NWS Winter Seasonal Outlook
2022-2023
Presenter: Treena Jensen, NWS Portland Warning Coordination Meteorologist
Key Points

- Quick Review of ENSO (El Niño Southern Oscillation) & Current Status
- La Niña Weather Implications - historically
- Third consecutive winter of La Niña
- NWS Climate Prediction Center (CPC) outlooks
  1) 8-14 day (high chance for wetter than normal)
  2) 1 Month, November (WA wetter than normal, otherwise Equal Chance)
  3) 3 Month, Winter (slight favor for wetter and cooler than normal)
  4) 3 Month, Spring (slight favor for wetter and cooler than normal)
  5) 3 Month, Summer (Favors warmer than normal)
El Niño-Southern Oscillation (ENSO)

What is ENSO?
El Niño and the Southern Oscillation, commonly referred to as ENSO, is a periodic fluctuation in sea surface temperature (SST) and the overlying atmosphere across the equatorial Pacific Ocean.

- **ENSO has three possible stages:**
  - ENSO-neutral (near-normal water temps across the equatorial Pacific)
  - La Niña (relatively cool water across the equatorial Pacific - *above right*)
  - El Niño (relatively warm water across the equatorial Pacific - *above left*)
ENSO Status: La Niña Advisory

- Equatorial sea surface temperatures (SSTs) are below average across most of the Pacific Ocean.
- There is a 75% chance La Niña will continue this winter.
- A 54% chance of transitioning to ENSO -Neutral Spring (FMA) 2023
- Favors wetter and cooler than normal conditions for the PNW this winter.
**La Niña Categories:**
3 consecutive overlapping 3-mo periods with SST anomalies of the following categories:

**WEAK:** -0.5 to -0.9 °C  
**MODERATE:** -1 to -1.4 °C  
**STRONG:** -1.5 to -1.9 °C  
**VERY STRONG:** ≥ -2 °C

Best chance are for a **WEAK** La Niña for 2022/23 Winter (DJF).

However, a moderate La Nina is possible, especially in December, as La Niña is expected to weaken in Jan and Feb

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Forecast from Oct 13.
Winter (DJF) Precipitation History: Weak La Niñas

Weak La Niña: 5 consecutive overlapping 3-month periods with SST anomalies between -0.5 to -0.9 °C.
Winter (DJF) Temperature History: Weak La Niñas

Weak La Nina: 5 consecutive overlapping 3-month periods with SST anomalies between -0.5 to -0.9 °C.
Average Snowfall for weak La Nina Years (Oct - Apr)

1950 - 2009 (missing two weak La Nina events).

Shows 4 to 12 inches more snow than average for the OR and WA Cascades.
Winter (DJF) Cascade Snow History: Government Camp

Government Camp Average Winter (DJF) Snowfall
For El Nino and La Nina years since 1950. 30-year average is 1991 - 2020

Government Camp Average DJF Snowfall:
La Nina: 172 inches
El Nino: 133 inches
1991-2020: 134 inches

Departure from normal:
Weak: 37 inches
Moderate: 23 inches
Strong: 56 inches
Weather Forecast Office
Portland, OR
Wednesday, October 26

Water Year Runoff vs. ENSO: Skagit River at Mt. Vernon, WA

Nov-Jan
Oceanic Niño Index

vs.
Historic Water Year Runoff Volume in Thousands of Acre-feet

www.nwrfc.noaa.gov

The diagram shows the correlation between November-January (Nov-Jan) Oceanic Niño Index (ONI) and the historic natural runoff of the Skagit River near Mount Vernon from 1951 to 2022. The ONI index is plotted on the x-axis, and the historical runoff volume in thousands of acre-feet is plotted on the y-axis. The data points represent individual years, with markers indicating La Niña, Neutral, and El Niño conditions. The trendline and data points suggest a relationship between ENSO events and water runoff volumes.
Nov-Jan Oceanic Niño Index vs Historic Water Year Runoff Volume in Thousands of Acre-feet

www.nwrfc.noaa.gov
NOV-JAN Oceanic Niño Index vs OCT-SEP Historical Natural Runoff
(KIOW1) YAKIMA - AT KIONA (1951-2022)

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

La Nina
Neutral
El Nino

Trendline MSL=1007 KAF; Corr(%)=-0.14; n=72

Latest Available ONI Index for NDJ:12/01/2021
Created: 10/26/2022 08:17 PDT

NOV-JAN Oceanic Niño Index
vs.
Historic Water Year Runoff Volume in Thousands of Acre-feet

www.nwrfc.noaa.gov
Water Year Runoff vs. ENSO: Crooked R near Prineville, OR

Nov-Jan
Oceanic Niño Index

vs.

Historic Water Year Runoff Volume in Thousands of Acre-feet

www.nwrfc.noaa.gov
ENSO Status: ‘Triple Dip’ La Niña Advisory

Monthly Global Temperature Departures (°C) since 1950.
Blue shaded = La Nina Years, Red = El Nino Years.

Three* occurrences since 1950 - very small sample size

* SST anomalies > -0.5 °C in Oct 1956
Winter (DJF) Precipitation History: **Triple Dip La Niñas**

- **1954-55**: Dry
- **1955-56**: Very Wet
- **1956-57**: Near Normal
- **1973-74**: Very Wet
- **1974-75**: Wet
- **1975-76**: Very Wet
- **1998-99**: Very Wet
- **1999-2000**: Near Normal
- **2000-01**: Very Dry
Winter (DJF) Temperature History: *Triple Dip La Niñas*

- 1954-55: Cool, Weak
- 1955-56: Cool, Moderate
- 1956-57: Cool, Uncategorized
- 1973-74: Near Normal, Strong
- 1974-75: Near Normal, Weak
- 1975-76: Near Normal, Strong
- 1998-99: Near Normal, Strong
- 2000-01: Near Normal, Weak
Triple Dip La Niña: in Progress

2020-21 2021-22 2022-23

Winter (DJF) Precipitation

Winter (DJF) Temperature

Average Precipitation Anomaly (in.)

Average Temperature Anomaly (°F)

Near Normal

Near Normal

TBD
8-14 Day Outlook Favors

- Precipitation: Greater chances for above normal
- Temperatures:
  - North: Greater Chance for Near Normal
  - South: Greater Chance for Above Normal

‘Normal’ is a 30 year average from 1991 through 2020
CPC 8-14 Day: Risk of Hazardous Weather

Risk of Hazardous Temperatures
Valid: 11/01/2022-11/07/2022

Risk of Heavy Precipitation
Valid: 11/01/2022-11/07/2022

Risk of Heavy Snow
Valid: 11/01/2022-11/07/2022

Risk of High Winds
Valid: 11/01/2022-11/07/2022

8-14 Day Risk of Hazardous Temperatures
Slight Risk for Much Below Temperatures
Nov 2 - 5, 2022

8-14 Day Risk of Hazardous Heavy Precipitation
Slight Risk for Heavy Precipitation
Nov 1 - 2, 2022

8-14 Day Risk of Hazardous Heavy Snow
Slight Risk for Heavy Snow in Cascades
Nov 1 - 2, 2022

8-14 Day Risk of Hazardous High Winds
Slight Risk for High Winds
Nov 1 - 2, 2022
RFC 10-Day Precipitation Forecast

Northwest River Forecast Center
10 Day QPF, Ending 12Z, 11/04/22

Northwest River Forecast Center
10 Day QPF (Percent of Climatology), Ending 12Z, 11/04/22
**Nov 2022 Outlook Favors**

- **Precipitation**
  - **North:** Greater Chance for Above Normal
  - **South:** Equal Chances for Above, Near, or Below Normal

- **Temperatures**
  - Equal Chances for Above, Near, or Below Normal
Dec-Feb Outlook Favors

Precipitation
Greater Chances for Above Normal

Temperatures
Greater Chances for Below Normal

CPC Dec 2022 - Feb 2023: 3 Month Outlook

Seasonal Precipitation Outlook
Valid: Dec-Jan-Feb 2022-23
Issued: October 20, 2022

Seasonal Temperature Outlook
Valid: Dec-Jan-Feb 2022-23
Issued: October 20, 2022
CPC Oct 2022 - Jan 2023: Seasonal Drought Outlook

Oct-Jan Outlook Favors

Drought conditions improving or even ending across much of Oregon & Washington

Oct-Jan Outlook Favors

CPC Oct 2022 - Jan 2023: Seasonal Drought Outlook

U.S. Seasonal Drought Outlook
Drought Tendency During the Valid Period

Valid for October 20, 2022 - January 31, 2023
Released October 20, 2022

Drought persists
Drought remains but improves
Drought removal likely
Drought development likely

http://go.usa.gov/3eZ73

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

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).
Mar-May (Spring 2023) Outlook Favors

Precipitation
Equal Chances for above, near, or below normal

Temperatures
Greater Chances for Below Normal
CPC Jun - Aug 2023: 3 Month Outlook

Jun-Aug (Summer) Outlook Favors

Precipitation
- Equal Chances for Above, Near, or Below Normal

Temperatures
- Greater Chances for Above Normal
Climate predictions can have skill in predicting seasonal totals and averages. However, most impacts are associated with short-duration storm systems.
Summary

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