

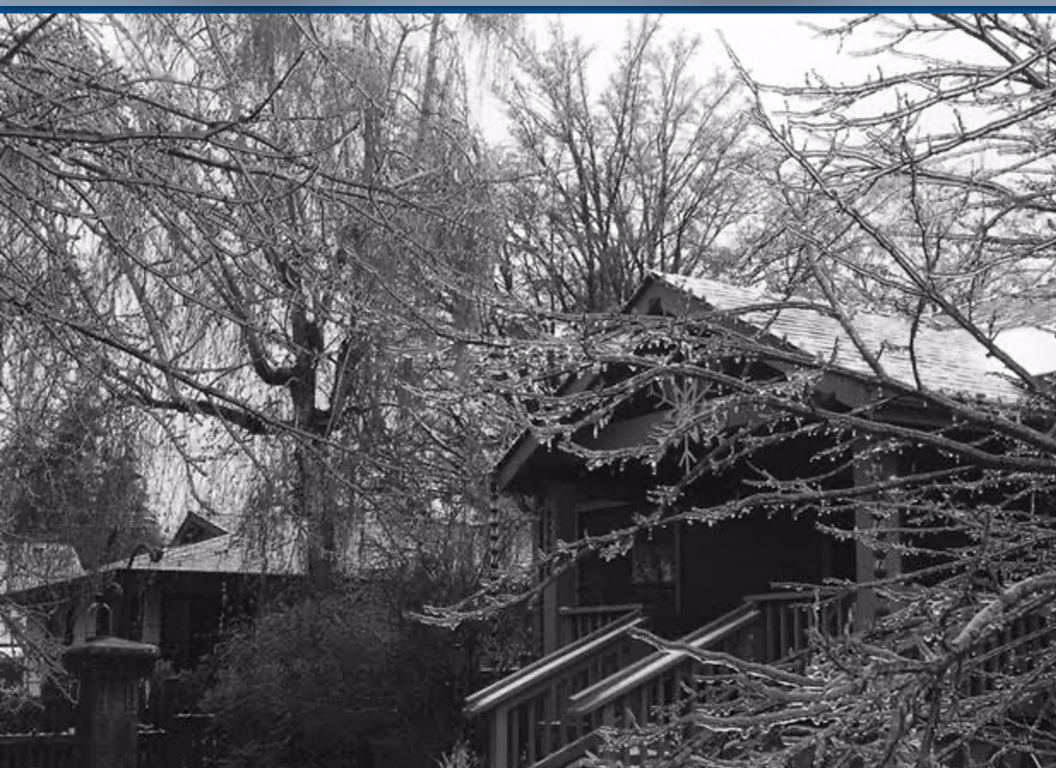
Weather Forecast Office

Portland, OR

# 2023-2024 PacNW Winter Outlook

Wed, Nov 2, 2023

Tanja Fransen, NWS Portland Meteorologist-in-Charge





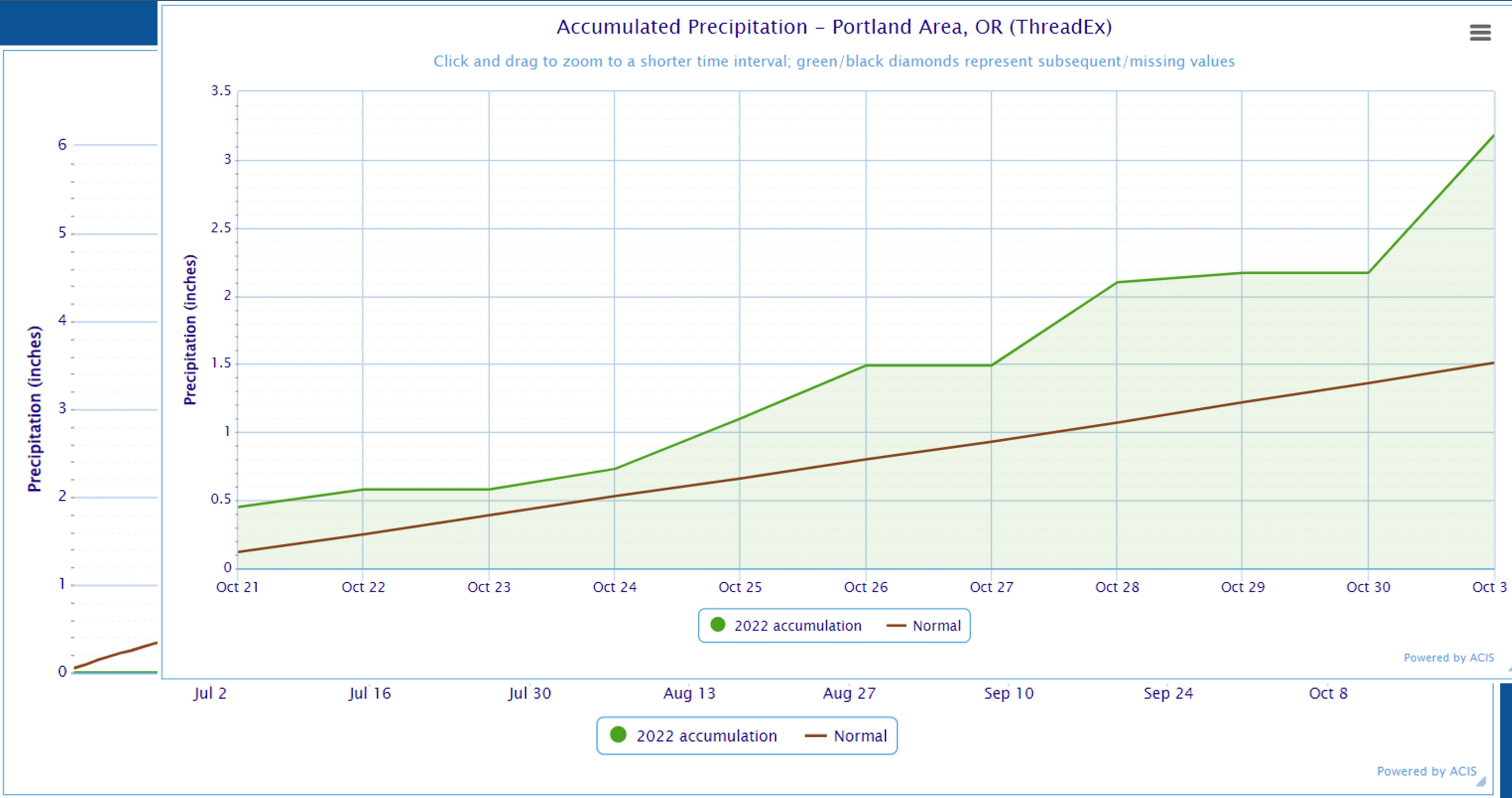
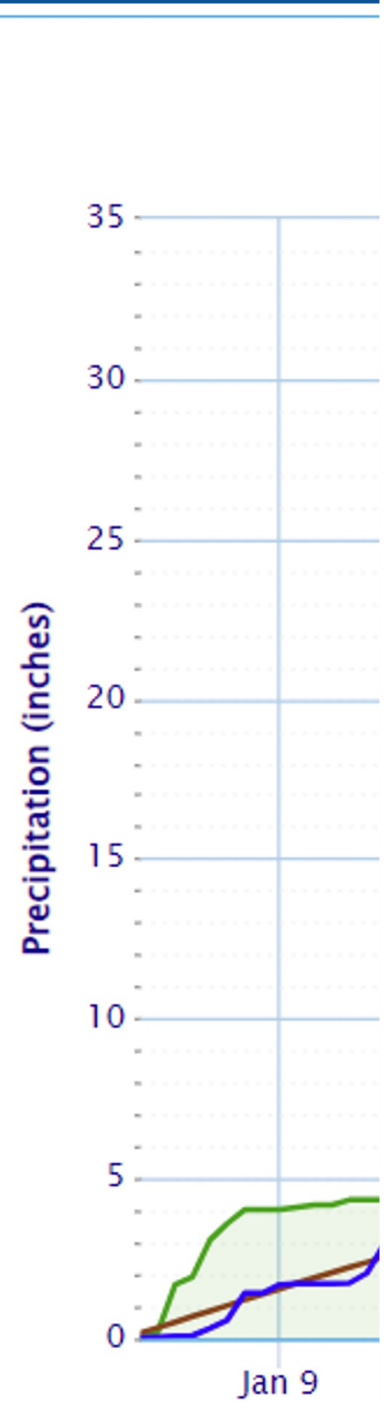
# Elephants in the Room

Weather Forecast Office  
Portland, OR





# Tanja Factor? Exhibit A



2022 accumulation Normal Highest (1999)



# Tanja Factor? Exhibit B - Feb 2023

Weather Forecast Office  
Portland, OR  
Friday, October 13

## Maximum 1-Day Total Snowfall for Portland Area, OR (ThreadEx)

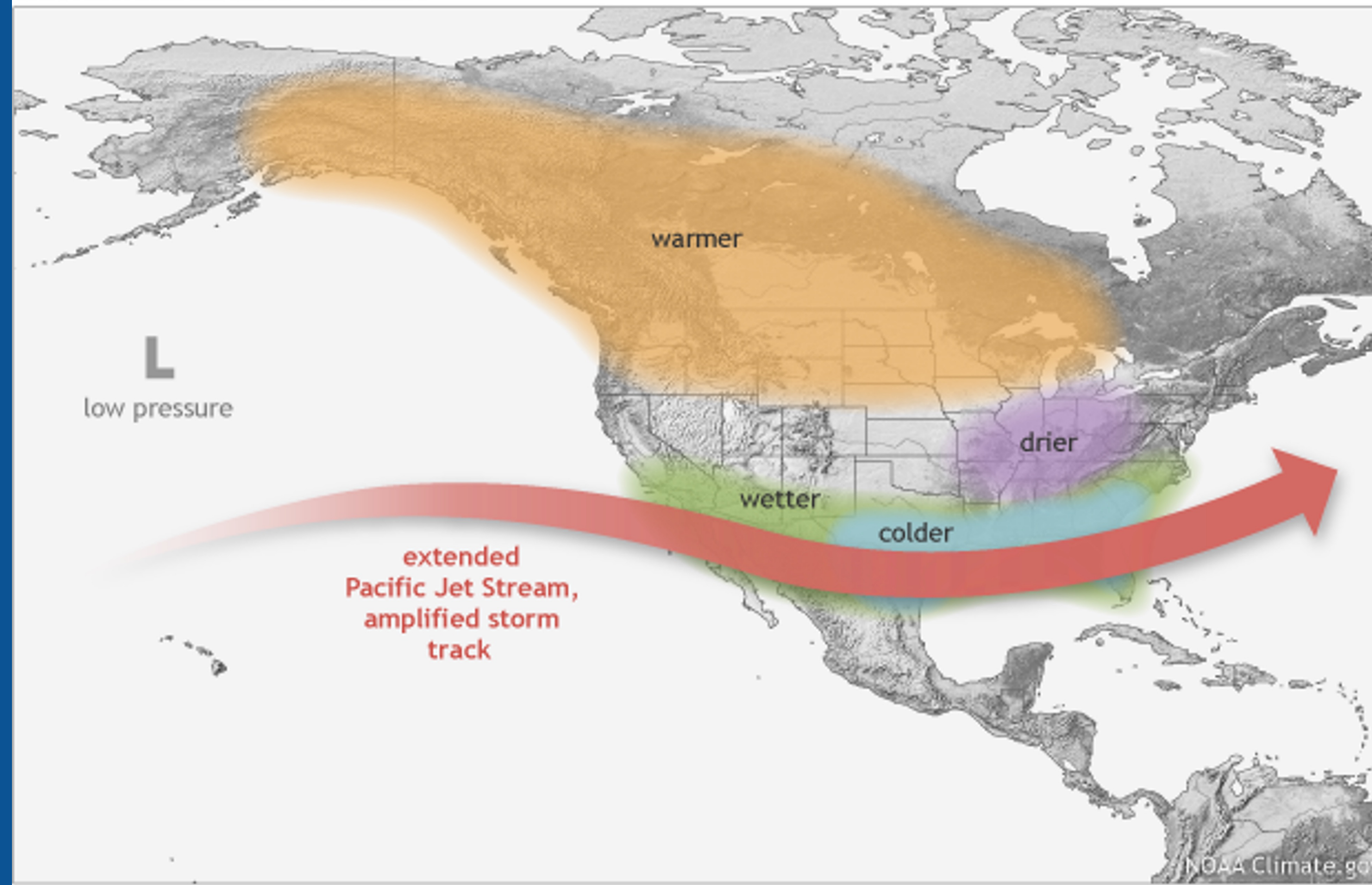
column heading to sort ascending, click again to sort de

Rank	Value	Ending Date
1	14.4	1943-01-21
2	10.8	2023-02-22
3	9.3	1956-01-26
4	8.0	1964-12-19
5	7.6	1951-03-08
6	7.5	1950-01-13
7	7.0	2008-12-20
-	7.0	1977-11-22
9	6.6	1996-01-27





## WINTERTIME EL NIÑO PATTERN

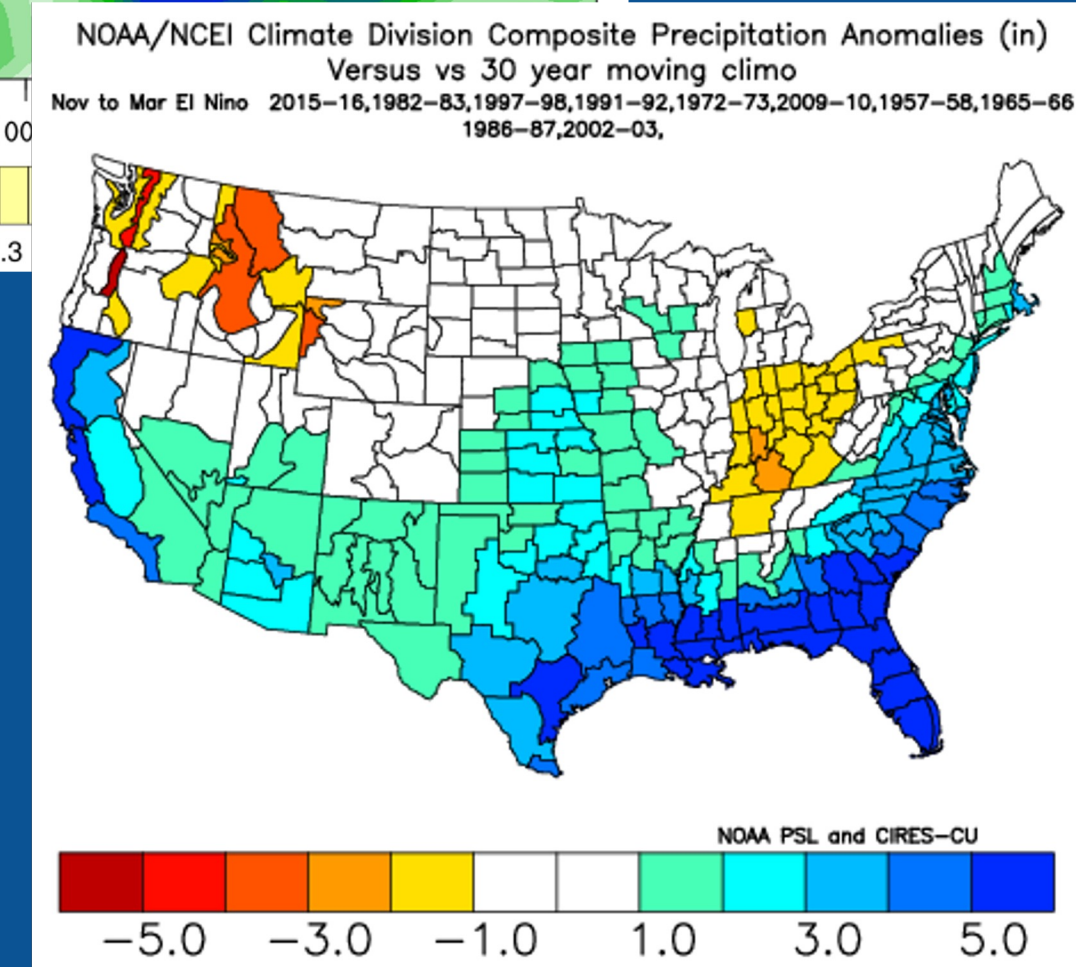
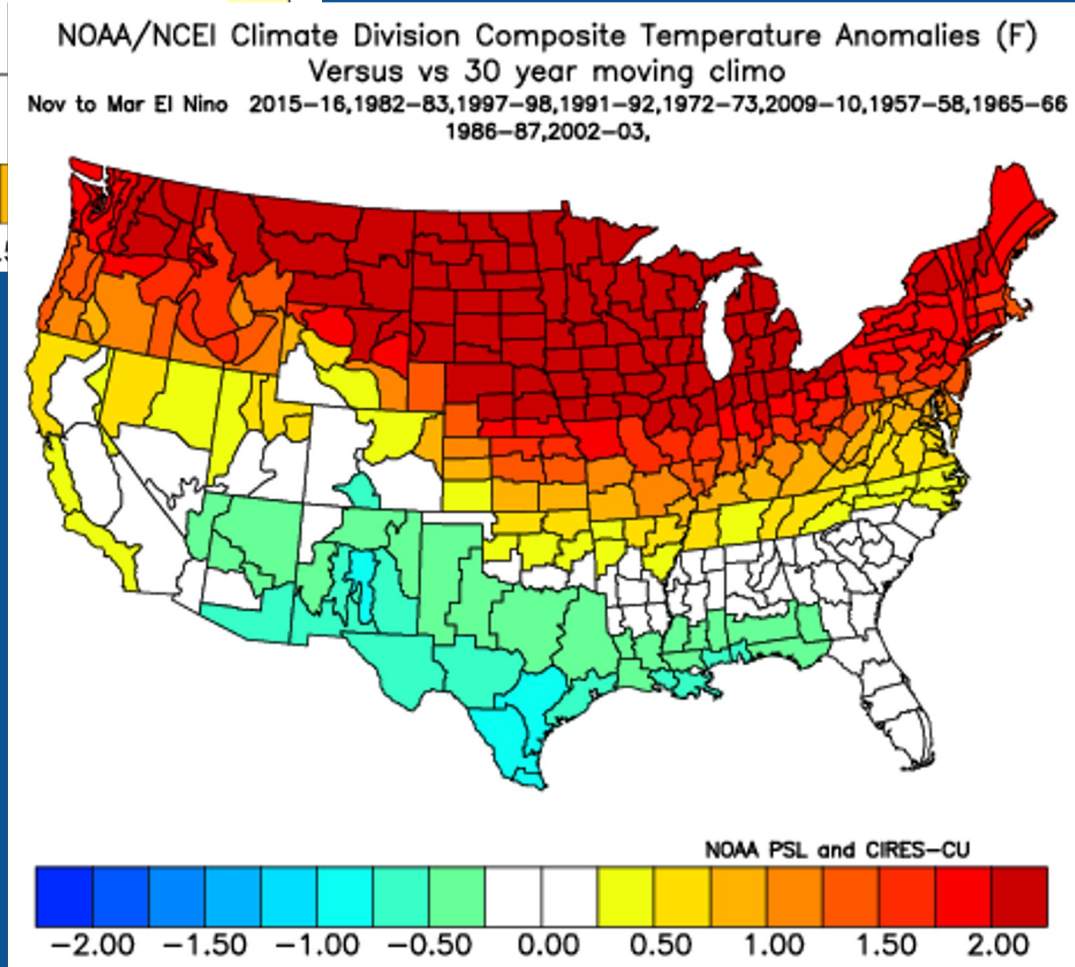
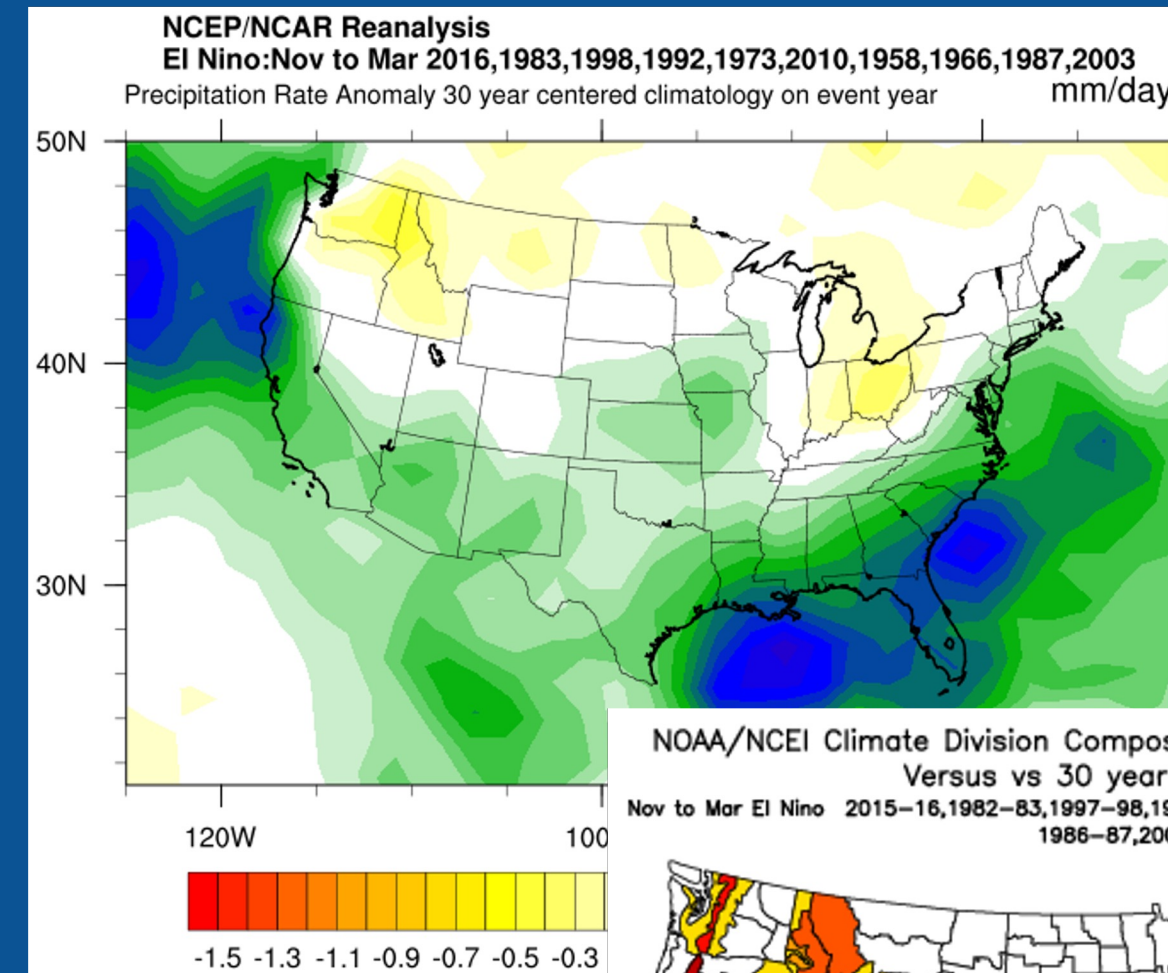
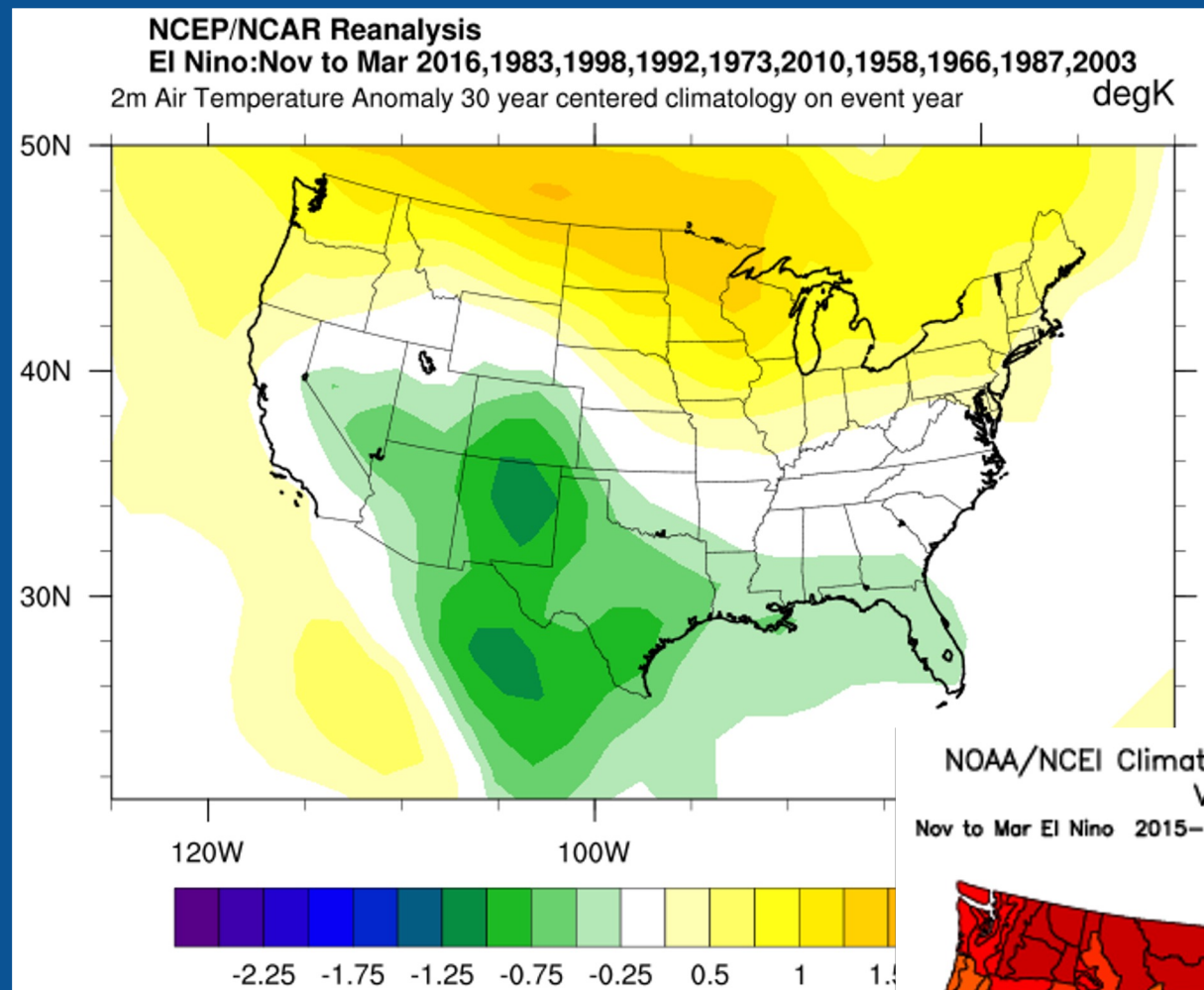


- Equatorial sea surface temperatures (SSTs) are above average across most of the Pacific Ocean.
- There is a **80% chance of a Strong El Niño** this winter.
- Strongly favors **warmer** than normal conditions for the PNW this winter. Precipitation is more uncertain but leans below average.



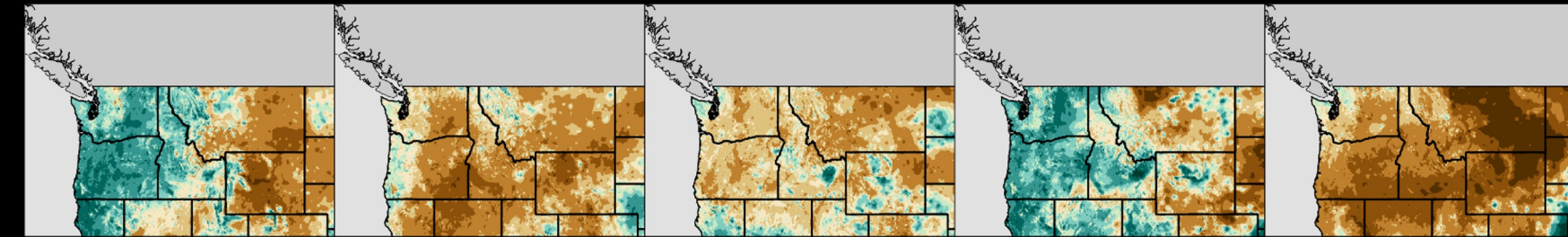
# NOAA/PSL and NCAR Reanalysis with El Niño years

Weather Forecast Office  
Portland, OR  
Friday, October 13

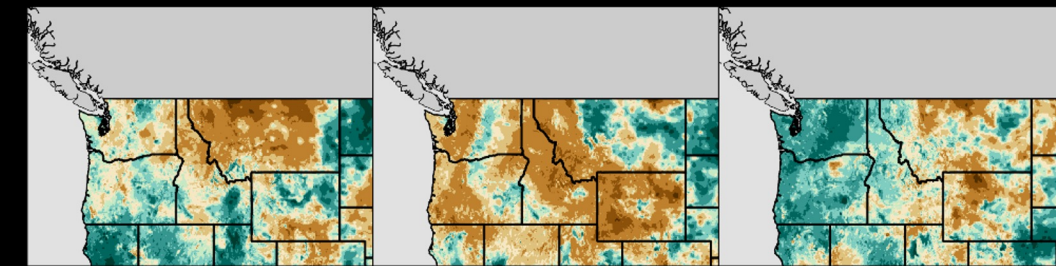


# EL NIÑO EVENTS (DJF): PRECIPITATION

## STRONG

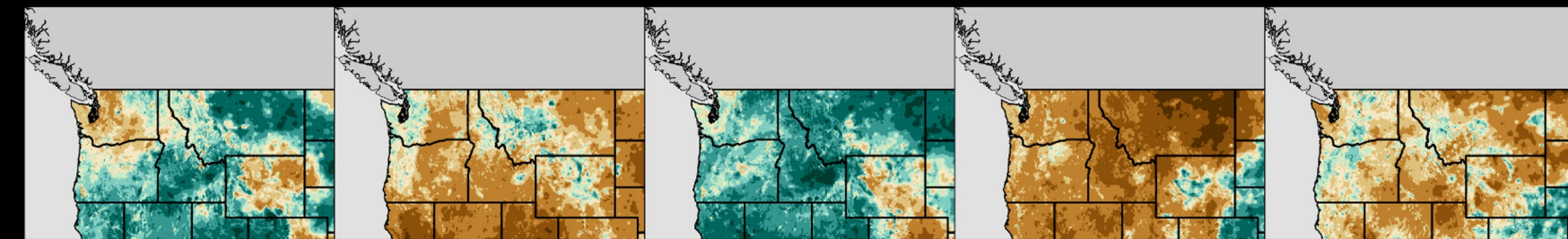


1957-1958 1965-1966 1972-1973 1982-1983 1991-1992

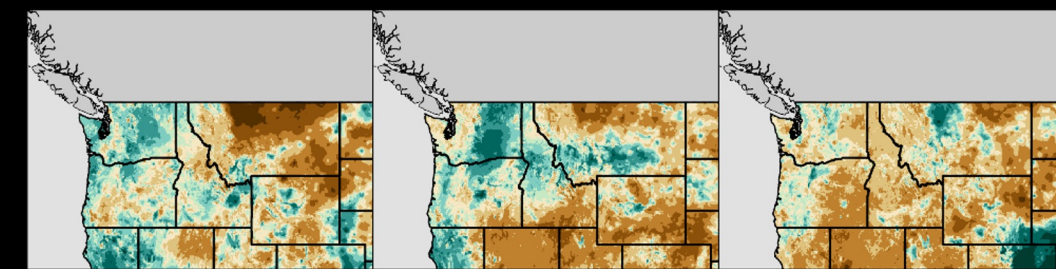


1997-1998 2009-2010 2015-2016

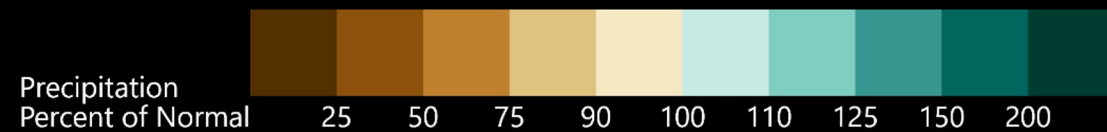
## MODERATE



1951-1952 1963-1964 1968-1969 1986-1987 1987-1988

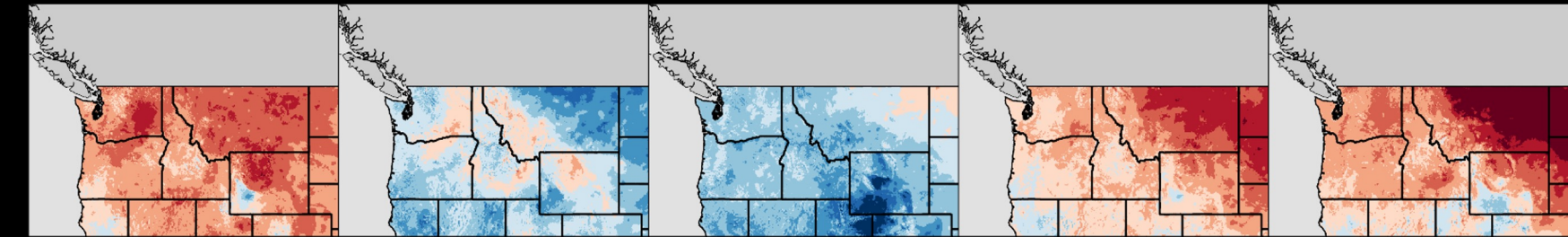


1994-1995 2002-2003 2006-2007

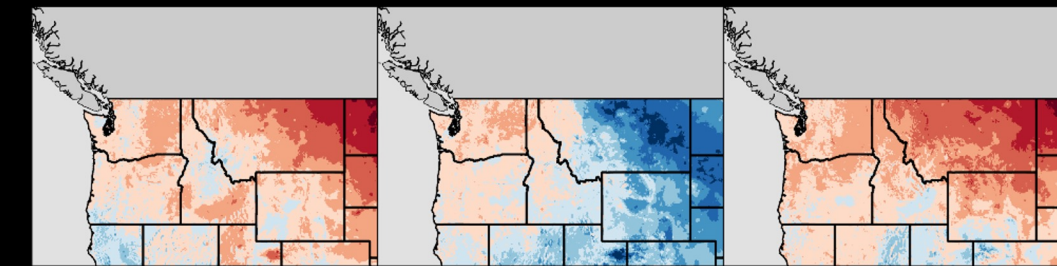


# EL NIÑO EVENTS (DJF): TEMPERATURE

## STRONG

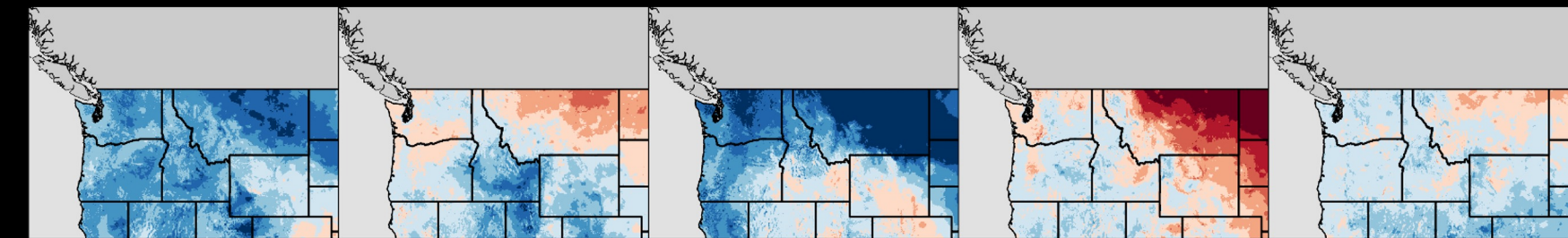


1957-1958 1965-1966 1972-1973 1982-1983 1991-1992

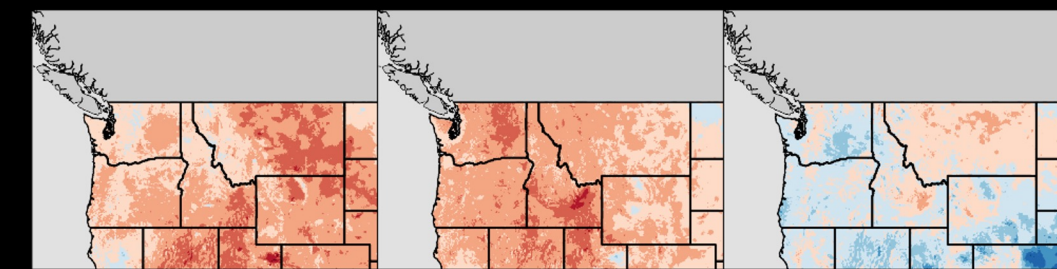


1997-1998 2009-2010 2015-2016

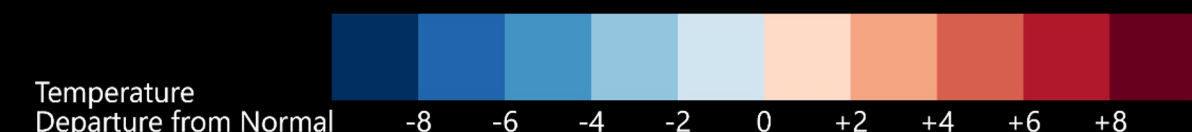
## MODERATE



1951-1952 1963-1964 1968-1969 1986-1987 1987-1988



1994-1995 2002-2003 2006-2007

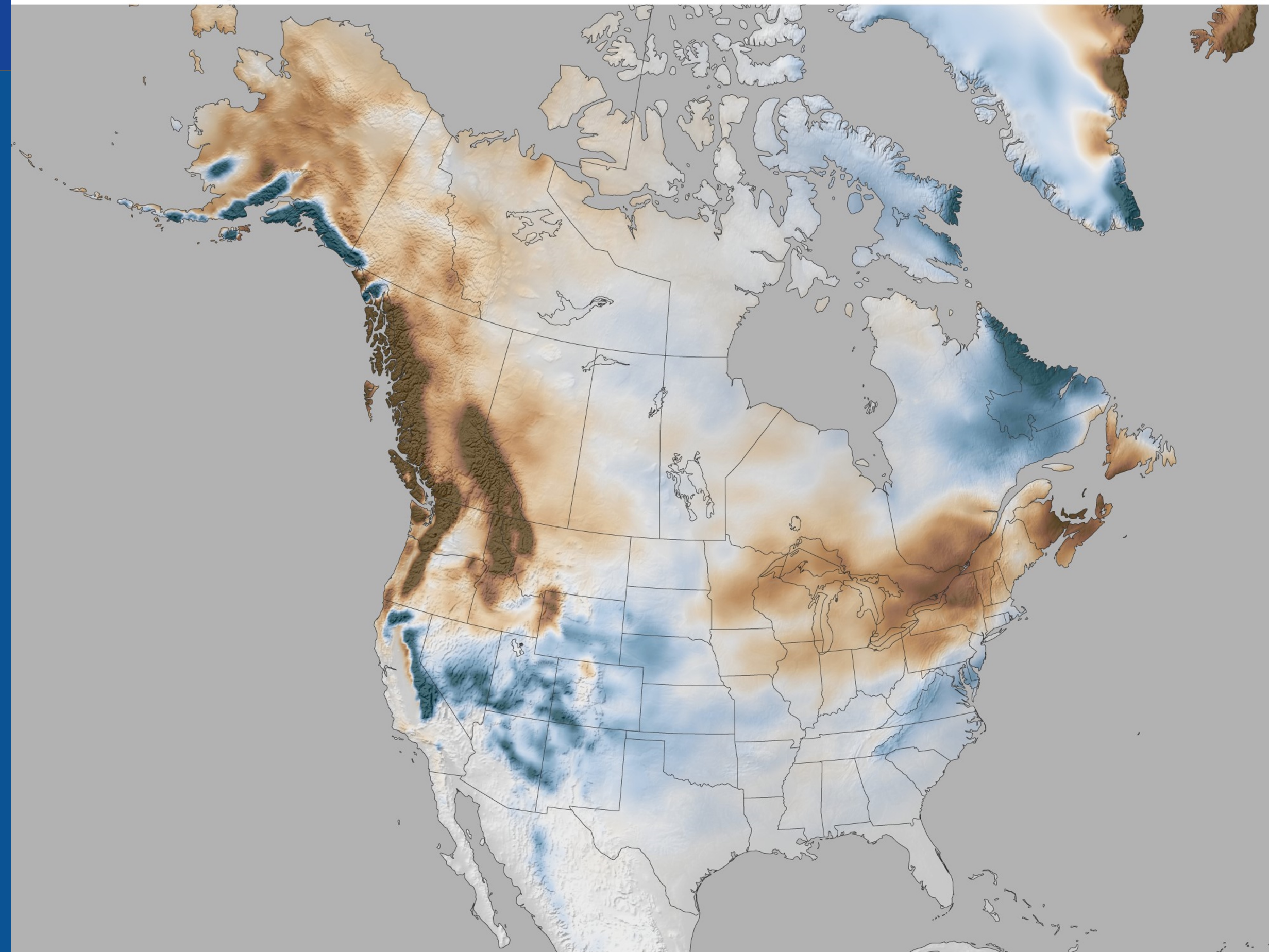






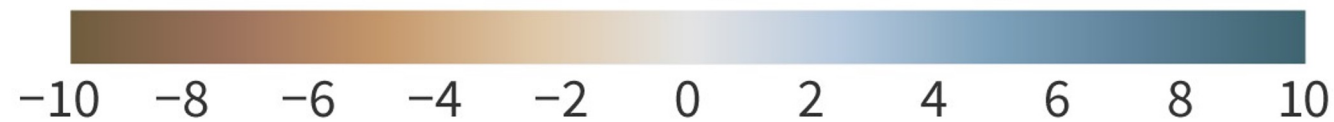
# Snowfall during all El Niño winters (Jan–Mar)

Weather Forecast Office  
Portland, OR



El Niño winters (1959–2023)  
vs. 1991–2020 average  
(detrended)

**difference from average snowfall (inches)**

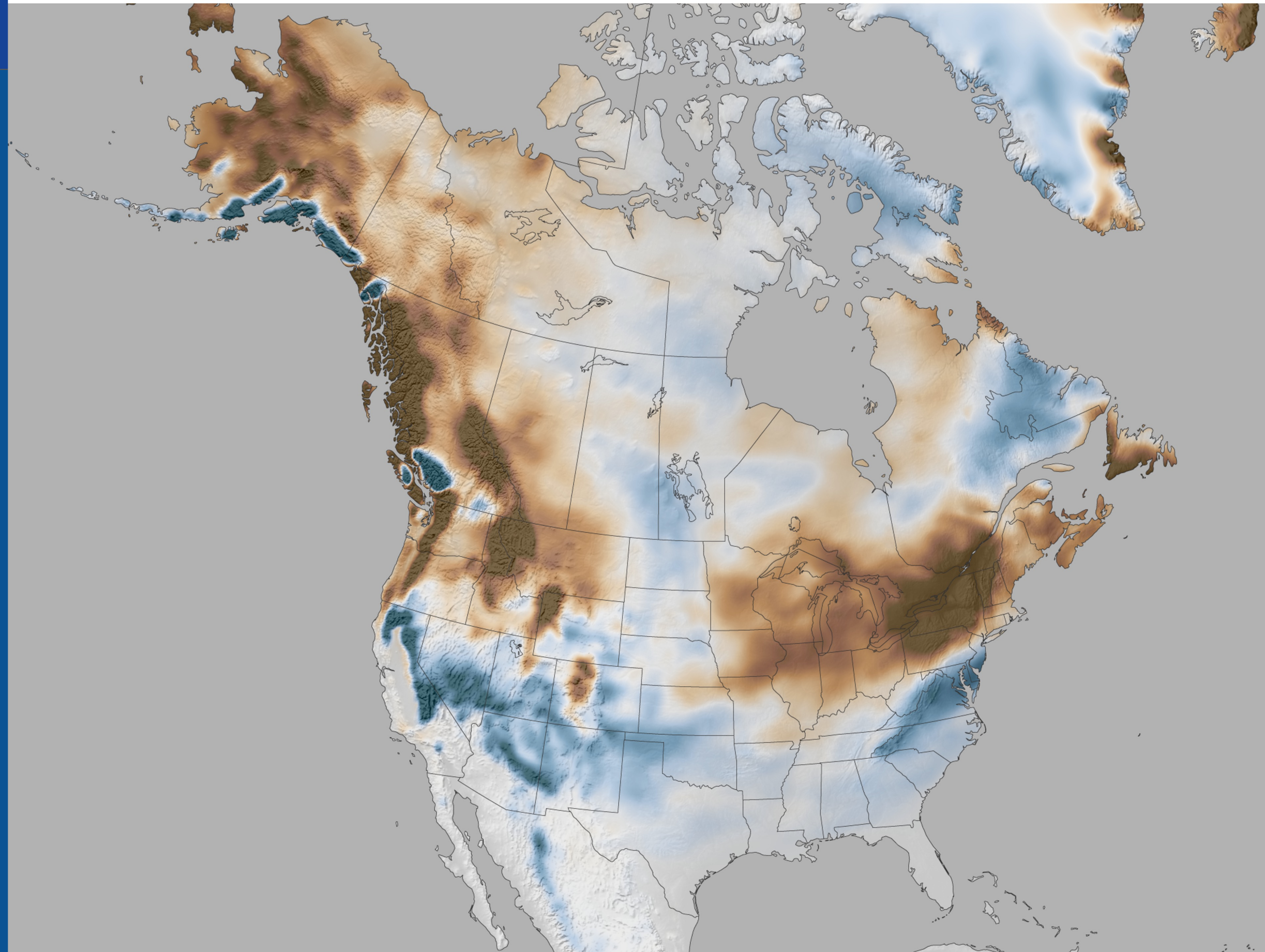


NOAA Climate.gov  
Data: ERA5



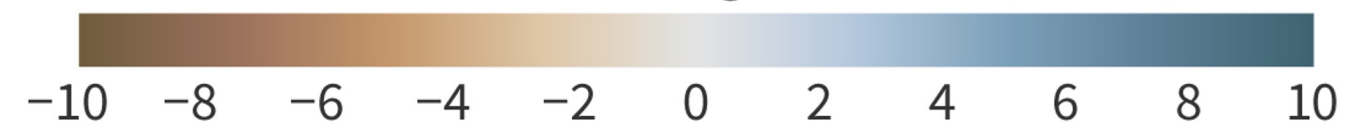
# Snowfall during moderate-to-strong El Niño winters (Jan-Mar)

Weather Forecast Office  
Portland, OR



1959–2023 (detrended)  
vs. 1991–2020 average

**difference from average snowfall (inches)**

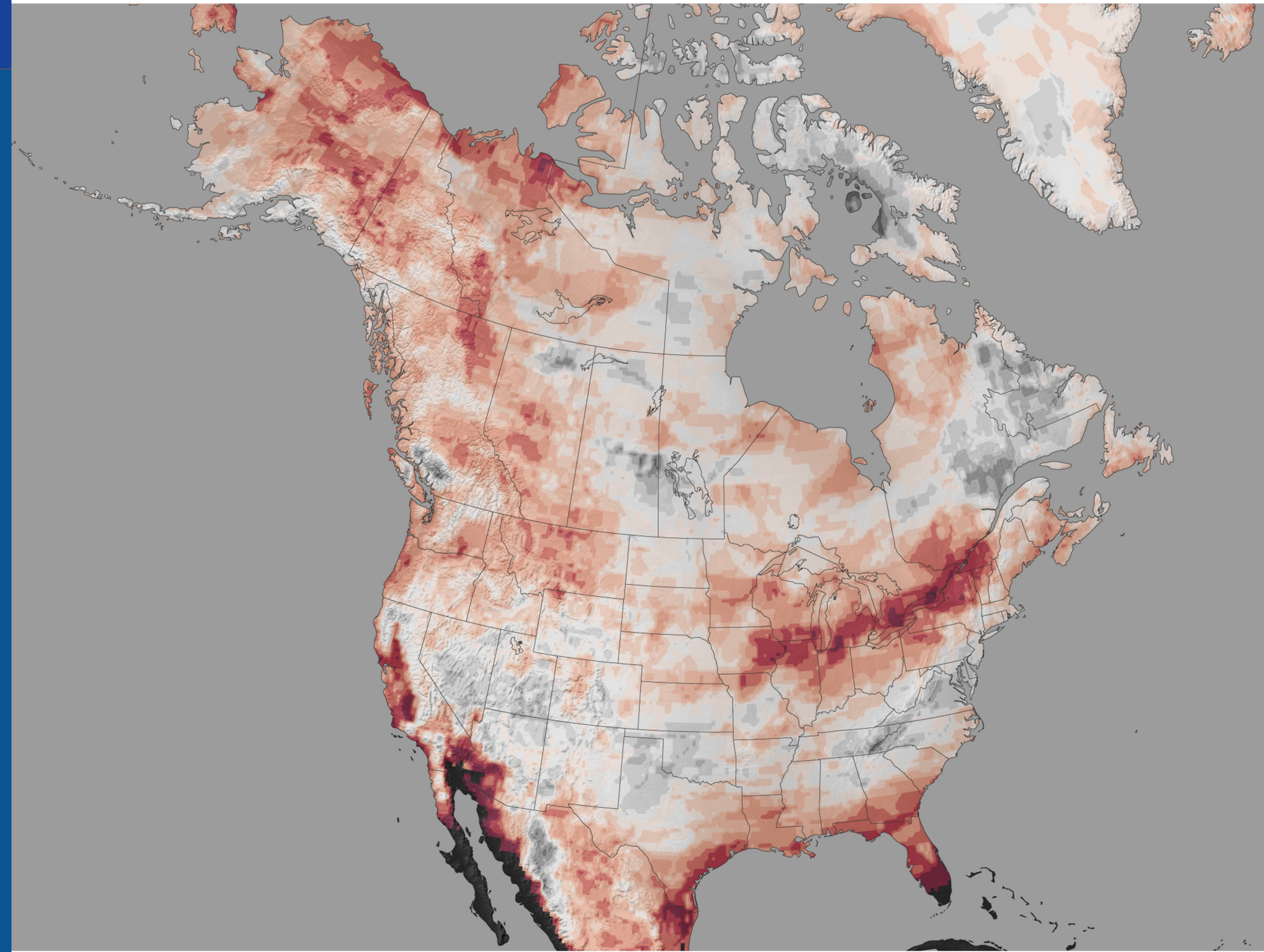


NOAA Climate.gov  
Data: ERA5



# How many moderate-to-strong El Niño winters (Jan-Mar) had below-average snowfall?

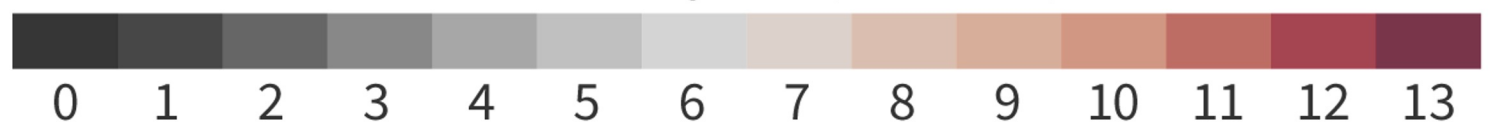
Weather Forecast Office  
Portland, OR



1959-2023

number of years (out of 13)

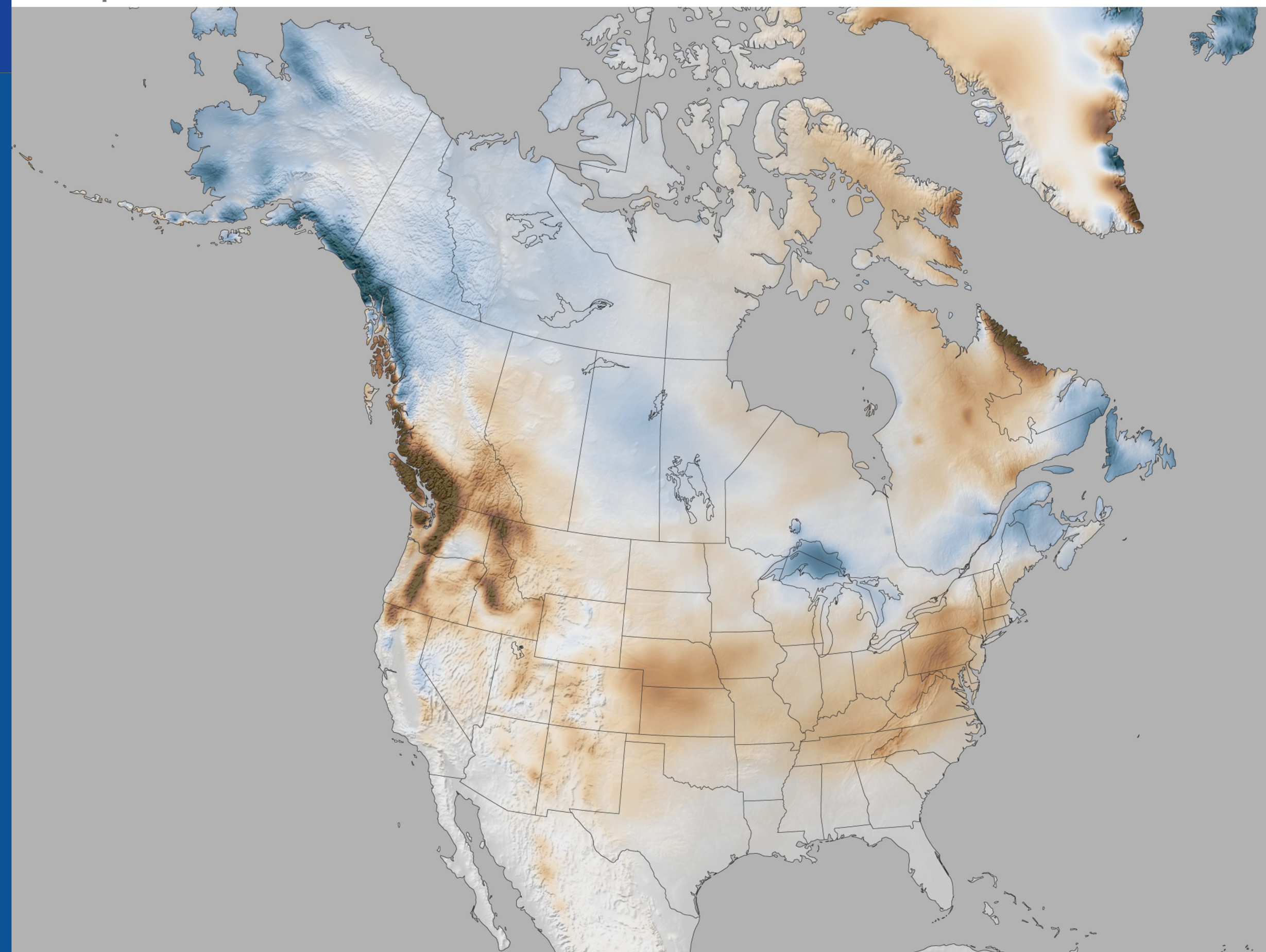
NOAA Climate.gov  
Data: ERA5





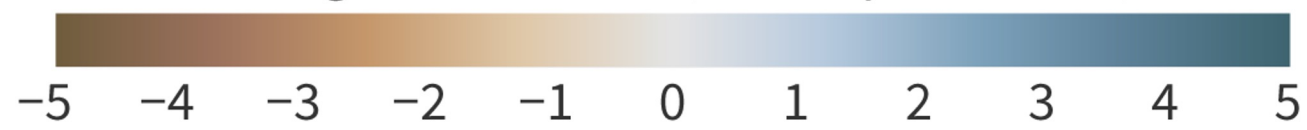
# Widespread decline in U.S. winter (Jan-Mar) snowfall

Weather Forecast Office  
Portland, OR



1959-2023

changes in snowfall (inches per decade)

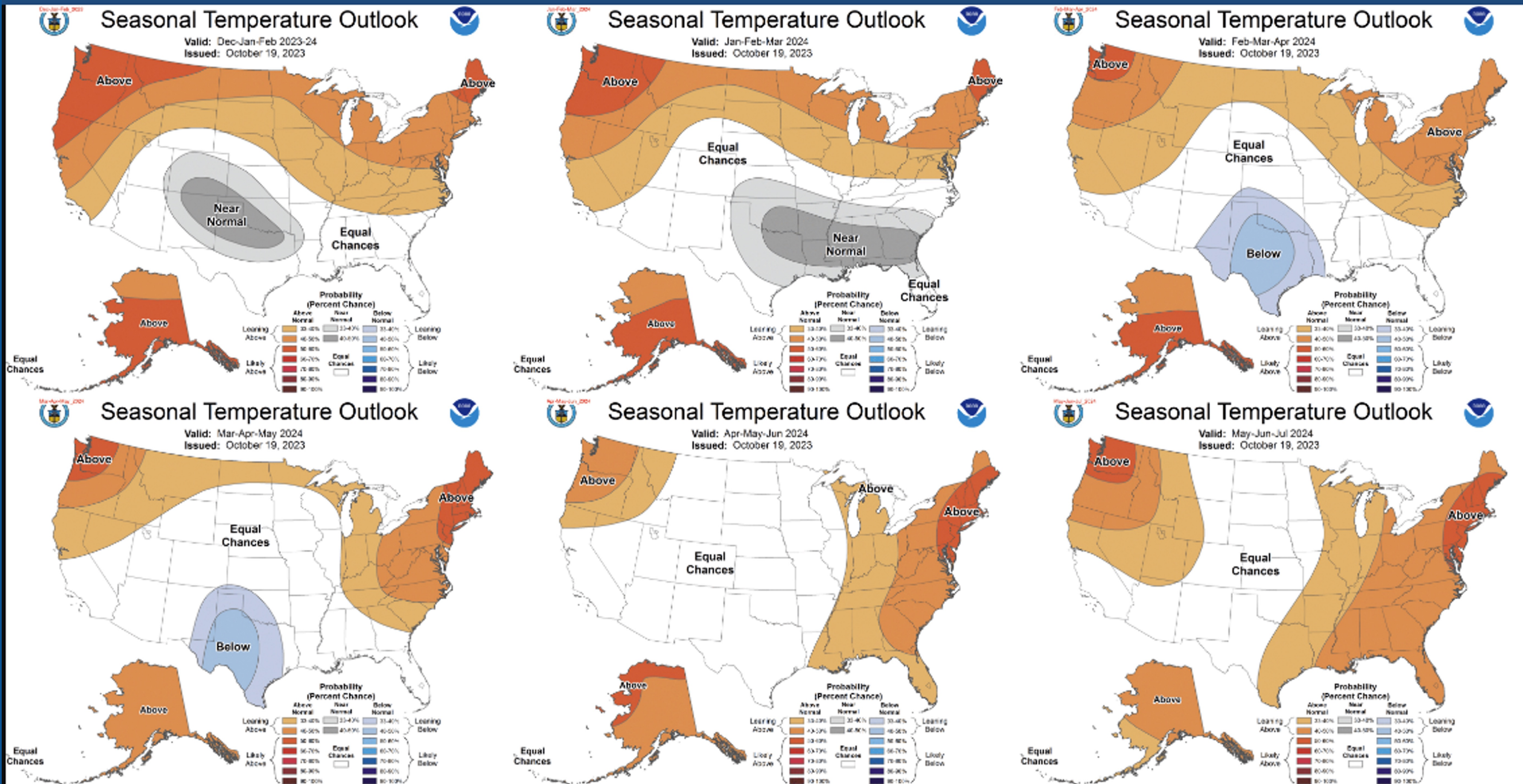


NOAA Climate.gov  
Data: ERA5



# CPC Outlooks - Temperature

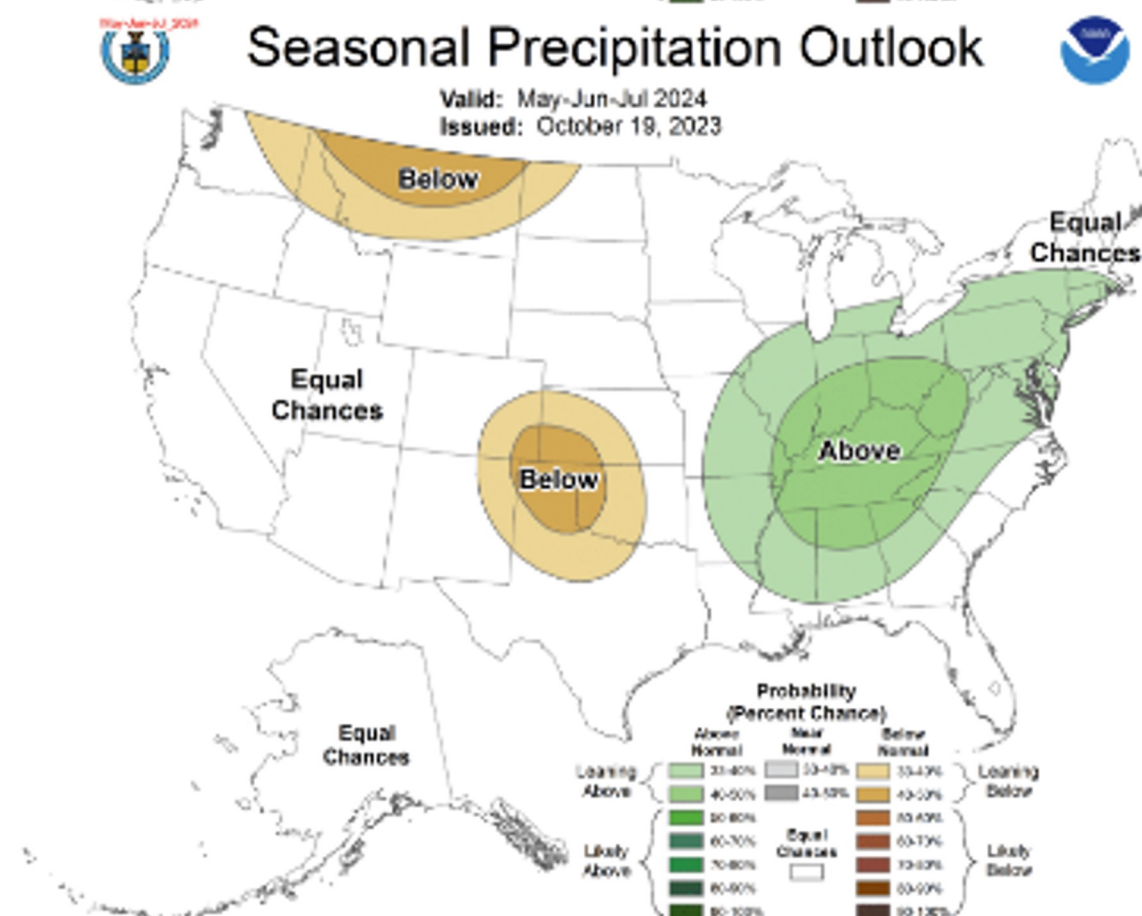
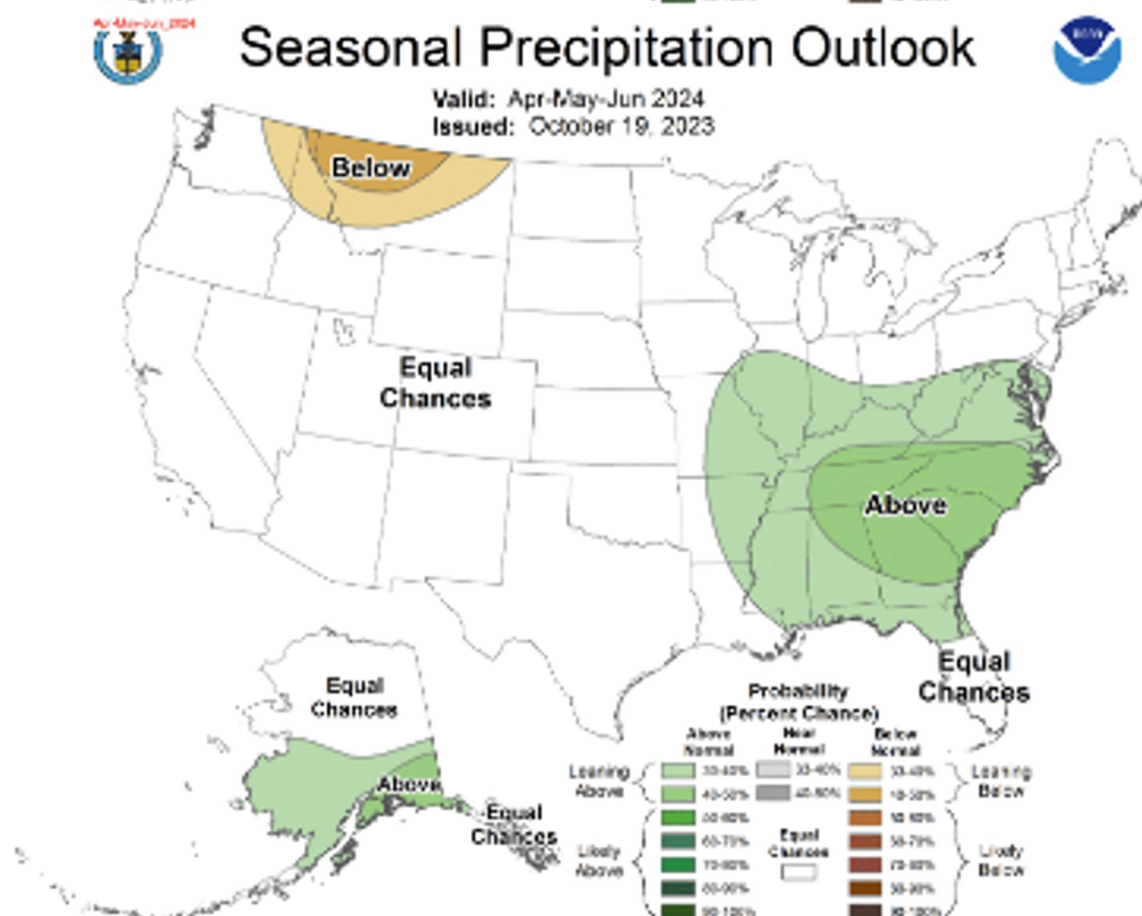
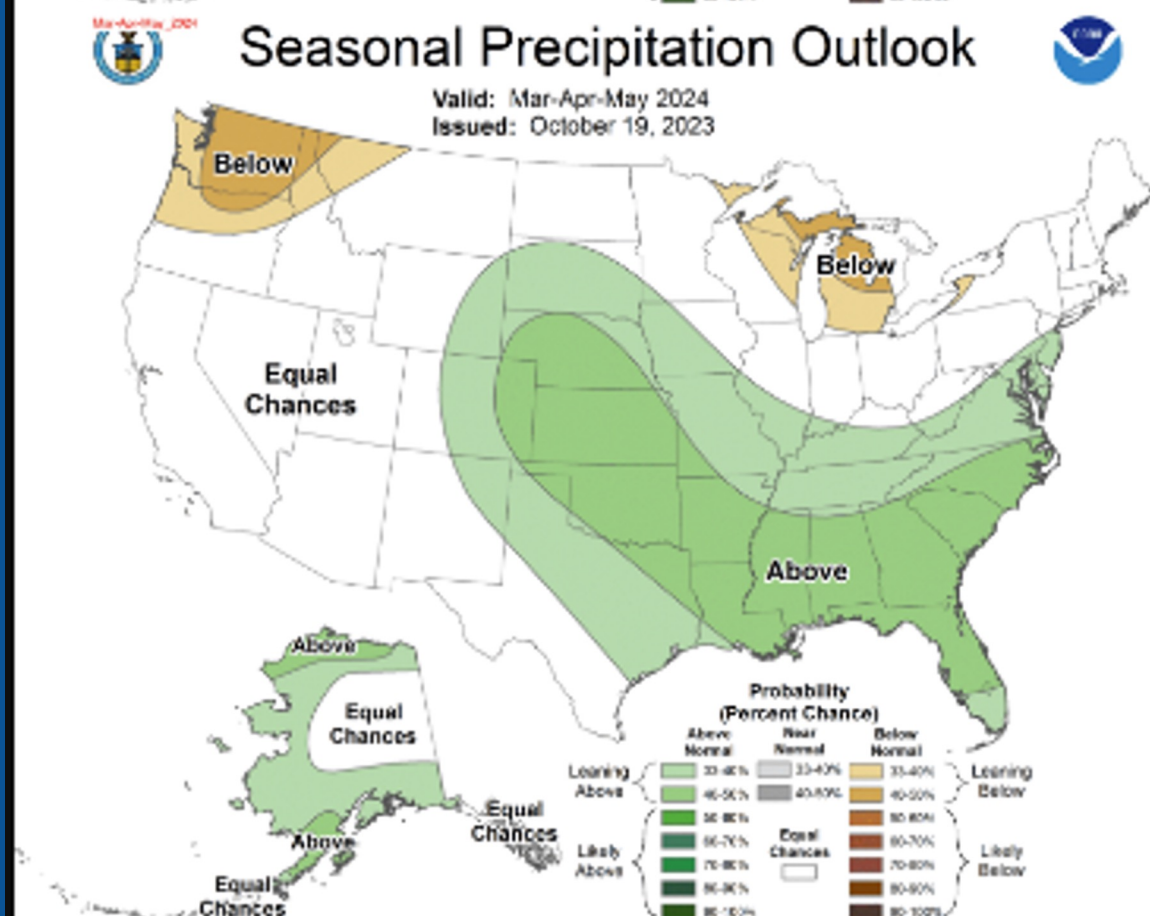
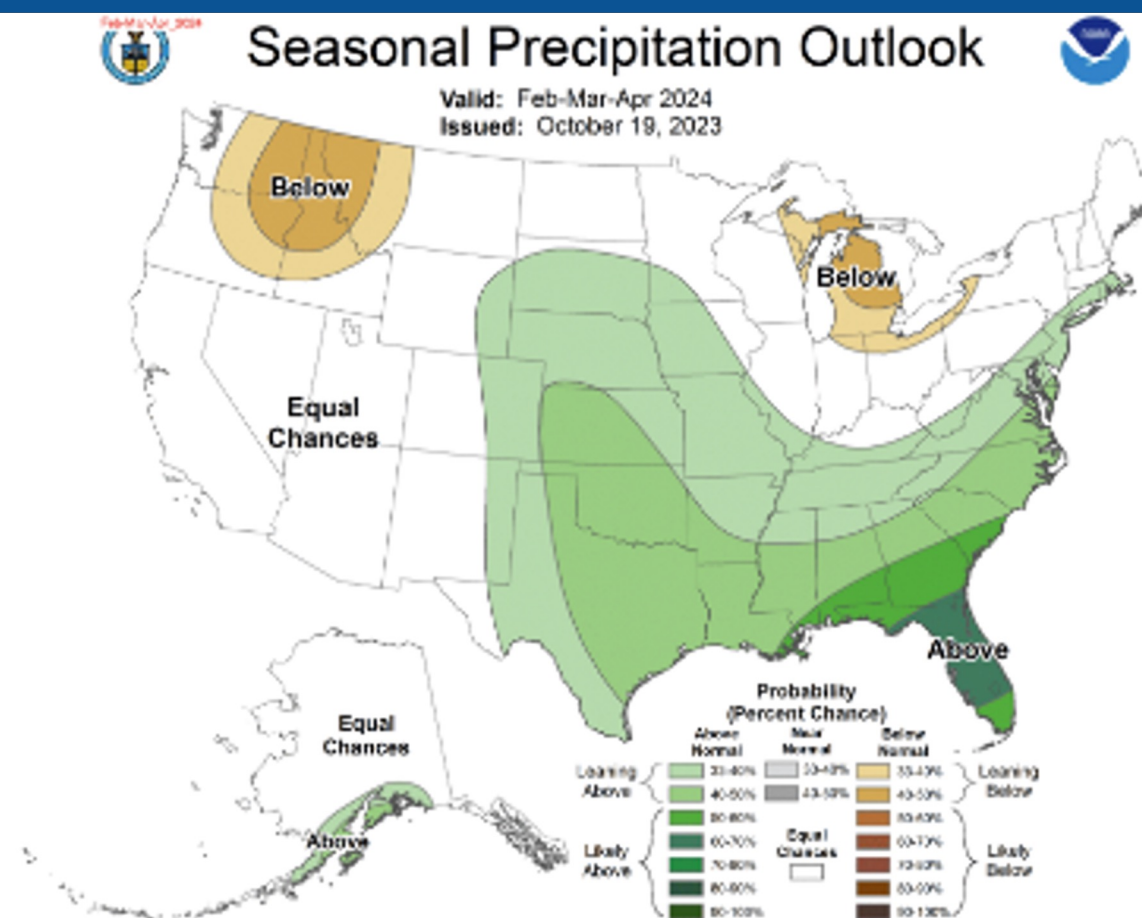
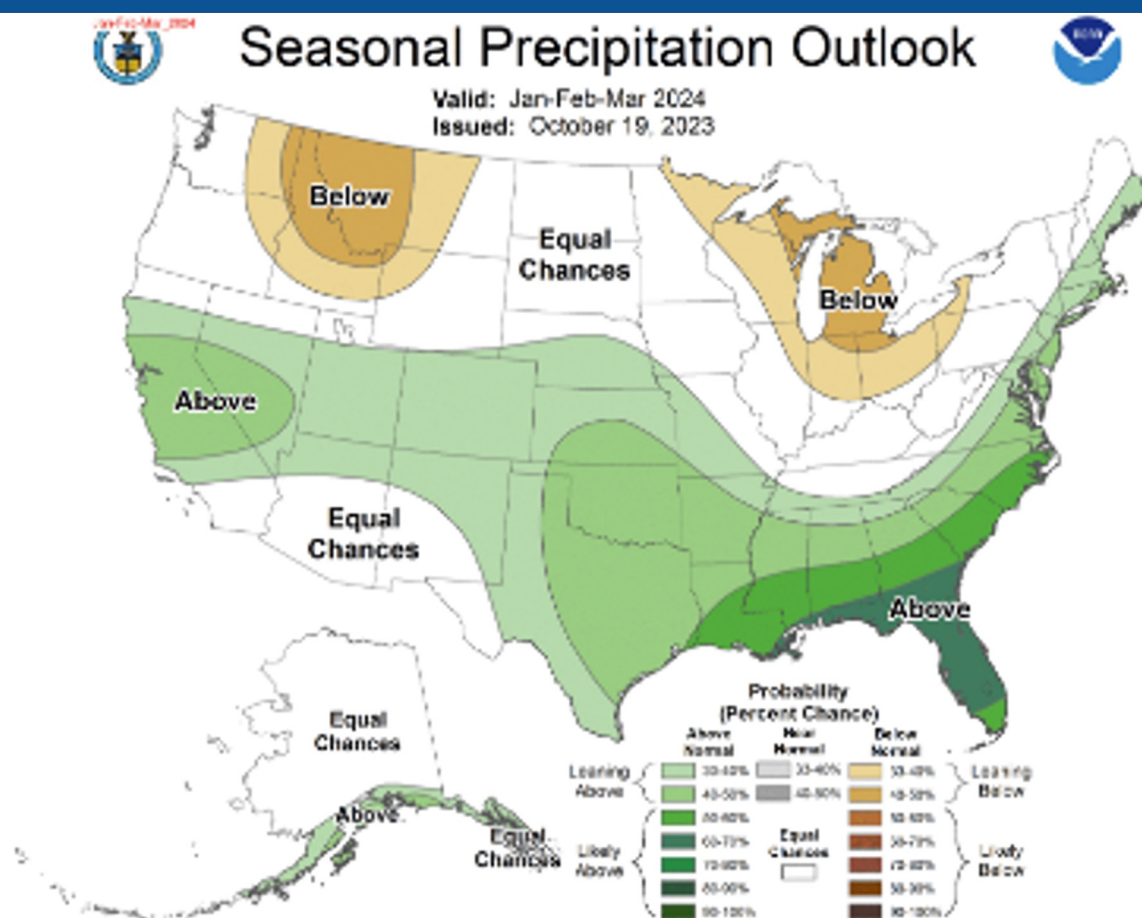
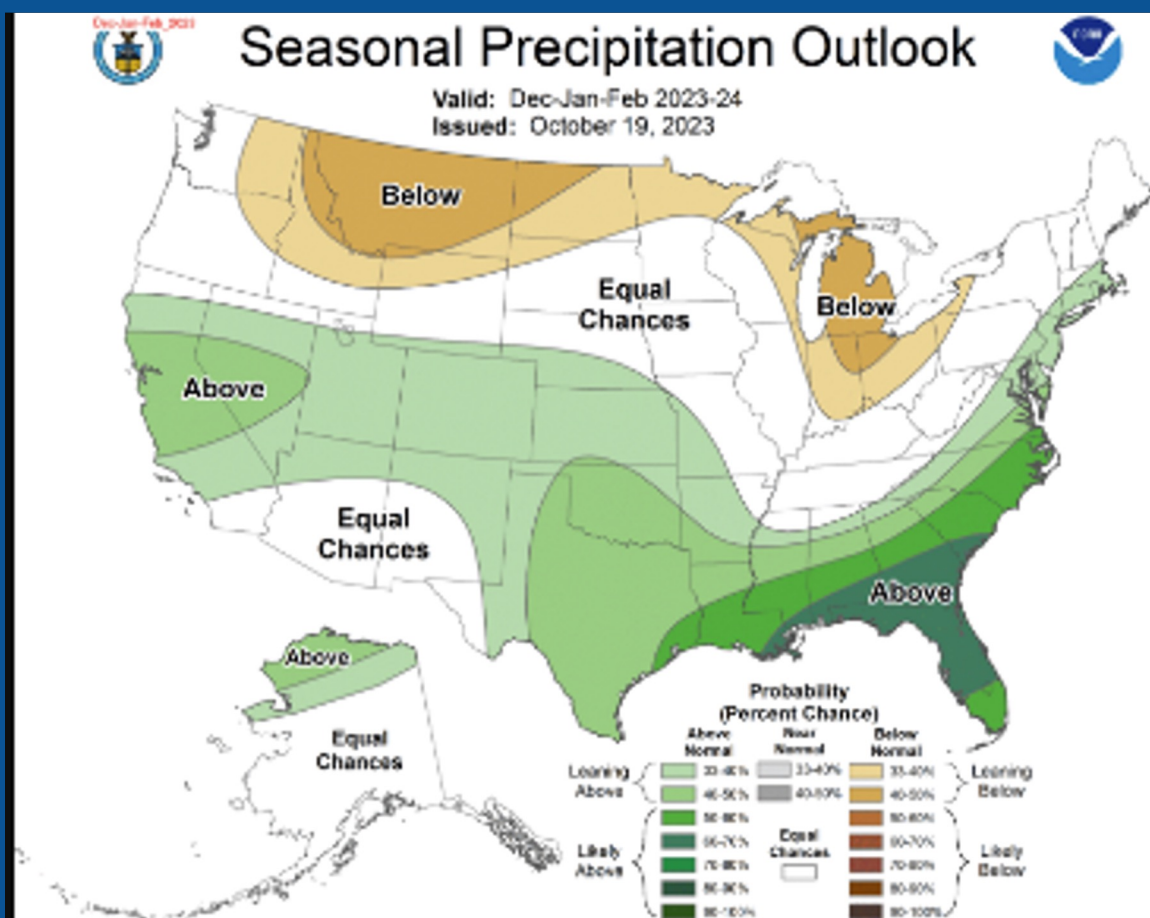
Weather Forecast Office  
Portland, OR





# CPC Outlooks - Precipitation

Weather Forecast Office  
Portland, OR



Climate predictions can have skill in predicting seasonal totals and averages. However, most impacts are associated with short-duration storm systems.

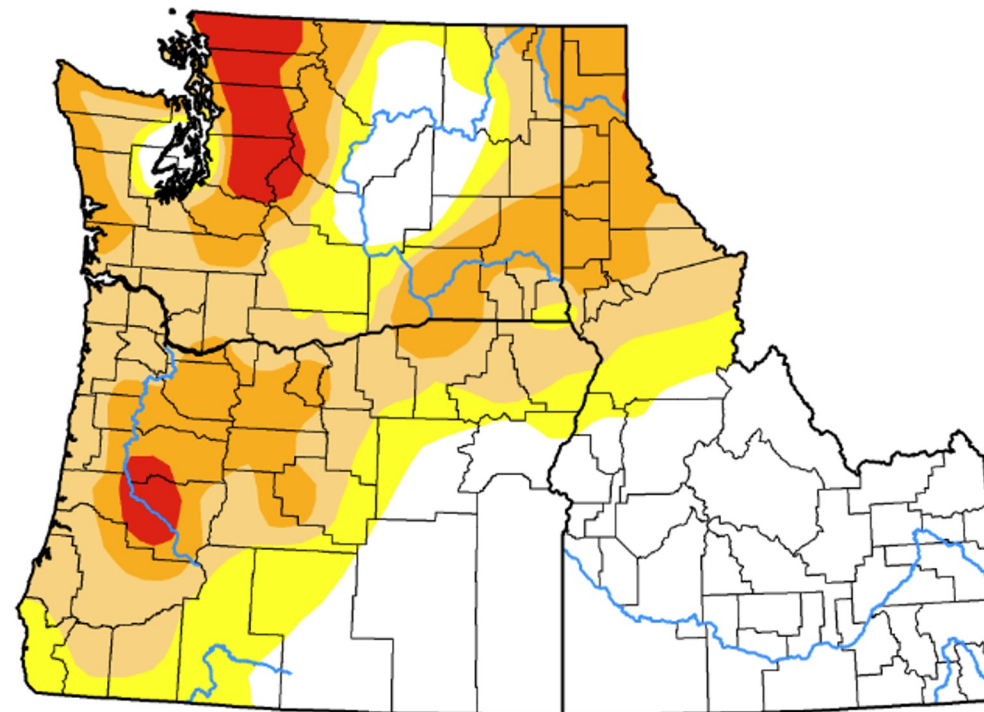
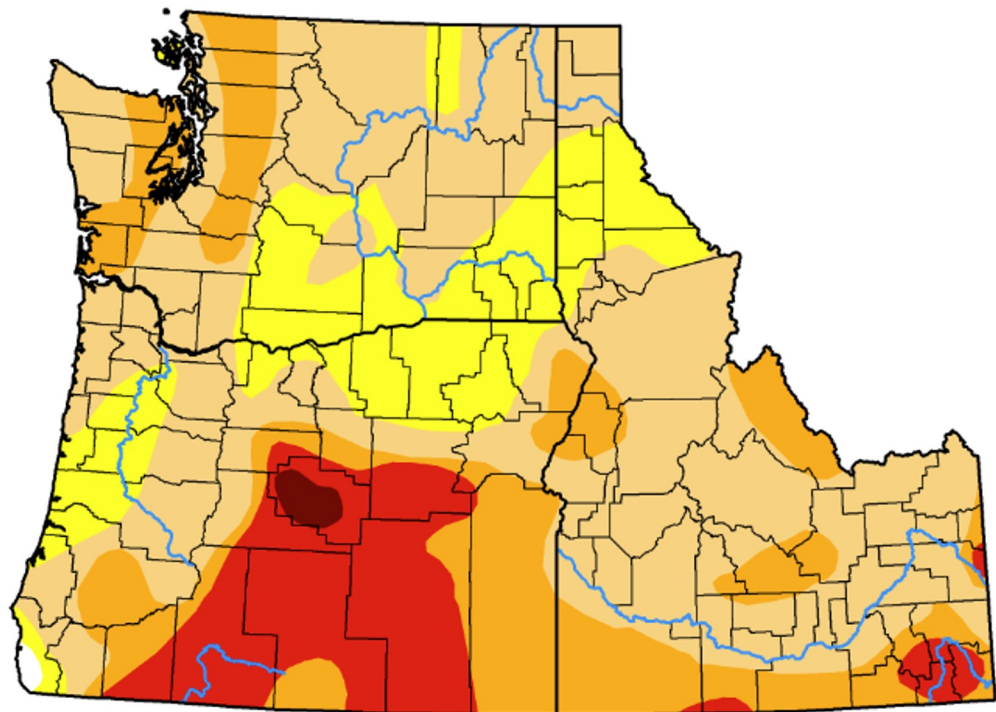


# Drought Monitor: PacNW

## Nov 1, 2022 vs Oct 31, 2023

### Drought Classification

- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)
- No Data



**D0 - Abnormally Dry**  
• Ski season is impacted



**D1 - Moderate Drought**  
• Some fields are left fallow  
• Water levels begin to decline; recreation and other uses are impacted



**D2 - Severe Drought**  
• Pastures are brown; hay yields are down, and prices are up; producers are selling cattle  
• Fire risk increases  
• Marshes are drying up, little water is available for waterfowl and wildlife; bears are moving into urban areas



**D3 - Extreme Drought**  
• Planting is delayed  
• Wildfire activity is high  
• Reservoirs and lakes are very low compared to normal; irrigation water is scarce

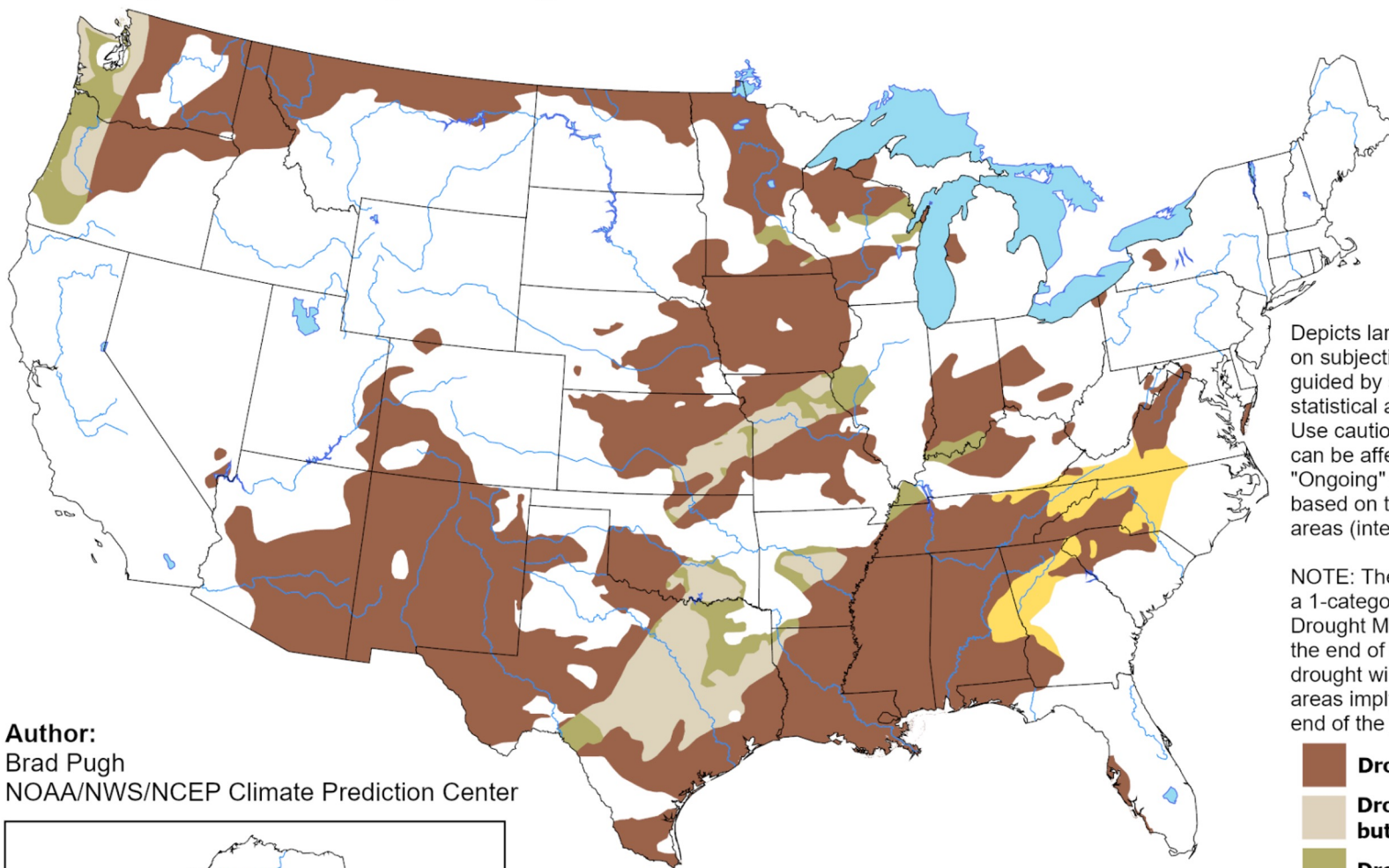


**D4 - Exceptional Drought**  
• Power generation is reduced



## U.S. Monthly Drought Outlook Drought Tendency During the Valid Period

Valid for November 2023  
Released October 31, 2023

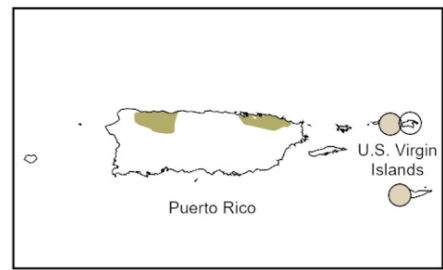
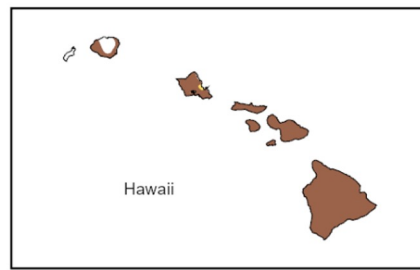


Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

- Drought persists
- Drought remains, but improves
- Drought removal likely
- Drought development likely
- No drought

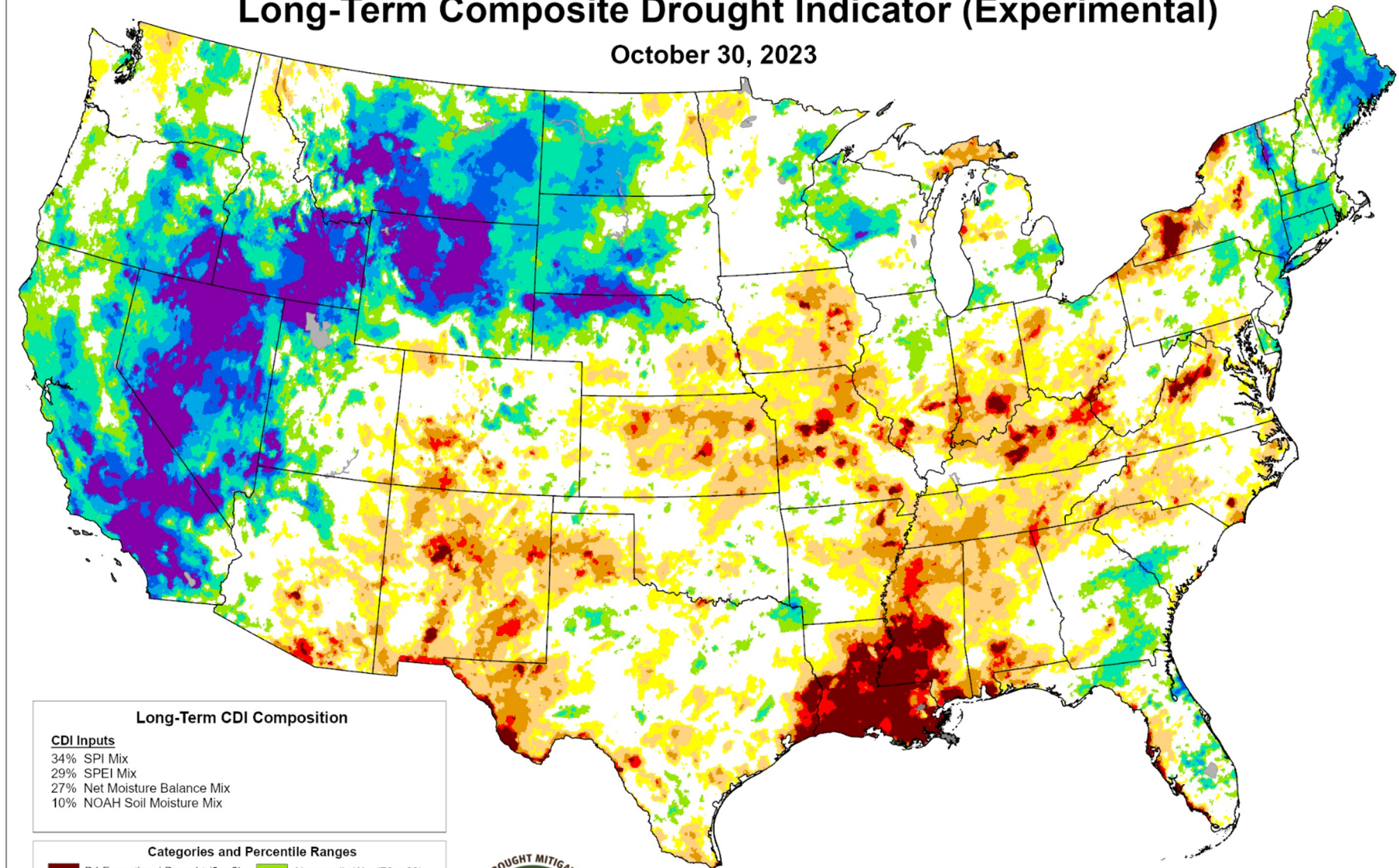
Author:  
Brad Pugh  
NOAA/NWS/NCEP Climate Prediction Center



<https://go.usa.gov/3eZGd>

## Long-Term Composite Drought Indicator (Experimental)

October 30, 2023



### Long-Term CDI Composition

CDI Inputs  
34% SPI Mix  
29% SPEI Mix  
27% Net Moisture Balance Mix  
10% NOAA Soil Moisture Mix

### Categories and Percentile Ranges

- |   |   |
|---|---|
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #8B0000; border: 1px solid black; margin-right: 5px;"></span> D4 Exceptional Drought (0 < 2) | <span style="display: inline-block; width: 15px; height: 15px; background-color: #90EE90; border: 1px solid black; margin-right: 5px;"></span> Abnormally Wet (70 < 80)     |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #FF4500; border: 1px solid black; margin-right: 5px;"></span> D3 Extreme Drought (2 < 5)     | <span style="display: inline-block; width: 15px; height: 15px; background-color: #3CB371; border: 1px solid black; margin-right: 5px;"></span> Moderately Wet (80 < 90)     |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #FF8C00; border: 1px solid black; margin-right: 5px;"></span> D2 Severe Drought (5 < 10)     | <span style="display: inline-block; width: 15px; height: 15px; background-color: #1E90FF; border: 1px solid black; margin-right: 5px;"></span> Severely Wet (90 < 95)       |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #FFD700; border: 1px solid black; margin-right: 5px;"></span> D1 Moderate Drought (10 < 20)  | <span style="display: inline-block; width: 15px; height: 15px; background-color: #4169E1; border: 1px solid black; margin-right: 5px;"></span> Extremely Wet (95 < 98)      |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #FFFF00; border: 1px solid black; margin-right: 5px;"></span> D0 Abnormally Dry (20 < 30)    | <span style="display: inline-block; width: 15px; height: 15px; background-color: #800080; border: 1px solid black; margin-right: 5px;"></span> Exceptionally Wet (98 - 100) |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: white; border: 1px solid black; margin-right: 5px;"></span> Near Normal (30 < 70)            | <span style="display: inline-block; width: 15px; height: 15px; background-color: #808080; border: 1px solid black; margin-right: 5px;"></span> No Data                      |

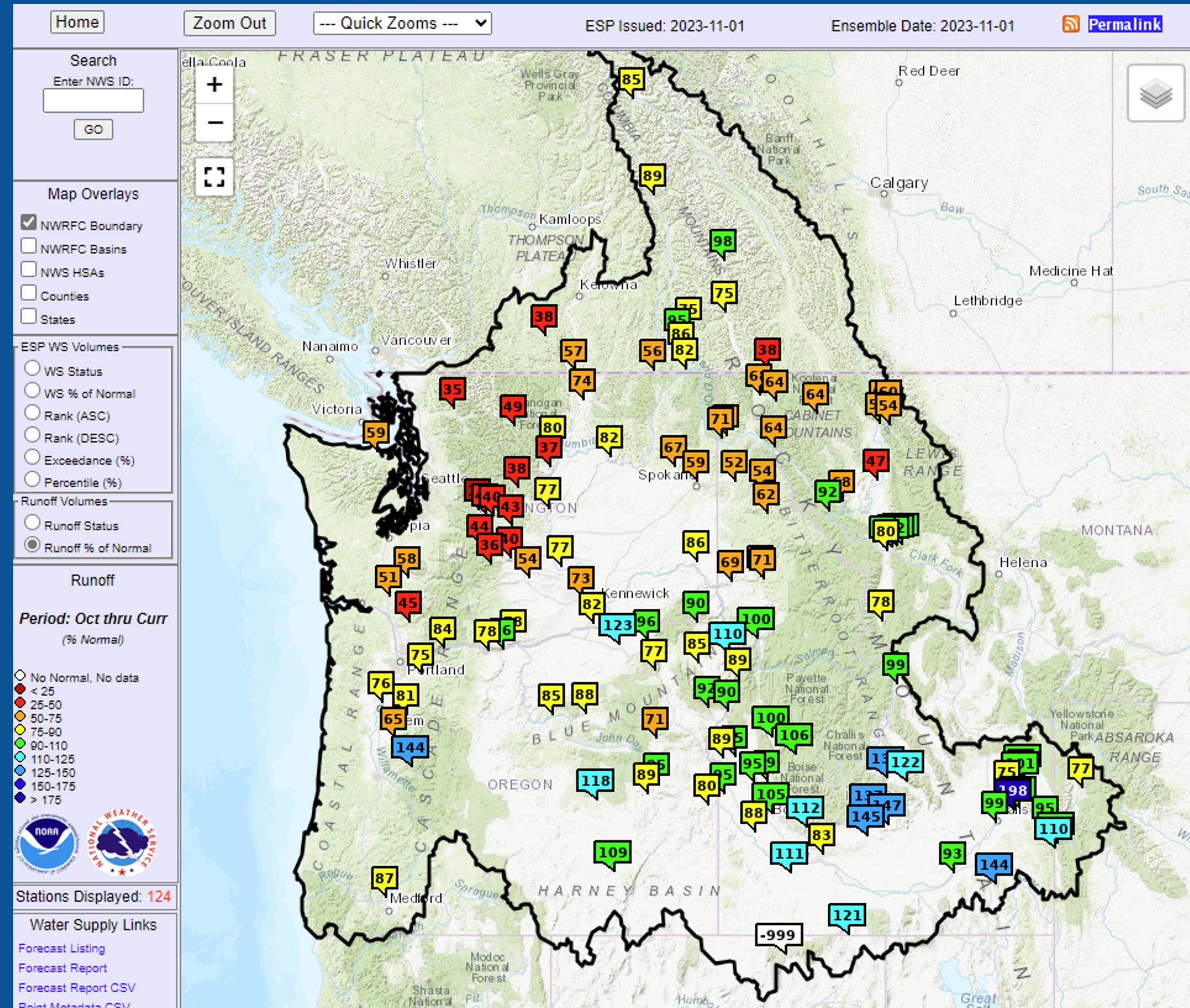


© 2023, National Drought Mitigation Center, University of Nebraska



# Runoff Volume: Nov 1, 2023

Weather Forecast Office  
Portland, OR





# Water Year Runoff vs. ENSO: **Columbia River - The Dalles**

Weather Forecast Office  
Portland, OR

## Oct-Dec

## Oceanic Niño Index

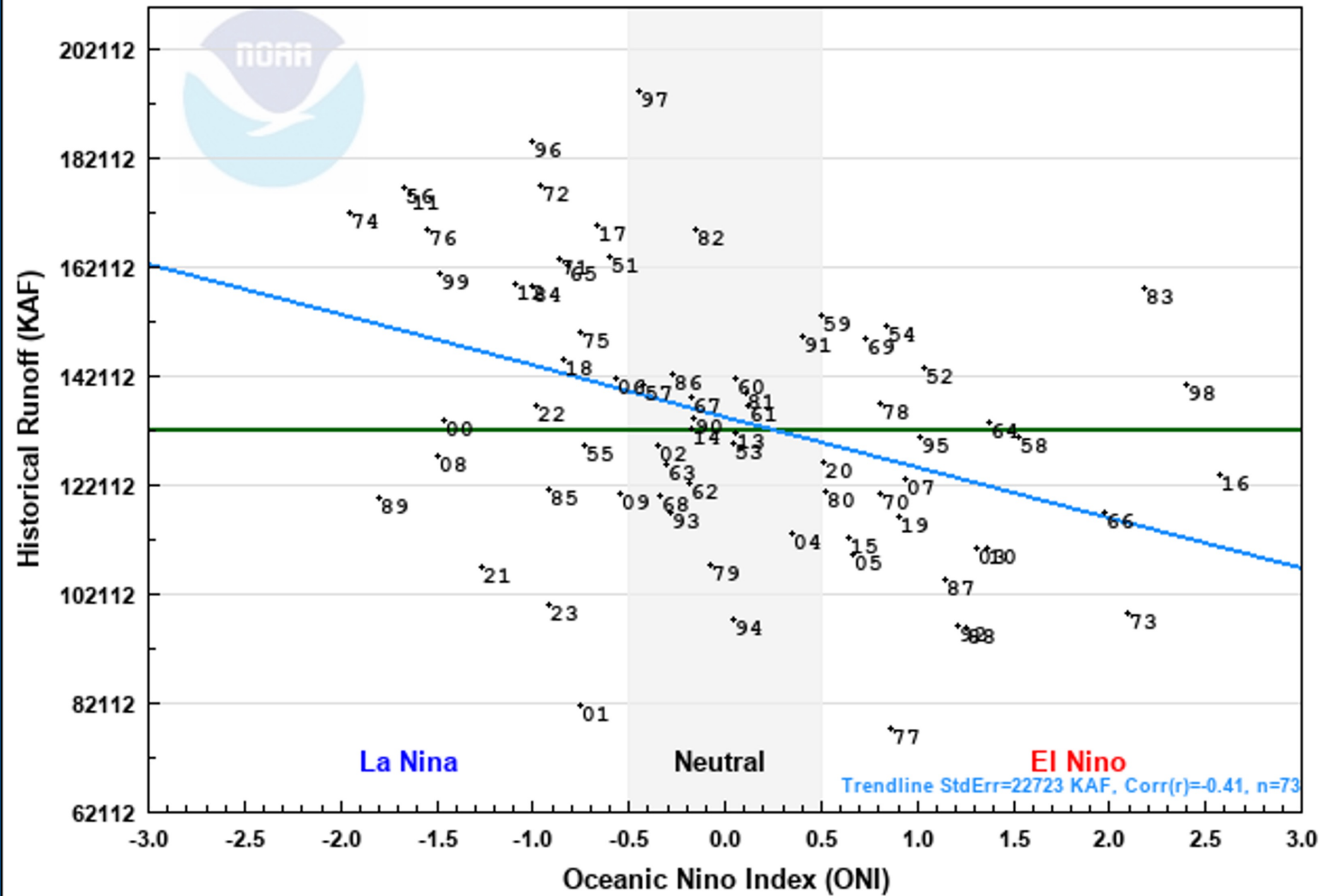
vs.

## Historic

## Water Year Runoff Volume in Thousands of Acre-feet

[www.nwrfc.noaa.gov](http://www.nwrfc.noaa.gov)

### OCT-DEC Oceanic Nino Index vs OCT-SEP Historical Water Supply Runoff (TDAO3) COLUMBIA - THE DALLES DAM (1951-2023)



◆ Runoff for Given Water Year    - ONI vs Runoff Trendline    - 30 Year Normal (1991-2020)

Latest Available ONI Index for OND:11/01/2022

Created: 11/02/2023 07:35 PDT

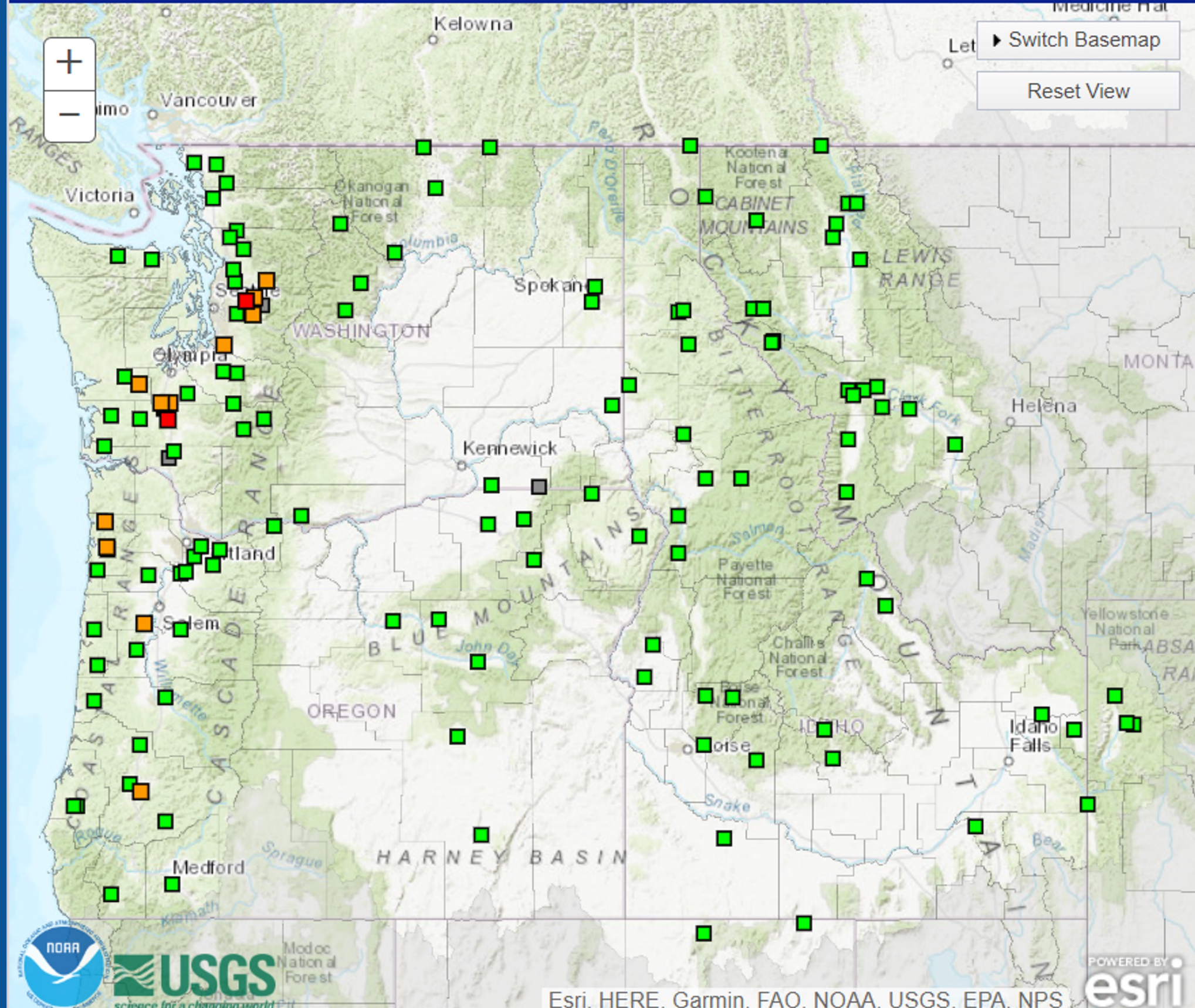




# Probabilistic River Forecasts: Nov-Dec-Jan

Auto Refresh: OFF Print this map Permalink BOOKMARK

Greater than:  chance of exceeding river flood levels during



[Return to national map.](#)

Click on the map or select one of the data views below:

- United States
- NWS Weather Forecast Offices
- Northwest River Forecast Center
- Water Resources Regions

**137 total gauges**  
 Show locations with 50% or greater chance of flooding during Nov-Dec-Jan (13)

- 0 Gauges: > 50% Major Long-Range Flood Risk
- 2 Gauges: > 50% Moderate Long-Range Flood Risk
- 11 Gauges: > 50% Minor Long-Range Flood Risk
- 121 Gauges: < 50% Long-Range Flood Risk
- 3 Gauges: No forecast within selected timeframe

[Show all locations](#)

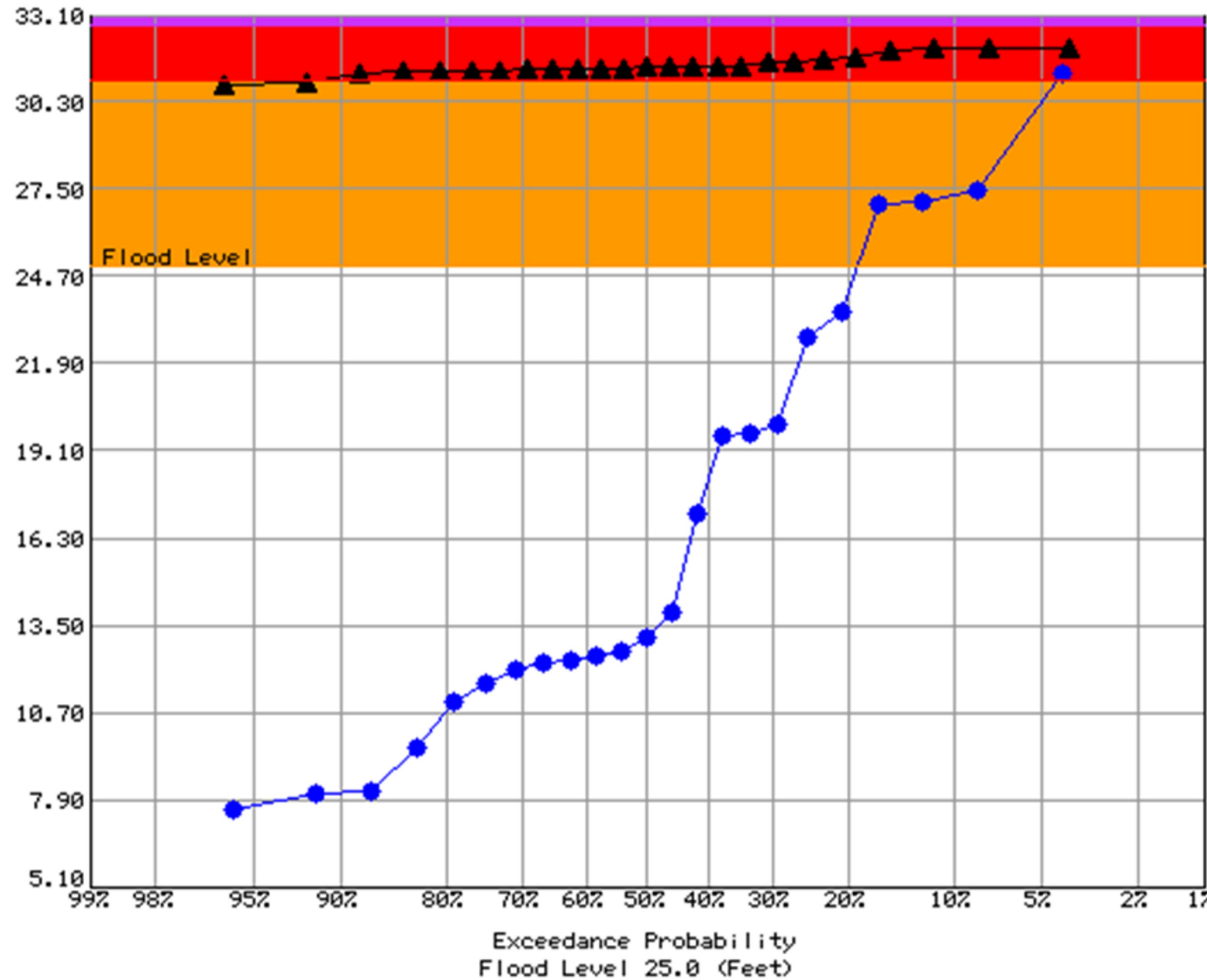
Last map update:  
 11/02/2023 at 10:37:45 am EDT  
 11/02/2023 at 14:37:45 UTC

- [What is UTC time?](#)
- [Map Help](#)
- [Product Description](#)
- [Feedback](#)
- [Disclaimer](#)
-



# Probabilistic River Forecasts

Chances of Exceeding River Levels on the MILK R -388 at GLASGOW MT \$  
 Latitude: 48.2 Longitude: 106.6  
 Forecast for the period 3/28/2011 - 6/26/2011  
 This is a conditional simulation based on the current conditions as of 3/23/2011

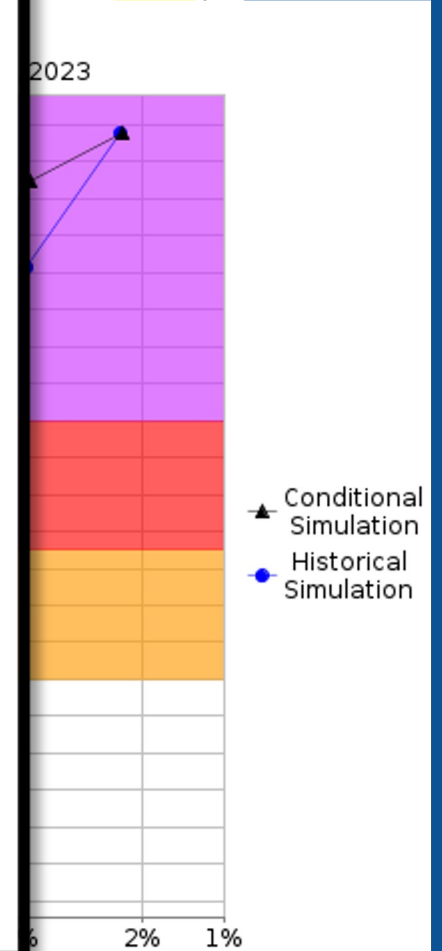


Major Flooding  
Above 32.8 Feet.  
 Moderate Flooding  
31.0-32.8 Feet.  
 Minor Flooding  
25.0-31.0 Feet.

▲ CS  
 ● HS



Chances of Exceeding River Levels on the MILK R -388 at GLASGOW MT \$  
 Latitude: 48.2 Longitude: 106.6  
 Forecast for the period 3/28/2011 - 6/26/2011  
 This is a conditional simulation based on the current conditions as of 3/23/2011



Hydrograph River at

Auto Refresh: OFF

WLS

22Z 22Z 22Z 22Z 22Z 22Z  
 Oct 5 Oct 6 Oct 7 Oct 8 Oct 9 Oct 10

Latest observed value: 4.69  
 12-Oct-2023. Flood Stage is

Action: 10.5

Stage (ft)

Maximum Stage (FT)

3pm 3pm 3pm 3pm 3pm 3pm  
 Thu Fri Sat Sun Mon Tue  
 Oct 5 Oct 6 Oct 7 Oct 8 Oct 9 Oct 10

Graph Created (3:19PM O)

TLMO3(plotting HGIRG) "Gage 0" Data

water.weather.gov

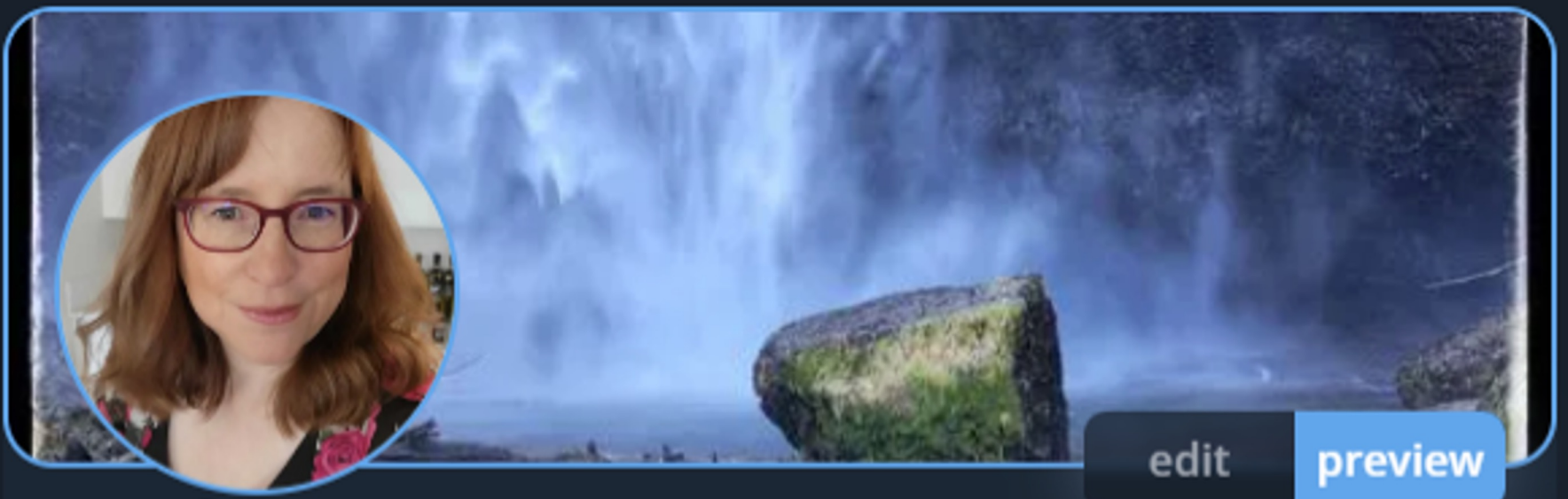
Exceedance Probability



# Do you have your winter survival kit ready?

Weather Forecast Office  
Portland, OR  
Friday, October 13







# Tanja Fransen

Meteorologist in Charge

DOC/NOAA National Weather Service  
Portland, OR  
University of Northern Colorado

- Business
- Meteorology
- Disasters
- Emergency Management

Save Contact 

 **Email**  
tanja.fransen@noaa.gov 