

The Month In Review September 2023

National Weather Service,
Pendleton, Oregon

Rainbow within convective clouds over the Blue Mountains in northeast Oregon. Photo By: Rob Brooks

September 2023 Climate Conditions Summary

September was mostly a benign month weather-wise. Conditions were mostly dry and warm during the first half of the month, although there was a rain event spanning the 25th through the 27th. The highest temperatures occurred on the 15th and 16th, after that conditions cooled down. The highest reported temperatures at the Pendleton OR airport reached 92 and 94 degrees on the 15th and 16th respectively. During the rest of the month, temperatures were cool and sometimes below average. There were not any significant weather events that warranted a Local Storm Report. There were only two record weather events, both of which were maximum daily rainfall amounts, that occurred on the 24th and 25th at Redmond, OR and Ellensburg, WA, respectively. The windiest periods occurred on the 3rd, 12th, 18th, and the 27th. For example, the greatest peak wind gust at the Pendleton, OR Airport was 51 mph on the 3rd.

The first dense fog episode occurred very early in the cool season on the night of the 21st - 22nd. There were also a couple of weak thunderstorms that occurred on the 2nd, 7th, and the 26th. There were also periods of elevated smoke layers, which were visible over much of the forecast area. These elevated smoke layers produced a beautiful sunset over Pendleton, OR on the 13th. Wildfires, such as the Lookout Fire, became contained and controlled on the 29th.

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



Unseasonal morning fog over Pendleton, OR



Thunderstorms to the west of Pendleton, OR



Elevated smoke near Pendleton, OR on the 13th

More Images Representing September 2023 Weather/Climate Conditions



Morning ACCAS clouds, indicating unstable air aloft



Vivid lightning strike just west of Pendleton, OR



A beautiful rainbow after a thunderstorm near Pendleton, OR



Fire season ending rain event over the forecast area on the 21st

Significant Weather Events - Local Storm Reports for September 2023

Significant Weather Events					
Date	Location	State	Event Type	Magnitude	Source

There were not any significant weather events that warranted a Local Storm Report (LSR) during the entire month.

Record Weather Events for September 2023

Record Weather Reports					
Event	Date	Where	Previous Record	New Record	Records Began
Daily Max Rainfall	September 24, 2023	Redmond, OR	0.27 / 2014	0.29	1941
Daily Max Rainfall	September 25, 2023	Ellensburg, WA	0.19 / 1947	0.23	1934

There were only 2 record weather events during September. On the 24th, a record daily maximum rainfall of 0.29 inches fell at Redmond, OR, which broke the previous record of 0.27 in 2014. Then a record maximum daily rainfall of 0.23 inch, which occurred on the 25th at Ellensburg, which broke the old record of 0.19 inch in 1947.

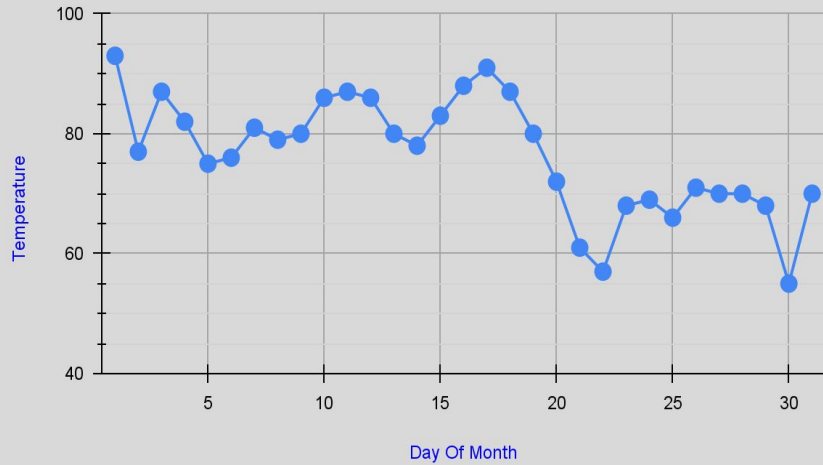
September 2023: Observed Monthly Maximum & Minimum Temperatures

Location <small>Source: ASOS, or otherwise stated</small>	Highest Maximum	Lowest Minimum
Pendleton, OR	94	43
Redmond, OR	95	29
Pasco, WA	92	42
Yakima, WA	91	33
Walla Walla, WA	91	43
Bend, OR CoOp	90	32
Ellensburg, WA	90	32
Hermiston, OR	92	40
John Day, OR CoOp	88	30
La Grande, OR CoOp	92	37
Dallesport, WA	94	42
Meacham, OR	89	27
MT Adams R.S., WA	88	32

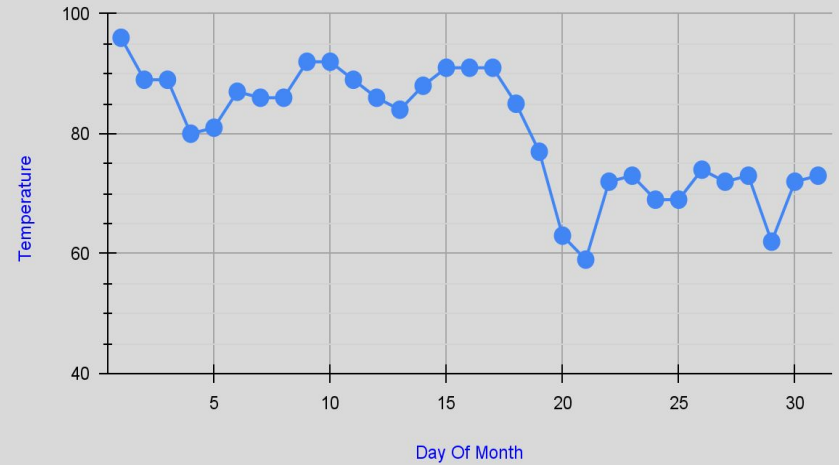
The warmest maximum temperature in the table above was 95 degrees at Redmond, OR. The coolest maximum temperature was at the John Day, OR CoOp station and the Mt. Adams Ranger Station with both stations reporting 88 degrees. The warmest lowest minimum temperature was at Pendleton, OR and Walla Walla, WA, with both stations reporting 43 degrees. The coldest lowest minimum temperatures was at Meacham, OR, with a low of 27 degrees.

September 2023 - Daily Maximum Temperatures For Select Cities

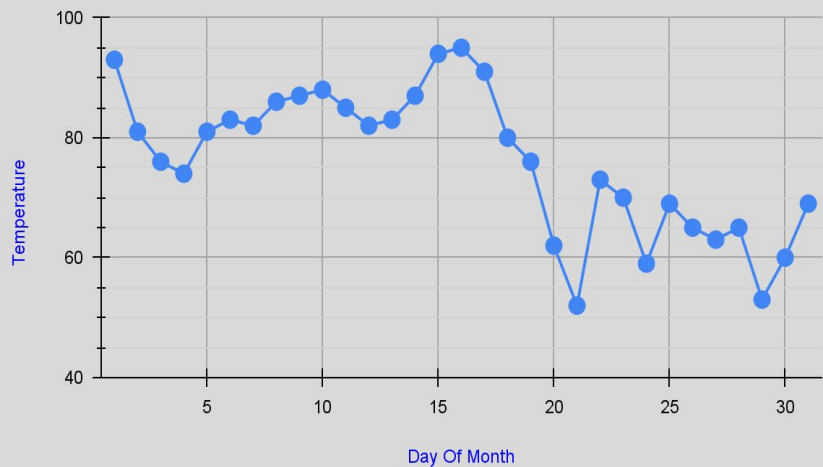
Pendleton, OR - September 2023 Daily Maximum Temperatures



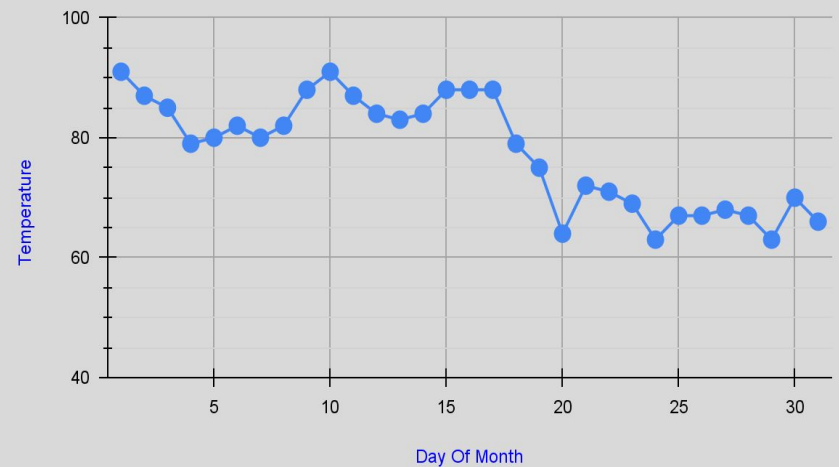
Pasco, WA - September 2023 Daily Maximum Temperatures



Redmond, OR - September 2023 Daily Maximum Temperatures



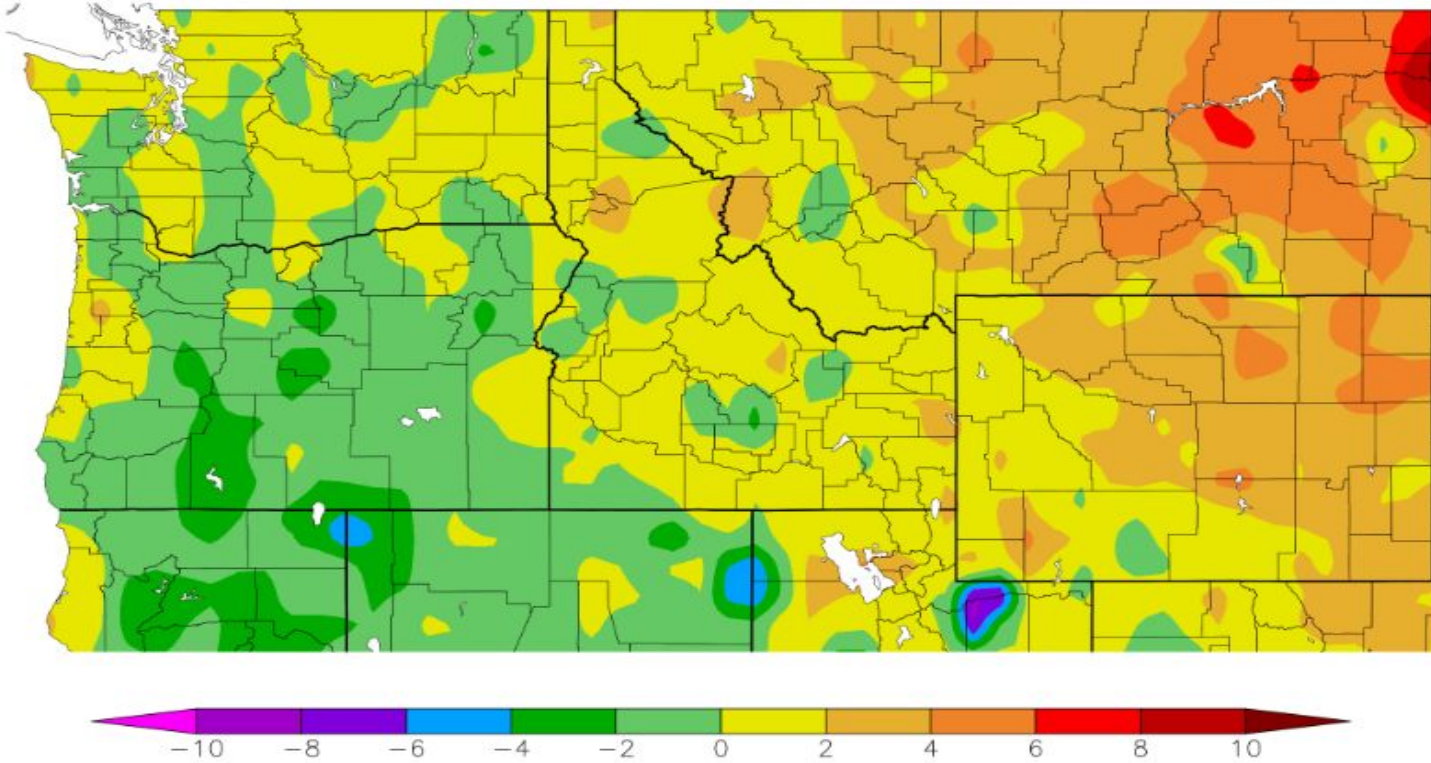
Yakima, WA - September 2023 Daily Maximum Temperatures



The graphs above clearly show that during just a little more than the first half of September was warm. Then during the rest of the month, temperatures became much cooler.

September 2023: Departure from Normal of Average Temperatures

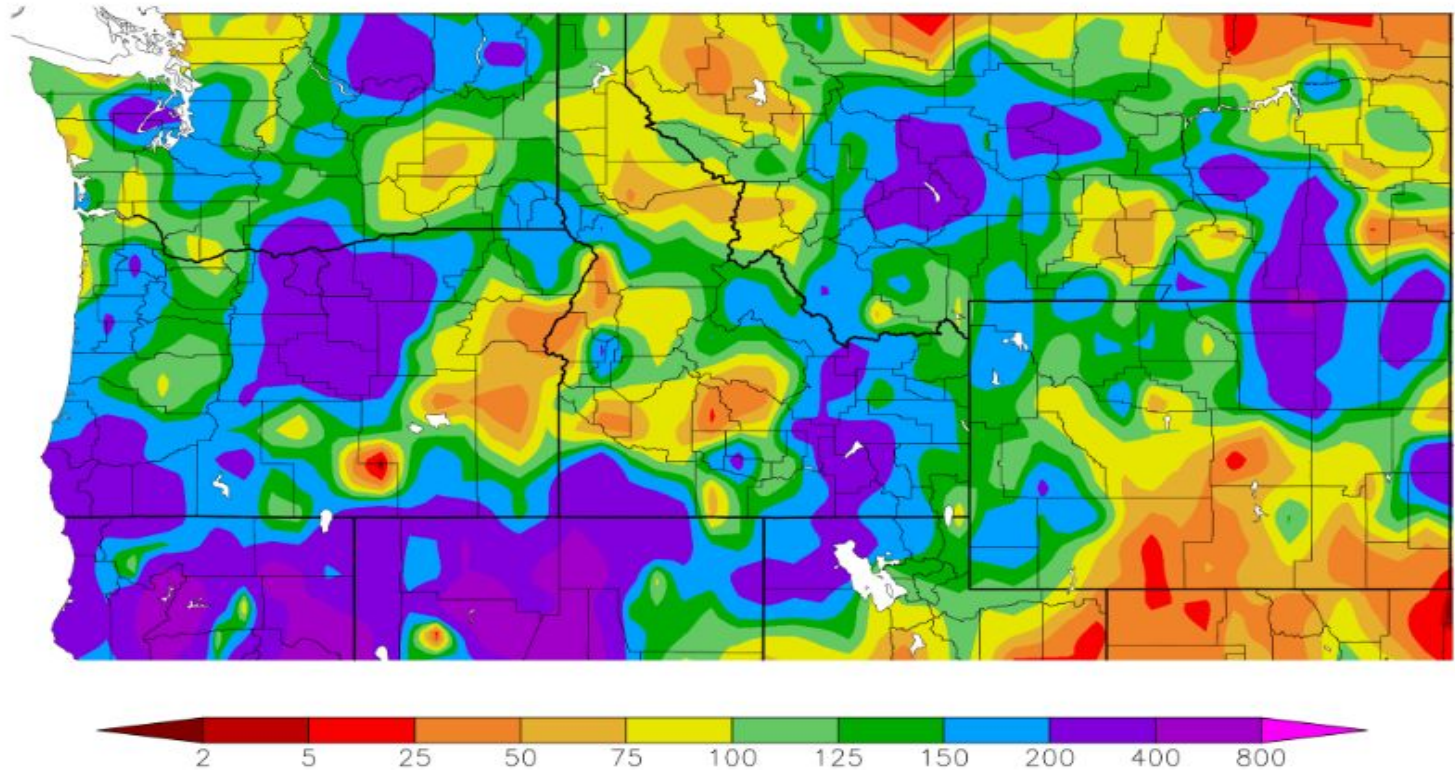
Departure from Normal Temperature (F)
9/1/2023 – 9/30/2023



The forecast area had near normal temperatures overall. The warmest departures from normal occurred over central and north central OR to the eastern and northeastern mountains. The coolest departures from normal were mostly on the Washington side of the forecast area, over the Lower Columbia Basin and the Yakima and Kittitas Valleys. The range of the departures from normal over the forecast area were from -4 degrees to +2 degrees.

September 2023: Percent of Normal of Precipitation

Percent of Normal Precipitation (%)
9/1/2023 – 9/30/2023



The percent of normal precipitation was very high (200-400%) over portions of central OR northward to north central OR, into the Foothills of the Southern Blue Mountains and the western portion of the Ochoco-John Day Highlands. The driest areas with the greatest negative percent of normal precipitation was over the WA Lower Columbia Basin (50-75%). The WA Cascades, the Yakima and Kittitas Valleys had about 125-200 percent of normal precipitation.

September 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	77.7	-1.7	47.4	2.5	62.6	0.4	0.39	0.16
Kennewick, WA	78.9	-1.6	56.2	3.0	67.6	0.8	0.15	-0.11
Walla Walla, WA	75.7	-2.8	54.1	0.2	64.9	-1.3	0.66	0.02
Dallesport, WA	78.5	-1.9	54.6	2.4	66.5	0.2	0.83	0.50
Redmond, OR	75.7	-2.9	41.7	1.1	58.7	-0.9	0.64	0.27
Pendleton Airport	77.5	-0.5	51.8	2.8	64.6	1.1	0.90	0.37
La Grande Airport	75.5	-1.8	44.0	-0.8	59.5	-1.5	0.61	-0.06
John Day, OR	73.9	-2.8	41.2	2.1	57.6	-0.3	0.51	-0.01

Every station had negative departures from the mean maximum temperatures, with the greatest departure at Redmond, OR of -2.9 degrees. Meanwhile, all but one station had positive mean minimum temperatures departures with the greatest departure from normal of +3.0 degrees at Kennewick, WA. There was an even split of above or below normal mean average temperatures, with the greatest departure of normal of -1.5 degrees at the La Grande, OR Airport. These departures were likely a result of more cloudy nights that kept temperatures up during the night, but cooler during the day. There was also close to an even split of the departure from normal precipitation, with the greatest departure from normal of +0.50 inch at Dallesport, WA (The Dalles).

The greatest departures are outlined in black boxes.

September 2023: Observed Total Precipitation and Total Snowfall / Hail

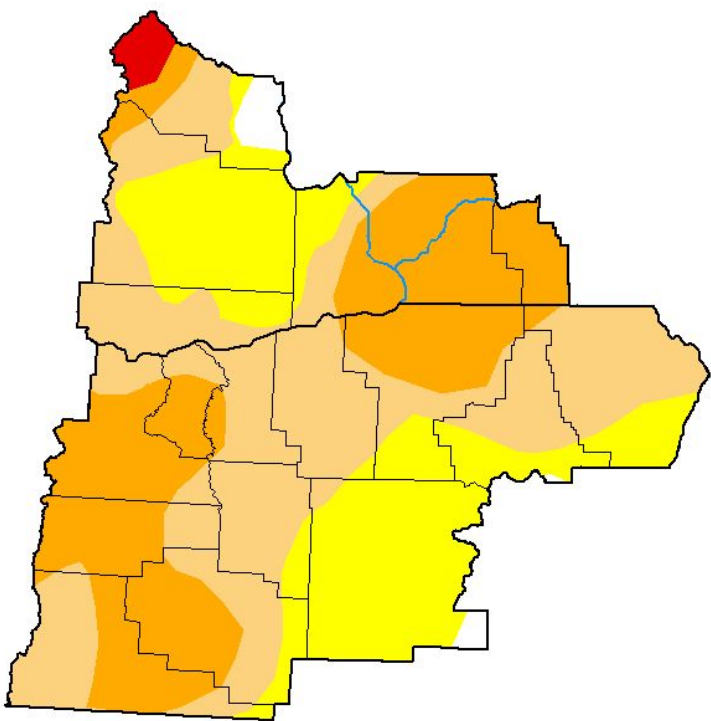
Location <small>Source: ASOS, or otherwise stated</small>	Total Precipitation (inches)	Total Snow/Hail (inches)
Pendleton, OR	0.90	0.0
Redmond, OR	0.64	M
Pasco, WA	0.20	M
Yakima, WA	0.39	M
Walla Walla, WA	0.66	M
Bend, OR CoOp	1.42	0.0
Ellensburg, WA	0.48	M
Hermiston, OR	0.72	M
John Day, OR CoOp	0.51	0.0
La Grande, OR CoOp	0.53	0.0
The Dalles, OR	0.83	M
Meacham, OR	1.86	M
Mt. Adams R.S., WA	1.77	0.0

The greatest reported total precipitation for September was 1.86 inches at Meacham, OR, and the least amount of precipitation was 0.20 inch at Pasco, WA. These amounts were close to normal for September. Of the available total snowfall amounts and/or hail, all of them were 0.00 inches of snow, and no hail was reported. Snowfall is rarely seen in September, but not impossible.

September 2023 - Drought Monitor – Pendleton Forecast Area

U.S. Drought Monitor Pendleton, OR WFO

October 3, 2023
(Released Thursday, Oct. 5, 2023)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	1.51	98.49	71.23	31.58	1.09	0.00
Last Week <small>09-26-2023</small>	1.51	98.49	71.11	31.58	1.09	0.00
3 Months Ago <small>07-04-2023</small>	1.59	98.41	64.55	13.32	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>09-26-2023</small>	1.51	98.49	71.11	31.58	1.09	0.00
One Year Ago <small>10-04-2022</small>	0.00	100.00	46.26	25.10	17.46	3.17

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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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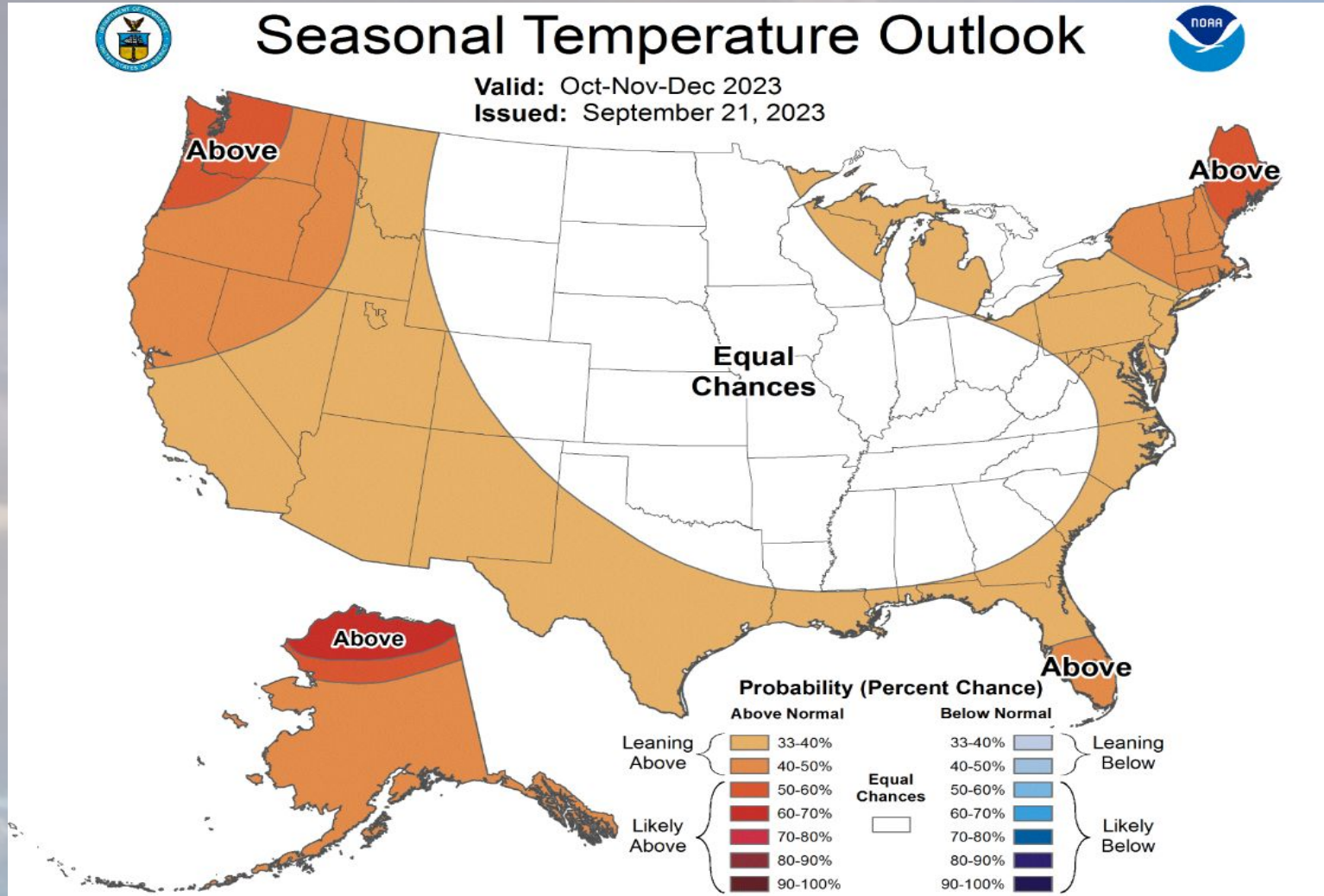
droughtmonitor.unl.edu

For additional drought and water supply information, please check out the Latest NWS Pendleton [Drought Summary / Water Supply Outlook](#), which has been released on Saturday, September 16th 2023.



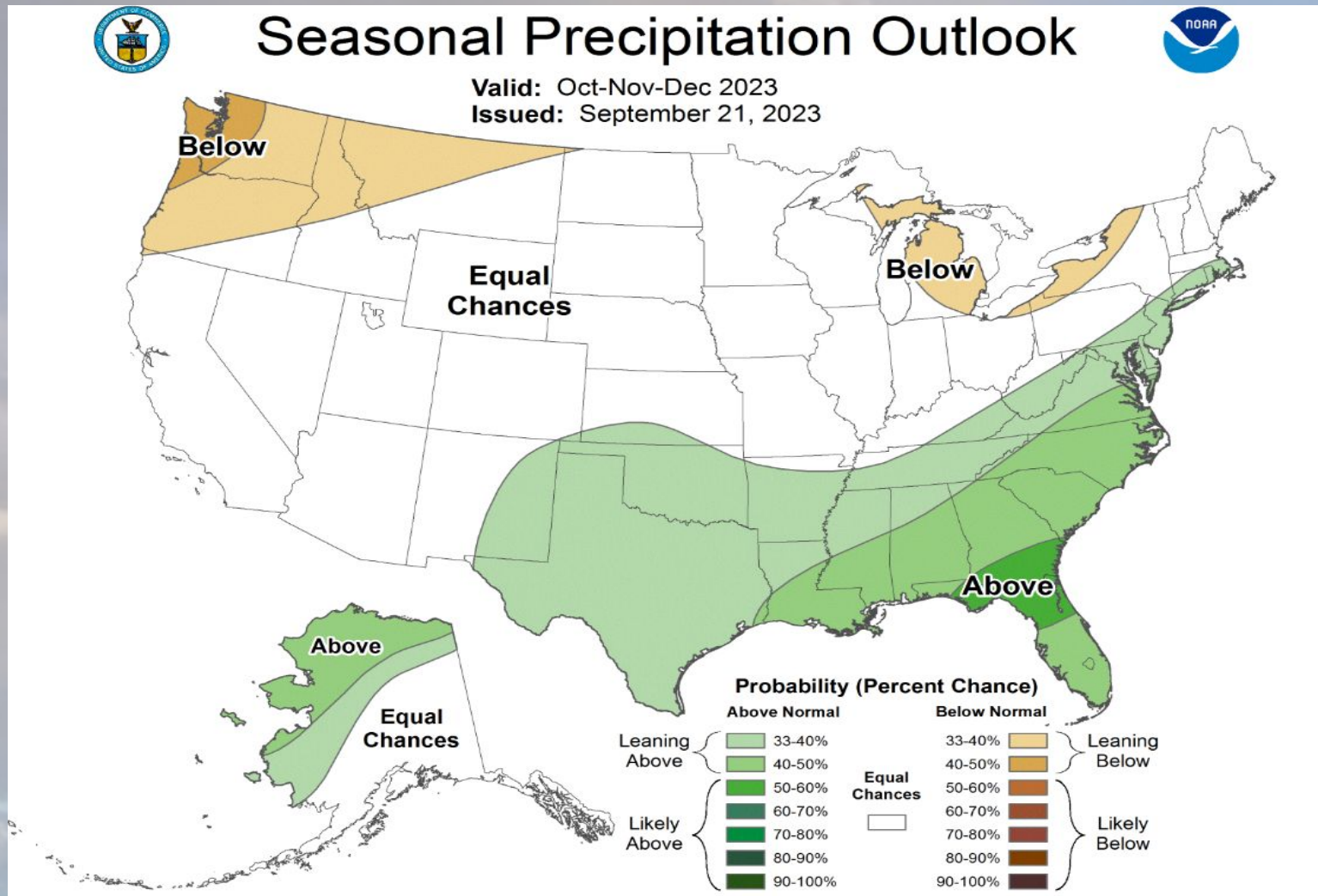
As of October 3rd, central to north central OR, along the OR Cascades, and the Lower Columbia Basin into the northern Blue Mountain Foothills had severe (D2) drought conditions. In the Yakima and Kittitas Valleys, and in southeastern portions of the forecast area, drought conditions were Abnormally Dry (D0). Most of the remainder of the forecast area had moderate (D1) drought conditions. However, the greatest drought conditions were in far northwest Kittitas County (Extreme - D3) drought conditions.

USA Three Month Temperature Outlook



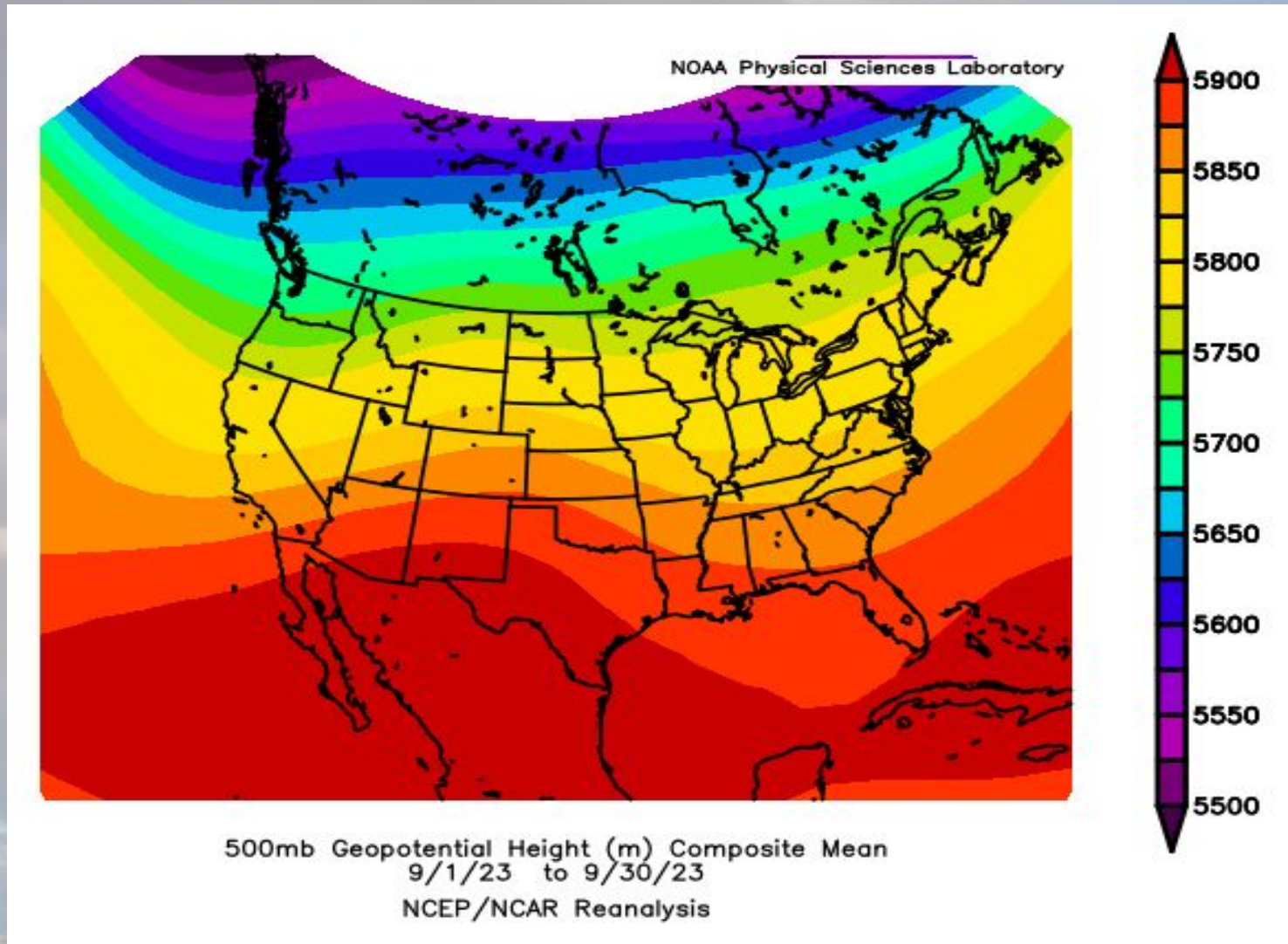
The three month outlook for the period October through December over the Pacific Northwest shows temperature probabilities leaning towards above normal (40-60%). This is a slightly greater probability of above normal temperatures than the previous 3 month outlook from August 2023. However, it should 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



The three month precipitation outlook for the period October through December over the Pacific Northwest shows precipitation amounts leaning towards slightly below normal (33-40%). This is not much of a change from the previous 3 month outlook (August 2023). Again, as with temperatures, precipitation is not always dependent on El-Nino events.

September 2023 Average 500 MB Pattern

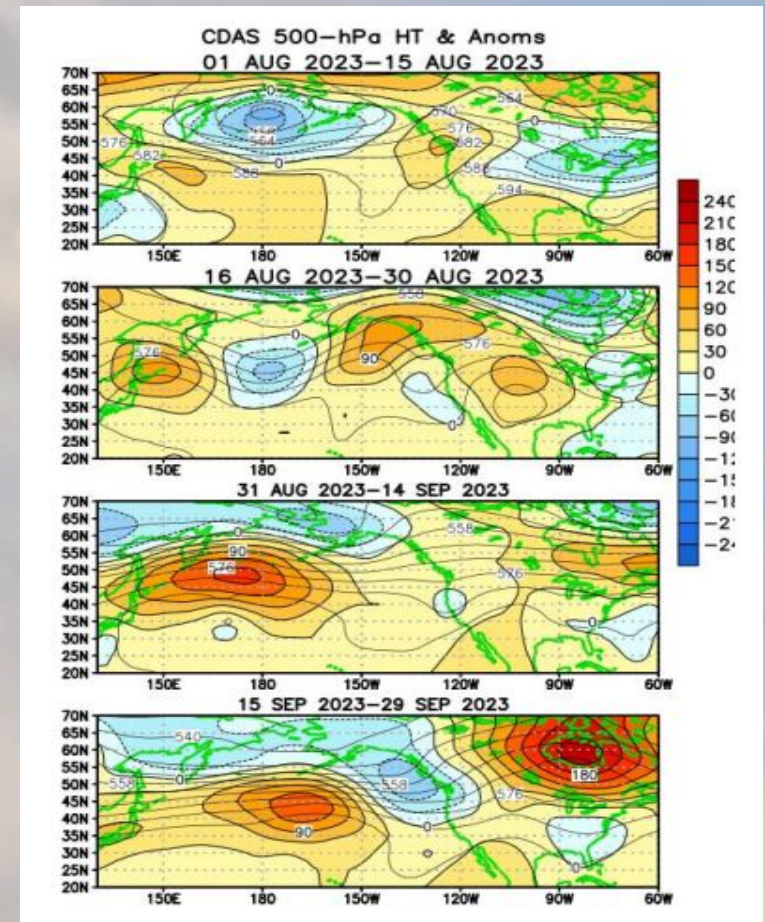


The average 500 mb flow pattern for September 2023 was an upper trough pattern over the west coast of the USA. This closely resembles the reason why September had more precipitation events than August, along with cooler than normal temperatures, especially during the daytime due to more cloudy conditions.

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

These are more detailed bi-weekly average 500 mb pattern plots that were sampled from the beginning of August through the end of September. 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.

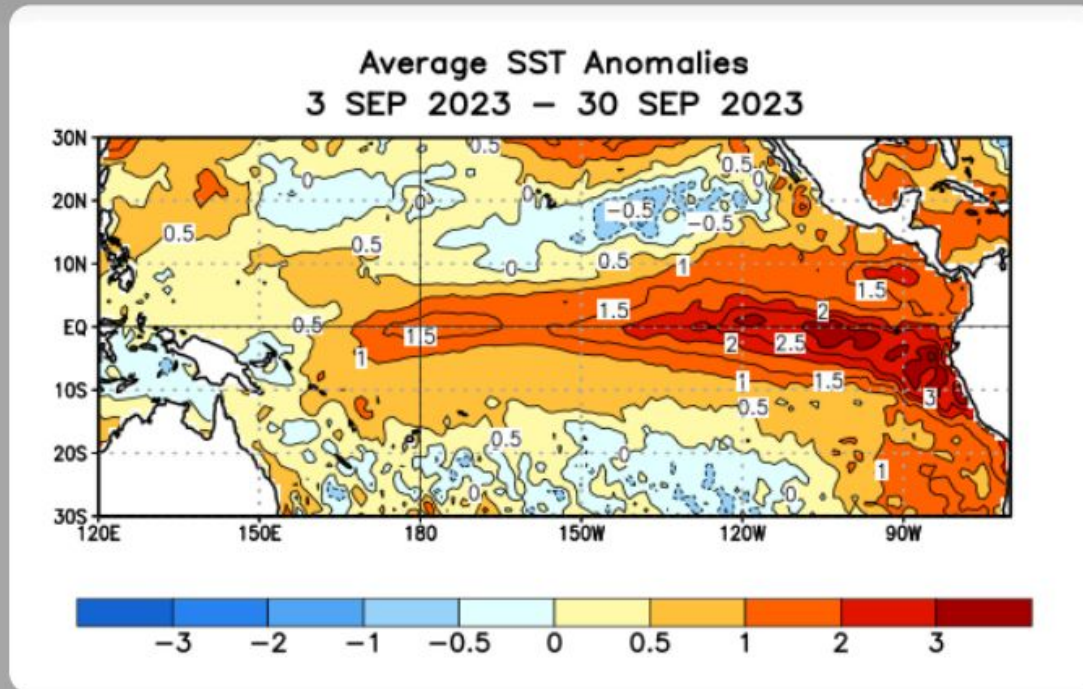


From August 1st through the 30th, there was an upper ridge pattern or a southwest flow. Then from the last day of August through the middle of September, the flow was mostly a westerly zonal flow pattern. Then an upper trough pattern developed during the second half of September, as was shown on the previous slide. These patterns closely resemble the warmer than normal conditions through the middle of September (except for a few exceptions, such as when the remnants of Hurricane Hilary moved across the Pacific Northwest). Then during the second half of September, cooler and wetter than normal conditions occurred.

Sea Surface Temperature (SST) Anomalies for September 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 in the western Pacific Ocean.



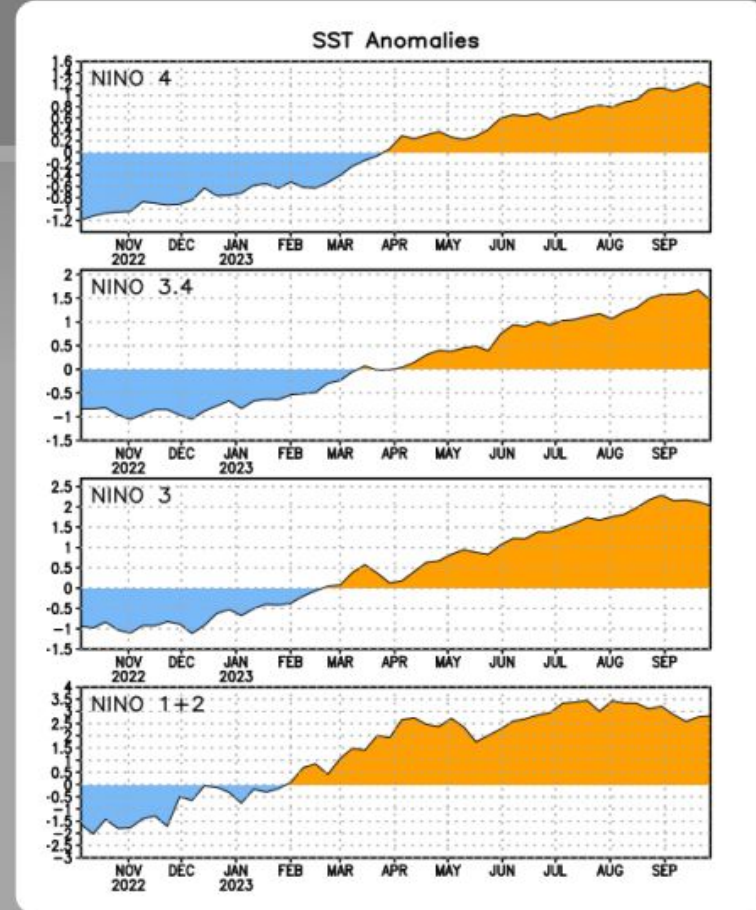
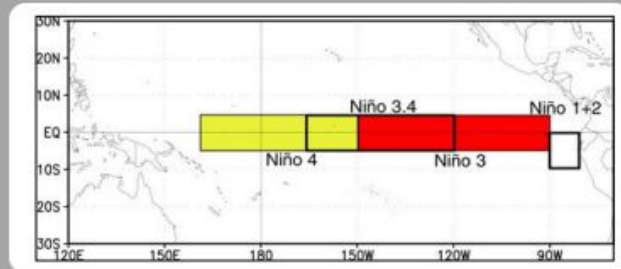
During the last four weeks, equatorial Sea Surface Temperatures (SSTs) were again above average over most of the Pacific Ocean (especially across the eastern equatorial Pacific, where SSTs were the warmest). These persistent, above normal SSTs continue to show the presence of an El Niño event that is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

ENSO Niño Regions SST Anomalies Ending in September 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	2.0°C
Niño 1+2	2.8°C



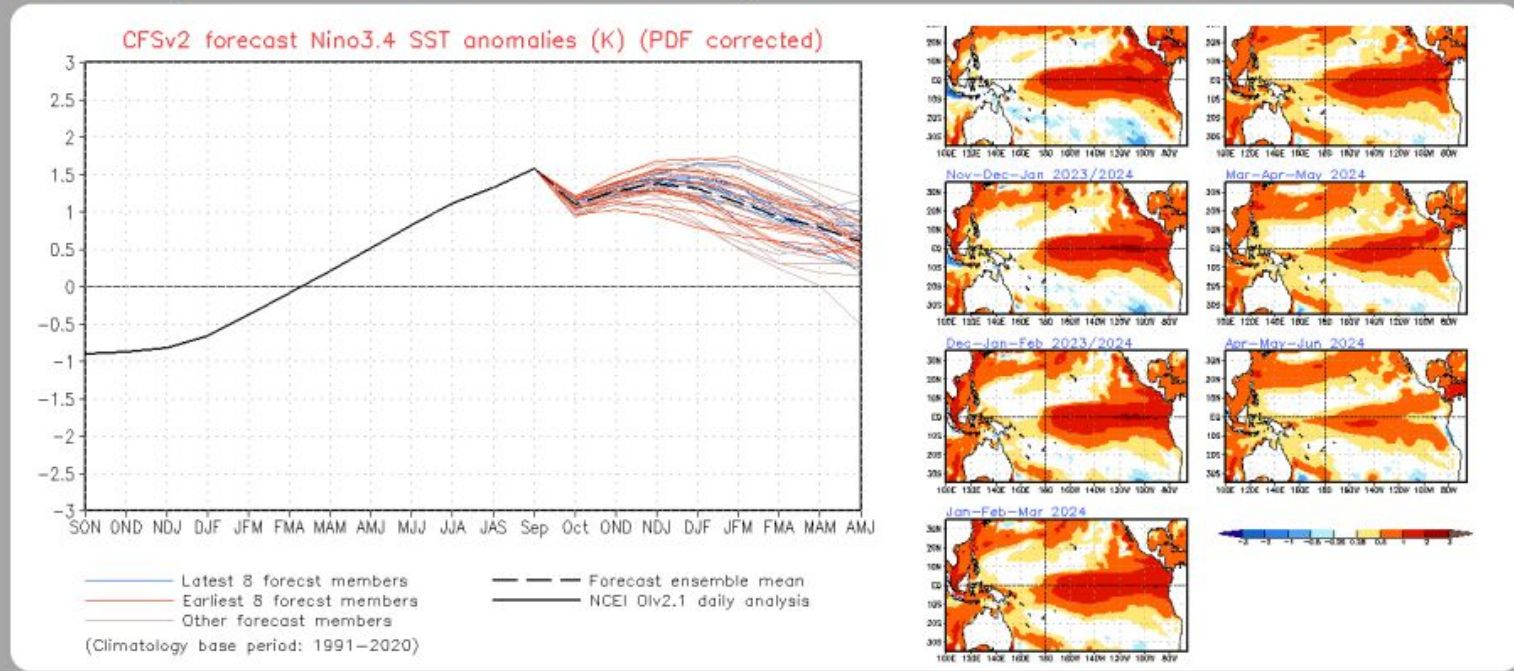
All Niño Regions continued to show warmer than normal Sea Surface Temperature (SST) anomalies during September, with the areas of orange shading on the chart continued above normal. All Niño Regions, except for Niño Region 1 + 2, showed some slight decrease in SST anomalies during the latter half of September. Nevertheless, SST conditions are still consistent with the ongoing El Niño.

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

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

Issued: 1 October 2023

The CFS.v2 ensemble mean (black dashed line) indicates El Niño will continue through the Northern Hemisphere Spring 2024. A moderate strength El Niño is favored (ONI between 1.0°C and 1.5°C).



The SST CFS.v2 forecast ensemble mean (the black dashed line) shows that El Niño will continue through the Northern Hemisphere spring of 2024. This is favored to become at least a moderate El Niño. Also, all of the thumbnail images to the right consistently show that well above normal SSTs will continue through spring, and then begins to decrease by the summer of 2024.

Current ENSO (El Niño Southern Oscillation) Alert System Status

Summary

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

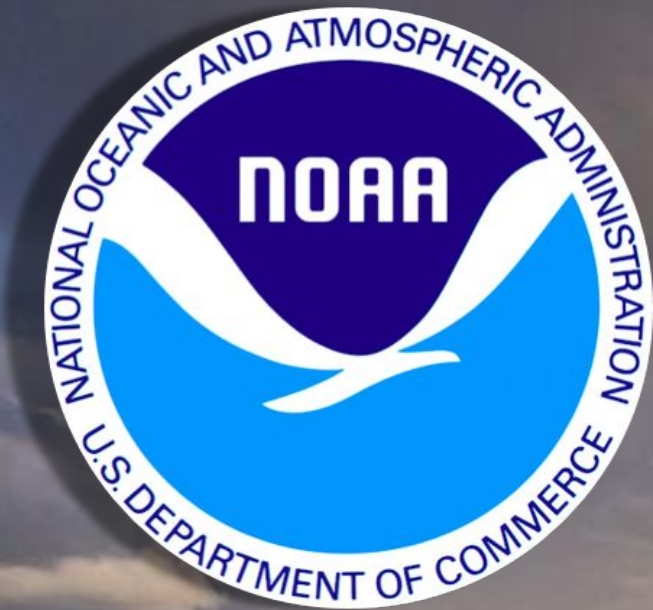
El Niño conditions are observed.*

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.

El Niño is anticipated to continue through the Northern Hemisphere winter (with greater than a 95% chance through January-March 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 January - March 2024).



Thank You!