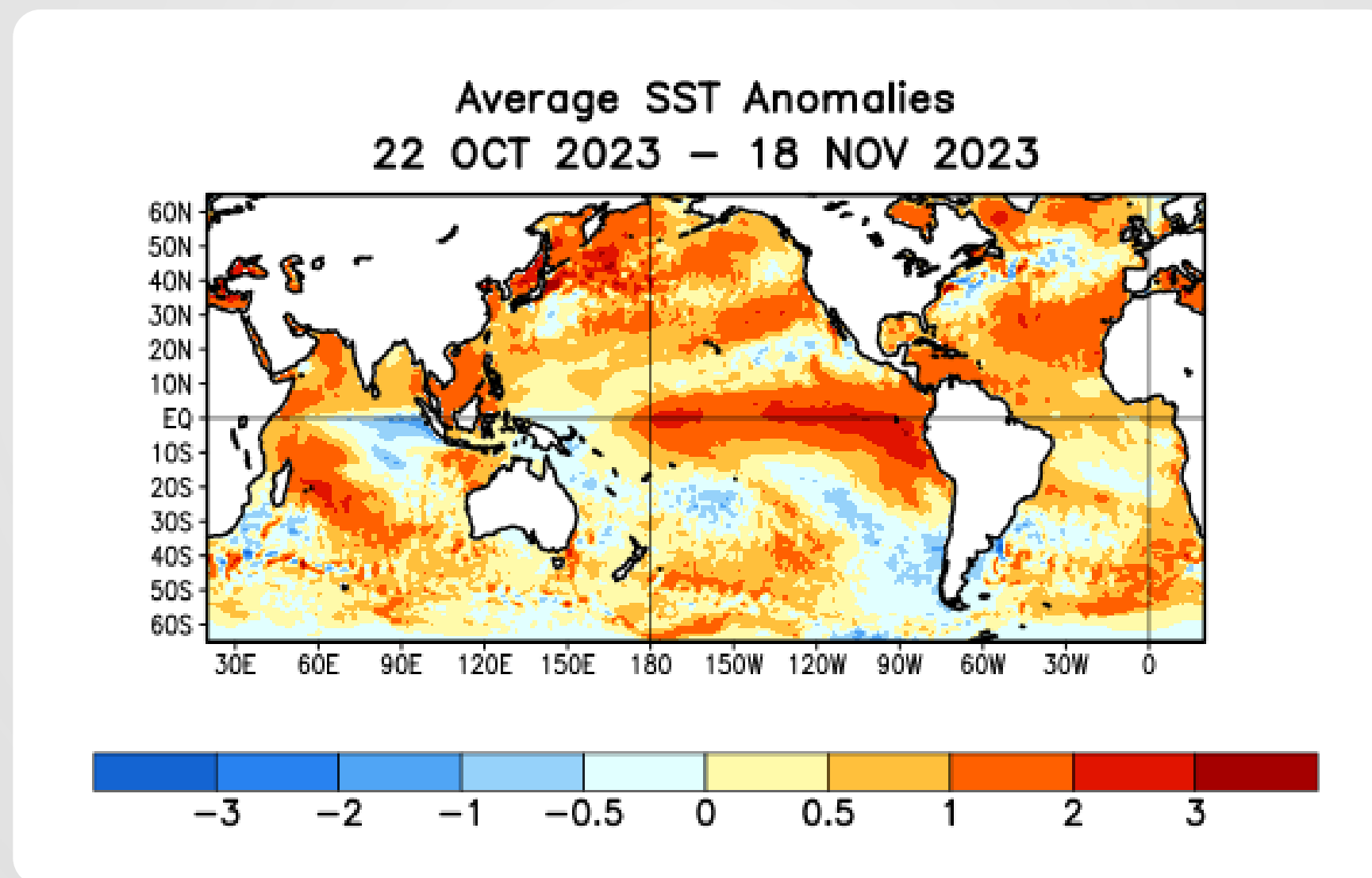


# Water Year Outlook 2024

November 30, 2023



Michael L. Anderson, State Climatologist

# Forecasting the Water Year

- Fall (October/November)
  - Precipitation Onset
  - Temperature: Anomalous, Extreme or Record-Setting
  - Soil Moisture State with Snowpack Initiation
- Winter (December/January/February)
  - Wet/Dry
  - Notable Anomalies
- Spring (March/April/May)
  - Late-Season Bailout or Early Shutoff?
  - Peak Snowpack Timing and Magnitude
- Summer (June/July/August/September)
  - Drying Timing, Pace and Scale
  - Extreme Heat Events
  - Tropical Activity
- Multi-Year Prediction – What about next year?

Climate Change: How much different will the next decade be?



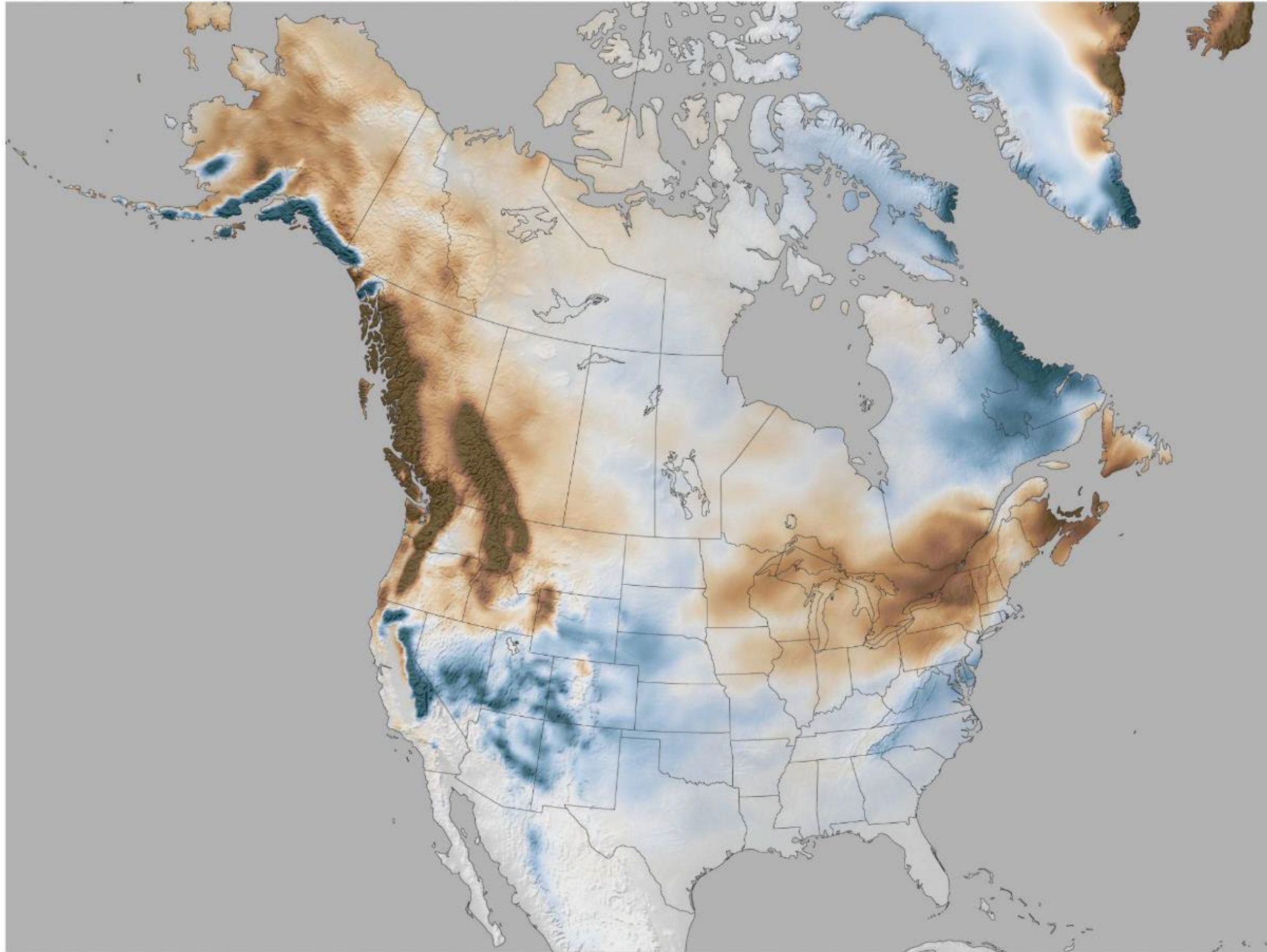
# El Niño Returns to the Eastern Tropical Pacific

- Last El Niño winter was in water year 2019
- 7 events in 21<sup>st</sup> Century so far  
(2 dry, 3 near average, 2 wet)
- This event expected to peak near end of calendar year
- Sub-seasonal climate influences are important



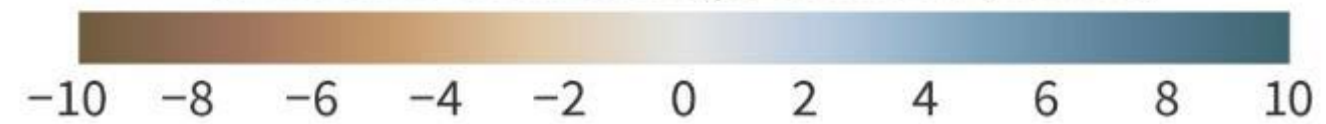


# Snowfall during all El Niño winters (Jan-Mar)



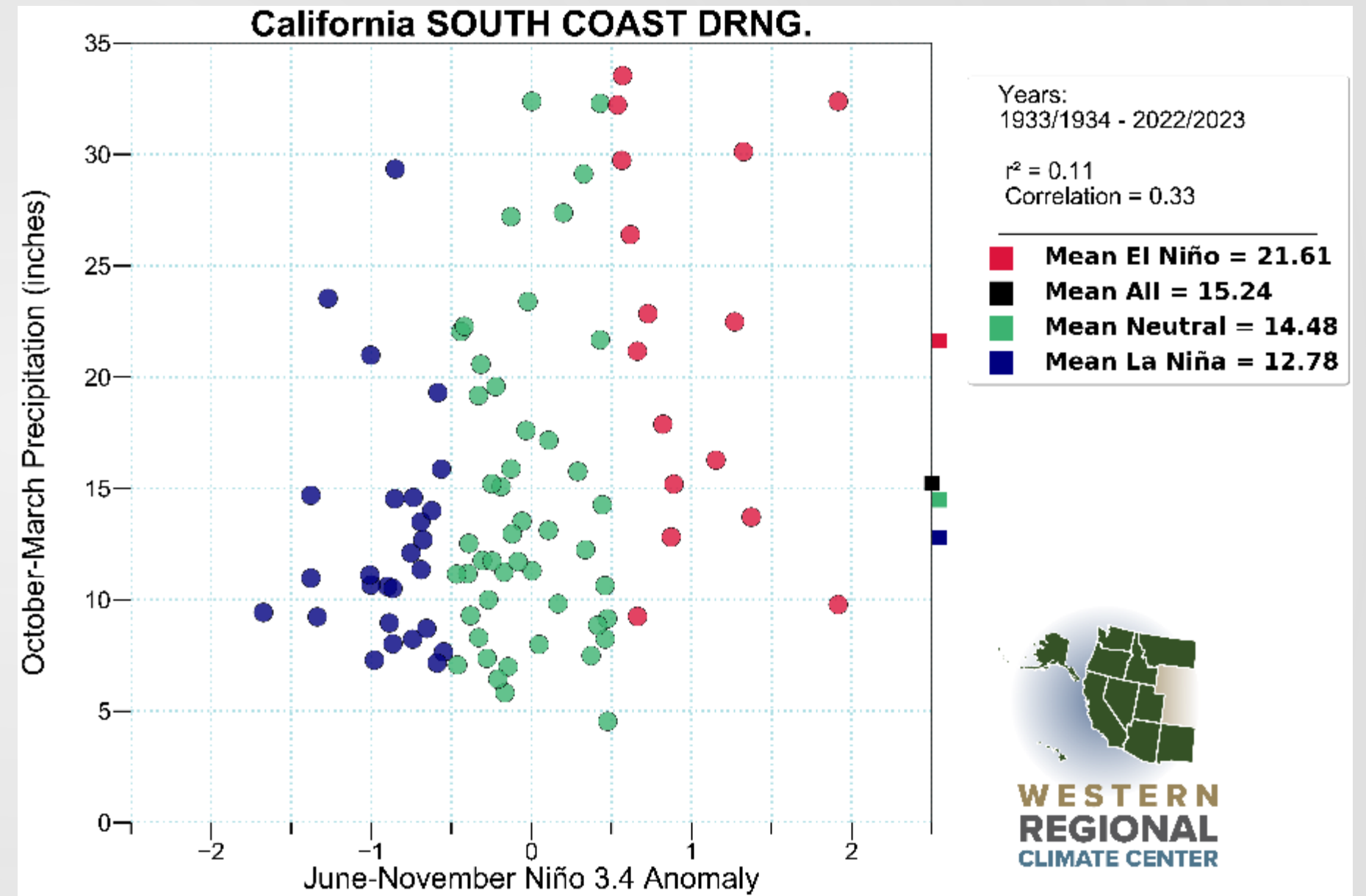
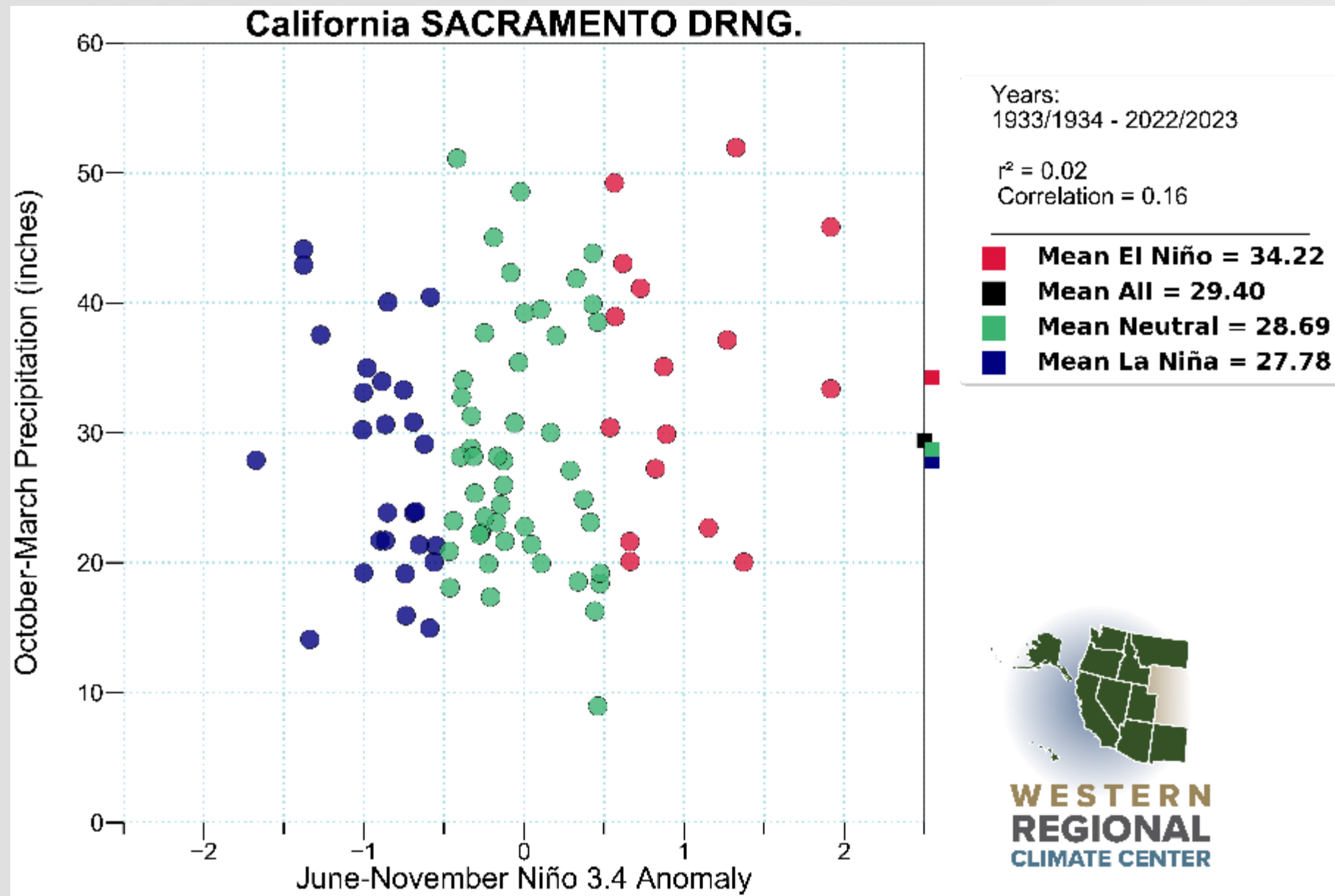
El Niño winters (1959-2023)  
vs. 1991-2020 average  
(detrended)

**difference from average snowfall (inches)**



NOAA Climate.gov  
Data: ERA5

# Precipitation Outcomes with ENSO

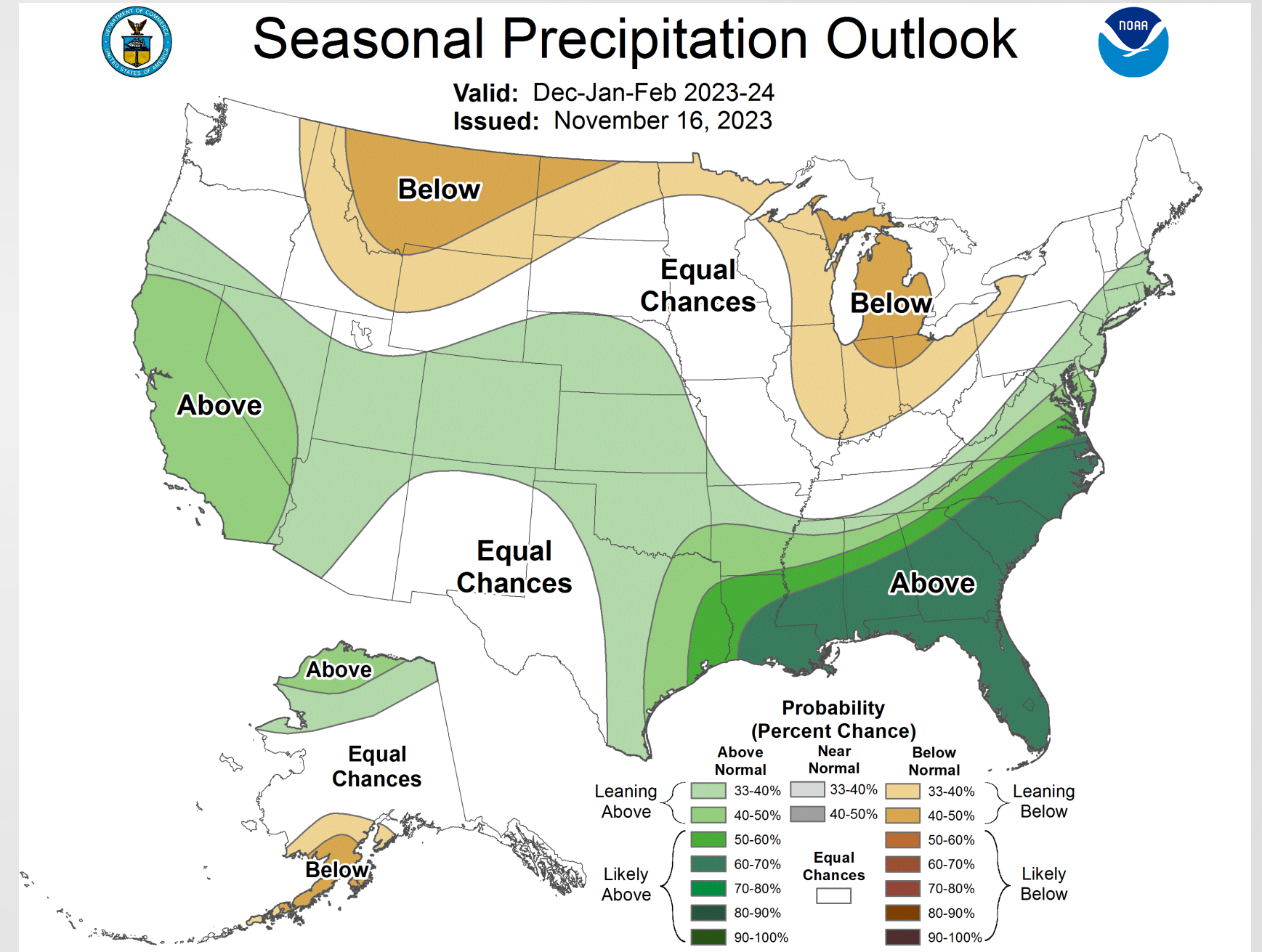
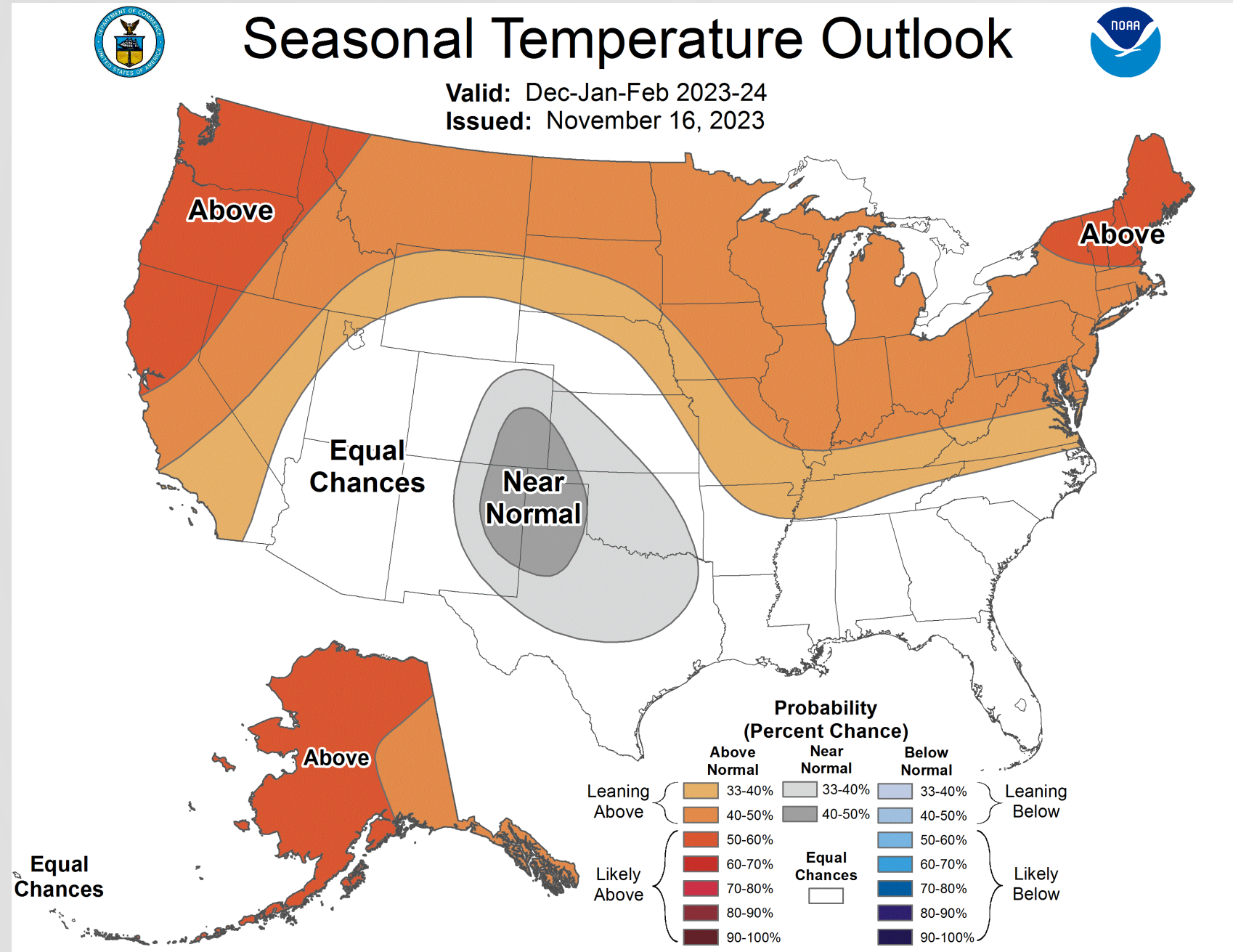


[WRCC: SOI-Precipitation Relationships \(dri.edu\)](http://dri.edu)



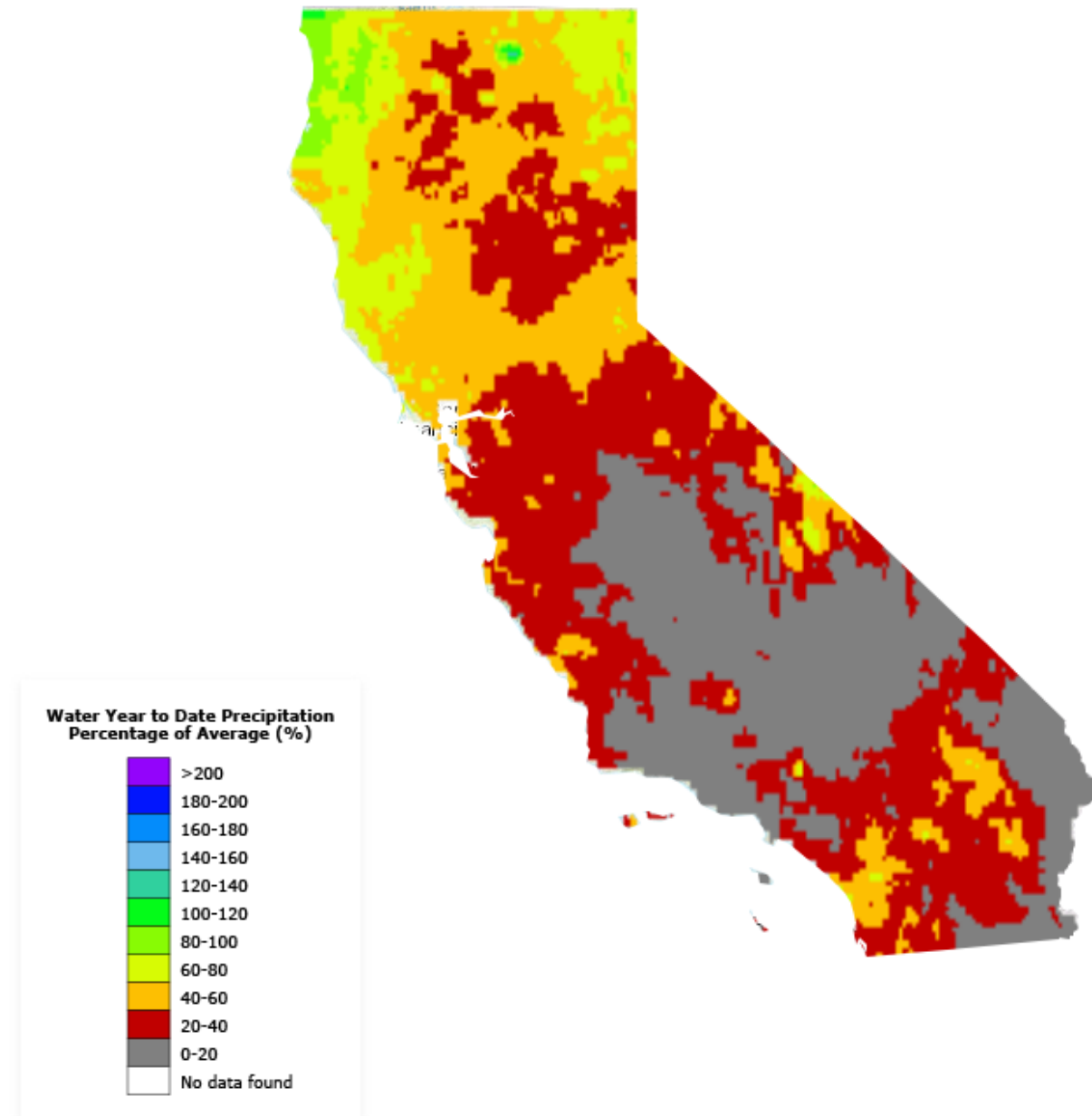


# NOAA Climate Prediction Center Outlooks



# WY 2024 Precipitation to Date

## 12/18/23: 46% of average



### Precipitation as of 12/18/2023

California's annual precipitation can vary greatly from year to year and region to region. The map of California shows how this water year's precipitation compares to what has been observed historically. The chart below provides a summary of California's current statewide precipitation statistics.

#### Precipitation Statistics (period of record: 1981-current)

##### Statewide as of 12/18/2023

Water Year to Date: **2.88"**

% of Average: **46%**

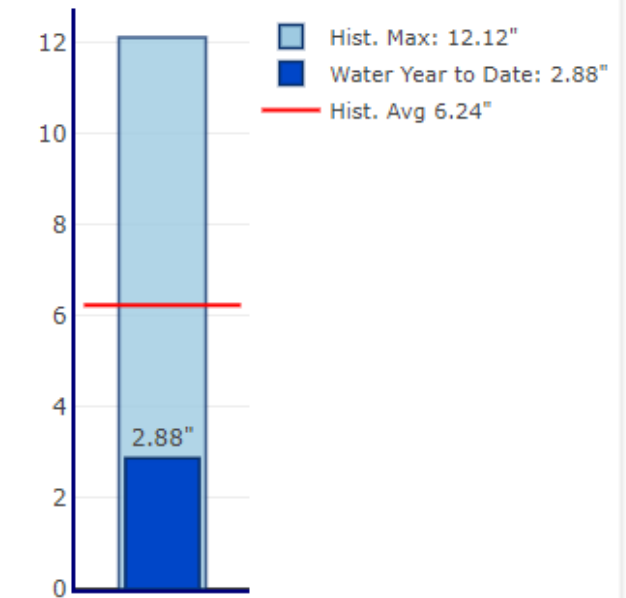
Precipitation % of average for full water year through September 30th: **12%**

##### Historical Record to Date:

Max: **12.12"**

Mean: **6.24"**

Min: **1.68"**



Precipitation for water year to date is 46% of historical average

California's new Water Year began Oct. 1, 2023 and ends Sept. 30, 2024. Graphics on this site use data for WY 2023-24. To view WY 2022-23 data, visit [the yearly summary page](#).





# CNRFC Web Page

## cnrfc.noaa.gov

**HOME** **HYDROLOGY** **WEATHER** **CLIMATE** **RESEARCH / OUTREACH** **LINKS** **SEARCH** **ABOUT US**

Local forecasts by "City, St" or ZIP Code:   [Location Help](#)

**NOAA / NW & News and Local CNRFC Information**

**2022 Water Year Peak Stage and Flow Data** - The 2022 Water Year peak stage and flow data for the 100 flood forecast points have been added to the CNRFC website. Select a location from the map interface below to view individual data.

**October 17 - 28, 2021 Storm Summary** - The CNRFC has published a comprehensive summary of the significant early season precipitation event affecting California and northern Nevada in October 2021. This study includes precipitation data, a discussion of weather conditions, resulting hydrologic impacts, and verification of CNRFC forecasts. To view this study, please visit our Storm Summaries webpage or go directly to the report.

**CNRFC Daily Briefing** - View a graphical summary of current & forecast weather & hydrologic conditions. Updated by 10 AM PT.

**ALERT** At Least One River Guidance (Flood Forecast) Point is Currently or Forecast to Exceed Monitor Stage **ALERT**

Recently-issued CNRFC Text Products:

Home Page Version: [Interactive Map](#) | [Legacy](#)    [Help/Manual](#)

**Geographic Overlays**

<input checked="" type="checkbox"/> CNRFC Boundary	<input type="checkbox"/> States	<input type="checkbox"/> Counties	<input type="checkbox"/> Burn Areas	2020	2022	2021
<input type="checkbox"/> Hydrography	<input type="checkbox"/> Basins	<input type="checkbox"/> Lakes	<input type="checkbox"/> Major Rivers	<input type="checkbox"/> WFCs	<input type="checkbox"/> Nat'l Parks	

**Rivers/Reservoirs**

**Deterministic Forecasts**  
 Show only critical stages (for pts only)   
 Date updated: Tue Dec 19 2023 09:47 AM PST  
 Forecast Points  Other Points

**Ensemble Forecasts**  
 Date updated: Tue Dec 19 2023 09:41 AM PST  
 Ensemble Points

**Peak Exceedance Probabilities\***  
 Date updated: Mon Dec 18 2023 02:38 PM PST  
 10% 25% 50% 75% 90%  
 5-Day Peak       
 10-Day Peak       
 \*Exceedance probabilities are only available for selected forecast points.

**Observed Data**  
 Date updated: Tue Dec 19 2023 09:47 AM PST  
 Show only critical stages (applies to for pts only)   

	Latest Hour	1 Hr Ago	2 Hrs Ago	3 Hrs Ago
Forecast Points	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other Points	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reservoirs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Deterministic Forecast + Observed Data**  
 Forecast data updated: Tue Dec 19 2023 09:47 AM PST  
 Obs data updated: Tue Dec 19 2023 09:47 AM PST  
 Forecast Points  Show only critical stages   
 Link to  observed  forecast  

Latest Hour	1 Hr Ago	2 Hrs Ago	3 Hrs Ago
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Significant River Flood Outlook**  
 Date updated: Mon Dec 18 2023 11:00 AM PST  
 Valid: 12/18/2023 - 12/23/2023  
 Latest Flood Outlook Product (updated daily)  
[National Significant River Flood Outlook](#)

**Change Map Background**

No Monitor or Flood Stage Available  100 Normal Conditions  2 Above Monitor Stage  0 Above Flood Stage  0 Above Danger Stage

The number inside each circle above represents the number of gauges with forecast conditions inside that category.

[Water Resources](#)

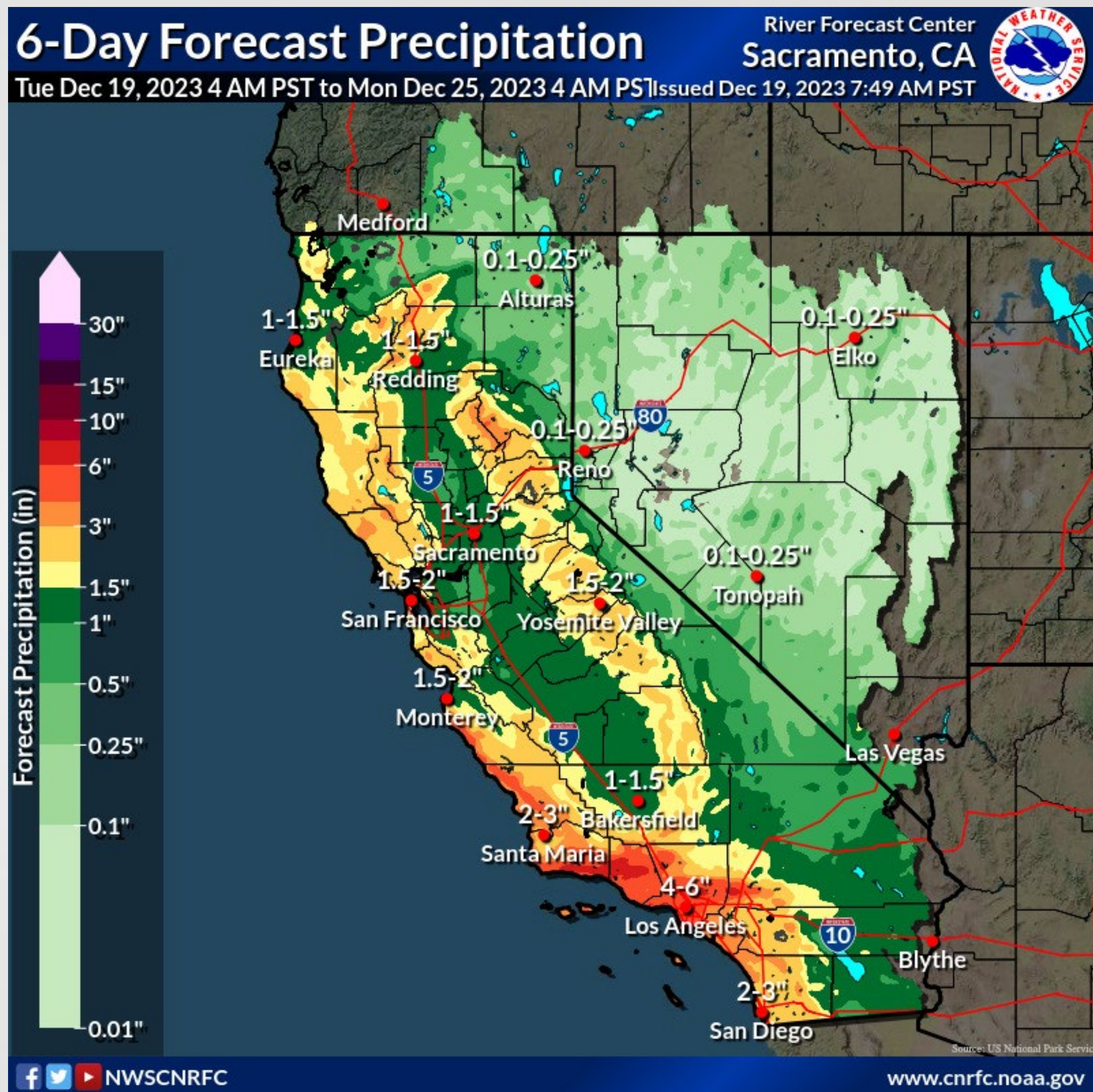
[Snow Data](#)





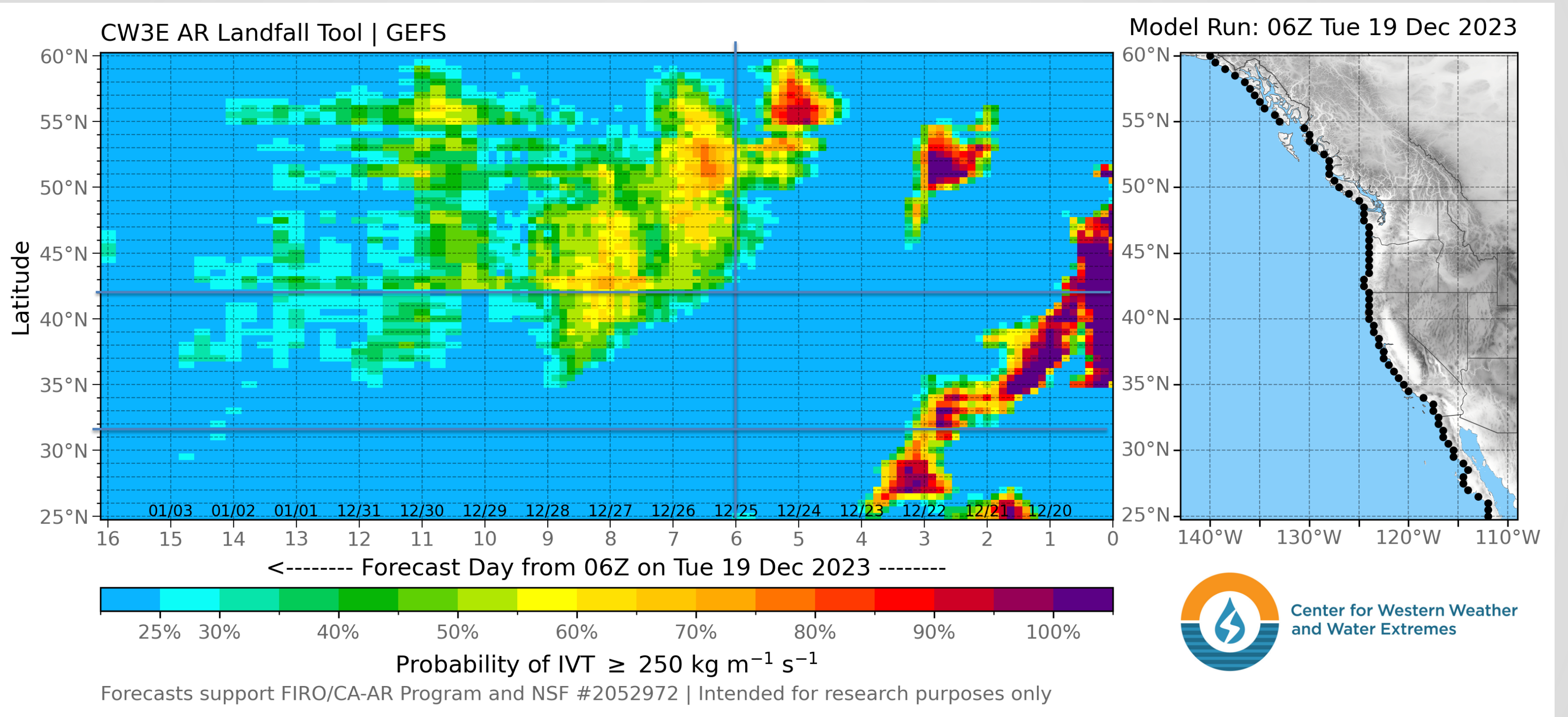
# CNRFC 6-Day Precipitation Forecast 12/19/23

- Map of precipitation expected over next 6 days
- 6-hour and daily accumulations for days 1 to 3
- Daily accumulations for day 4 to 6



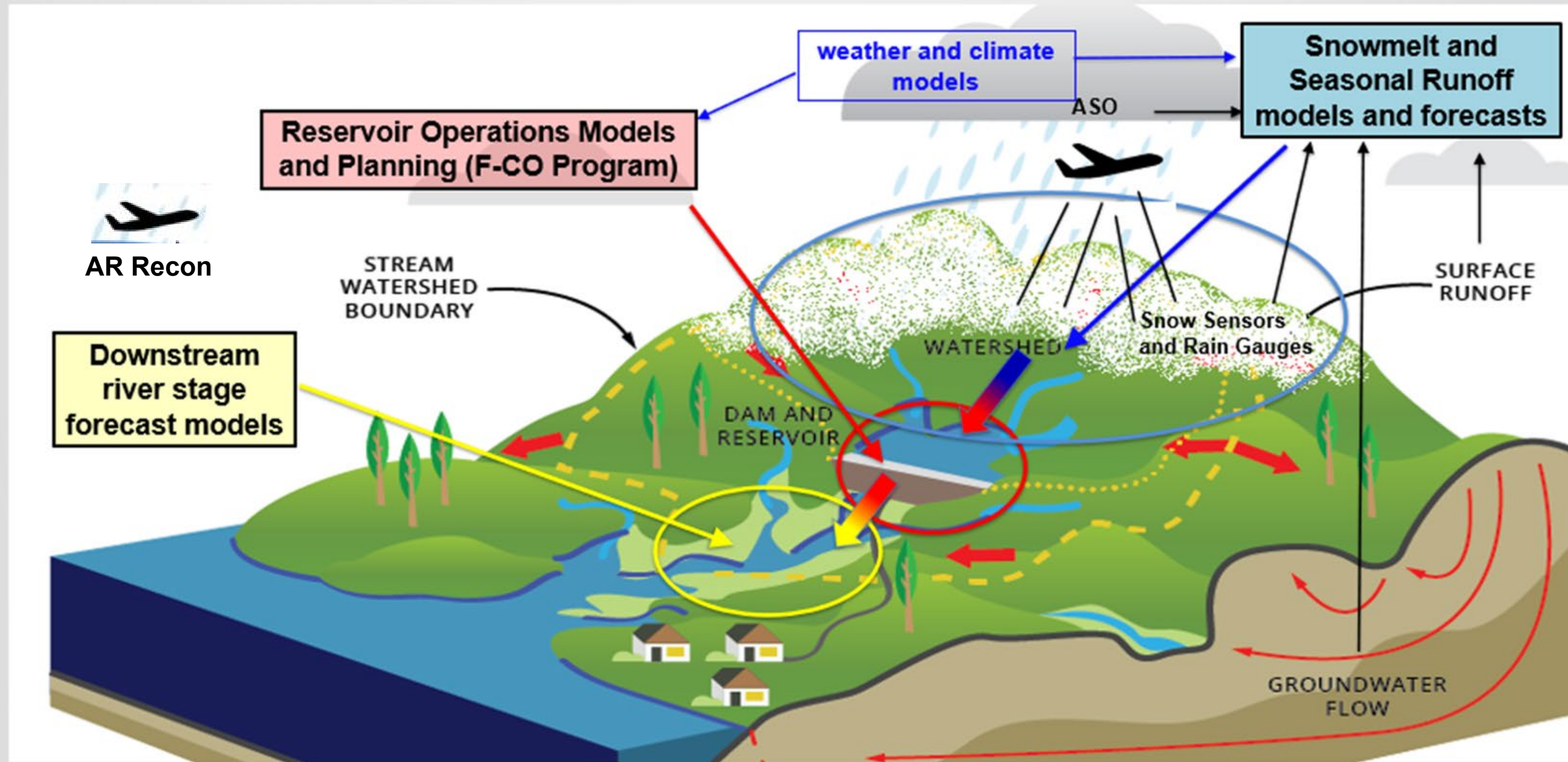


# Water Vapor Transport Forecast





# Observations and Forecasts Informing Water Management





# Final Thoughts

- Slow start to WY2024
- WY 2023 full of extremes and transitions
- Expect more of the same in WY2024
- The wet days will likely be wetter than usual; greater likelihood of coastal hazards
- Timing, pace and scale of storms will play a key role in impacts and water year outcomes.



# Questions?

- Email: [Michael.L.Anderson@water.ca.gov](mailto:Michael.L.Anderson@water.ca.gov)
- Websites:
  - <https://cnrfc.noaa.gov> (NWS CNRFC)
  - <https://cw3e.ucsd.edu> (Scripps Center for Western Weather and Water Extremes)
  - <https://cww.water.ca.gov> (California Water Watch)

