2021-22 Winter Weather Forecast

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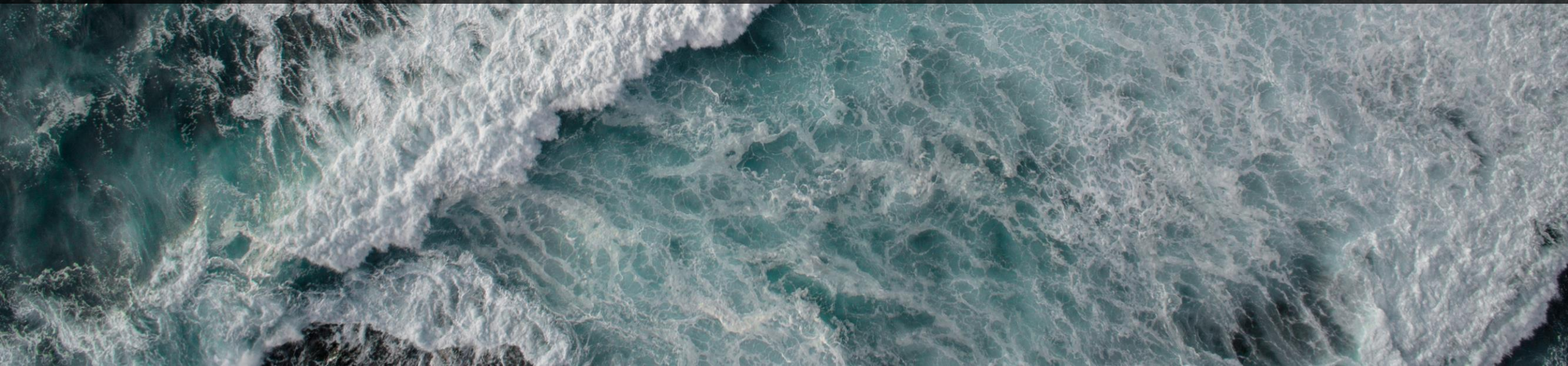


Methods and Review

- 1

2020-21 Scorecard

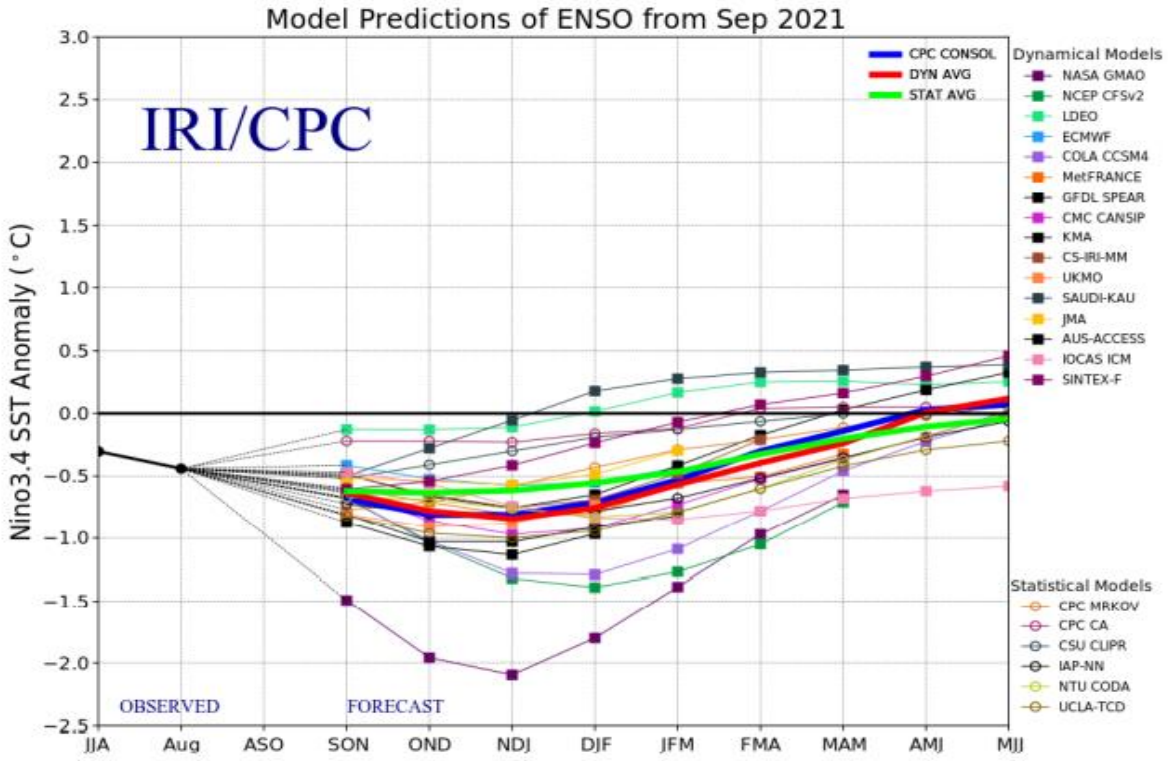
Predictions	Actual	Grade
Water Year Rain: 37-47” December Update: 33-43”	30.22”	
Average Temperature Departure: Between -3°F and 1°F	1.2°F	
Lowest Winter Temperature: <20°F	24°F	
Peak Wind Gust: 45-55 MPH	50 MPH	
(December prediction only) Most Active Time: Mid-January thru Mid-February	Mid-January to Mid-February	
April 1st Snow Depth on Mt. Hood: 110-180% of normal	117%	
Valley Snowfall: 2-8 inches December Update: 3-10 inches	Portland: 10.1 inches All Valley Average: 6.2 inches	

How I Forecast

- Adjusted analog year approach using:
  - ENSO via the Oceanic Nino Index (ONI) and confirmed using the SOI extrapolated back to 1900.
  - Pacific and Atlantic Multidecadal Oscillation
  - Sunspot Count
  - **Analogs not weighted equally. Analogs that are closer condition wise to this year's conditions have a higher weighting.**
- Adjustments to analog years made using statistical analysis (since 1940):
  - If there is a statistically likely/unlikely chance (90%) of something occurring, analogs will be adjusted if there is no clear analog trend.
  - General trends based on previous season.
- Snow prior to 1970s have been adjusted to a 4.3-inch average per winter.

Data, and Factors

ENSO Outlook/Models



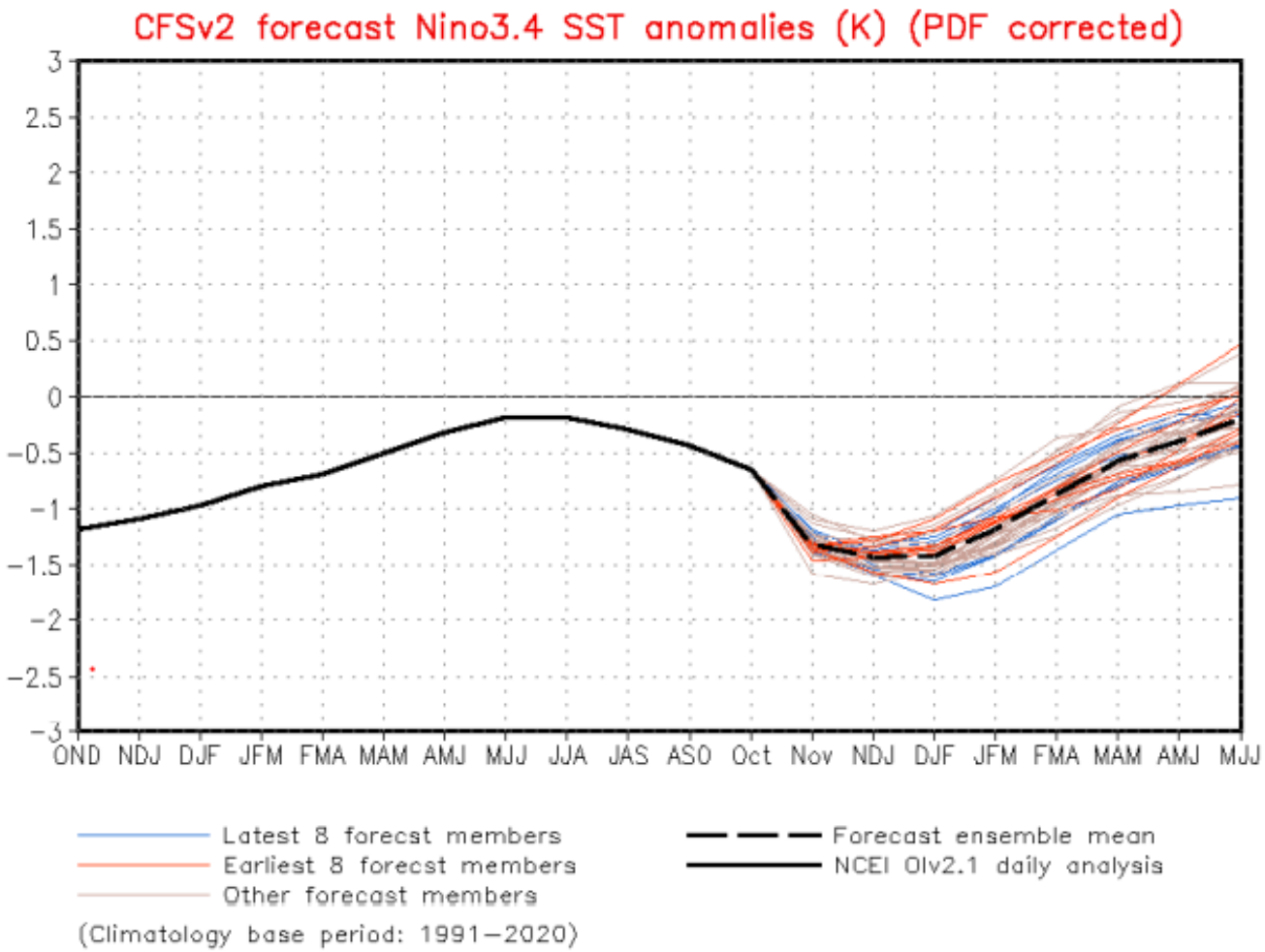
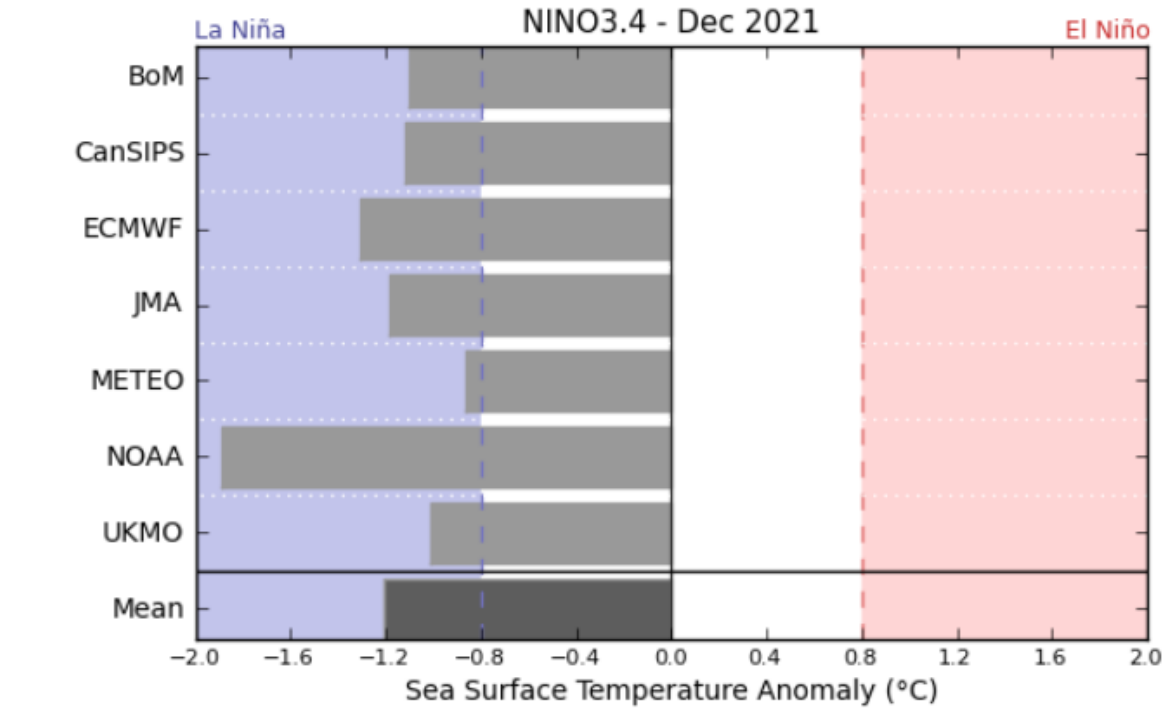
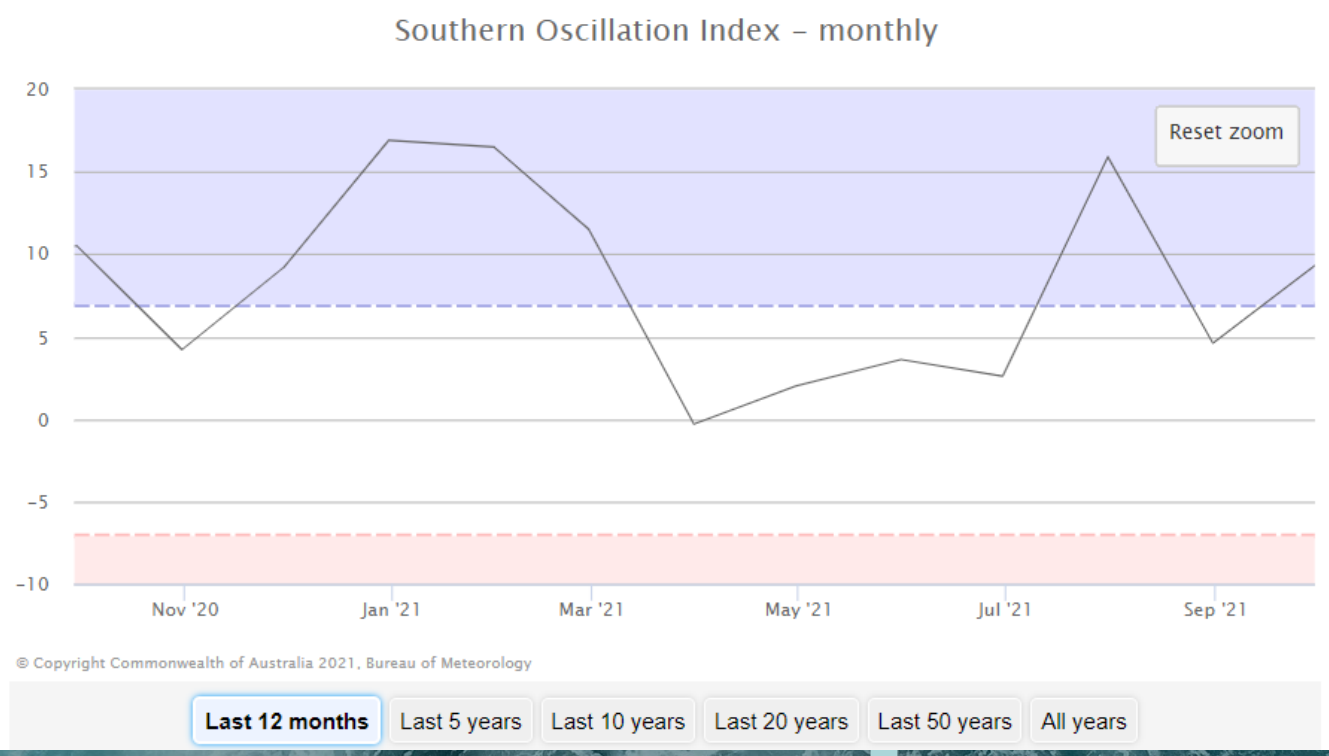


Figure provided by the International Research Institute (IRI) for Climate and Society (updated 20 September 2021).

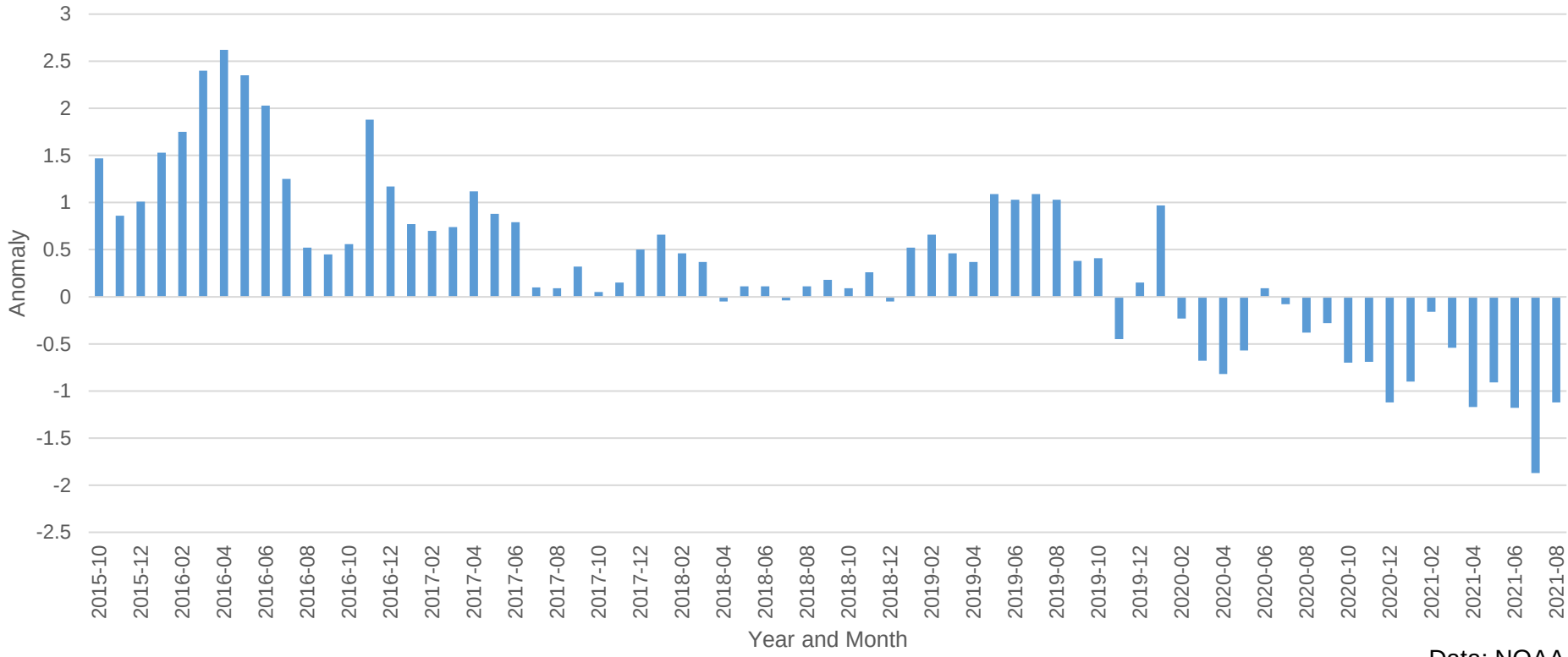
ENSO Outlook: A Cleaner Look



Southern Oscillation Index

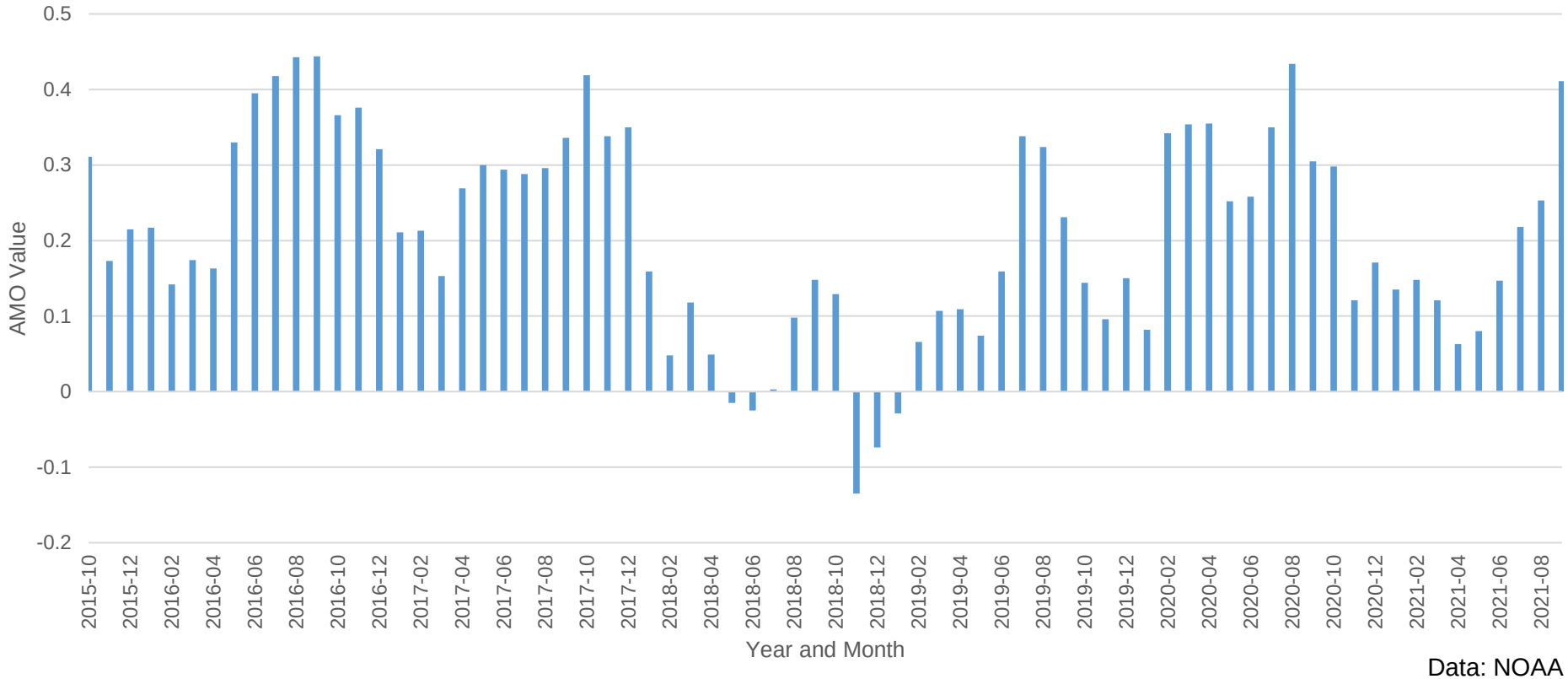


Pacific Decadal Oscillation Values the Last 6 Years



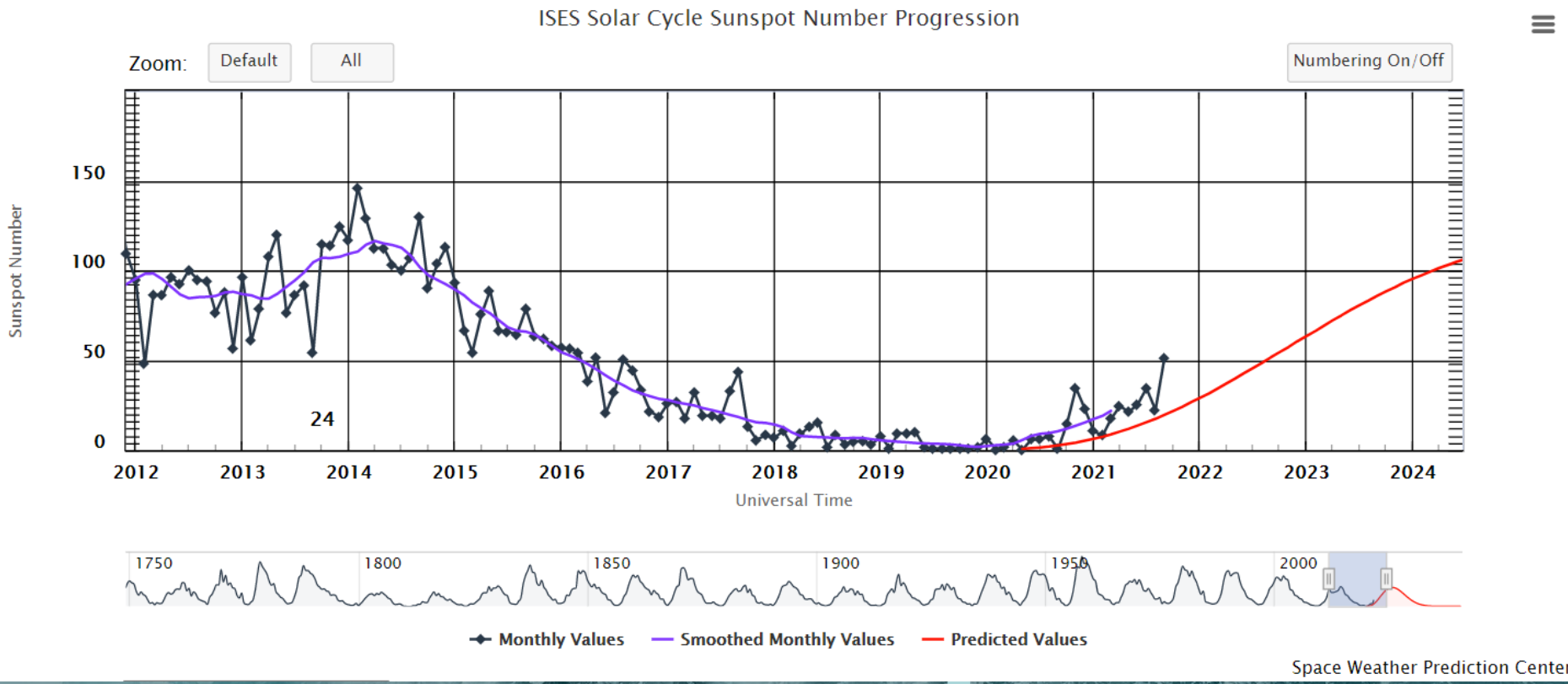
Data: NOAA

Atlantic Multidecadal Oscillation Last 6 Years



Data: NOAA

Sunspot Count

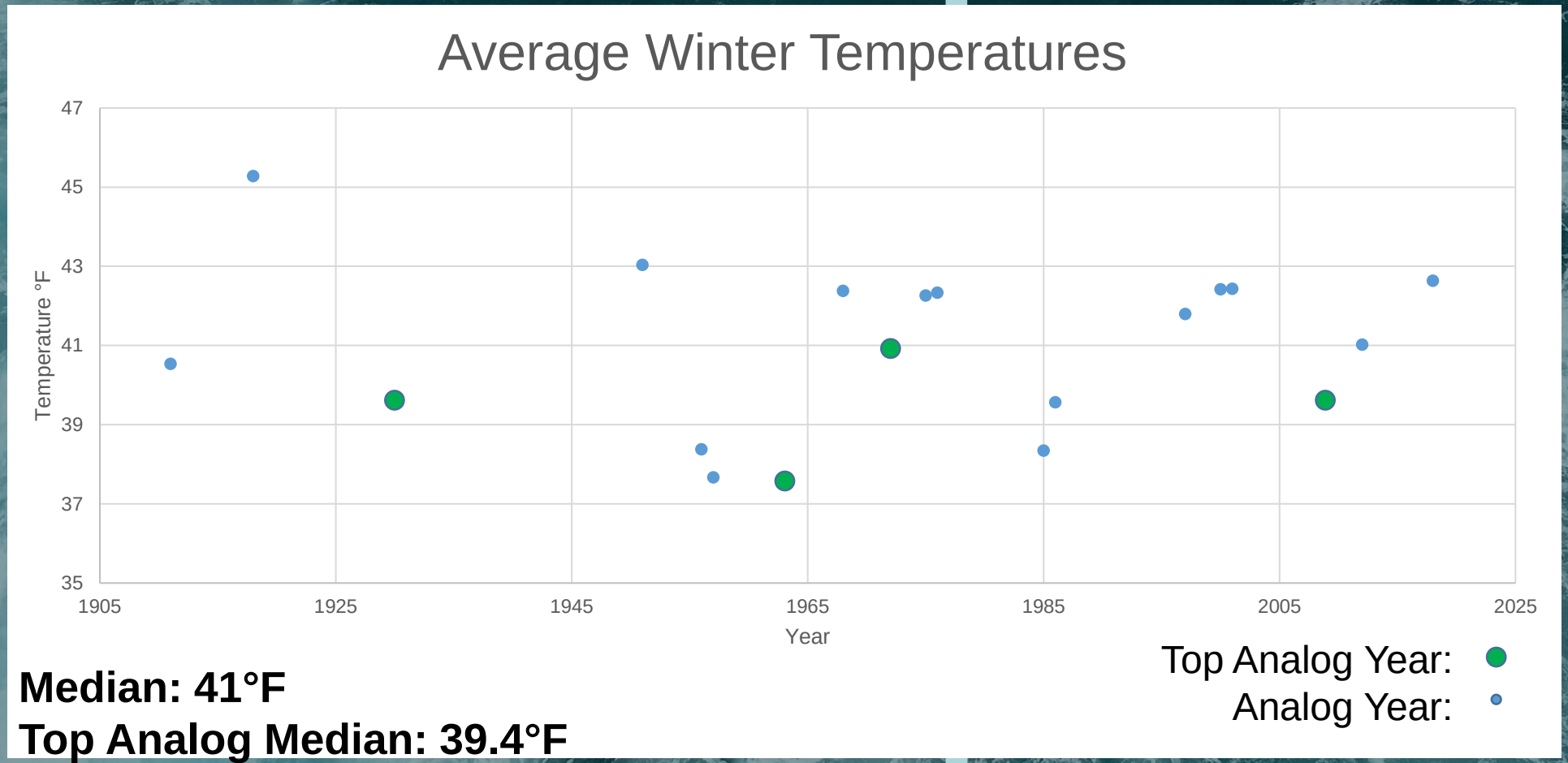


Analog Years and Trends

2021-22 Analog Years

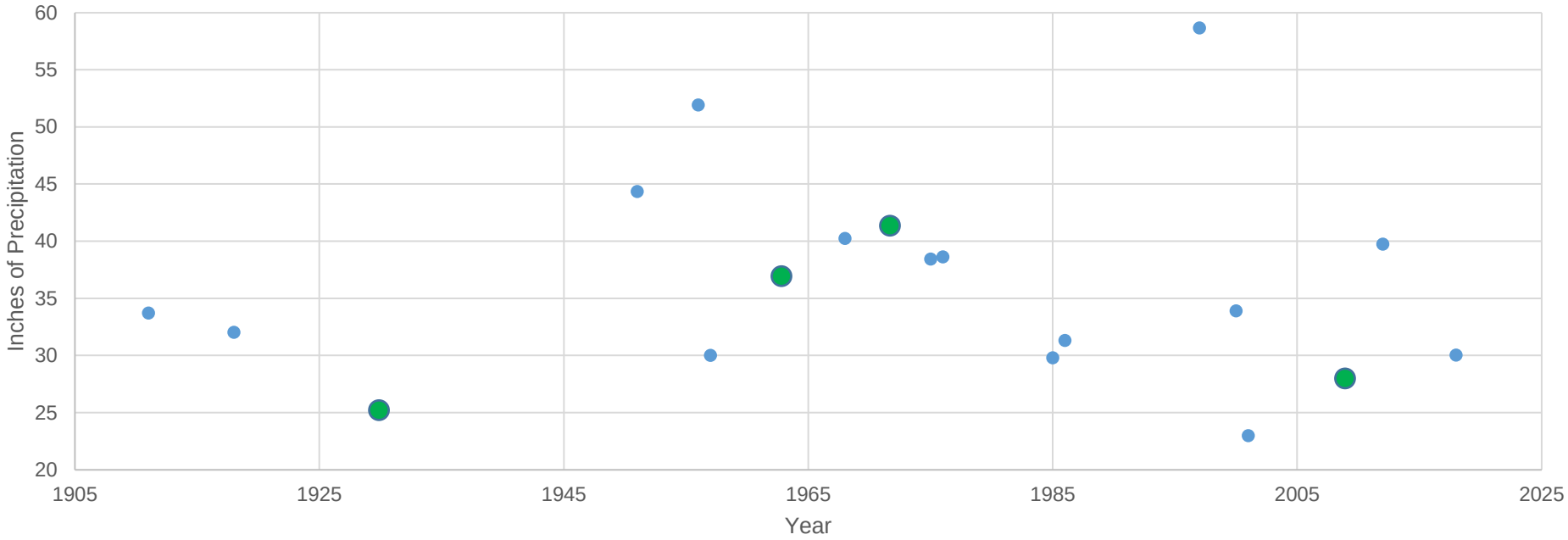
- 1910-11
- 1917-18
- 1929-30
- 1950-51
- 1955-56
- 1956-57
- 1962-63
- 1967-68
- 1971-72
- 1974-75
- 1975-76
- 1984-85
- 1985-86
- 1996-97
- 1999-2000
- 2000-01
- 2008-09
- 2011-12
- 2017-18

- Top Analog Year
- Enso Neutral Year
- La Nina Year



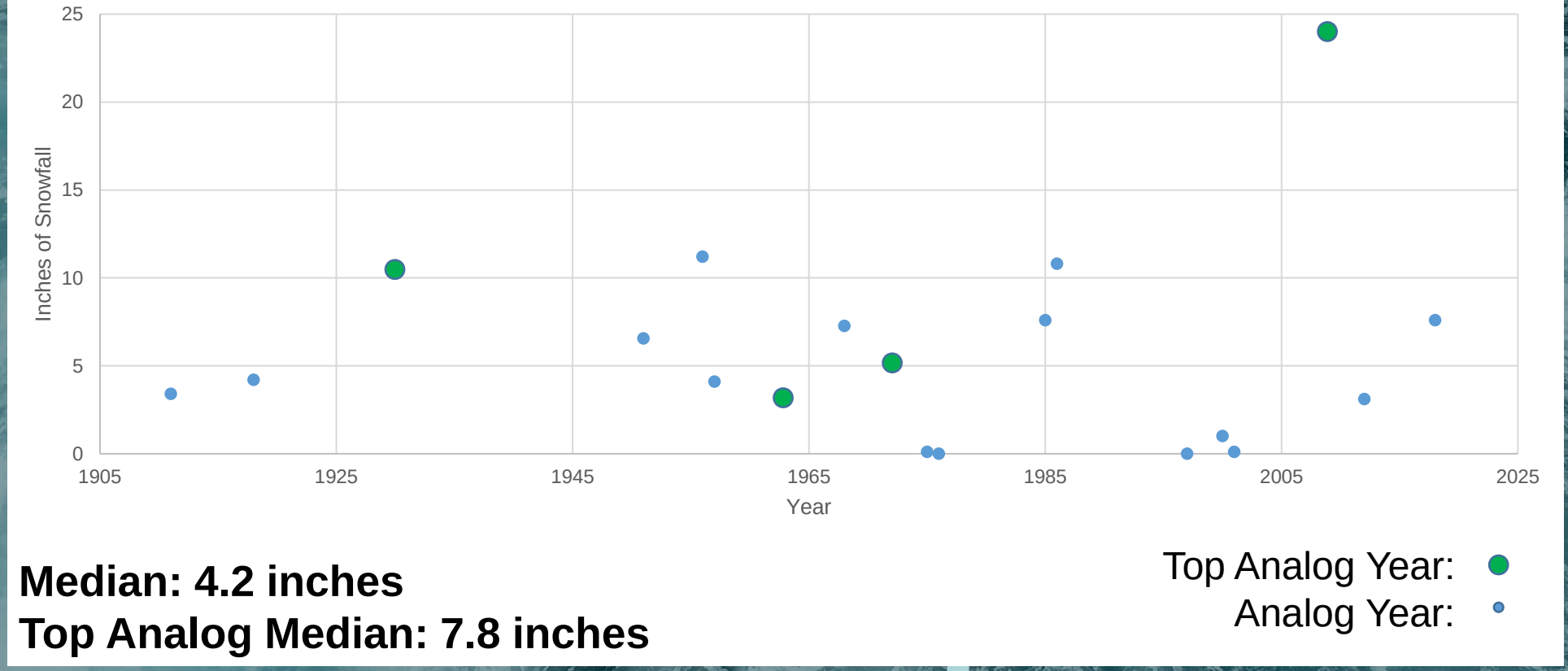
Median: 41°F

Top Analog Median: 39.4°F



Median: 33.4 inches
Top Analog Median: 32.3 inches

Top Analog Year:
Analog Year:



Median: 4.2 inches

Top Analog Median: 7.8 inches

Top Analog Year Comparisons

	1929-30	1962-63	1971-72	2008-09	2021-22
ENSO	Weak La Nina	Neutral/La Nina Borderline	Moderate La Nina	Weak La Nina	Weak/ Moderate La Nina
PDO	Neutral, lean positive	Negative	Negative	Negative	Negative
AMO	Positive	Positive	Negative	Positive	Positive
Sunspot Count and Trend	90, dropping	56, dropping	73, dropping	4, at minimum	50, gaining

Top Analog Highlights

1929-30

- Much drier than average water year.
- Warm December and February.
- January: Longest Arctic Blast in Portland's history (19 days).

1962-63

- Columbus Day Storm.*
- Major Arctic blast, and 5 inches of snow in January.
- Slightly below normal rainfall for the water year.

1971-72

- Wetter than average water year.
- Cold snap and 5 inches of snow in December.

2008-09

- December: Arctic Blast plus 19 inches of snow.
- Despite high levels of winter activity, water year was below normal.

Will it be the Worst-Case Scenario?

- 40+ inches of snow.
- 60+ inches of precipitation with a major flood event, or less than 15 inches.
- 1st 110 mph gust or higher since 1962.
- Too much mountain snow to operate ski resorts or to drive over passes.
- Lowest temperature below 0. Lowest high temperature below 10. Arctic blast lasting 30 days.

Historically Significant Trends:

- 4 winters in a row have failed to get below 20°F.
  - Only 1 time since 1940 with 4 winters in a row to fail to get below 20°F.
  - Chance to exceed 4 winters in a row: 3%.
- Only 3 winters (1941-42, 1973-74, 1976-77) have produced a temperature under 20°F with less than 1.5 inches of snow.
- 2nd La Nina is almost always contains a **drier** winter than the first (1/11 sets since 1950 was wetter the second year)
  - Last winter: 15.9 inches (1.4 inches above average).
  - Fall and Spring do not have a clear trend.

The Official Predictions

The Basics

- Rain: Below average water year favored: **28-38” (75-103% of average)**
  - Winter no more than 15.5”.
  - Best estimate: 33”
- Temps: Below normal favored: **up to 5°F degrees below average**
  - Best estimate: 2°F below average.
- Windstorm(s): Some storms but nothing historic: Peak gust **45-60 mph**.
  - If a major windstorm happens, it will be early season.
- Lowest Temp: **below 20°F**.
  - Enhanced chance of an arctic blast, possibly major blast.
  - Best Estimate: 11°F
- Peak Time period: Mid-December thru Late-January.

Snow

- Mountain Snow Depth on April 1st between **90-140%** of normal.
- Winter favors an above average snowfall: **4-12”**.
  - Central/South Valley: 4-16”
  - Best estimate: 7” with 1-6 snowstorms with 1” or more.
    - Central/South Valley 11”.
  - Chance of 2-inch snowstorm: 75%
  - Chance of 5-inch major snowstorm: 50%
  - Chance of 8-inch snowpocalypse: 30%
  - Chance of a bust winter: 10%.

THANK YOU

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