

# CW3E Atmospheric River Outlook

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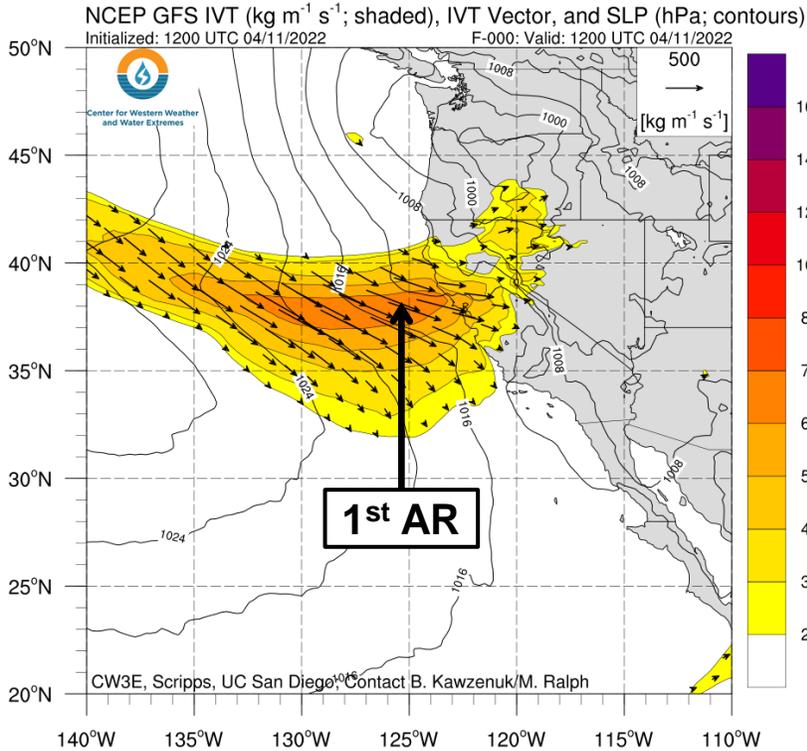
## **Active pattern is forecast to continue throughout today and into mid-week, increasing the potential for precipitation across the U.S. West Coast**

- Over the past week, a series of ARs and low-pressure systems impacted Northern and Central California bringing 3 – 6 inches of liquid precipitation and 1–3 feet of snow
- The active pattern is forecast to continue over the next several days, resulting in additional precipitation and mountain snow
- An AR is currently impacting the Pacific Northwest and is forecast to move down the coast, impacting Northern California later today
- Another AR is forecast to move-in behind the current AR between the 20<sup>th</sup> and 21<sup>st</sup>, bringing an additional period of precipitation to the region
- Due to the relatively weak and short duration of these ARs in the forecast, it is unlikely that they will bring conditions that fall on the AR scale and the probability of AR 1+ conditions is low across a majority of California
- The NWS Weather Prediction Center (WPC) is forecasting at least 2–5 inches of precipitation over the Northern Sierra Nevada, Northern California Coast Ranges, and southern Oregon Coast Ranges during the next 5 days
- The National Weather Service has issued a Winter Weather Advisory of portions of the Northern Sierra Nevada

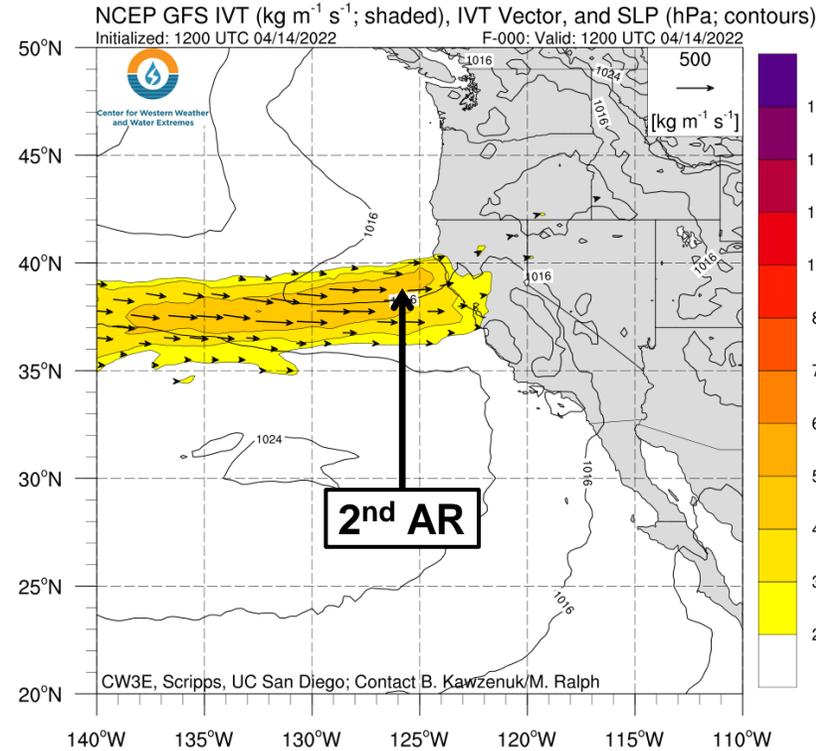
# CW3E AR Outlook: 18 April 2022

## GFS IVT & SLP Analyses

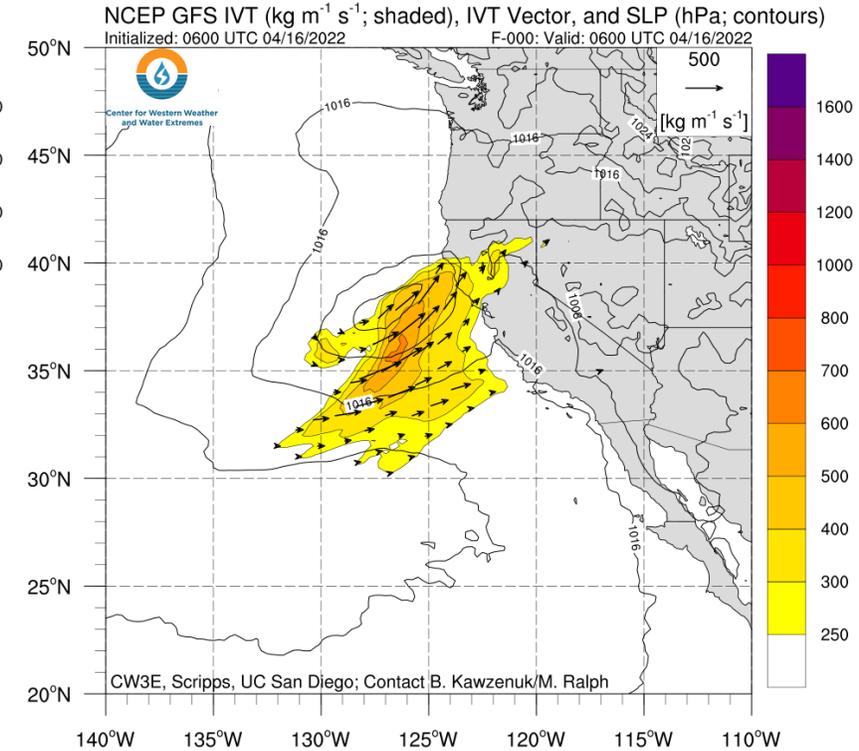
(A) Valid: 4 AM PT 11 Apr



(B) Valid: 4 AM PT 14 Apr



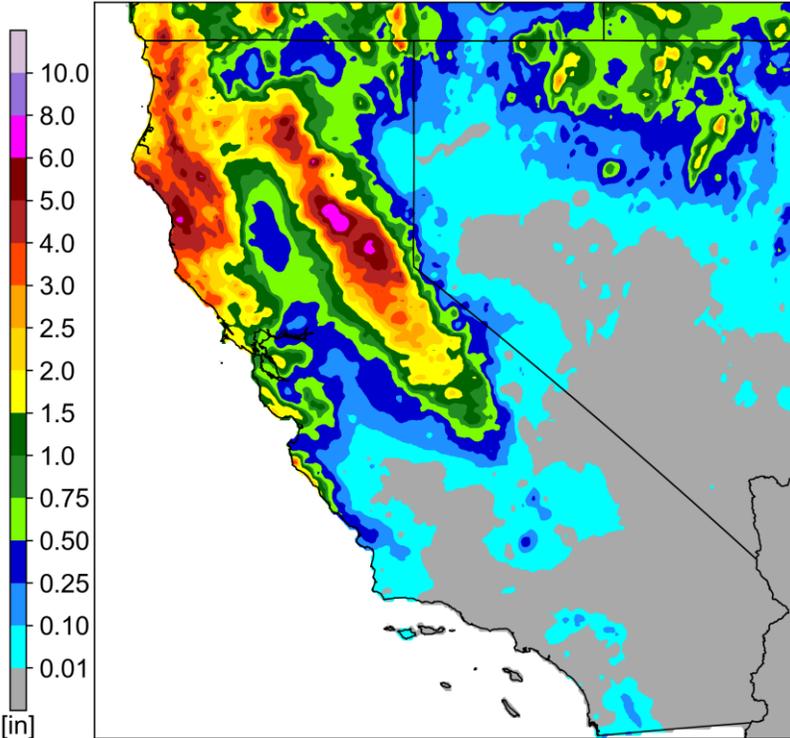
(C) Valid: 10 PM PT 15 Apr



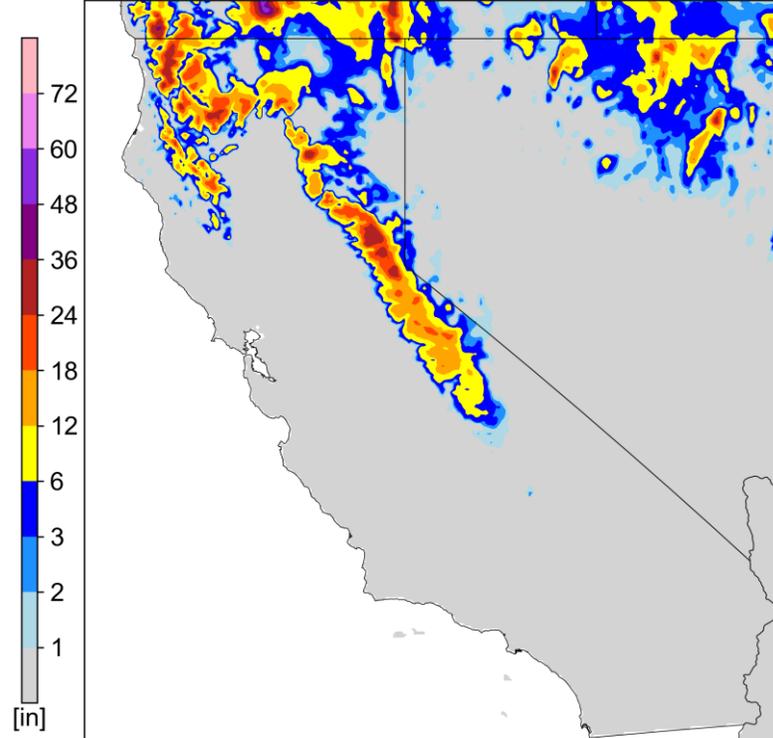
- Over the past week, a series of ARs and low-pressure systems impacted Northern and Central California
- The first and strongest AR made landfall during the evening of 10 Apr and brought AR 1 conditions to portions of Northern and Central California (Figure A)
- The second AR made landfall during the evening of 13 Apr (Figure B)
- A weak low-pressure system brought a brief period of AR conditions to Northern and Central California on 15–16 Apr (Figure C)

# CW3E AR Outlook: 18 April 2022

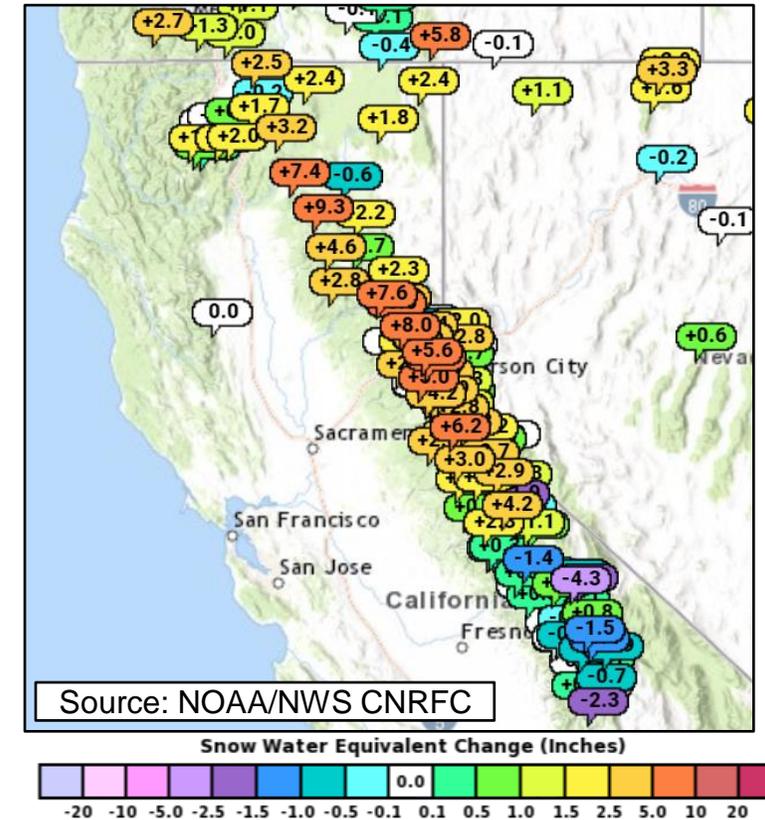
NCEP Stage IV 7-day QPE:  
Valid 4 AM PT 11–18 Apr



NOHRSC 7-day Interpolated Snowfall:  
Valid 4 AM PT 11–18 Apr



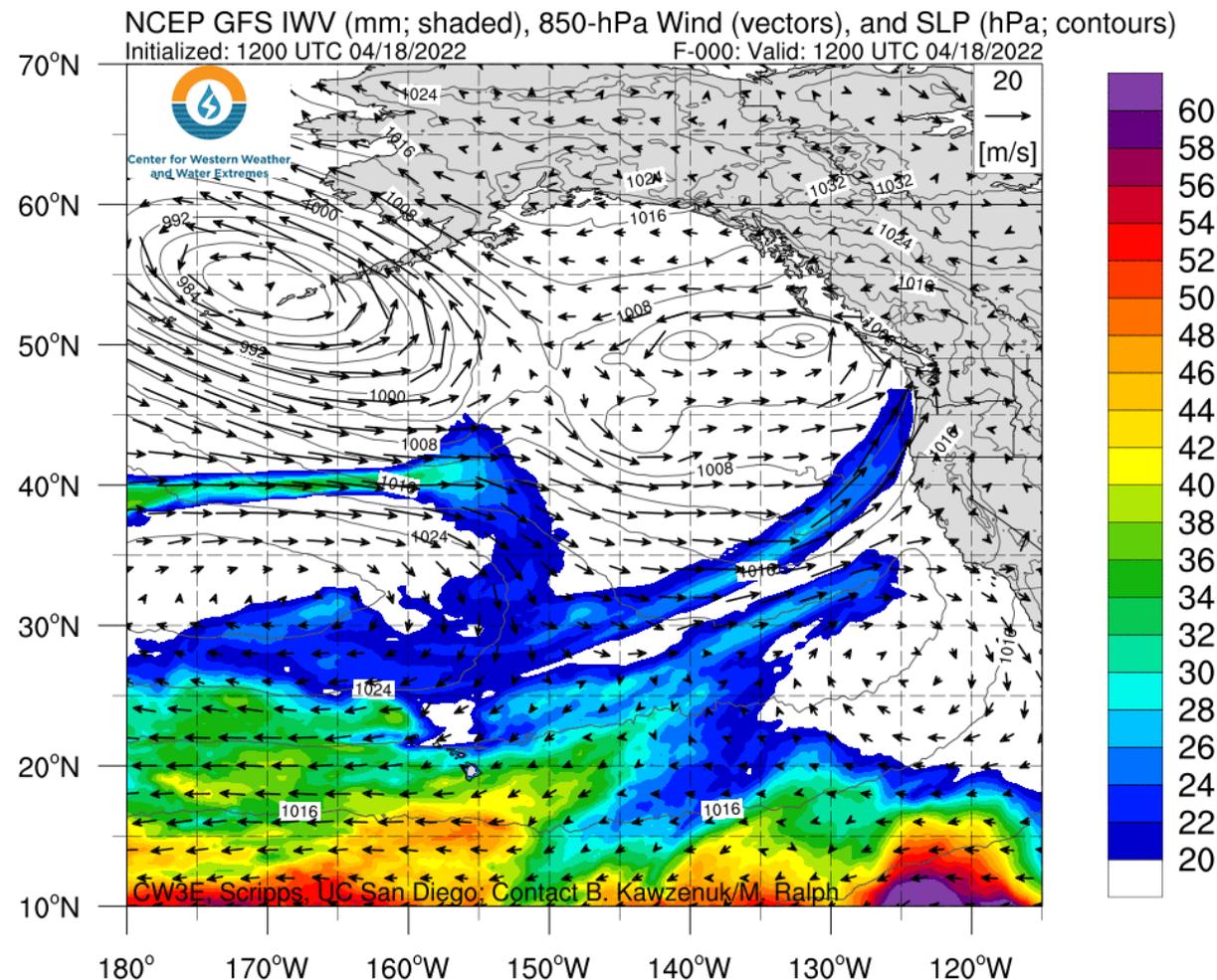
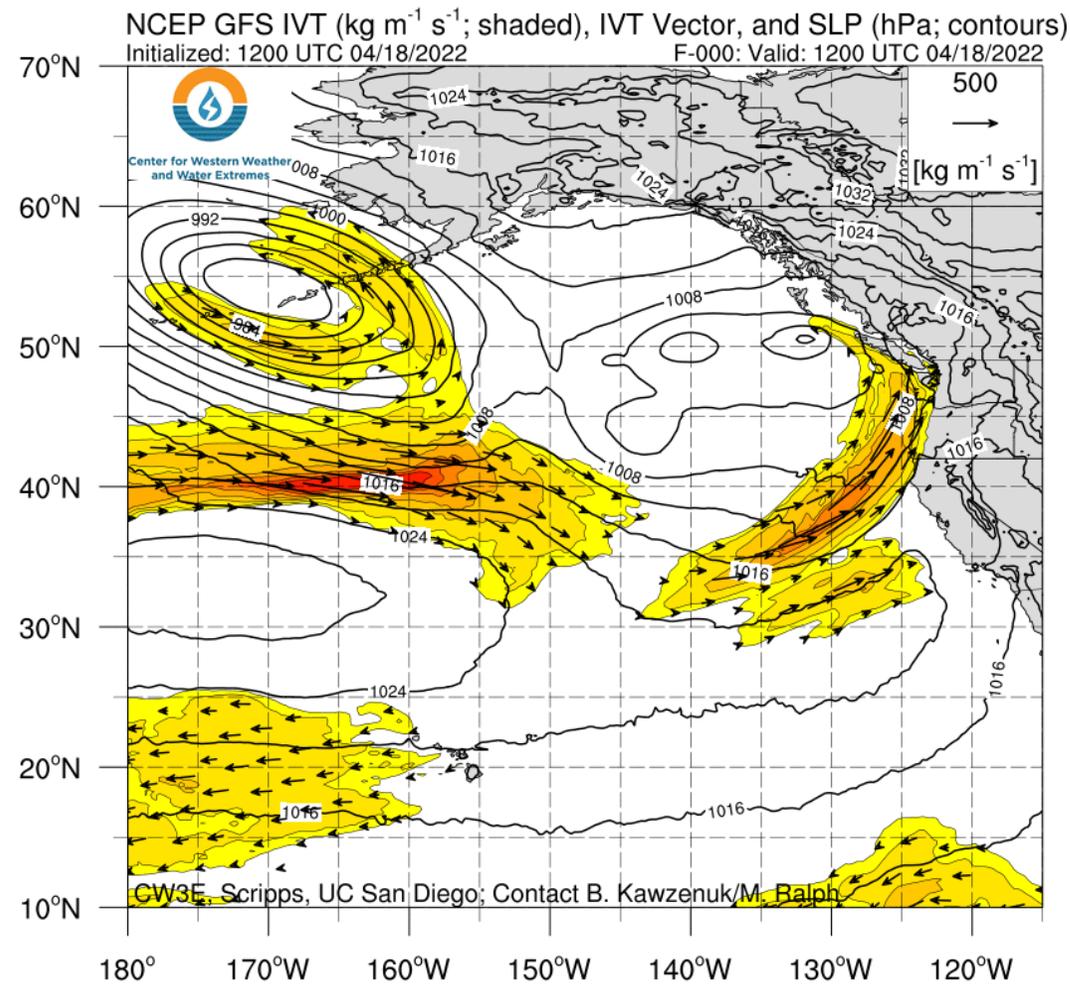
7-day SWE Change: Valid 11–18 Apr



- These three storms produced about 3–6 inches of total precipitation in the Northern California Coast Ranges and Northern Sierra Nevada
- An estimated 1–3 feet of total snow fell in the higher elevations of the Sierra Nevada and the Klamath Mountains
- Several stations in the Northern Sierra Nevada recorded SWE increases > 5 inches between 11 Apr and 18 Apr
- Lower Lassen Peak recorded a 7-day SWE increase of 9.3 inches

# Atmospheric River Outlook: 18 April 2022

For California DWR's AR Program



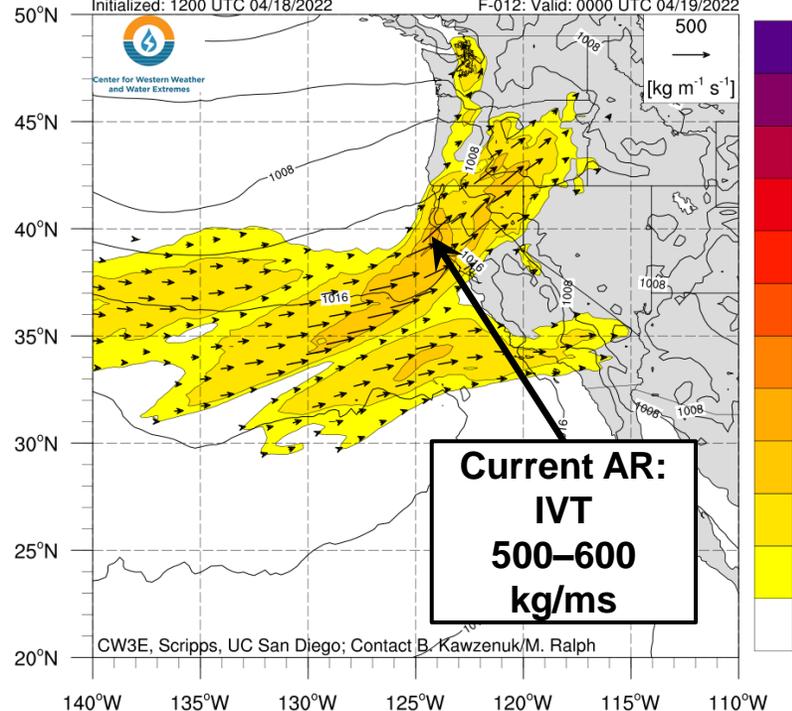
## GFS IVT Forecast

A) Valid: 5 PM PDT 18 April 2022

NCEP GFS IVT ( $\text{kg m}^{-1} \text{s}^{-1}$ ; shaded), IVT Vector, and SLP (hPa; contours)

Initialized: 1200 UTC 04/18/2022

F-012: Valid: 0000 UTC 04/19/2022

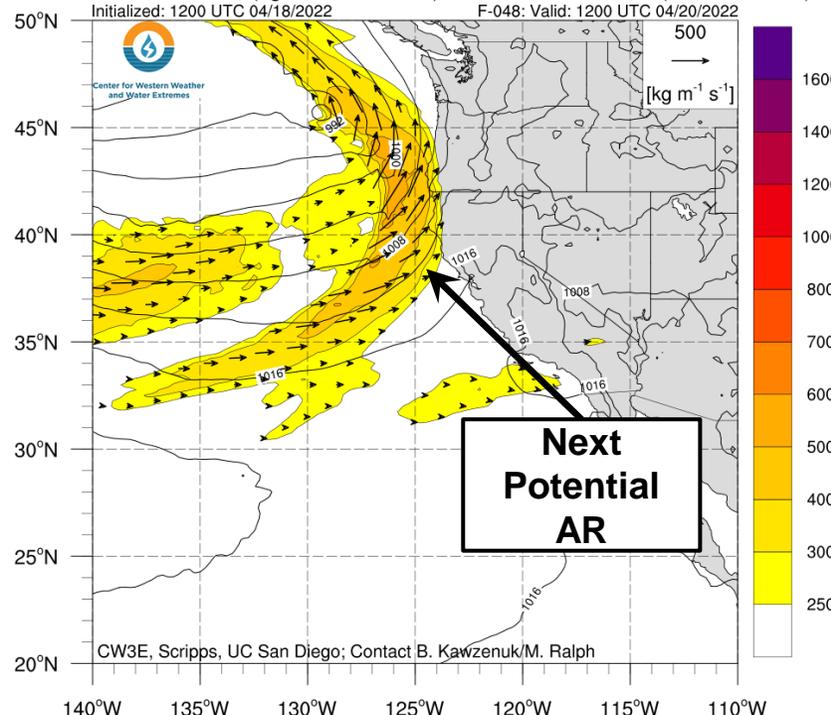


B) Valid: 5 AM PDT 20 April 2022

NCEP GFS IVT ( $\text{kg m}^{-1} \text{s}^{-1}$ ; shaded), IVT Vector, and SLP (hPa; contours)

Initialized: 1200 UTC 04/18/2022

F-048: Valid: 1200 UTC 04/20/2022

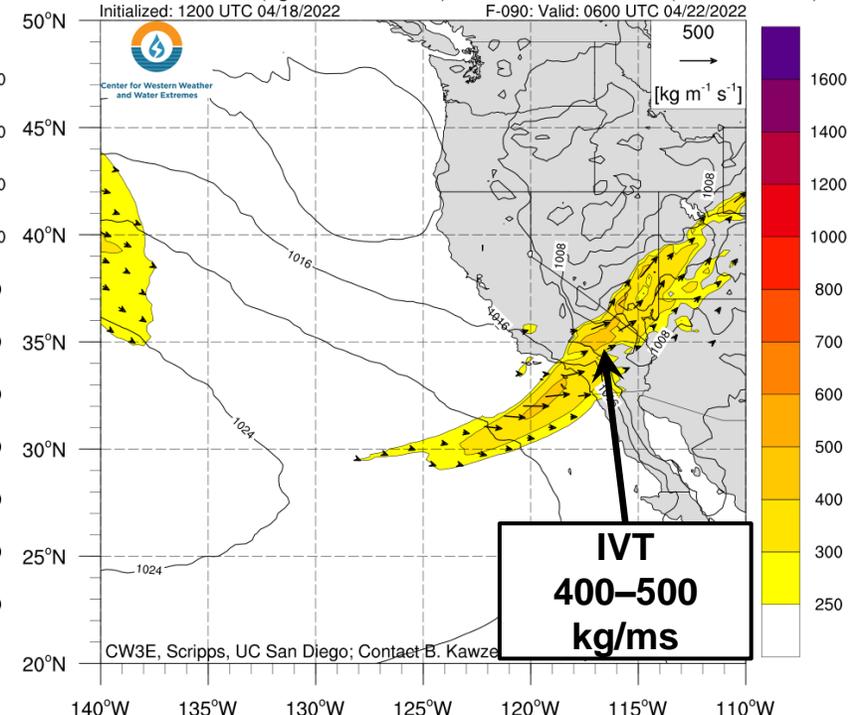


C) Valid: 11 PM PDT 21 April 2022

NCEP GFS IVT ( $\text{kg m}^{-1} \text{s}^{-1}$ ; shaded), IVT Vector, and SLP (hPa; contours)

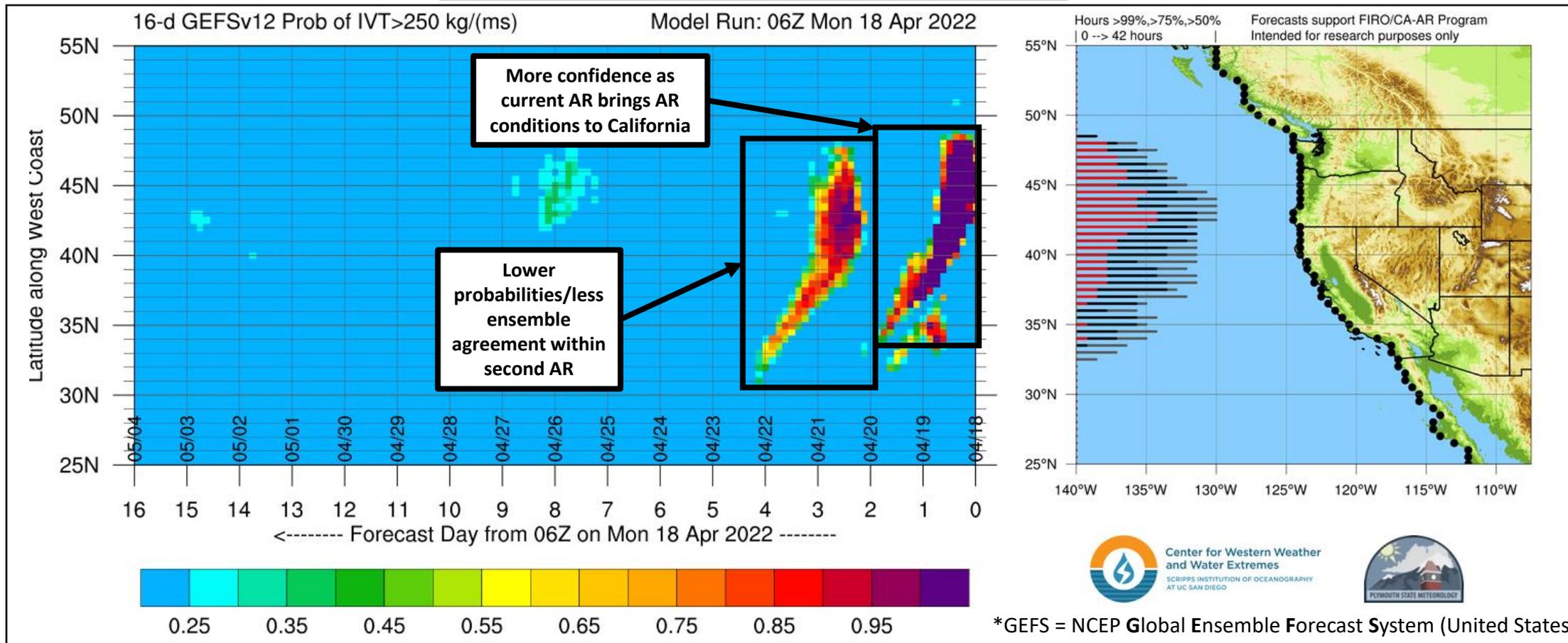
Initialized: 1200 UTC 04/18/2022

F-090: Valid: 0600 UTC 04/22/2022



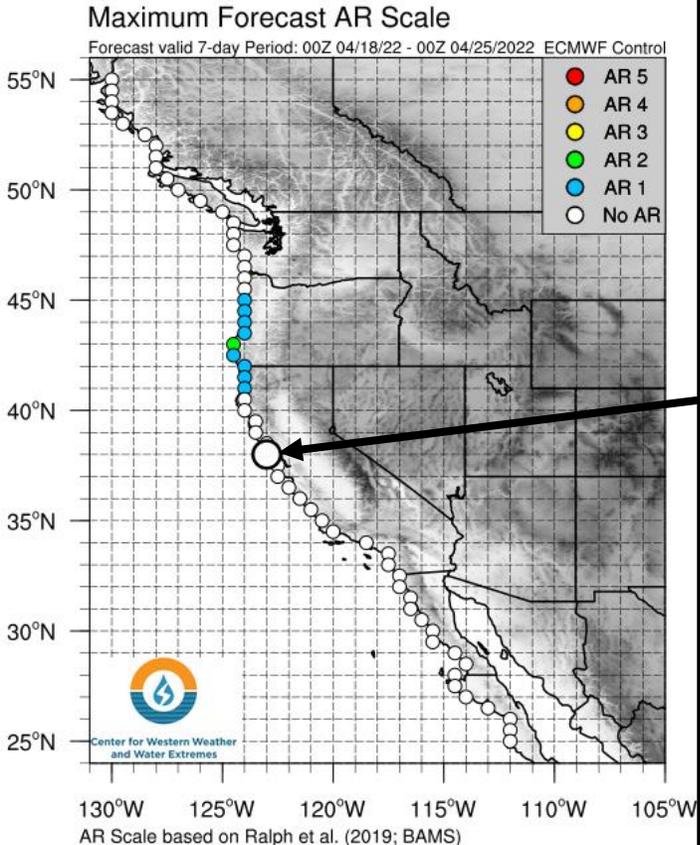
- The AR that is currently impacting the Pacific Northwest is forecast to move southward over the U.S. West Coast, bringing moderate AR conditions (IVT  $>500 \text{ kg/ms}$ ) to Northern California later today (Figure A)
- Another system is forecast to move-in behind the current AR, increasing the potential for addition precipitation on the 20<sup>th</sup> through the 21<sup>st</sup>
- The second AR is forecast to swing down the California coast, bringing weak AR conditions to Southern California late on the 21<sup>st</sup>

## Probability of AR Conditions Along Coast

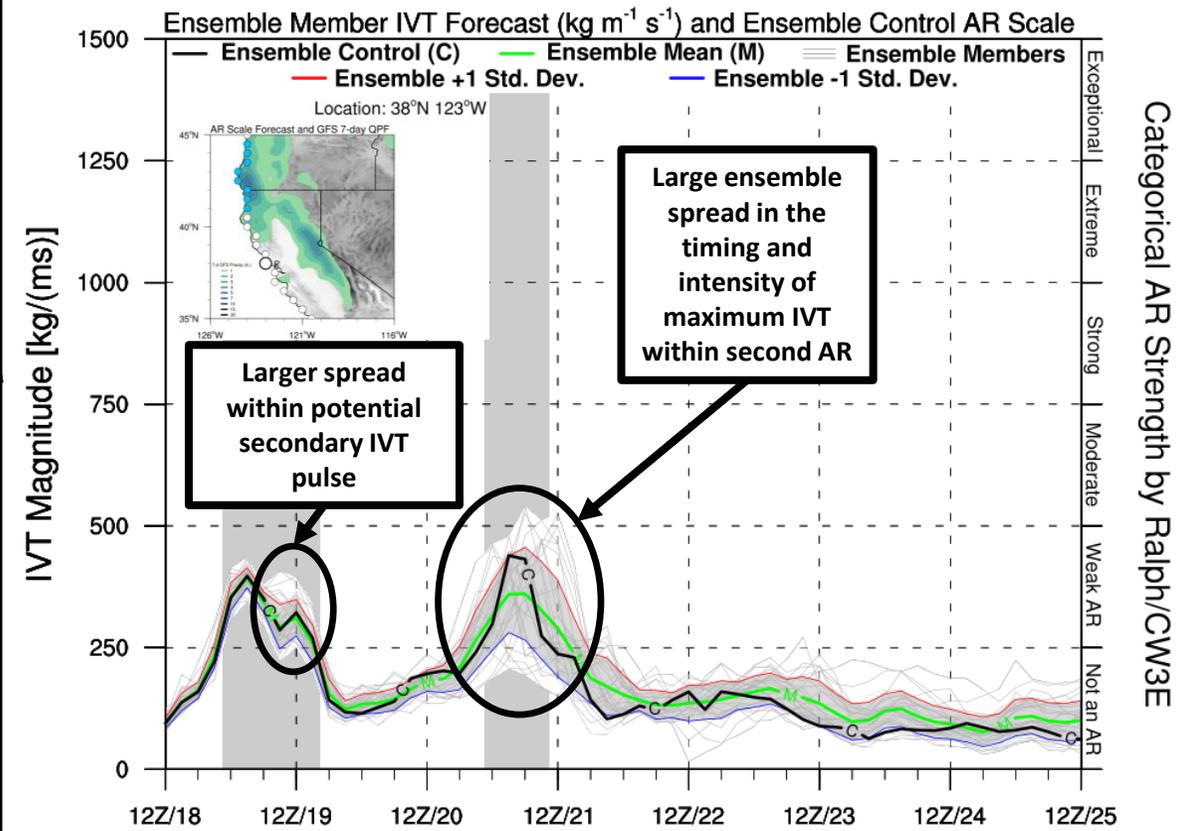


- The GEFS (initialized 06Z 18 April) is showing high ensemble agreement (>95%) in AR conditions (IVT >250 kg/(ms)) within the current AR over coastal locations from southern Washington to northern California throughout today and into tomorrow.
- The GEFS is exhibiting lower ensemble agreement of AR conditions associated with the second AR, especially over California, within a 6-to-18-hour period on the 20<sup>th</sup> and 21<sup>st</sup>.

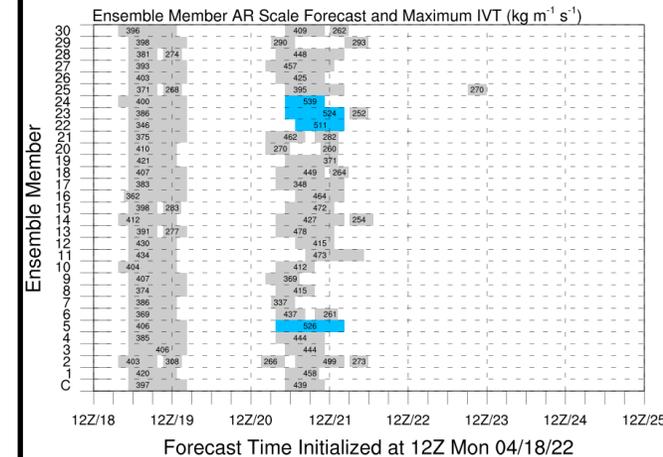
## GEFS AR Scale Forecast



## GFS Ensemble Initialized: 12Z Mon 04/18/22



Categorical AR Strength by Ralph/CW3E



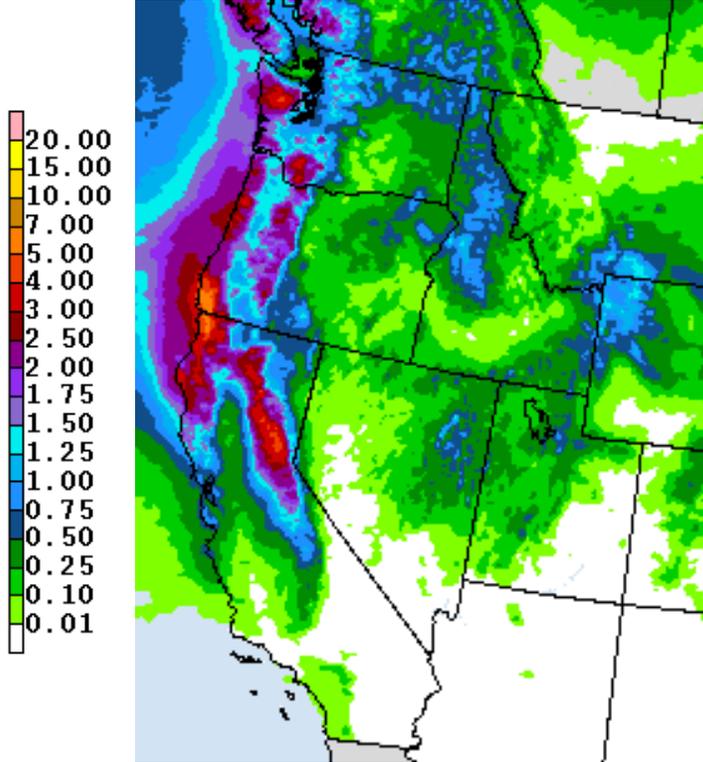
AR Scale	# of Ens.	% of Ens.
1	4	~13%
2	0	0%
3	0	0%
4	0	0%

Due to the relatively weak magnitude and short duration of these ARs, the GEFS is currently forecasting AR conditions that do not reach AR 1 status over a majority of CA

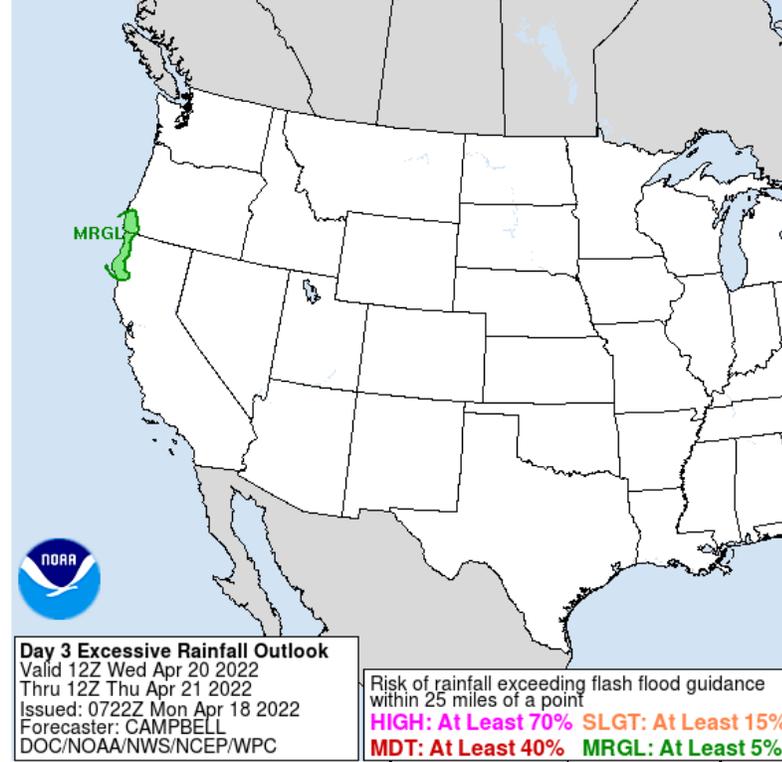
- The GEFS is currently indicating the potential for a secondary pulse of higher IVT magnitudes during the latter portions of the current event over NorCal
- There is currently larger ensemble spread in the timing, magnitude, and overall duration associated with the next AR

While a majority of GEFS members are not currently forecasting the next AR to bring AR 1+ conditions to N. CA, four members are forecasting AR 1 conditions

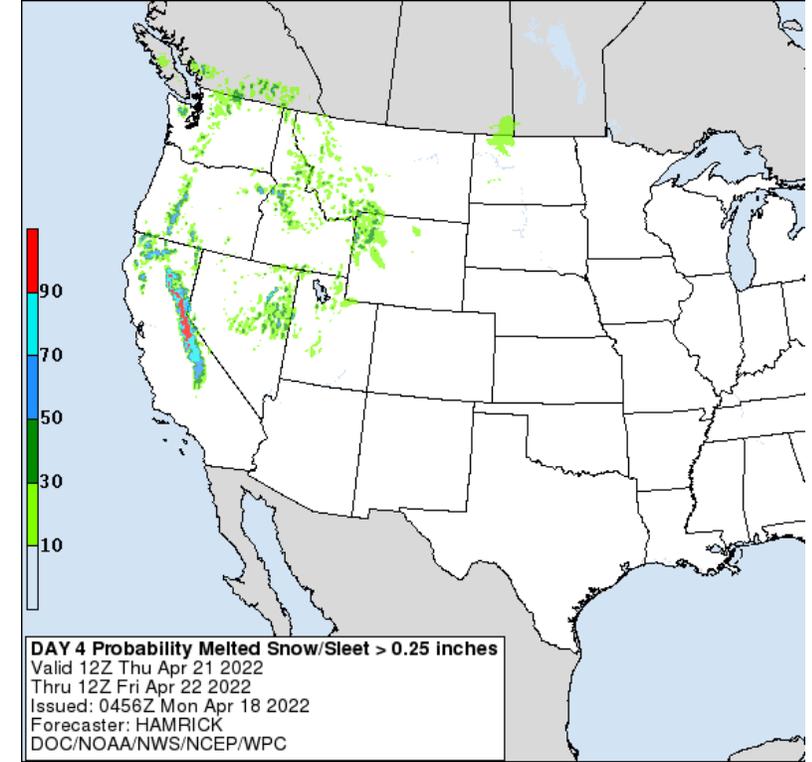
WPC 5-day QPF:  
Valid 4 AM PT 18–23 Apr



WPC Day 3 Excessive Rainfall Outlook



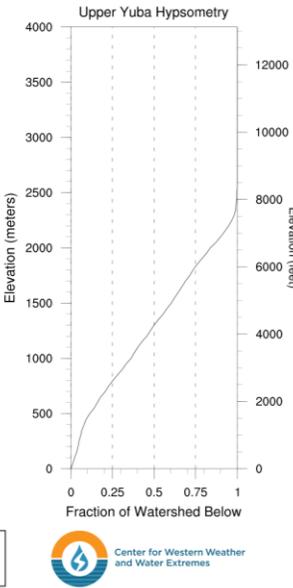
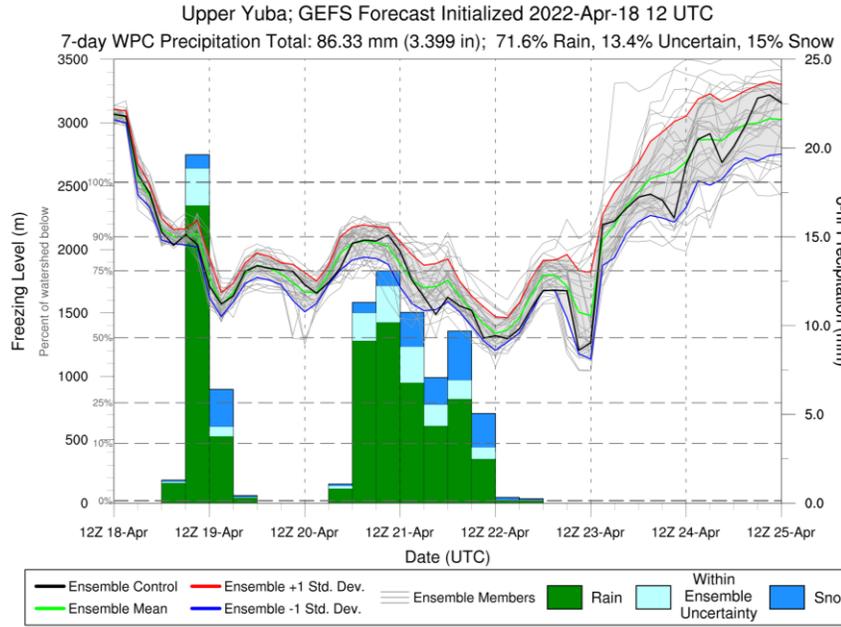
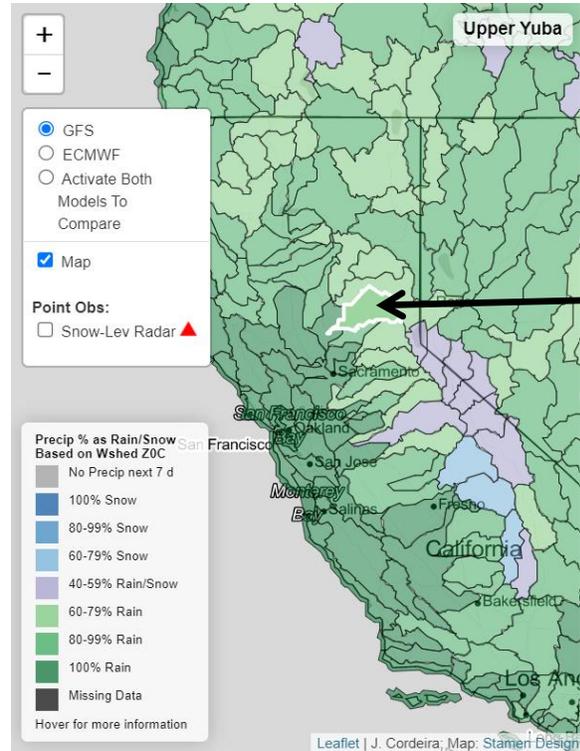
WPC Day 4 Probability of Snow/Sleet > 0.25 Inches



Source: NOAA/NWS Weather Prediction Center

- The NWS Weather Prediction Center (WPC) is forecasting at least 2–5 inches of precipitation over the Northern Sierra Nevada, Northern California Coast Ranges, and southern Oregon Coast Ranges during the next 5 days
- More than 5 inches of precipitation are possible near the Oregon/California border, where the WPC has issued a slight risk of rainfall exceeding flash flood guidance in association with the AR on 20–21 Apr
- Significant snowfall accumulations are likely in the higher elevations of the Sierra Nevada on 21–22 Apr

## Watershed Freezing Level and Precipitation Forecasts: Upper Yuba



**Hazardous Mountain Travel**  
 Valid 2 AM – 2 PM, Tuesday, April 19<sup>th</sup>, 2022

**Impacts**

- Snow covered roads
- Slippery roads
- Reduced visibilities at times
- Travel delays
- Chain controls

**Timing**

- Tuesday

**Forecast**

- 4" - 7" above 6500 feet, locally higher over mountain peaks

NWS Sacramento

Issued: April 18, 2022

- The WPC is forecasting about 3.4 inches of mean areal precipitation in the Upper Yuba watershed during the next 7 days
- Freezing levels are forecasted to drop below 7,000 ft tonight and remain below 7,000 ft through 22 Apr
- The drop in freezing levels will likely allow for significant snowfall accumulations in the higher terrain of the Northern Sierra Nevada where the National Weather Service has issued a Winter Weather Advisory