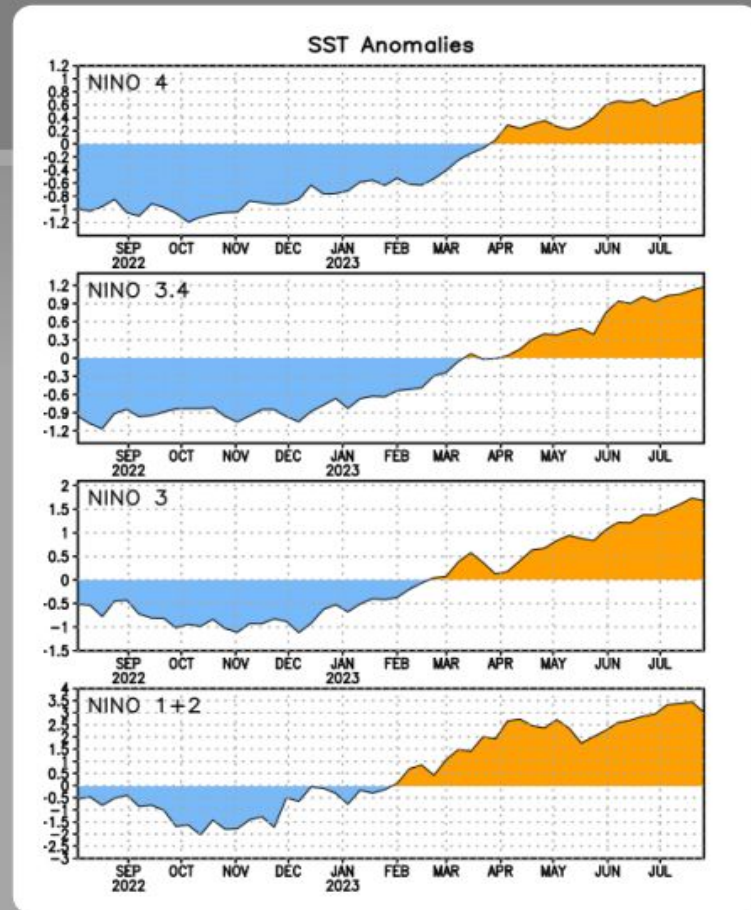
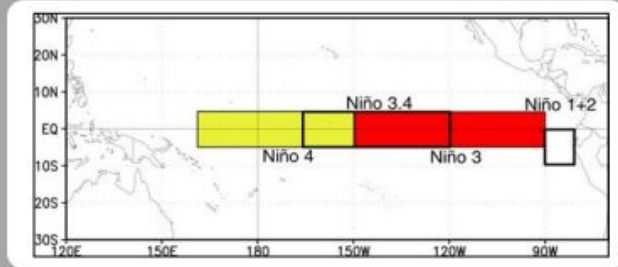
Equatorial Sea Surface Temperatures (SSTs) were above average over most of the Pacific Ocean during the last four weeks (especially the central and eastern equatorial Pacific). There were still some cooler than normal areas off the coast of Mexico southwestward. These persistent, mostly above normal, SSTs continues to show the presence of an El Niño event, which is expected to continue through the fall into the winter of 2023 - 2024.

ENSO Niño Regions SST Anomalies Ending in July 2023

Niño Region SST Departures (°C) Recent Evolution

The latest weekly SST departures are:

Niño 4	0.8°C
Niño 3.4	1.2°C
Niño 3	1.7°C
Niño 1+2	3.0°C



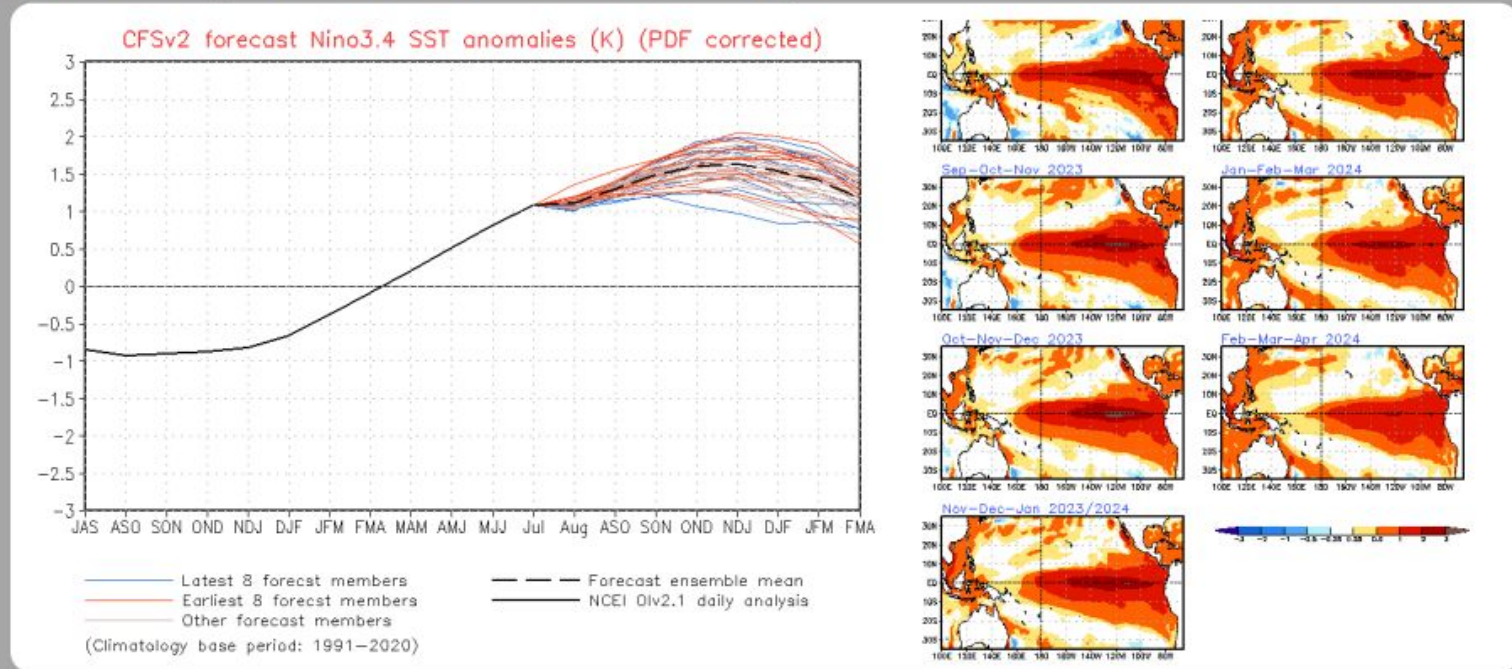
All Niño Regions continued to show warmer than normal SSTs in July, with the area of orange on the chart continuing to increase in area over time. This is consistent with the current El Niño event, which is forecast to continue through the fall and into the winter of 2023 - 2024. These warming SSTs have been taking place during the past 4 to 6 months, with the greatest in Niño Region 1 + 2, and Niño Region 3 (the easternmost Niño regions).

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

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

Issued: 31 July 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 favored to become a moderate to strong El Niño. Also, all of the thumbnail images to the right consistently shows above normal SSTs throughout the summer and fall, into the winter of 2023-2024.

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 conditions.

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 currently observed, with equatorial SSTs above average across the central and eastern Pacific Ocean. The tropical Pacific atmospheric anomalies are consistent with El Niño conditions. El Niño is expected to continue through the Northern Hemisphere winter of 2023-2024 (with greater than a 95% chance through December 2023 - February 2024).



Thank You!