

# The Month In Review

February 2023

National Weather Service  
Pendleton, Oregon

Moderate snow falling at WFO Pendleton



# February 2023 Climate Conditions Summary

February 2023 was, overall, slightly cooler, but drier than normal in the forecast area. Several precipitation and high wind events occurred during the month. The Cascades and northeast mountains received most of the precipitation from Pacific weather systems that brought high elevation snow and lower elevation rain. These events occurred on the 5<sup>th</sup>, 6<sup>th</sup>, 8<sup>th</sup>, 13<sup>th</sup>-14<sup>th</sup>, 22<sup>nd</sup>-23<sup>rd</sup>, and 26<sup>th</sup>-28<sup>th</sup>. Though these were rather frequent, the total precipitation liquid equivalent amounts added up to be less than normal at most locations. The most significant snowfalls were in the Cascades and the northern Blue Mountains. At the end of the month, an arctic intrusion brought very cold temperatures and snow to many low elevation areas, including Pendleton, OR, which received a total of 6.3 inches that fell on the 23<sup>rd</sup> and 24<sup>th</sup>. These storms resulted in a couple of Winter Weather Advisories for snowfall in the 2 to 4 inch range for some of the lower elevations. During this period, the forecast area experienced its coldest temperatures, with a number of record low temperatures being reported. The lowest temperature reported at any of the regular reporting stations was -2 degrees at Redmond, OR, -3 degrees at Meacham, OR, and a low of +2 at the Pendleton, OR airport. This low at Pendleton was a tie for the lowest minimum temperature of the winter season. The most significant wind events occurred on the 19<sup>th</sup>-21<sup>st</sup>. Below and on the next slide are some images representative of climate and weather conditions that were typical for the month.



Heavy snow at WFO Pendleton, OR



Virga from convective clouds at sunrise



Winter wonderland, at NWS Pendleton, OR



# More Images Representing February 2023 Weather/Climate Conditions



The quiet after the storm at midnight in Pendleton, OR



Heavy snowfall at Tollgate, OR, in the northern Blue Mountains



Dust storm south of Kennewick, WA on February 21, 2023



Early morning snow at the NWS Pendleton, OR on Feb 23, 2023

# Significant Weather Event Storm Reports for February 2023

Significant Weather Events					
Date	Location	State	Event Type	Magnitude	Source
February 5, 2023	3 NNW SKI BLUEWOOD	WA	HEAVY SNOW	12	MESONET
February 6, 2023	5 SW SPOUT SPRINGS	OR	HEAVY SNOW	14	MESONET
February 6, 2023	6 ENE LEHMAN HOT SPRGS	OR	HEAVY SNOW	9	MESONET
February 6, 2023	9 SW SKI BLUEWOOD	OR	HEAVY SNOW	17	MESONET
February 6, 2023	6 SW KAMELA	OR	HEAVY SNOW	7	MESONET
February 6, 2023	MEACHAM	OR	HEAVY SNOW	8	PUBLIC
February 6, 2023	WNW TOLLGATE	OR	HEAVY SNOW	16	TRAINED SPOTTER
February 8, 2023	17 SSE DAYTON	WA	SNOW	6	PUBLIC
February 8, 2023	28 WNW TIETON	WA	SNOW	7	OTHER FEDERAL
February 8, 2023	16 NNW ROSLYN	WA	SNOW	5.1	MESONET
February 13, 2023	3 NNE ELLENSBURG	WA	NON-TSTM WND GST	61	ASOS
February 13, 2023	CLE ELUM	WA	SNOW	10	PUBLIC
February 13, 2023	ROSLYN	WA	SNOW	10	PUBLIC
February 14, 2023	15 SSE DAYTON	WA	HEAVY SNOW	10	MESONET
February 14, 2023	13 NW ELGIN	OR	HEAVY SNOW	12	MESONET
February 14, 2023	21 E MILTON-FREEWATER	OR	HEAVY SNOW	18	MESONET
February 19, 2023	3 NNE ELLENSBURG	WA	NON-TSTM WND GST	62	ASOS
February 19, 2023	6 NNW ELLENSBURG	WA	NON-TSTM WND GST	47	TRAINED SPOTTER
February 20, 2023	2 ESE KENNEWICK	WA	NON-TSTM WND GST	50	TRAINED SPOTTER
February 20, 2023	3 NNE ELLENSBURG	WA	NON-TSTM WND GST	64	ASOS
February 20, 2023	2 SE KENNEWICK	WA	NON-TSTM WND GST	60	TRAINED SPOTTER
February 20, 2023	8 NW WEST RICHLAND	WA	NON-TSTM WND GST	58	MESONET
February 20, 2023	10 NNW BENTON CITY	WA	NON-TSTM WND GST	72	MESONET
February 20, 2023	2 NW KENNEWICK	WA	NON-TSTM WND GST	62	MESONET

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

continued on next slide →



# Significant Weather Event Storm Reports for February 2023

Significant Weather Events					
Date	Location	State	Event Type	Magnitude	Source
February 20, 2023	17 NW GOLDENDALE	WA	NON-TSTM WND GST	64	MESONET
February 20, 2023	1 NNE PASCO	WA	NON-TSTM WND GST	64	ASOS
February 20, 2023	1 NNE PASCO	WA	NON-TSTM WND GST	68	ASOS
February 20, 2023	14 NNW WEST RICHLAND	WA	NON-TSTM WND GST	66	MESONET
February 20, 2023	1 ENE PASCO	WA	NON-TSTM WND GST	63	MESONET
February 20, 2023	5 WSW RUFUS	OR	NON-TSTM WND GST	58	MESONET
February 20, 2023	4 NW WEST RICHLAND	WA	NON-TSTM WND GST	60	MESONET
February 20, 2023	1 SW KAHLOTUS	WA	NON-TSTM WND GST	67	MESONET
February 20, 2023	IRRIGON	OR	NON-TSTM WND DMG	Roof shingles	TRAINED SPOTTER
February 20, 2023	15 ESE MORO	OR	NON-TSTM WND GST	73	MESONET
February 20, 2023	22 NE GOLDENDALE	WA	NON-TSTM WND GST	64	MESONET
February 20, 2023	WAITSBURG	WA	NON-TSTM WND GST	64	MESONET
February 20, 2023	KENNEWICK	WA	NON-TSTM WND DMG	Power outage	UTILITY COMPANY
February 20, 2023	10 ENE GOLDENDALE	WA	NON-TSTM WND GST	60	MESONET
February 20, 2023	17 NW WARM SPRINGS	OR	NON-TSTM WND GST	58	MESONET
February 21, 2023	14 SE BURBANK	WA	NON-TSTM WND GST	62	MESONET
February 21, 2023	11 E SHANIKO	OR	NON-TSTM WND GST	63	MESONET
February 21, 2023	19 N WEST RICHLAND	WA	NON-TSTM WND GST	63	MESONET
February 21, 2023	8 NW WEST RICHLAND	WA	NON-TSTM WND GST	79	MESONET
February 21, 2023	HERMISTON	OR	NON-TSTM WND GST	61	ASOS
February 21, 2023	WALLA WALLA	WA	NON-TSTM WND GST	59	ASOS
February 21, 2023	2 NNW PENDLETON	OR	NON-TSTM WND GST	57	ASOS
February 22, 2023	30 W MAUPIN	OR	HEAVY SNOW	8	MESONET
February 22, 2023	2 WSW KENNEWICK	WA	SNOW	1	TRAINED SPOTTER

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# Significant Weather Event Storm Reports for February 2023

Significant Weather Events					
Date	Location	State	Event Type	Magnitude	Source
February 22, 2023	KENNEWICK	WA	SNOW	2	BROADCAST MEDIA
February 22, 2023	RICHLAND	WA	SNOW	2	BROADCAST MEDIA
February 22, 2023	WALLA WALLA	WA	SNOW	2	PUBLIC
February 22, 2023	WALLA WALLA	WA	SNOW	3	PUBLIC
February 23, 2023	3 SSE WHITE SWAN	WA	HEAVY SNOW	4	TRAINED SPOTTER
February 23, 2023	2 ESE PENDLETON	OR	HEAVY SNOW	4.5	NWS EMPLOYEE
February 23, 2023	ENE PENDLETON	OR	HEAVY SNOW	5.6	NWS EMPLOYEE
February 26, 2023	19 NW ROSLYN	WA	SNOW	5	FIRE DEPT/RESCUE
February 28, 2023	5 NNW LA PINE	OR	SNOW	3	TRAINED SPOTTER
February 28, 2023	2 E SNOQUALMIE PASS	WA	SNOW	4	PUBLIC
February 28, 2023	6 NNW EASTON	WA	SNOW	2.5	COCORAHS
February 28, 2023	2 SSE SNOQUALMIE PASS	WA	SNOW	4	COCORAHS
February 28, 2023	1 SSW TROUT LAKE	WA	HEAVY SNOW	12	COCORAHS

Most of the significant weather events during February were heavy snow/snow or non-thunderstorm high wind gusts or wind damage. Most of the non-thunderstorm wind events occurred during the middle of the month around February 19<sup>th</sup> through the 21<sup>st</sup>. Most of the heavy snow or snow reports occurred around February 6<sup>th</sup> - 14<sup>th</sup>, and then again during the latter part of February from the 22<sup>nd</sup> to the 28<sup>th</sup>.



# Record Weather Events for February 2023

Record Weather Reports					
Event	Date	Where	Previous Record	New Record	Records Began
Max Rainfall	February 5, 2023	Hermiston, OR	0.3 / 1907	0.3 (tie)	1906
Max Snowfall	February 23, 2023	Pendleton, OR	3.5 / 1993	4.4	1934
Low Temperature	February 24, 2023	Pendleton, OR	10 / 1993	2	1934
Low Temperature	February 24, 2023	Ellensburg, WA	8 / 2011	5	1934
Low Temperature	February 24, 2023	Hermiston, OR	11 / 2003	5	1906
Low Temperature	February 24, 2023	Pasco, WA	12 / 1962	10	1942
Low Temperature	February 24, 2023	Walla Walla, WA	11 / 1962	9	1930
Low Temperature	February 24, 2023	Yakima, WA	9 / 1993	8	1909
Low Temperature	February 25, 2023	Pendleton, OR	6 / 2011	2	1934
Low Temperature	February 25, 2023	Redmond, OR	-2 / 2011	-2 (tie)	1941
Low Temperature	February 25, 2023	Walla Walla, WA	8 / 1993	7	1930
Low Temperature	February 25, 2023	Dallesport, WA	13 / 1993	13 (tie)	1929

There were a total of 12 record weather event reports, most of which were record low temperatures on the 24<sup>th</sup> and 25<sup>th</sup> of February during an arctic intrusion which included moderate to heavy snow and very cold temperatures. However, there was only one record snowfall event, which occurred on the 23<sup>rd</sup> at Pendleton, OR, and one record rainfall event, which occurred on the 5<sup>th</sup> in Hermiston, OR. The remainder of the record weather events were record low temperatures during the arctic intrusion during the latter part of the month.

# February 2023: Observed Monthly Maximum & Minimum Temperatures

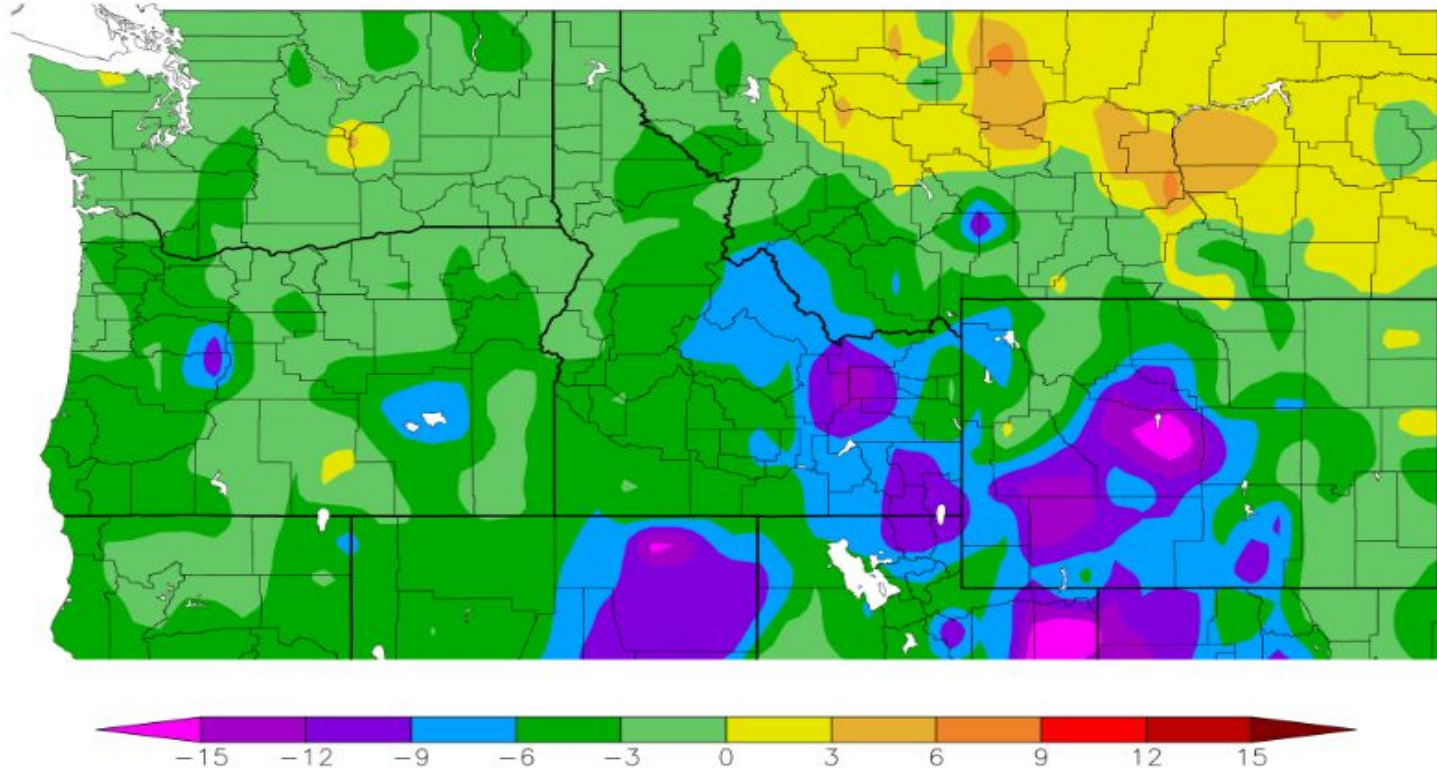
Location	Highest Maximum	Lowest Minimum
Pendleton, OR	57	2
Redmond, OR	63	-2
Pasco, WA	47	10
Yakima, WA	60	8
Walla Walla, WA	67	7
Bend, OR Co-Op	58	1
Ellensburg, WA	55	5
Hermiston, OR	57	5
John Day, OR	61	13
La Grande, OR	52	11
The Dalles, OR	56	13
Meacham, OR	51	-3
MT Adams RS, WA	49	3

The table above shows that most of the highest maximum temperatures that occurred in February were in the 50s to lower 60s. The highest was at Walla Walla, WA, with a high of 67 degrees, and the lowest was at Pasco, WA with a high of 47 degrees. The coldest minimums were mostly in the single digits to lower teens. The coldest was at Meacham, OR with a low of -3 degrees, and the warmest minimum was at John Day, OR and The Dalles (Dallesport, WA) with both stations reporting a minimum low of 13 degrees for the month.



# February 2023: Departure from Normal of Average Temperatures

Departure from Normal Temperature (F)  
2/1/2023 – 2/28/2023

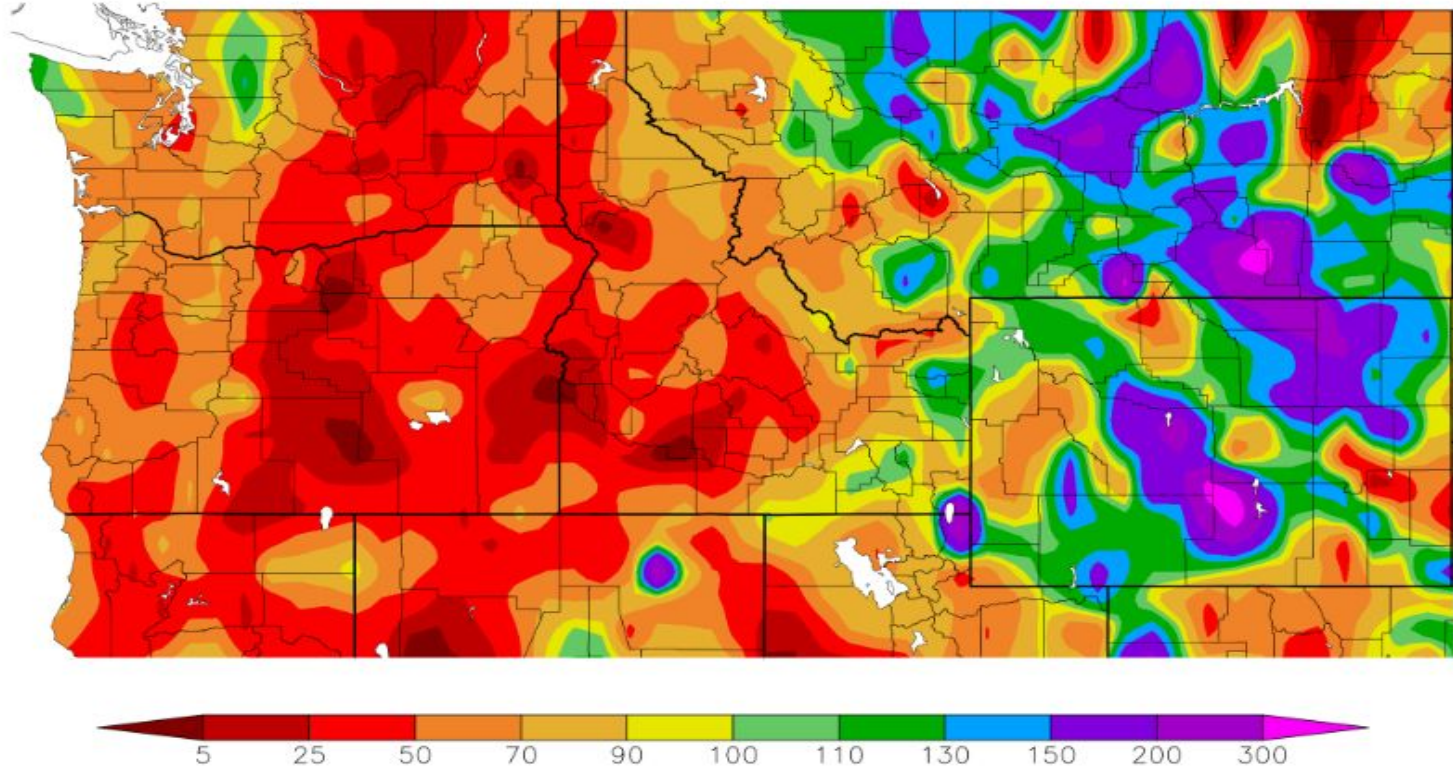


The image above shows that most of the forecast area had below normal temperatures for the month, which ranged mostly from -1 to -6 degrees below normal. There was a very small area in the central OR Cascades, in western Deschutes County, which had departures of normal from -6 to -9 degrees. The only warmer than normal area was a small portion in northeast Kittitas County, WA, which had above normal temperatures with departures of 1 to 3 degrees.



# February 2023: Percent of Normal of Precipitation

Percent of Normal Precipitation (%)  
2/1/2023 – 2/28/2023



All of northeast OR and southeast WA had a percent of normal precipitation that was below normal. They ranged from a small area of 5 to 25 percent of normal in north central OR, to other areas ranging from 25 to 90 percent of normal. The majority of the forecast area had percentages of normals ranging from 50 to 90 percent of normal. The least driest areas were in the Blue Mountains and the foothills of northeast OR and southeast WA.



# February 2023 Departures from Normal Means/Sums for Select Cities

	Max T	Max T D	Min T	Min T D	Avg	Avg T D	PCPN	PCPN D
<b>Yakima</b>	45.6	-0.7	23.9	-2	34.8	-1.3	0.44	-0.34
<b>Kennewick</b>	46.3	-1.7	28.3	-2.4	37.3	-2	0.25	-0.53
<b>Walla Walla</b>	44.5	-1.5	29.0	-3.2	36.8	-2.3	0.85	-0.91
<b>The Dalles</b>	46.8	-1.8	29.2	-2.6	38.0	-1.9	0.56	-1.21
<b>Redmond</b>	47.5	0.7	22.3	-1.4	34.9	-0.3	0.09	-0.56
<b>Pendleton Airport</b>	46.3	-0.5	26.9	-3.4	36.6	-1.9	0.72	-0.39
<b>La Grande Airport</b>	41.5	-1.4	24.8	-1.1	33.2	-1.2	0.62	-0.52
<b>John Day</b>	48.1	0.7	26.5	1.7	37.3	1.2	0.33	-0.41

Among the 8 key stations listed above, 6 of them had average high temperatures below normal, with the largest deviation of -1.8 degrees at The Dalles (Dallesport, WA). Meanwhile, the warmest was at Redmond, OR and John Day, OR, both with +0.7 degree above normal. All but one station, had below normal average minimum temperatures, with Pendleton OR having the great departure of -3.4 degrees. Of the mean average temperatures, Walla Walla, WA had the greatest departure of -2.3 degrees below normal, and the warmest was at John Day, OR with a departure of +1.2 degrees above normal. Precipitation was below normal at every station on the list, with The Dalles (Dallesport, WA) having the largest deviation from normal at -1.21 inches.

## February 2023 Observed Total Precipitation and Total Snowfall/Hail

Location	Total Precipitation (inches)	Total Snow/Hail (inches)
Pendleton, OR	0.72	6.3
Redmond, OR	0.09	M
Pasco, WA	0.24	M
Yakima, WA	0.44	M
Walla Walla, WA	0.85	M
Bend, OR Co-Op	0.08	4.0
Ellensburg, WA	0.30	M
Hermiston, OR	0.43	M
John Day, OR	0.33	M
La Grande, OR	0.62	M
The Dalles, OR	0.56	M
Meacham, OR	3.29	M
Mt. Adams RS, WA	1.13	4.0

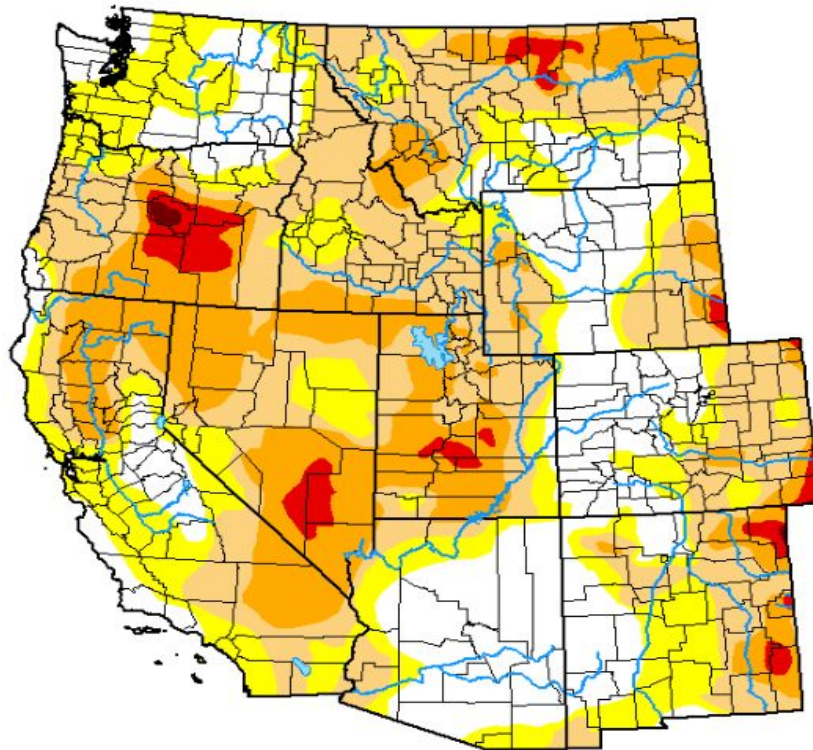
The greatest precipitation amount in the list above was at Meacham, OR, with 3.29 inches, and the least amount of precipitation was at the Bend, OR Co-Op station with only 0.08 inch. Of the three available snowfall reports, the greatest was at Pendleton, OR with a total of 6.3 inches, and the least was a tie between the Bend, OR Co-Op and the Mt. Adams Ranger Station with both stations reporting a total of 4.0 inches of snow. Most of these precipitation amounts were below normal for February.



# February 2023 - Drought Monitor – Western USA

## U.S. Drought Monitor West

**February 28, 2023**  
(Released Thursday, Mar. 2, 2023)  
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	24.28	75.72	53.55	22.35	3.09	0.15
<b>Last Week</b> 02-21-2023	19.71	80.29	60.34	24.11	3.17	0.15
<b>3 Months Ago</b> 11-29-2022	6.58	93.42	68.74	44.88	17.62	2.02
<b>Start of Calendar Year</b> 01-03-2023	12.08	87.92	62.42	38.84	12.41	0.27
<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> 03-01-2022	3.95	96.05	90.42	70.14	23.68	2.80

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>

Author:

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

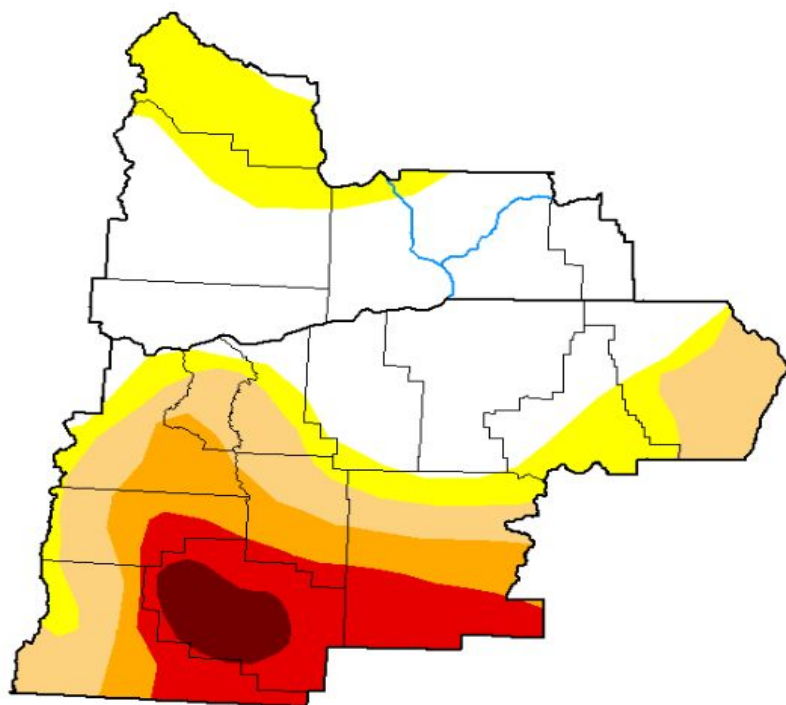
Drought conditions were in the “none” category again over the Lower Columbia Basin to the Blue mountains and the southern WA Cascades (except for Kittitas County), which had drought conditions in the “D0” (Abnormally Dry) category. The greatest drought conditions continued to be in central OR, east of the Cascades, with drought conditions that ranged from the “D3” (Extreme Drought) category to as great as the “D4” (Exceptional Drought) category.



# February 2023 - Drought Monitor – Pendleton Forecast Area

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

**January 31, 2023**  
(Released Thursday, Feb. 2, 2023)  
Valid 7 a.m. EST



### Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	42.14	57.86	39.97	24.11	14.61	3.17
<b>Last Week</b> <i>01-24-2023</i>	42.14	57.86	39.97	24.11	14.61	3.17
<b>3 Months Ago</b> <i>11-01-2022</i>	0.00	100.00	51.51	25.59	17.46	3.17
<b>Start of Calendar Year</b> <i>01-03-2023</i>	29.80	70.20	39.93	22.93	15.24	3.17
<b>Start of Water Year</b> <i>09-27-2022</i>	0.00	100.00	46.03	24.98	17.46	3.17
<b>One Year Ago</b> <i>02-01-2022</i>	4.47	95.53	91.30	85.92	54.78	21.83

### Intensity:

None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate 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>

### Author:

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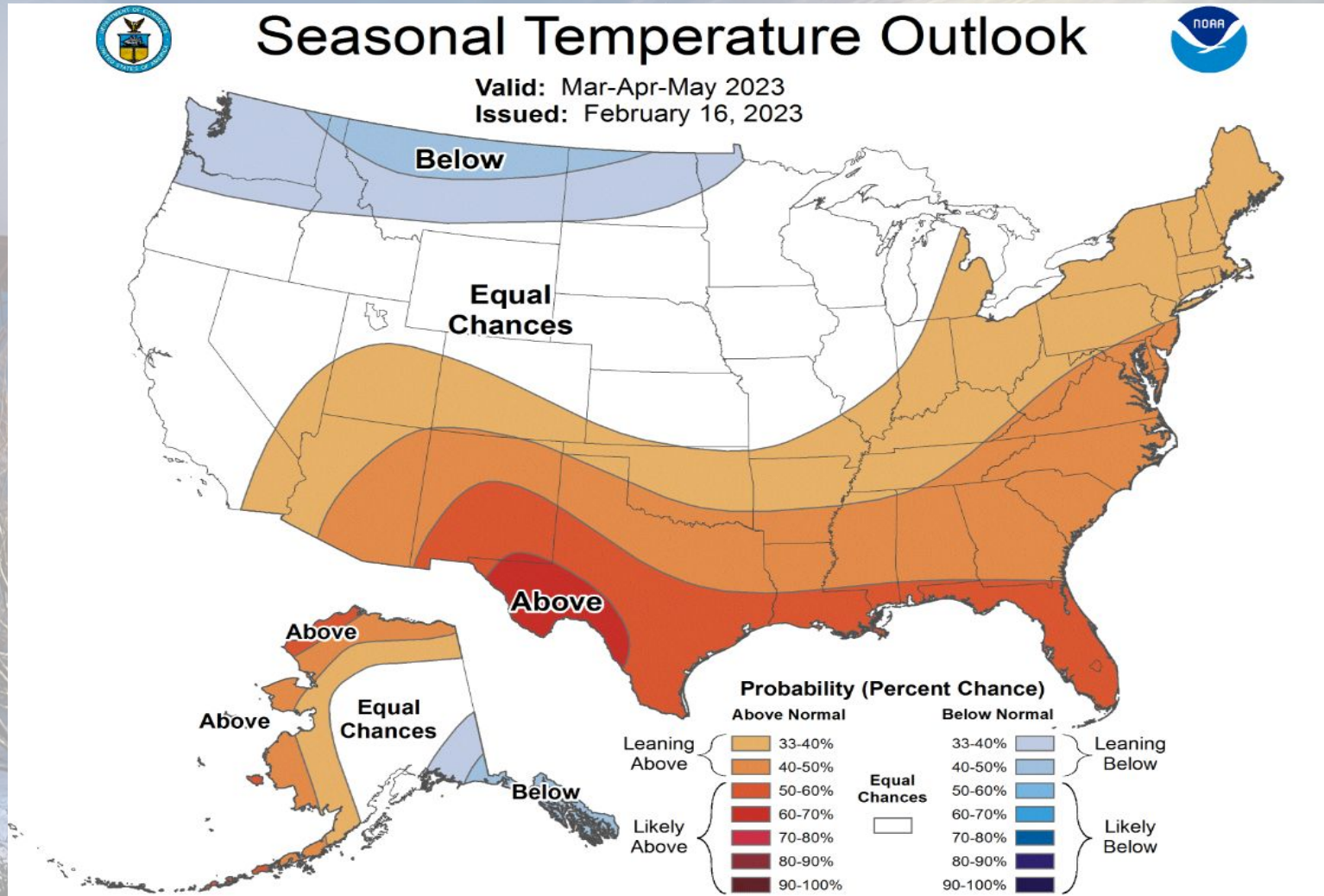


[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)

A close-up of the forecast area shows that drought conditions were in the (“none”) category from the Lower Columbia Basin east to the Blue Mountains and most of the southern WA Cascades. Central OR, east of the Cascades, eastward across the southern Ochoco-John Day highlands had the worst drought conditions, of “D3” - “D4” (Extreme Drought to Exceptional Drought) category. Eastern Wallowa County had mostly a “D1” (Moderate Drought) category.

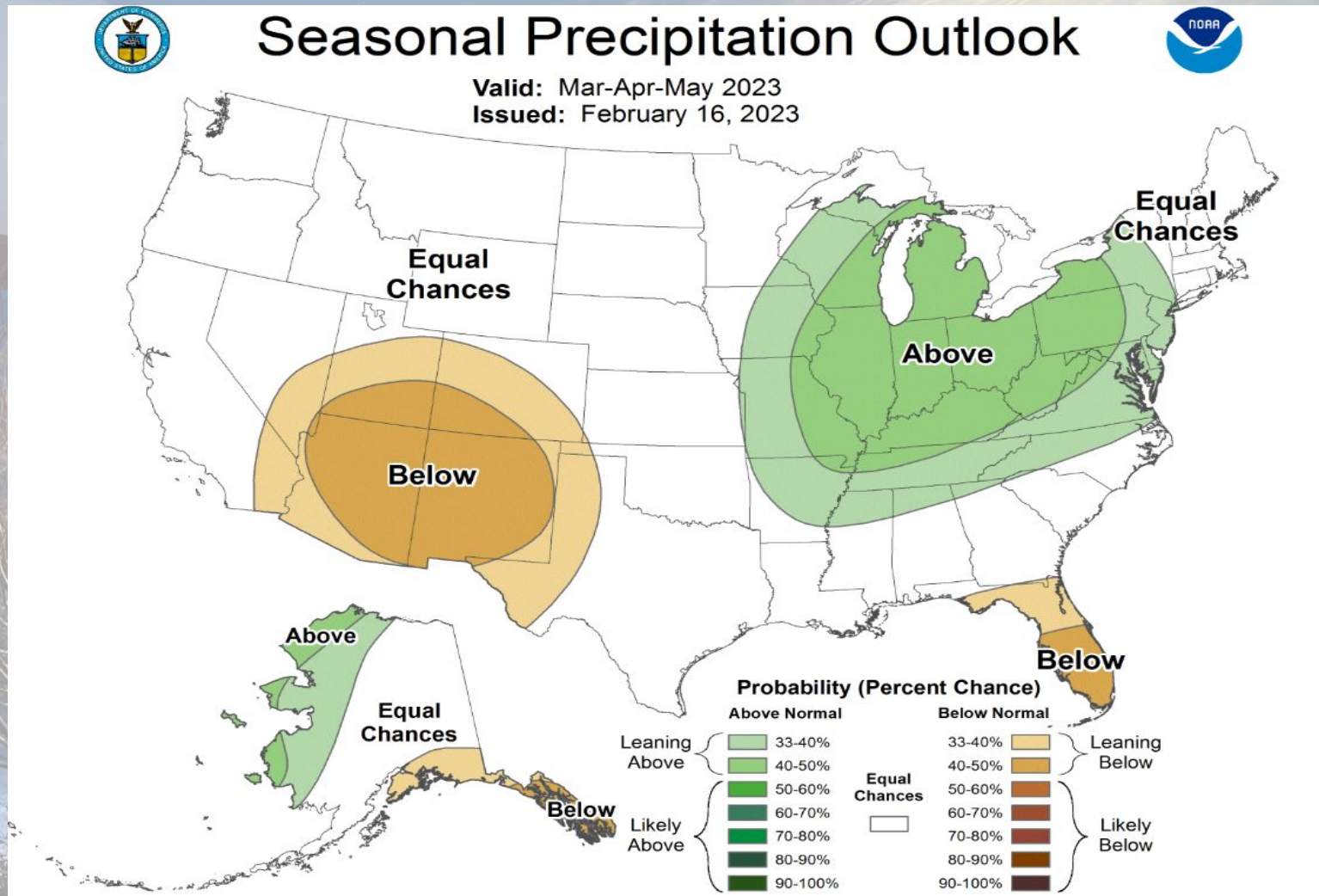


# USA Three Month Temperature Outlook



The three month outlook for the period March through May for the Pacific Northwest shows that temperature probabilities are leaning to mostly below normal, except for the southern two thirds of OR, which has equal chances of above or below normal temperatures. The coldest areas are more favored to be over northern third of OR and all of the WA portion of the forecast area.

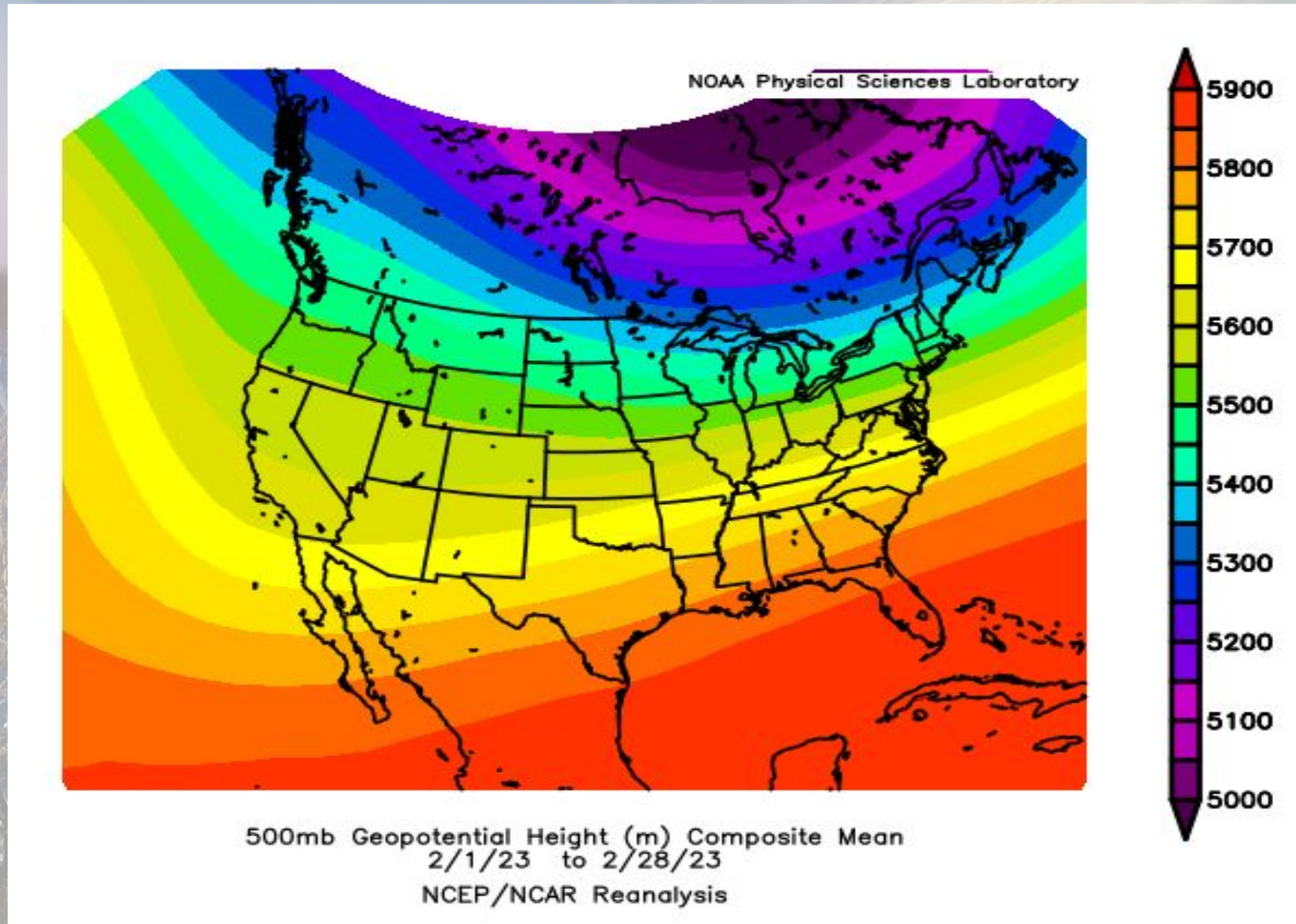
# USA Three Month Precipitation Outlook



The three month outlook for the period March through May for the Pacific Northwest shows that precipitation probabilities all have equal chances of above or below normal precipitation across all of Oregon and Washington.



# February 2023, Average 500 MB Pattern



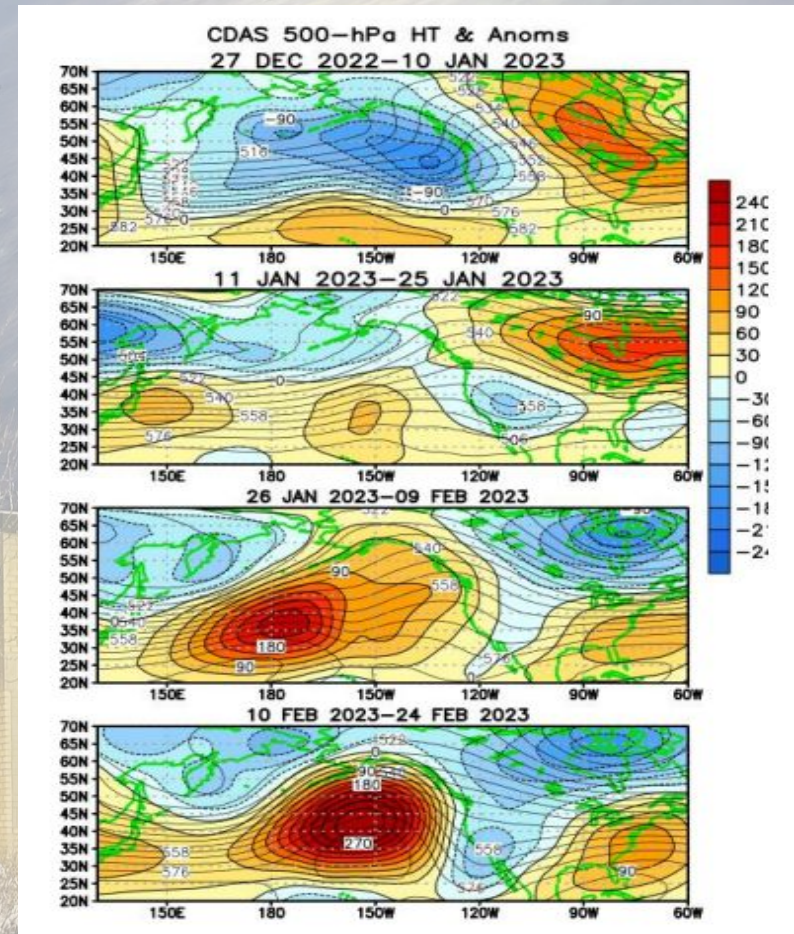
The average 500 mb pattern over the Pacific Northwest in February shows mostly a westerly zonal flow with subtle troughing. This is representative of the drier than normal conditions, but also mostly cooler than normal conditions due to the subtle upper troughing pattern. This pattern also indicates a greater number of Pacific weather systems, which is likely the reason for the high number of high wind and/or snow events across the Pacific Northwest in February.



# Two Month, Average Bi-weekly 500 MB Plots for January - February 2023

These are more detailed bi-weekly average 500 mb pattern plots, which was sampled from the following period: Very late December through the latter third of February.

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



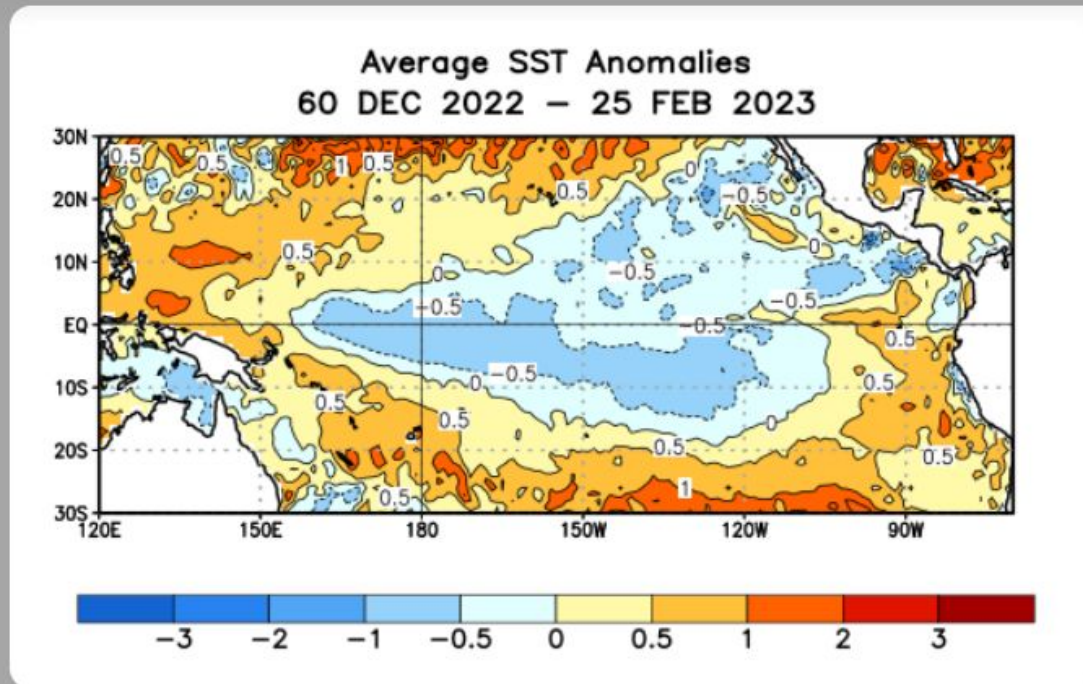
From late December through the first part of January, a strong upper trough (depicted by the blue area) dominated the Pacific Northwest and this resulted in an active weather pattern. This upper trough weakened later in January, resulting in a more quiet weather pattern. Then a strong upper ridge built over the eastern Pacific that resulted in a mostly northwest to trough pattern over the Pacific Northwest from late January to late February. This likely attributed to the drier and mostly cooler than normal conditions in February. This pattern is more reminiscent of an El-Nino scenario rather than a La-Nina scenario, and ENSO conditions were favored to transition out of the La Nina to ENSO Neutral conditions.



# Sea Surface Temperature (SST) Anomalies for February 2023

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

In the last four weeks, equatorial SSTs were below average across the central and east-central Pacific Ocean and above average in the eastern Pacific.



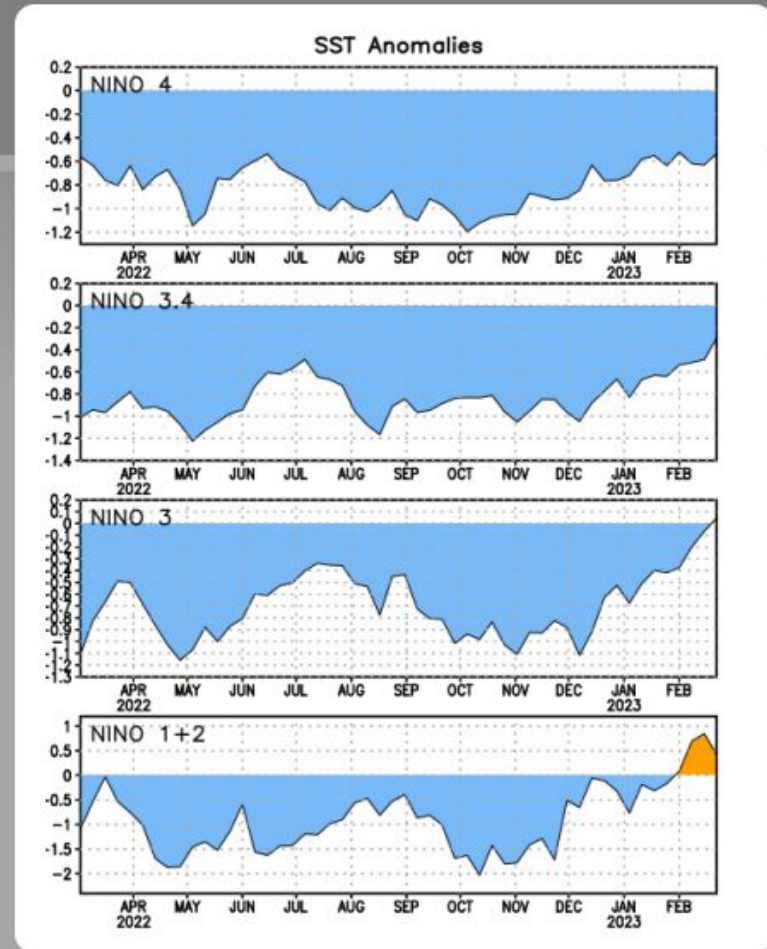
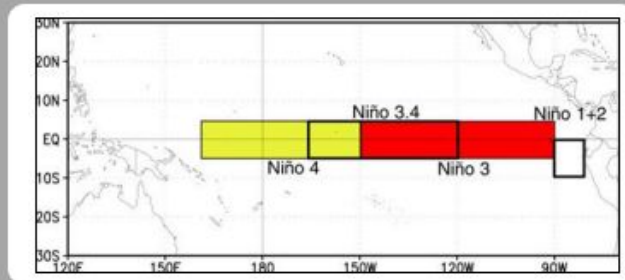
During the last 4 weeks up to late February, Sea Surface Temperatures (SSTs) were cooler than average across the central and east central Pacific, but they became warmer than average over the eastern Pacific. This is consistent with the expected transition from La Nina conditions to ENSO neutral conditions.

# ENSO NINO Regions SST Anomalies for Each Nino Region in January 2023

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

The latest weekly SST departures are:

Niño 4	-0.5°C
Niño 3.4	-0.3°C
Niño 3	0.0°C
Niño 1+2	0.4°C



As consistent with the previous slide, Niño Region 1+2 (the eastern Pacific) became warmer than normal, while the other three Niño Region remained cooler than normal. However, all Niño Regions showed either warming, or steady Sea Surface Temperatures. This is a further indication that ENSO conditions are transitioning from La Niña to ENSO neutral.

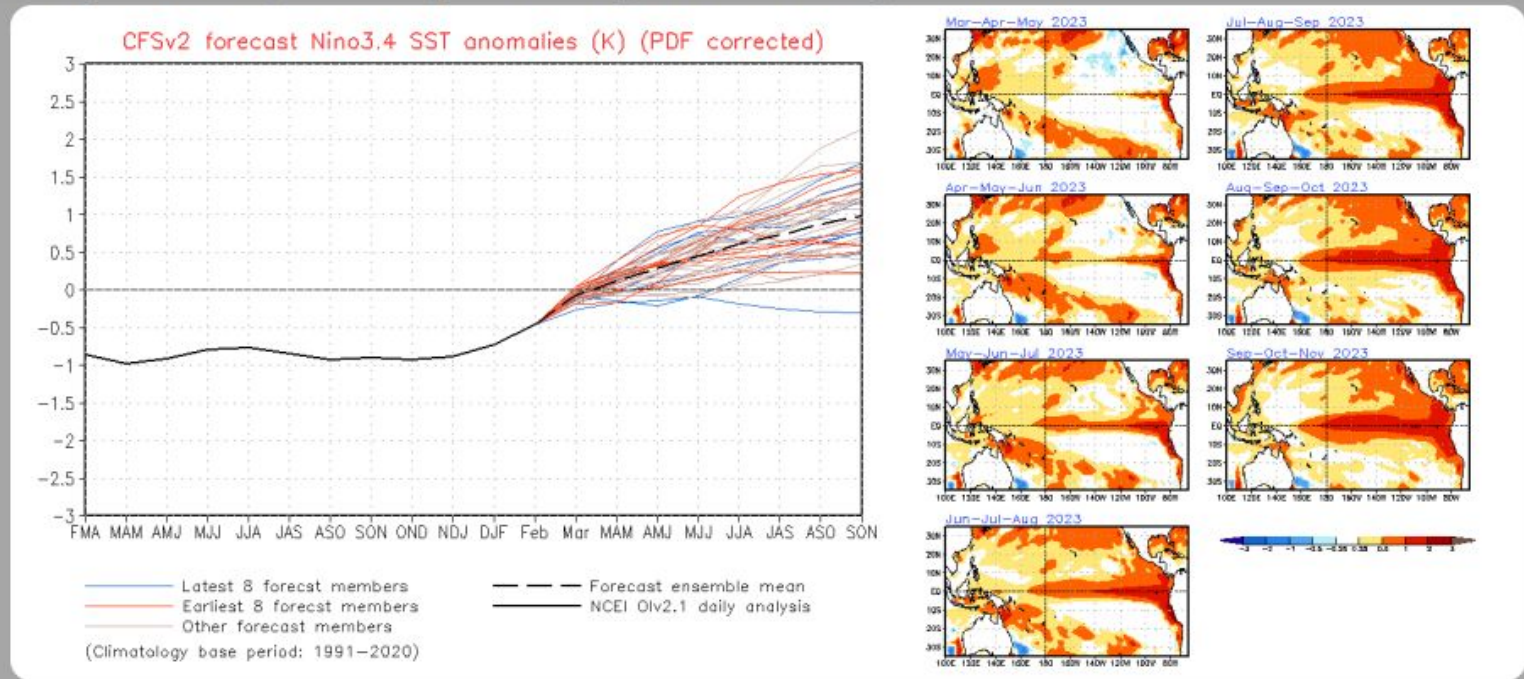


# Sea Surface Temperature (SST) NCEP CFS.v2 Ensemble Mean Outlook

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

Issued: 27 February 2023

The CFS.v2 ensemble mean (black dashed line) indicates ENSO-neutral is expected by March 2023 and then may continue into the Northern Hemisphere early summer, before potentially transitioning to El Niño.



The SST CFS.v2 forecast ensemble mean shows that ENSO-neutral is expected by March 2023, and then may continue into the Northern Hemisphere during early summer, before potentially transitioning to El Niño conditions. The small SST images on the right shows continued warming to above normal through the Sep-Oct-Nov three month time period (the 7th image).

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

## Summary

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

La Niña is present.\*

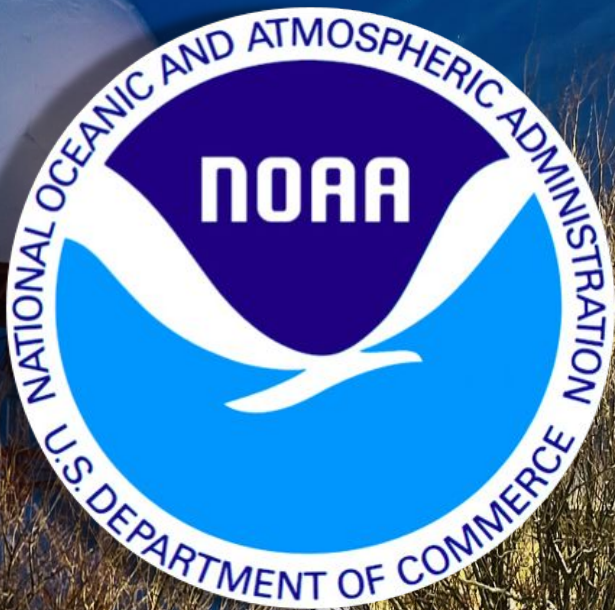
Equatorial sea surface temperatures (SSTs) are below average across most of the Pacific Ocean.

The tropical Pacific atmosphere is consistent with La Niña.

ENSO-neutral conditions are expected to begin within the next couple of months, and persist through the Northern Hemisphere spring and early summer.\*

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. However, ENSO-neutral conditions are expected to begin within the next couple of months and persist through the Northern Hemisphere spring and early summer.





Thank You!

