

# The Month In Review

## November 2022

National Weather Service  
Pendleton, Oregon

Early Season Snowfall Over Northeast Oregon

# November 2022, Climate Conditions Summary

November began as a stormy month with significant precipitation and wind events, which ended with a significant wind event on the 5<sup>th</sup> of the month. For example, the Pendleton Airport, received 0.98 inches of rain on the 1<sup>st</sup> and it was followed by a strong wind event with a maximum wind gust of 77 mph reported by the Pendleton ASOS, early in the morning on the 5<sup>th</sup>. Many other stations reported significant rain and/or snow during this time, as well as strong winds. Then it became rather quiet, but with fog and rime ice in places, with stagnant air conditions under high pressure ridges. Air Stagnation Advisories or Air Quality Alerts were in effect under inversions during this quiet time. Conditions became active again from the 27<sup>th</sup> to the 30<sup>th</sup> with significant snow and rain events. Some lower elevations reported their first snowfall of the season, such as the Pendleton Airport that had its first measurable snowfall on the 28<sup>th</sup> with 0.8 inches of snow. Overall the month had a diversity of weather conditions ranging from heavy rain or snow & high winds to rather quiet, but cold and foggy conditions with widespread fog or low stratus. Below are images of weather conditions for the month. In the first image, there is a tree that was toppled over by strong winds on the 5<sup>th</sup>. Then the second and third image shows a fog/rime ice occurrence during a freezing fog event at the Pendleton Airport. On the next slide are more images of weather conditions during the month.



High winds toppled a tree in northeast Oregon.



Freezing fog coated trees at NWS Pendleton.



Dense freezing fog in Pendleton, Oregon.

# More Images Representing November 2022 Weather/Climatic Conditions



Autumn foliage at its peak in Pendleton, OR in early November.



Broken tree limb after a wind gust of 77 mph in Pendleton, OR



Numerous trees down, crushing cars from an intense wind storm.



First significant November snow accumulations at Tollgate, OR.

# Significant Weather Event Storm Reports for November 2022

Significant Weather Events				
Event	Date	Report	Where	Source
Snow	November 1, 2022	E 2.0 inches	2 W Bend, OR	Trained Spotter
Snow	November 1, 2022	M 3.0 inches	5 NNW La Pine, OR	Trained Spotter
Snow	November 4, 2022	M 3.0 inches	1 WNW La Grande, OR	Trained Spotter
Non-TSTM Wind Gust	November 4, 2022	M 48 mph	2 WSW Kennewick, WA	Trained Spotter
Snow	November 9, 2022	M 2.3 inches	1 WSW Bend, OR	COCORAHS
Snow	November 27, 2022	E 4.5 inches	3 WSW Joseph, OR	Public
Heavy Snow	November 28, 2022	E 11.0 inches	6 W Starkey, OR	Dept of Highways
Heavy Snow	November 28, 2022	E 12.0 inches	17 WNW Pine Grove, OR	Dept of Highways
Heavy Snow	November 28, 2022	M 7.0 inches	6 NW Easton, WA	COCORAHS
Heavy Snow	November 28, 2022	M 6.0 inches	John Day, Or	Co-Op Observer
Heavy Snow	November 28, 2022	M 8.0 inches	1 NNW John Day, OR	Trained Spotter
Heavy Snow	November 28, 2022	E 6.0 inches	John Day, OR	Other, Federal
Heavy Snow	November 28, 2022	M 10.0 inches	17 WNW Pine Grove, OR	MESONET
Heavy Snow	November 28, 2022	M 10.0 inches	10 NNE Ukiah, OR	MESONET
Heavy Snow	November 28, 2022	M 8.0 inches	6 ENE Lehman Hot Springs, OR	MESONET
Non-TSTM Wind Gust	November 29, 2022	M 55 mph	4 SSW Mission, OR	MESONET
Non-TSTM Wind Gust	November 29, 2022	M 57 mph	3 WSW Kooskooskie, OR	MESONET
Non-TSTM Wind Gust	November 30, 2022	M 58 mph (1st report)	1 WNW Cayuse, OR	MESONET
Non-TSTM Wind Gust	November 30, 2022	M 60 mph (1st report)	11 ESE Pendleton, OR	MESONET
Non-TSTM Wind Gust	November 30, 2022	M 66 mph (2nd report)	1 WNW Cayuse, OR	MESONET
Heavy Snow	November 30, 2022	M 10.0 inches	Glenwood, WA	NWS Employee
Heavy Snow	November 30, 2022	M 14.0 inches	BZ Corner, WA	NWS Employee
Non-TSTM Wind Gust	November 30, 2022	M 58 mph (1st report)	3 WSW Kooskooskie, OR	MESONET
Non-TSTM Wind Gust	November 30, 2022	M 65 mph (1st report)	11 ESE Pendleton, OR	MESONET
Non-TSTM Wind Gust	November 30, 2022	M 64 mph (2nd report)	3 WSW Kooskooskie, OR	MESONET

continued on next slide →

# Significant Weather Event Storm Reports for November 2022

Significant Weather Events				
Event	Date	Report	Where	Source
Heavy Snow	November 30, 2022	M 22.0 inches	1 NNW Glenwood, WA	Trained Spotter
Heavy Snow	November 30, 2022	M 4.0 inches	1 SE Ellensburg, WA	Trained Spotter
Snow	November 30, 2022	M 2.5 inches	4 ENE Yakima, WA	Trained Spotter
Heavy Snow	November 30, 2022	M 20.0 inches	1 N Trout Lake, WA	Trained Spotter
Heavy Snow	November 30, 2022	M 5.0 inches	3 SSE White Swan, WA	Trained Spotter

All of the significant weather events that were reported during the month were either snow, heavy snow or high non-thunderstorm wind gust events. There were a total of 21 reports of snow or heavy snow events, and a total of 9 reports of high non-thunderstorm wind gust events. The snow and heavy snow events occurred on the 1<sup>st</sup>, 4<sup>th</sup>, 9<sup>th</sup> and from the 27<sup>th</sup> through the 30<sup>th</sup> of the month. The non-thunderstorm wind gust events occurred on the 4<sup>th</sup> and from the 27<sup>th</sup> through the 30<sup>th</sup> of the month.

## Record Weather Events for November 2022

Record Weather Reports					
Event	Date	Where	Previous Record	New Record	Records Began
Maximum Rainfall	November 1, 2022	Pendleton, OR	0.61" / 1950	0.98"	1934
Maximum Rainfall	November 1, 2022	Walla Walla, WA	0.60" / 1994	1.08"	1930
Maximum Rainfall	November 1, 2022	Pasco, WA	0.55" / 1994	0.59"	1942
Maximum Rainfall	November 1, 2022	Redmond, OR	0.42" / 1948	0.54"	1941
Maximum Rainfall	November 1, 2022	Hermiston, OR	0.74" / 1973	0.79"	1906

All of the record weather events during the month were maximum rainfall events, of which all were broken with no tied events. These all occurred on the first of the month. The greatest amount was an amount of 1.08 inches at Walla Walla, WA that broke the old record of 0.60 of an inch in 1994.

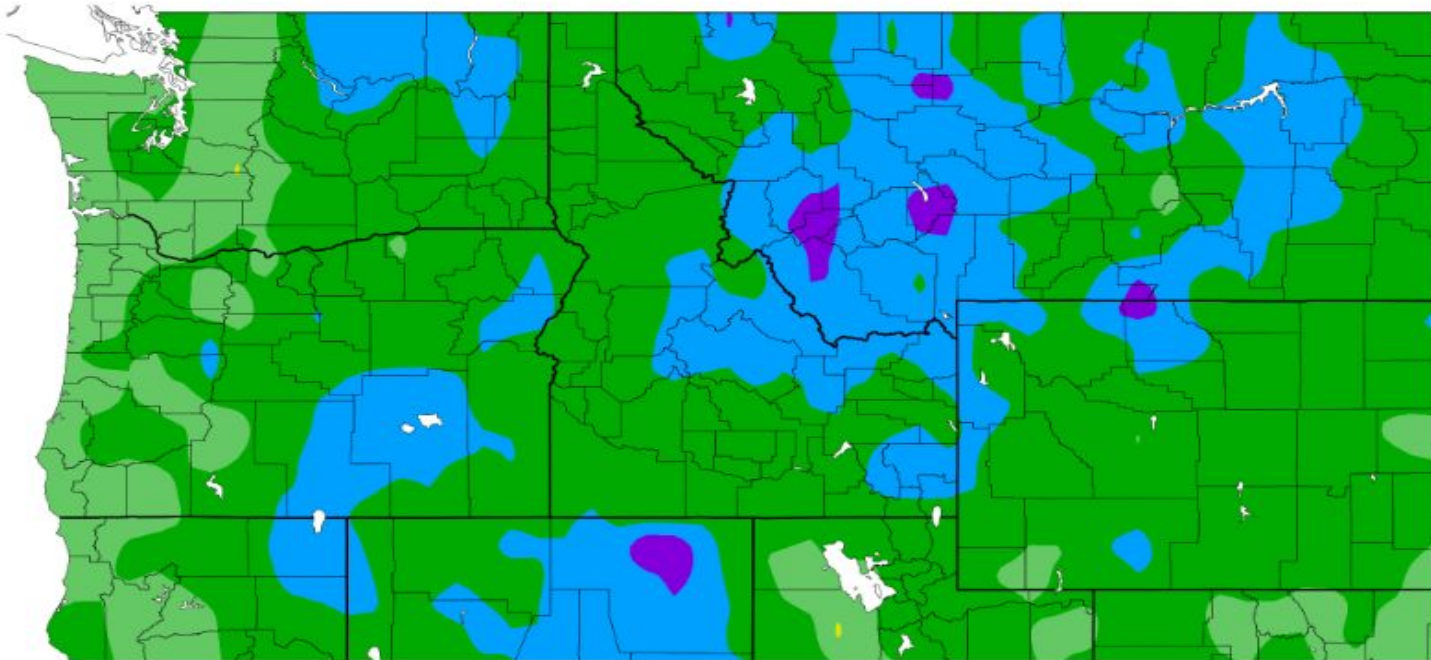
## November 2022, Observed Monthly Maximum & Minimum Temperatures

Location	Highest Maximum	Lowest Minimum
Pendleton, OR	62	17
Redmond, OR	62	7
Pasco, WA	63	15
Yakima, WA	61	9
Walla Walla, WA	60	19
Bend, OR	61	10
Ellensburg, WA	51	11
Hermiston, OR	63	14
John Day, OR	61	15
La Grande, OR	54	8
The Dalles, OR	62	22
Meacham, OR	48 (partial month data)	5 (partial month data)
MT Adams RS, WA	51	10

The above table shows the highest maximum and minimum temperatures for the month for key stations in the forecast area. The extremes are shaded blue and red in the list. There was a tie for the highest maximums at Pasco, WA and Hermiston, OR with 63 degrees F. The lowest maximum was at Meacham, a mountain location, which is of no surprise, despite some missing data. The lowest minimum was also at Meacham with a low of 5 degrees (the coldest), and the warmest minimum at The Dalles, OR (ASOS at Dallesport, WA) with 22 F.

# November 2022, Departure from Normal of Average Temperatures

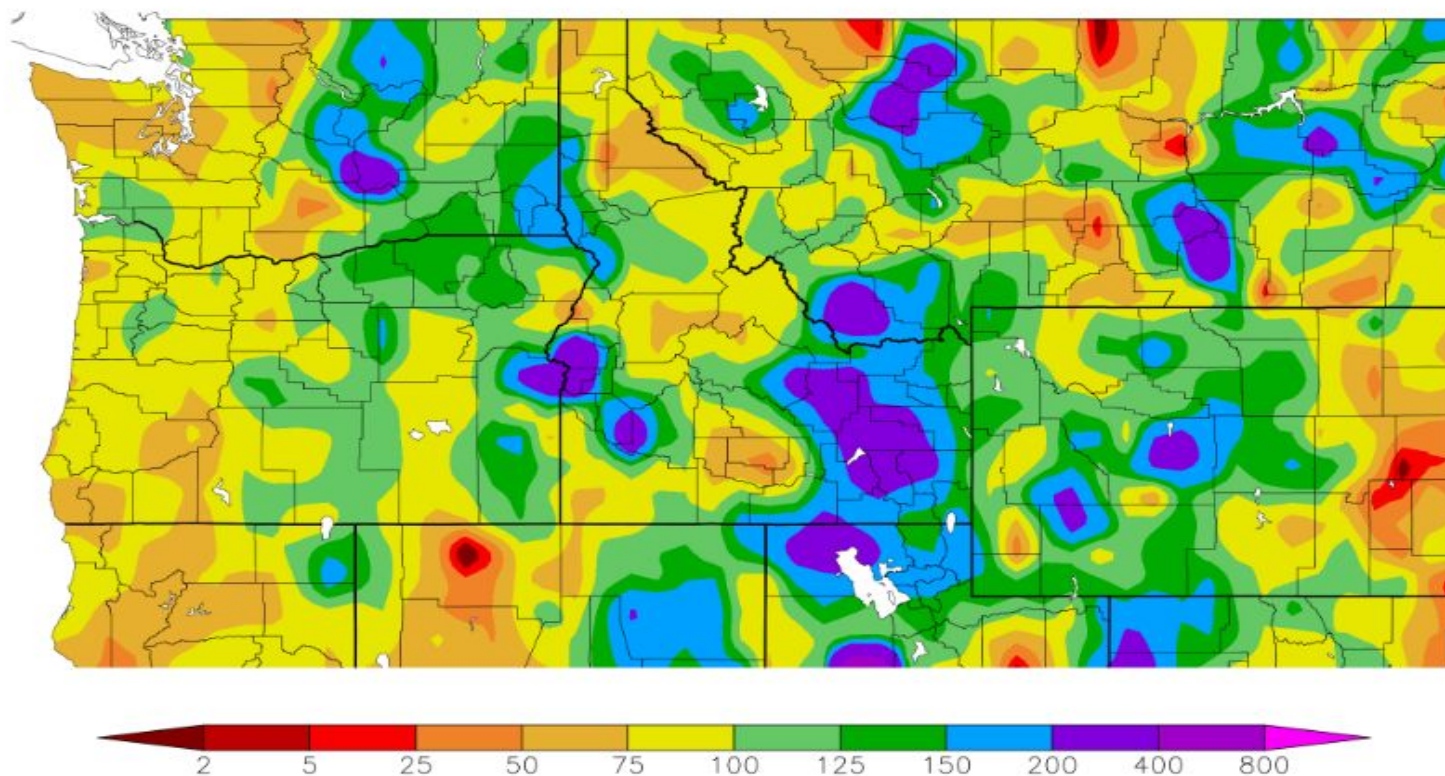
Departure from Normal Temperature (F)  
11/1/2022 – 11/30/2022



Overall, November was a much cooler than normal month on average. In the image above, it is shown that northeast OR and southeast WA had well below normal average temperatures throughout the forecast area. The departures from normal ranged mostly from -4 to -8 degrees, with some small areas having departures that ranged from -8 to -12 degrees from normal (shown as blue shaded areas mainly in eastern and northeast OR and WA).

# November 2022, Percent of Normal of Precipitation

Percent of Normal Precipitation (%)  
11/1/2022 – 11/30/2022



Most of northeast OR and southeast WA had greater than normal precipitation with a percent of normal that ranged from 100 to as much as 400 percent. These were mostly in the Lower Columbia Basin, central OR, the northeast Mountains and the Blue Mountain Foothills. Drier areas had percents of normal ranging mostly from 50 to 100 percent, with a small area as low as 25-50 percent in south central WA, Yakima Valley, and parts of north central OR.



# November 2022 Departures from Normal Means/Sums for Select Cities

	Max T	Max T D	Min T	Min T D	Ave T	Ave T D	PCPN	PCPN D
<b>Yakima</b>	42.6	-5.3	22	-4.8	32.3	-5	0.58	-0.47
<b>Kennewick</b>	43.8	-6.8	30.2	-5.3	37	-6.1	1.2	0.2
<b>Walla Walla</b>	40.4	-8.1	29	-6.2	34.7	-7.1	3.18	0.31
<b>The Dalles</b>	47.4	-2.6	32.1	-3.2	39.8	-2.8	1.4	-0.74
<b>Redmond</b>	46.3	-2.6	23.4	-2.4	34.9	-2.5	0.9	-0.06
<b>Pendleton Airport</b>	42.9	-6.3	29	-4.4	35.9	-5.4	2.29	0.77
<b>La Grande Airport</b>	40.9	-5.3	24.4	-5.5	32.7	-5.3	3.11	1.08
<b>John Day</b>	45.9	-3.8	27.2	-0.9	36.6	-2.3	1.66	0.31

In the table above, every single station had below normal mean maximum, mean minimum, and mean average temperatures. The greatest values are highlighted in black boxes. These were all at Walla Walla, WA, which had departure values of -8.1, -6.1, and -7.1 degrees F for the mean maximum, mean minimum, and mean average respectively. As for precipitation amounts, there was nearly an even split of above and below normal precipitation departures from normal. The greatest was at the La Grande, OR Airport, which had an departure from normal of +1.08 inches. The greatest amount of below normal precipitation was at The Dalles, OR (ASOS at Dallesport, WA), which had a departure value of -0.74 inch. Overall, it was a cooler than normal month, but near normal precipitation on average with the even split.

## November 2022 Observed Total Precipitation and Total Snowfall/Hail

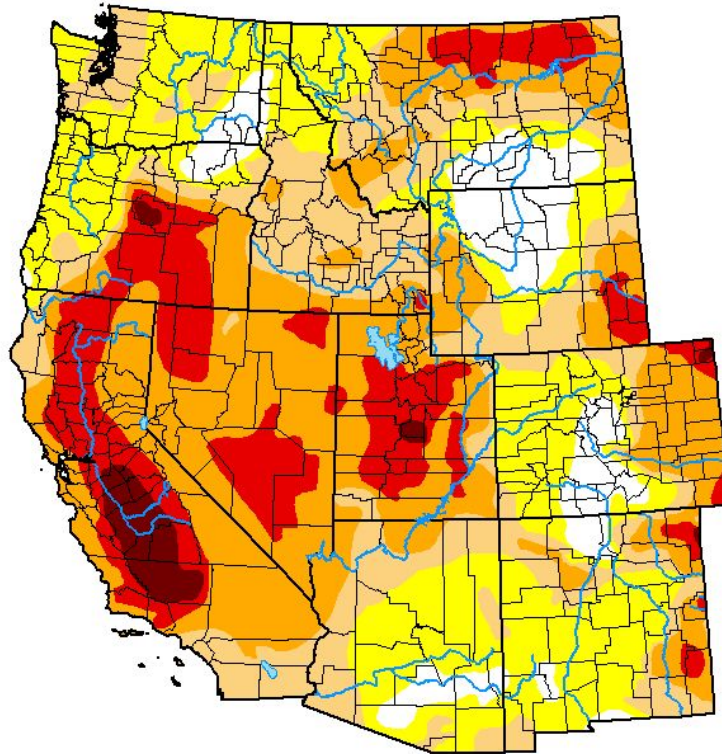
Location	Total Precipitation (inches)	Total Snow/Hail (inches)
Pendleton, OR	2.29	0.8
Redmond, OR	0.90	M
Pasco, WA	1.11	M
Yakima, WA	0.58	M
Walla Walla, WA	3.18	M
Bend, OR	2.95	1.7
Ellensburg, WA	1.75	M
Hermiston, OR	1.42	M
John Day, OR	1.66	M
La Grande, OR	3.11	M
The Dalles, OR	1.40	M
Meacham, OR	5.43 (partial month data)	M
MT Adams RS, WA	4.61	22.0

The above table shows the rainfall and snowfall totals for the same key stations as in the previous slide. There are only 3 stations in this list that normally reports snow every month. Of the precipitation totals (liquid equivalent) in the first column, Meacham, OR had the greatest amount of precipitation (5.43 inches), while Yakima, WA had the least (0.58 inch). However, most ranged from one to two inches. Of the snowfall amounts, Pendleton had 0.8 inch, which was the least, and the Mt. Adams Ranger Station had the most, with 22.0 inches.

# November 2022 - Drought Monitor – Western USA

## U.S. Drought Monitor West

**December 6, 2022**  
(Released Thursday, Dec. 8, 2022)  
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	7.93	92.07	66.64	45.25	16.00	2.02
<b>Last Week</b> 11-29-2022	6.58	93.42	68.74	44.88	17.62	2.02
<b>3 Months Ago</b> 09-06-2022	11.81	88.19	68.39	49.06	18.91	2.63
<b>Start of Calendar Year</b> 01-04-2022	3.68	96.32	89.29	64.90	23.85	3.94
<b>Start of Water Year</b> 09-27-2022	3.89	96.11	73.90	47.71	19.37	2.63
<b>One Year Ago</b> 12-07-2021	2.32	97.68	94.64	77.13	44.08	12.60

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>

Author:

David Simeral  
Western Regional Climate Center



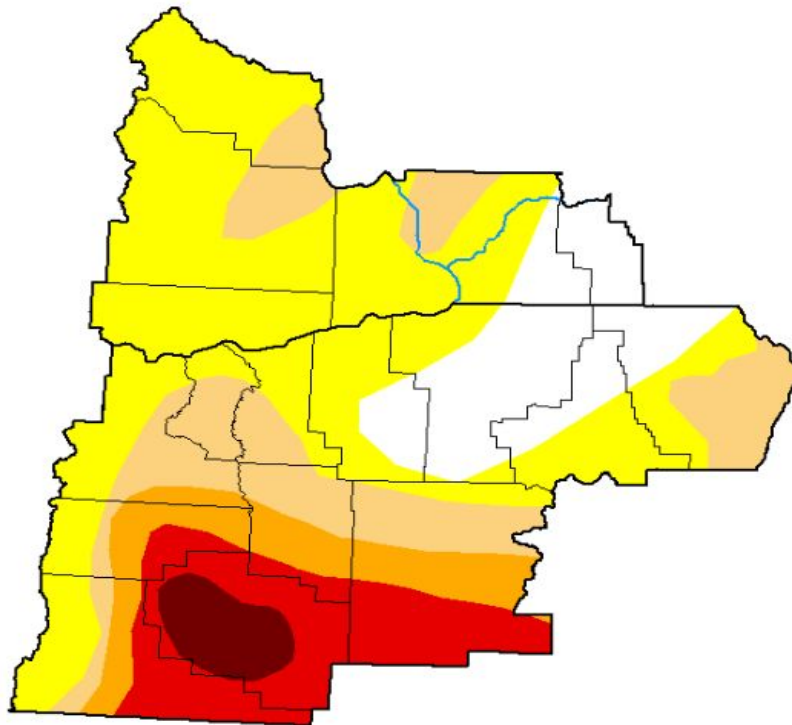
[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)

November drought conditions had eased over the Blue Mountain Foothills and the northern Blue Mountains (white areas over northeast OR and southeast WA). These areas now have drought conditions of “None”. The greatest drought conditions were over central OR, mostly in Crook County with D4 (“Exceptional Drought”) conditions. However, most of northeast OR and southeast WA had drought conditions between D0 to D2 (“Abnormally Dry” to “Severe”).

# November 2022 - Drought Monitor – Pendleton Forecast Area

## U.S. Drought Monitor Pendleton, OR WFO

**November 29, 2022**  
(Released Thursday, Dec. 1, 2022)  
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	14.82	85.18	41.36	22.93	15.24	3.17
<b>Last Week</b> 11-22-2022	14.76	85.24	42.98	22.93	15.24	3.17
<b>3 Months Ago</b> 08-30-2022	33.39	66.61	40.48	24.74	17.46	3.17
<b>Start of Calendar Year</b> 01-04-2022	3.10	96.90	95.52	87.37	61.34	21.83
<b>Start of Water Year</b> 09-27-2022	0.00	100.00	46.03	24.98	17.46	3.17
<b>One Year Ago</b> 11-30-2021	2.01	97.99	96.75	93.83	84.61	38.59

Intensity:



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Author:

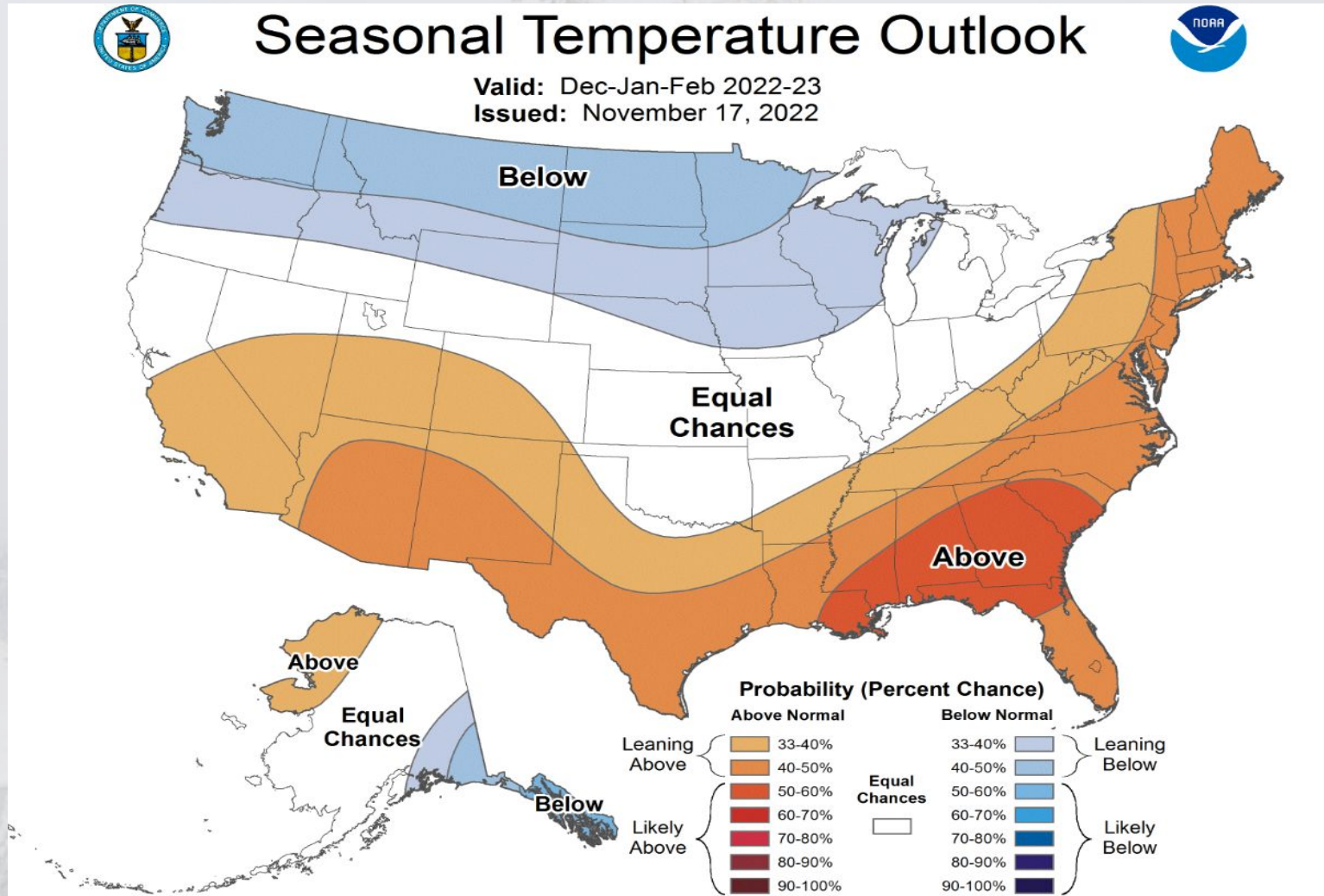
David Simeral  
Western Regional Climate Center



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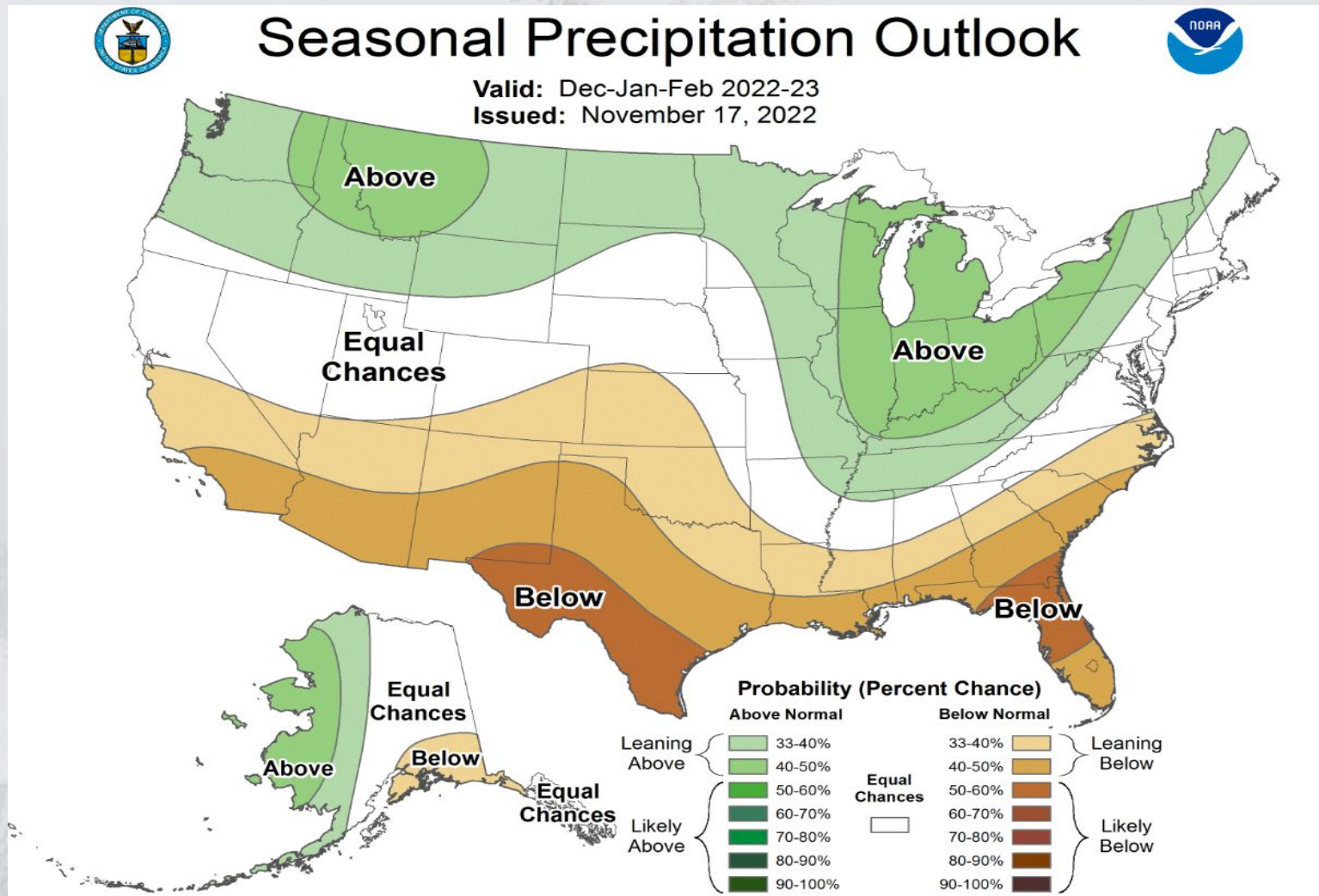
Here is a close-up of the forecast area, showing drought conditions. As previously mentioned, drought conditions were the least (“none”) in the Northern Blue Mountains and Foothills (white areas). Drought conditions were worse in the south central part of the forecast area (mainly Crook County). However, most of the forecast area had drought conditions that ranged from D0 to D2 (“Abnormally Dry” to “Severe”) drought conditions.

# USA Three Month Temperature Outlook



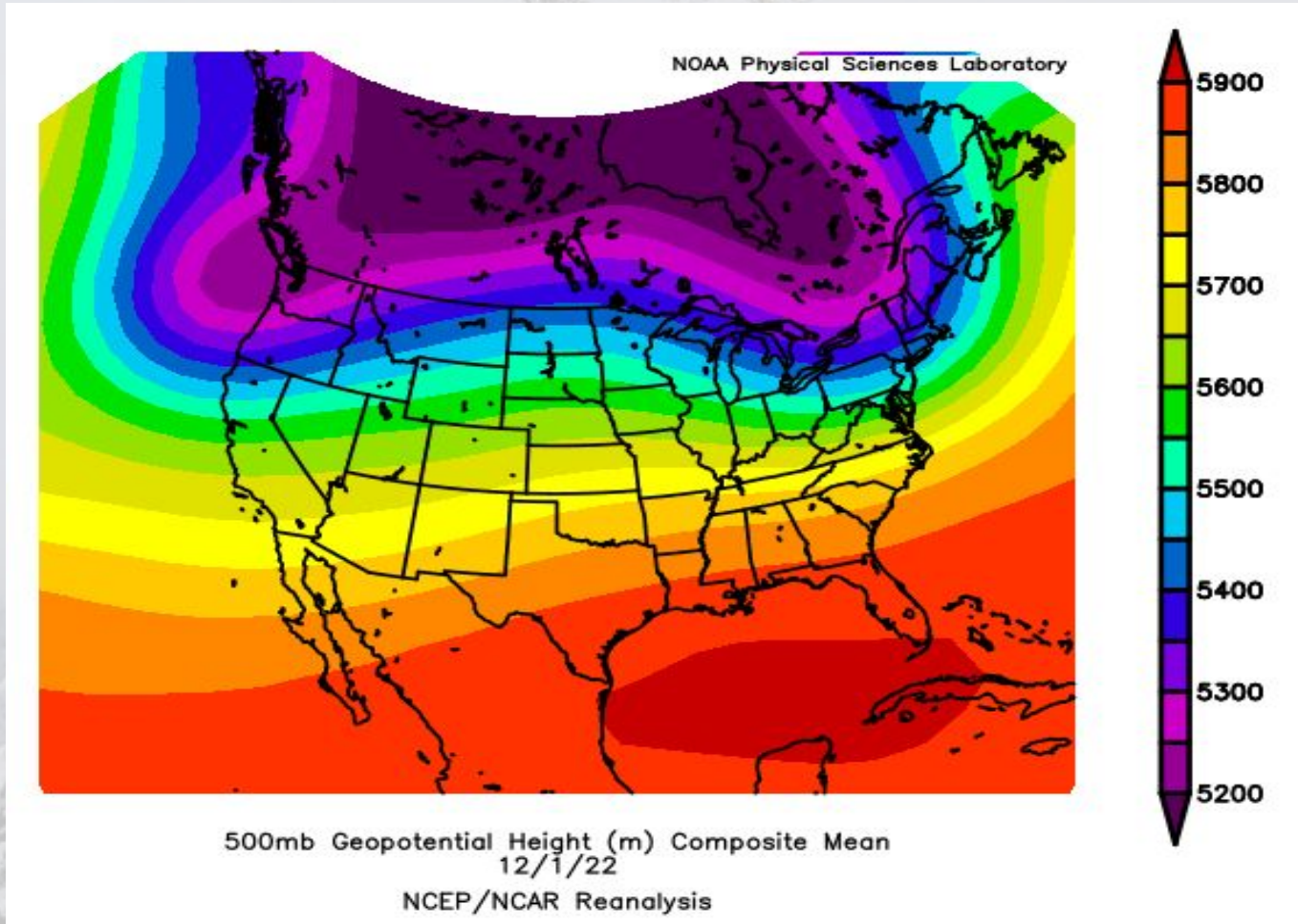
The three month outlook for the period December through February for the Pacific Northwest shows that temperature probabilities are tilted slightly to be colder than normal. This is consistent with the ongoing La Nina event. The coldest areas are more favored to be over WA, while the southern third of OR is favored to have equal chances of above or below normal temperatures.

# USA Three Month Precipitation Outlook



The three month outlook for the period December through February for the Pacific Northwest shows that precipitation probabilities are tilted slightly to be above normal. This, like the temperature forecast, is also consistent with the ongoing La Nina event. The greatest departures are favored to be in a small portion of northeast OR and far eastern WA.

# November 2022, Average 500 MB Pattern

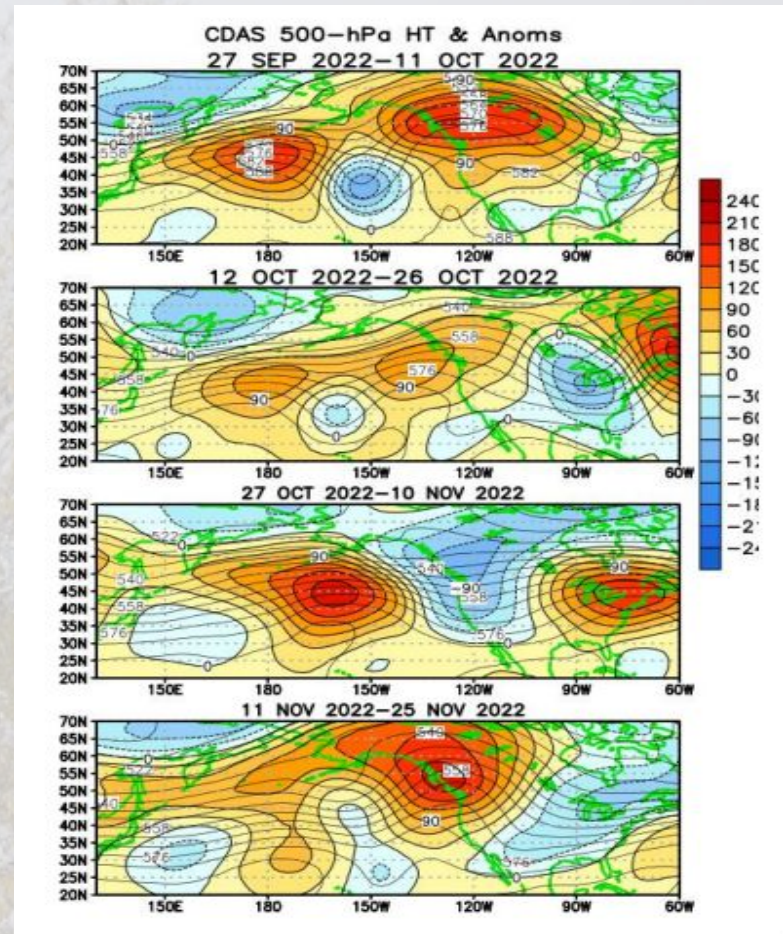


The image above shows that there was a deep trough, with a positively tilted axis centered off the OR/WA coast. This resulted in a deep southwest flow at 500 mb over the region and forecast area. As a result, the region and forecast area had a greater than normal amount of weather systems with cooler than normal temperatures overall. However, there were also some quiet periods with episodes of fog and/or stratus, which cause air stagnation issues with cold temperatures under inversions where there was fog or low stratus.

# Two Month, Average Bi-weekly 500 MB Plots for October & November 2022

These are more detailed bi-weekly average 500 mb pattern plots, which was sampled from the following period: End of September through the end of November.

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



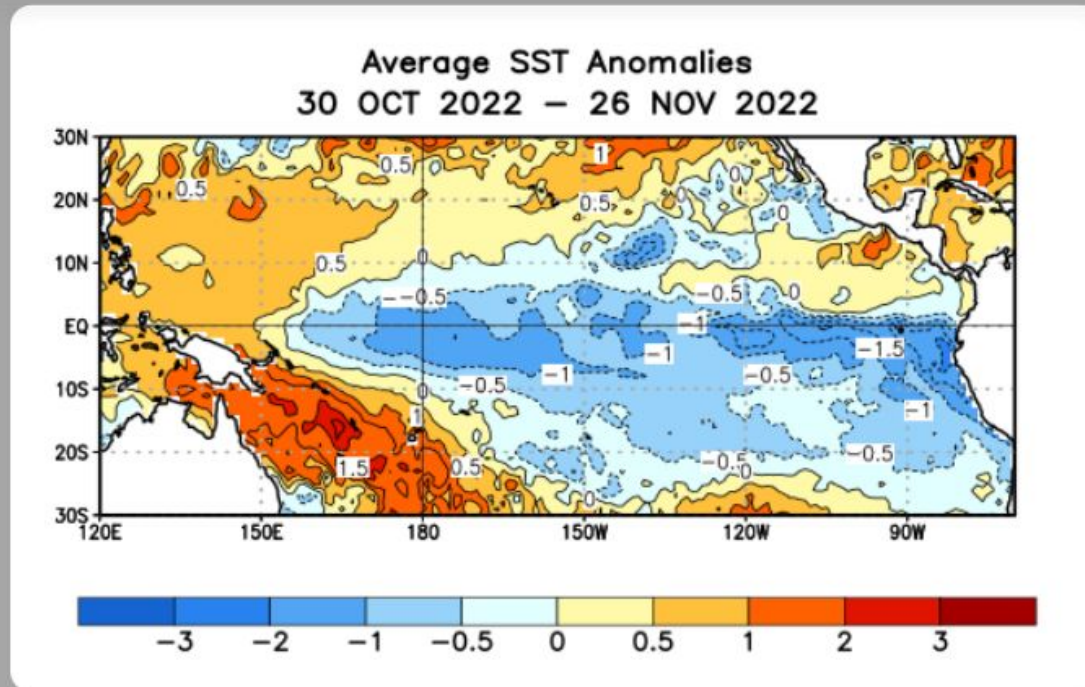
The period from the end of September through near the end of October (the top two images) shows an overall high pressure ridge over the Pacific Northwest. This resulted in the warmer and drier period during much of that time. Then from late October through early November, there was distinct troughing over the region (third image), which resulted in more frequent wet and cold weather systems. Then a strong upper ridge pattern returned in the middle to the latter half of November, which resulted in some quiet periods. Episodes of fog and low stratus were seen under the high pressure aloft that coincided with cold temperatures under the inversions.



# Sea Surface Temperature (SST) Anomalies for November 2022

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

In the last four weeks, equatorial SSTs were below average across most of the Pacific Ocean.



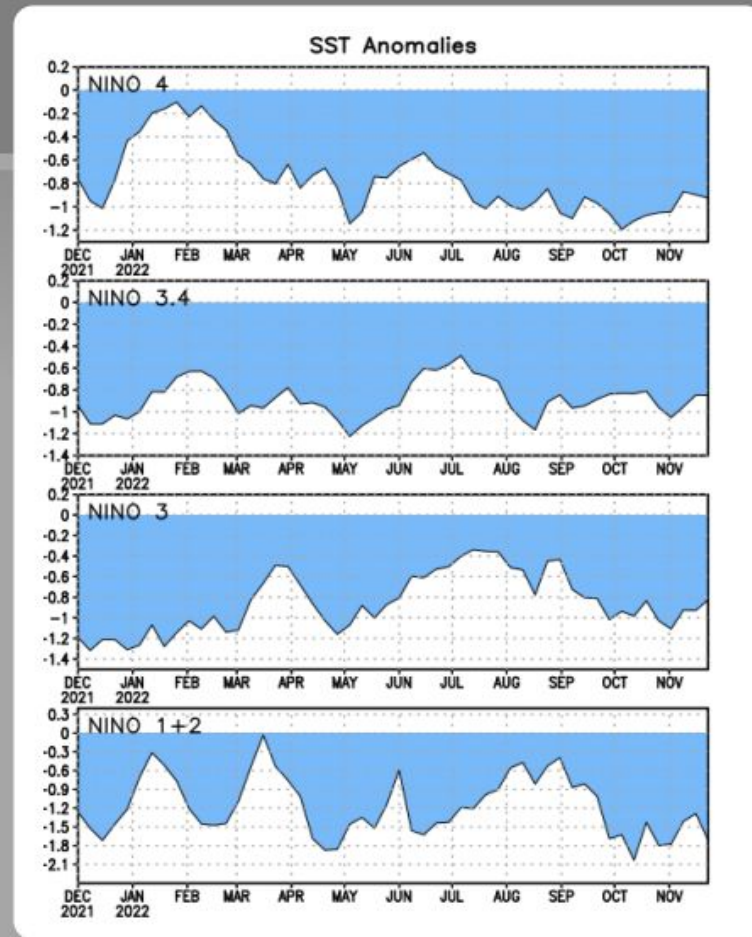
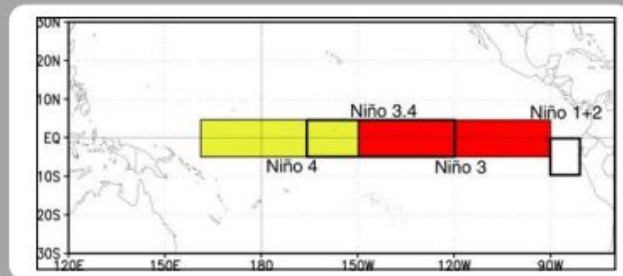
From the end of October to near the end of November, Sea Surface Temperatures (SSTs) were below average across most of the tropical Pacific Ocean. There continued to be some warmer areas off the coast of Central America. This is consistent with the ongoing La Nina event, which is expected to persist into this winter, for the third year in a row.

# ENSO NINO Regions SST Anomalies for Each Nino Region in November 2022

## Niño Region SST Departures (°C) Recent Evolution

The latest weekly SST departures are:

Niño 4	-0.9°C
Niño 3.4	-0.8°C
Niño 3	-0.8°C
Niño 1+2	-1.7°C



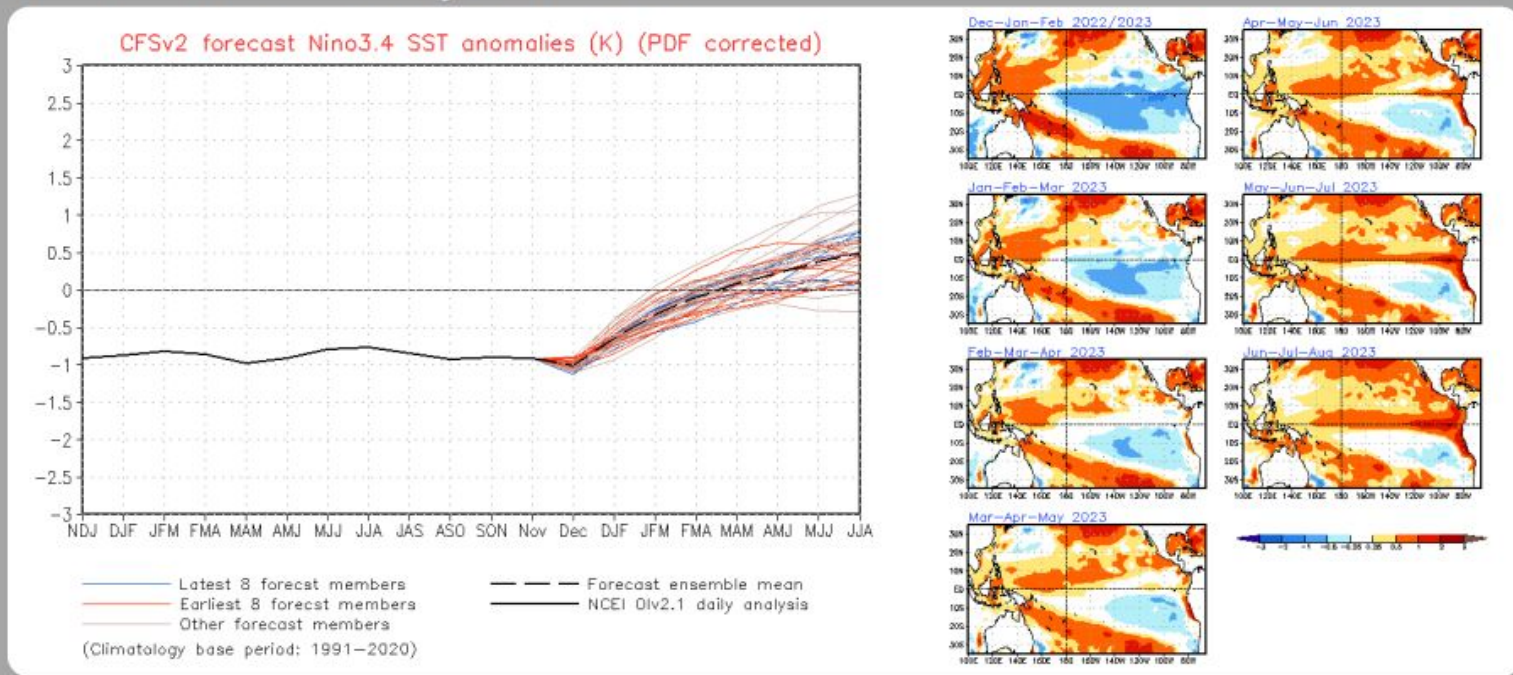
All Niño Regions showed a solid area of below normal SSTs during the past year with no periods of above normal SSTs in any of the Niño Regions. Niño Regions 3.4 and 4 showed nearly steady SSTs during November, while Niño Region 3 showed some slight warming, and Niño Region 1+2 showed some warming and then cooling of SSTs. This is also consistent with the ongoing La Nina event, for the third winter in a row.

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

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

Issued: 28 November 2022

The CFS.v2 ensemble mean (black dashed line) indicates La Niña is likely to persist into Northern Hemisphere winter 2022-23, and then transition to ENSO-neutral around January-March 2023.



The SST CFS.v2 forecast ensemble mean shows that La Niña conditions are likely to persist into the Northern Hemisphere winter of 2022 - 2023, and then transition to ENSO-neutral between January and March 2023. The smaller SST images to the right also show gradual warming of SSTs during each of the 3 month periods, which they represent through the winter and spring.

# Current ENSO (El Nino Southern Oscillation) Alert System Status

## Summary

ENSO Alert System Status: **La Niña Advisory**

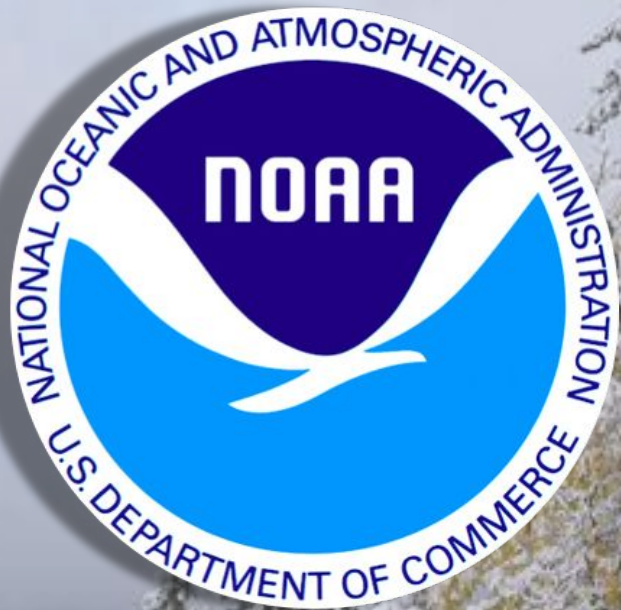
La Niña is present.\*

Equatorial sea surface temperatures (SSTs) are below average across most of the Pacific Ocean.

The tropical Pacific atmosphere is consistent with La Niña.

There is a 76% chance of La Niña during the Northern Hemisphere winter (December-February) 2022-23, with a transition to ENSO-neutral favored in February-April 2023 (57% chance).\*

The current ENSO Alert System Status is still “**La-Nina Advisory**”. Equatorial sea surface temperatures are still below average across most of the Pacific Ocean, and the tropical Pacific atmosphere is still consistent with La Nina. There is a 76% chance of La Nina from December - February, with a transition to ENSO-neutral (57% chance) from February - April 2023. This will be the third winter in a row with a La Nina Advisory in effect.



**Thank You!**