

CW3E Precipitation Outlook

For California DWR's AR Program

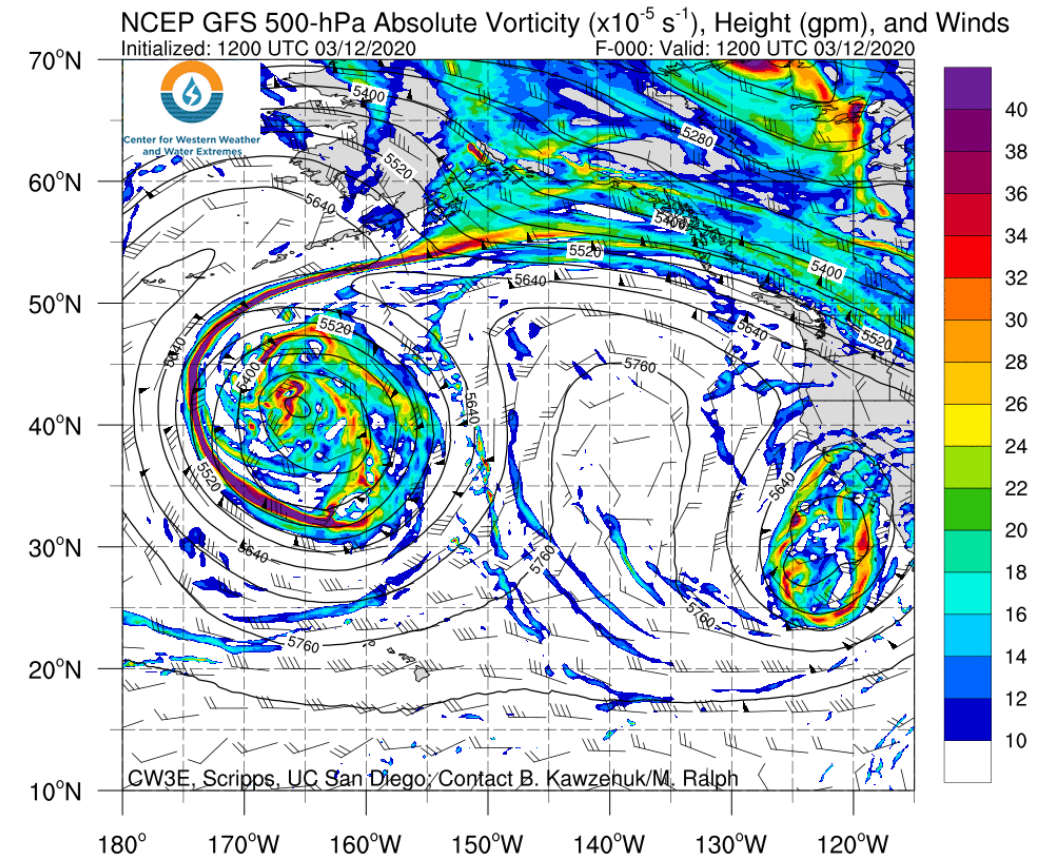
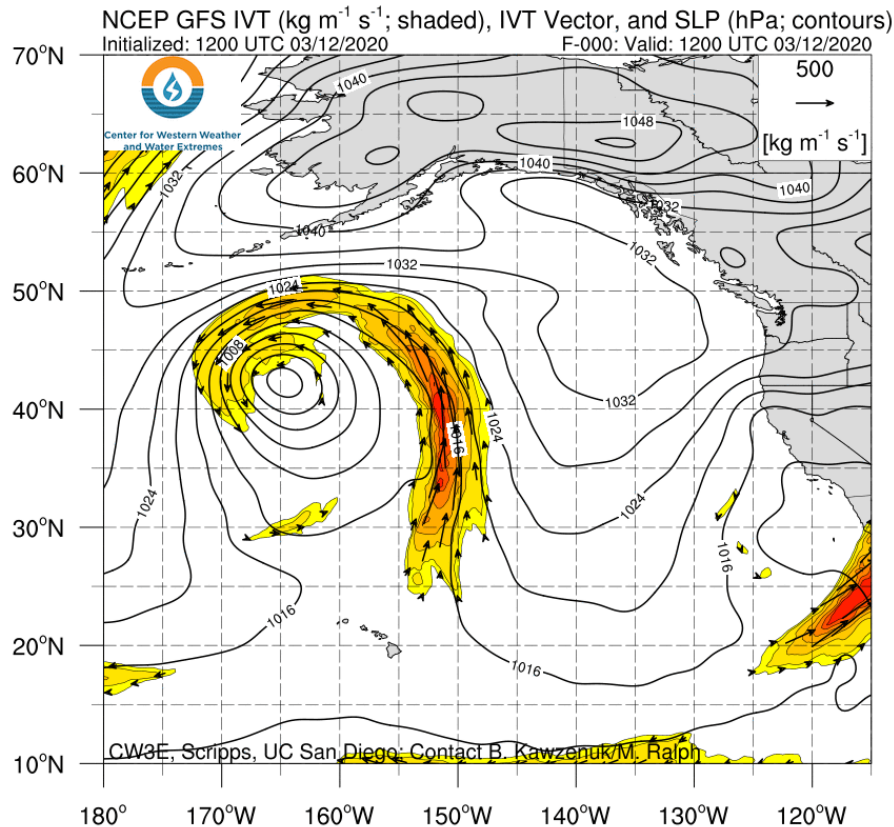


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A slow moving cutoff low pressure system is forecast to impact California for an extended period

- A Cutoff low is forecast to form off the Pacific Northwest Coast around 00 UTC 15 March (5 PM PDT 14 March 2020)
- The cutoff low is forecast to propagate slowly down the U.S. West Coast, bringing an extended period of precipitation to CA
- Portions of the Northern Sierra could receive as much as 5 inches of precipitation, potentially resulting in multiple feet of snow
- Due to an extended dry period in the previous several weeks, this forecast precipitation could bring some much needed relief to drought conditions across much of the state



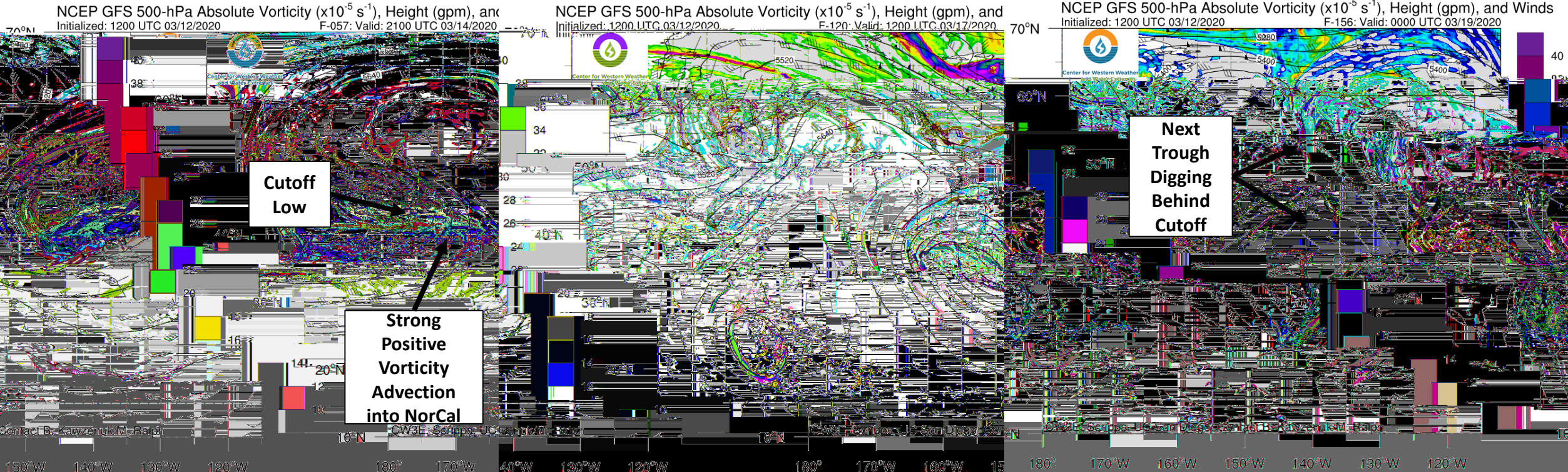
Precipitation Outlook: 12 Mar 2020

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- The low is forecast to become cutoff at 500-hPa, just offshore of Oregon, at ~21 UTC on 14 March 2020 (2 PM PST)
- Strong positive vorticity advection to the south of the low will provide support for precipitation over Northern California

The cutoff low slowly propagates down the California Coast, making its way over Central–Southern California by 12 UTC 17 March (5 AM PST)

The cutoff is forecast to begin to move inland at approximately 00 UTC 19 March (5 PM PST 18 March) while another trough is forecast to dig upstream of the cutoff from the Gulf of Alaska

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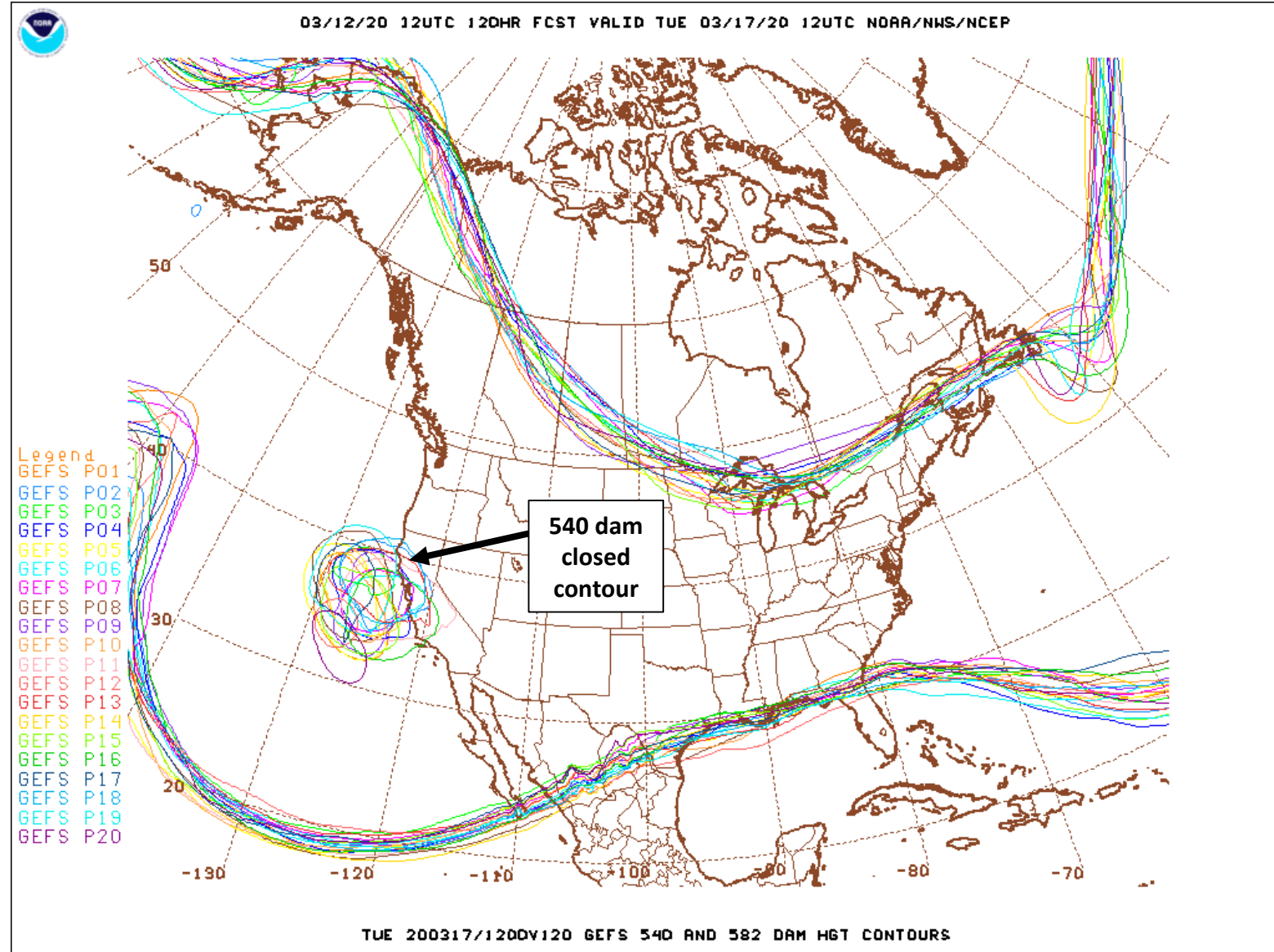
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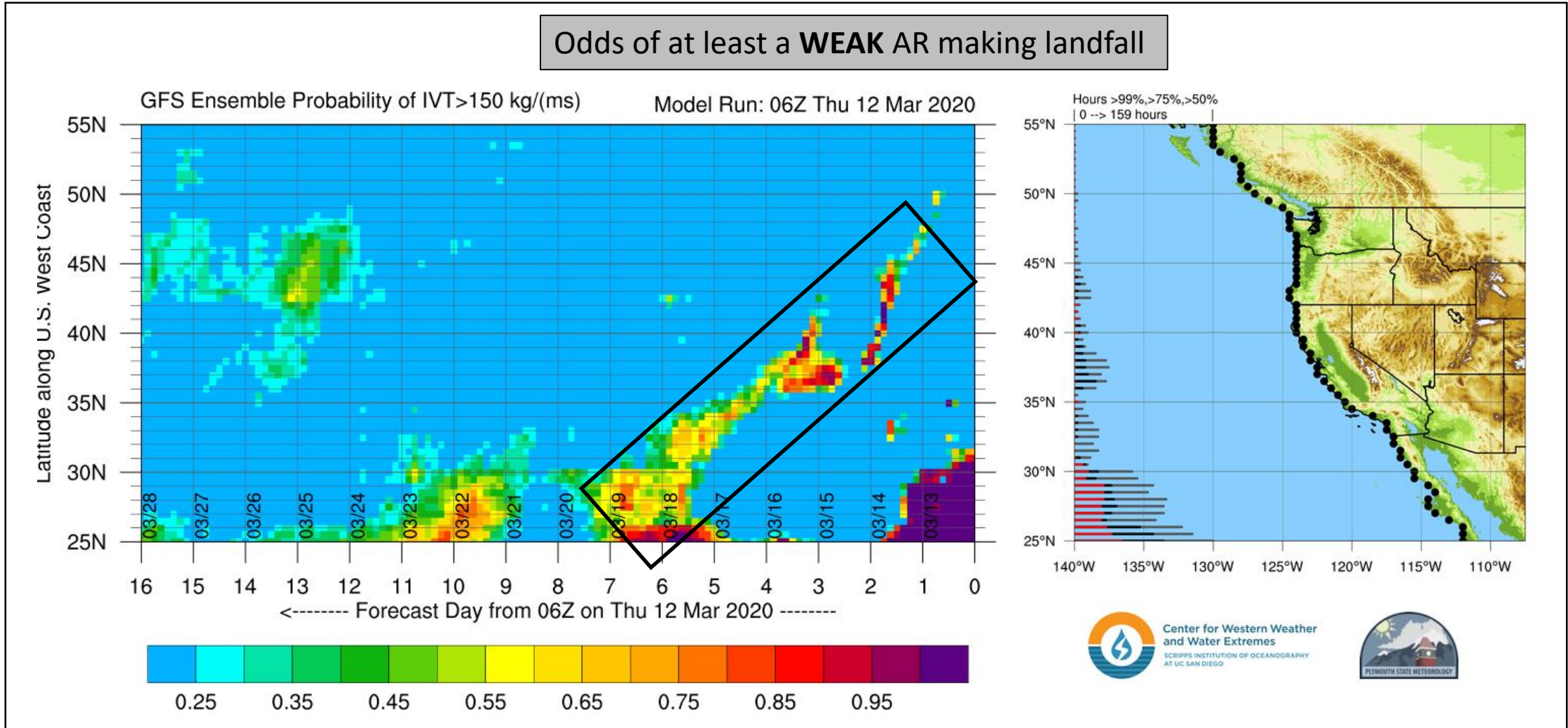
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- The 540 dam contours in the GEFS suggest that there is some forecast uncertainty in the location and spatial extent of the cutoff low at 500-hPa at 12 UTC 17 March
- There are a couple of ensemble members that have the cutoff far offshore, which would result in less impacts produced by the low over California
- Other ensemble members are faster to propagate the low down the coast, which would result in a shorter duration event and lower precipitation accumulations
- The ensemble spread during this portion of the forecast suggest there is potentially lower confidence in precipitation accumulation forecasts throughout California





Odds of at least a **WEAK** AR making landfall



- As the cutoff propagates down the USWC, there is a moderate to high probability (>55% of ensemble members) of IVT $>150 \text{ kg m}^{-1} \text{ s}^{-1}$
- While 150 units of IVT is low relative to atmospheric river standards, it is still indicative of strong onshore flow embedded in the southern quadrants of the cutoff and could support upslope moisture flux and orographic precipitation on top of the synoptic precip.

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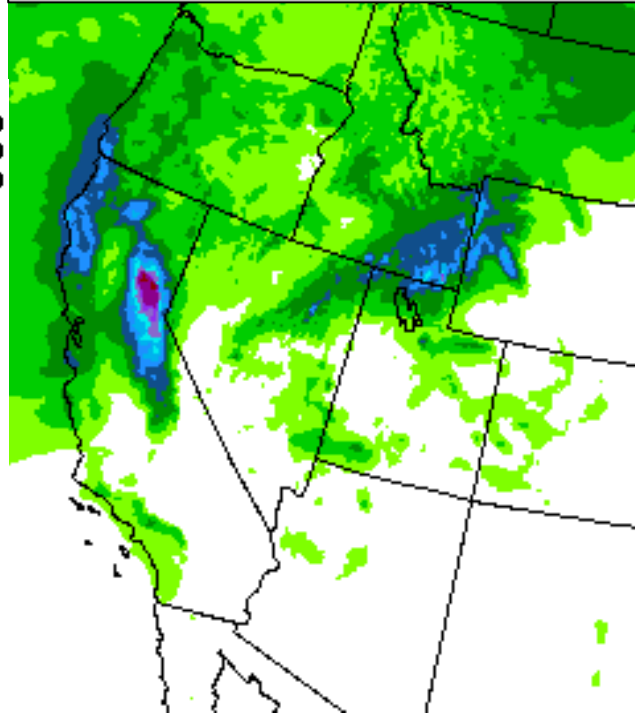
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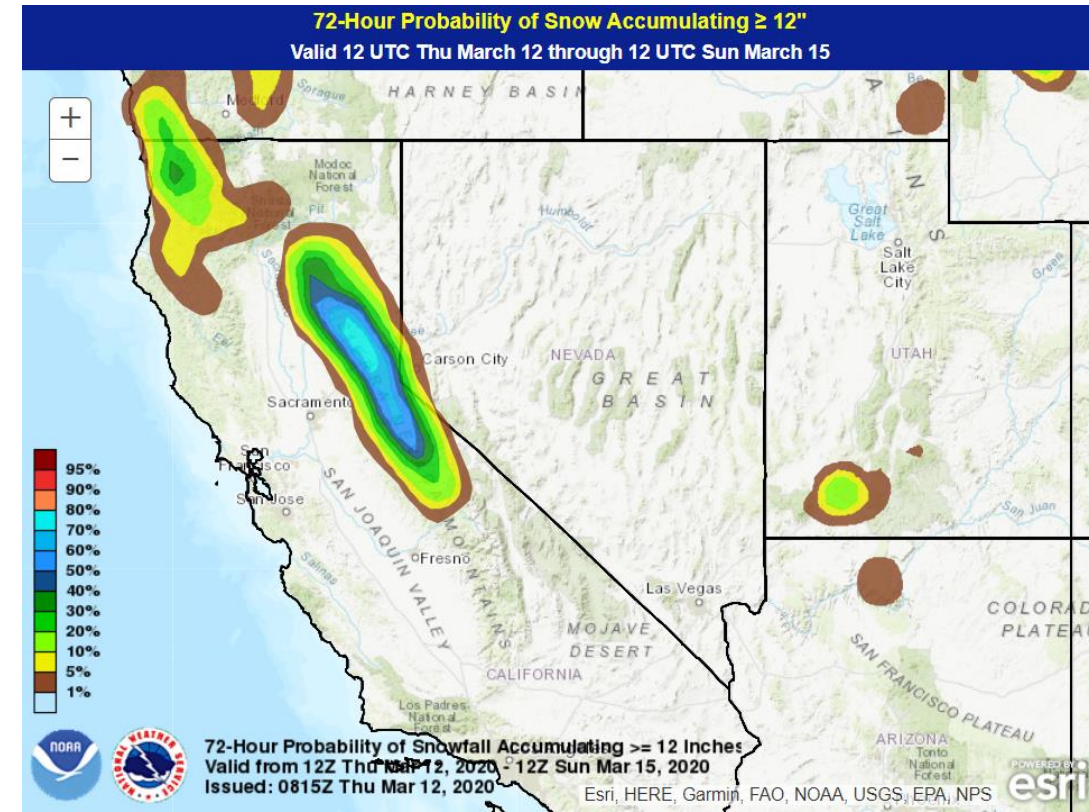
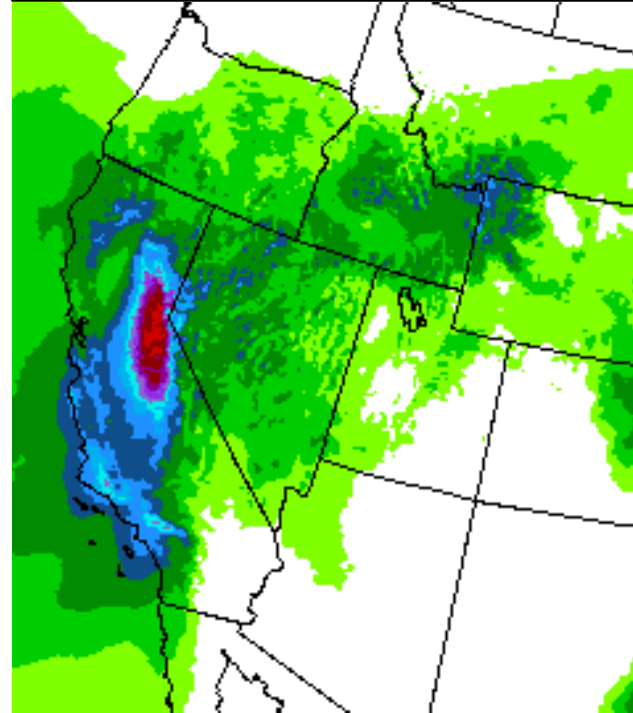
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WPC 24-h QPF
Valid 1200 UTC 14–15 Mar



WPC 48-h QPF
Valid 1200 UTC 15–17 Mar



Source: NOAA/NWS Weather Prediction Center, <https://www.wpc.ncep.noaa.gov/>

- The heaviest precipitation is forecast over the Central and Northern Sierras between 1200 UTC 14 Mar and 1200 UTC 17 Mar
- Some areas may receive more than 5 inches of total precipitation during this 72-hour period
- As the cutoff low slowly drifts southward, lighter precipitation amounts (1–2 inches) are forecast over coastal portions of Central and Southern California
- More than 12 inches of snow are possible (> 50% probability) over the Northern Sierras by 1200 UTC 15 Mar, with additional significant accumulations likely through 18 Mar

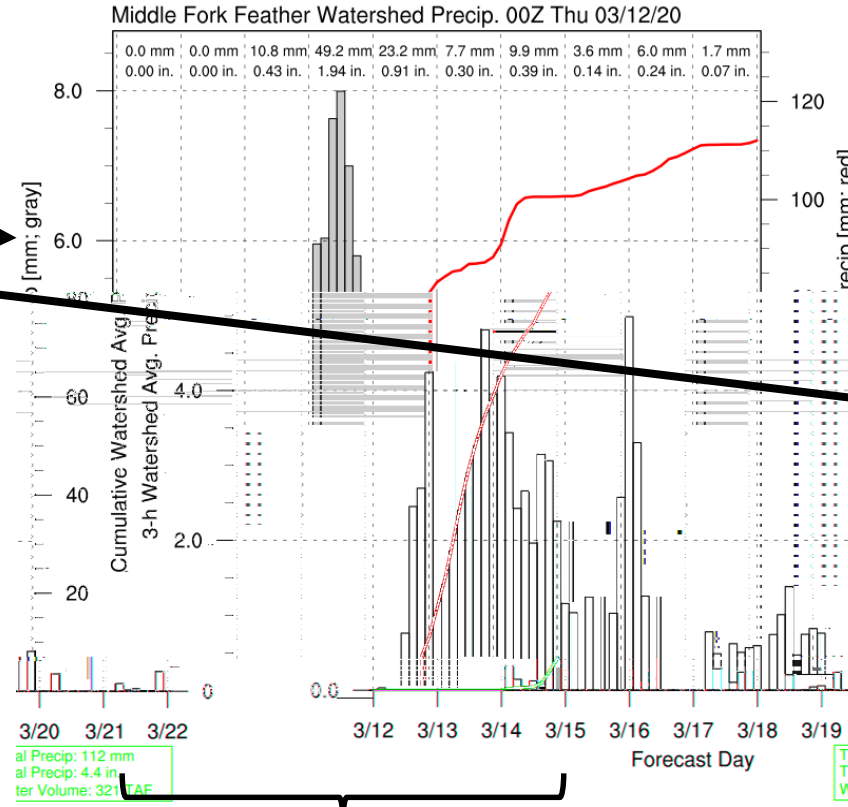
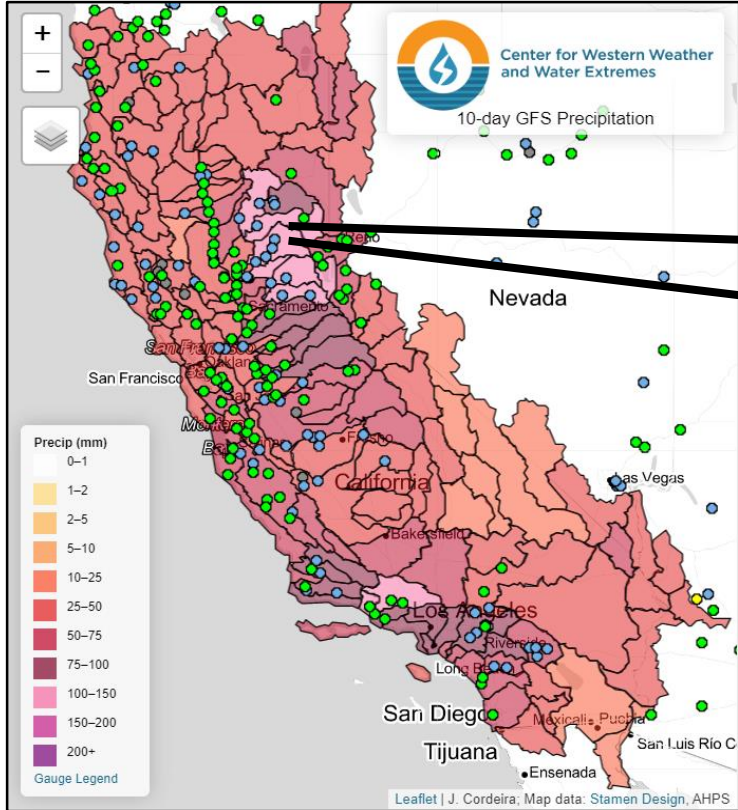
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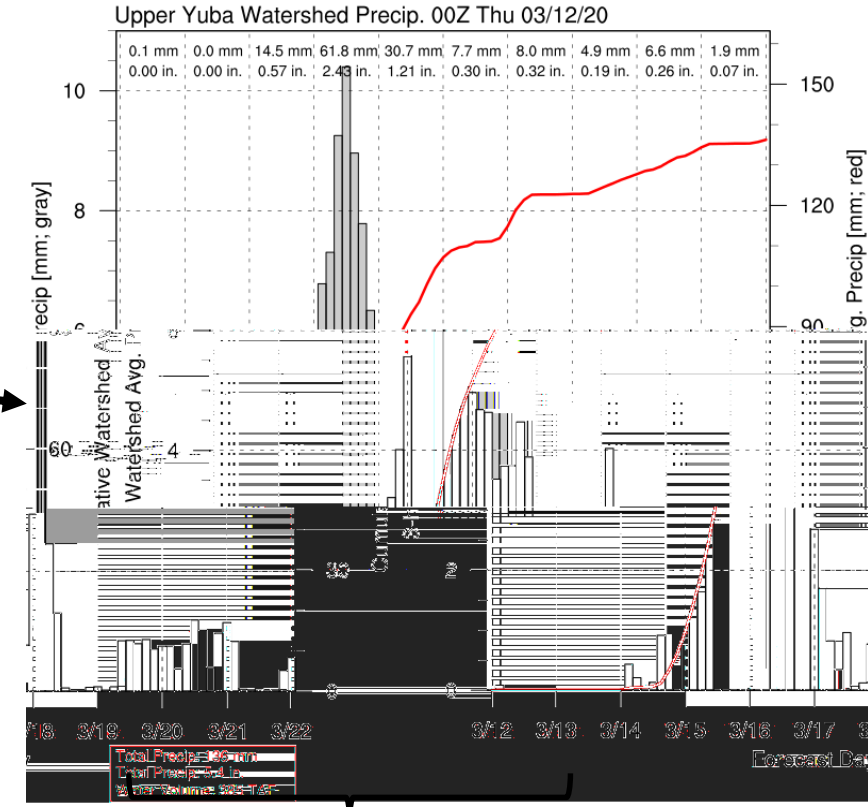


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GFS 10-day Watershed Precipitation Forecasts



3.97 in



4.83 in

- 00Z 12 Mar GFS run is forecasting about 4 inches of mean aerial precipitation over the Middle Fork Feather Watershed and nearly 5 inches of mean aerial precipitation over the Upper Yuba Watershed by 0000 UTC 19 Mar

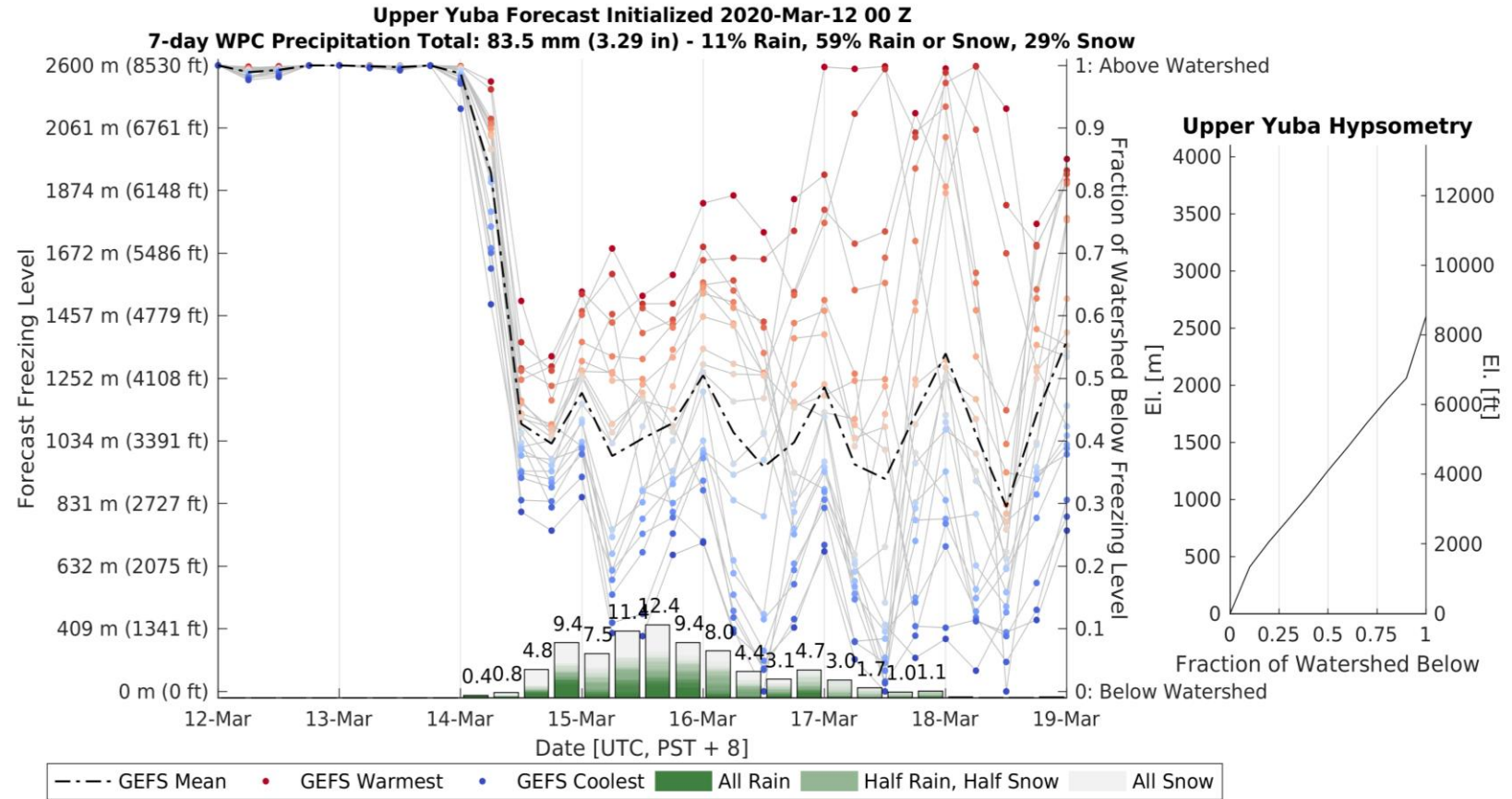
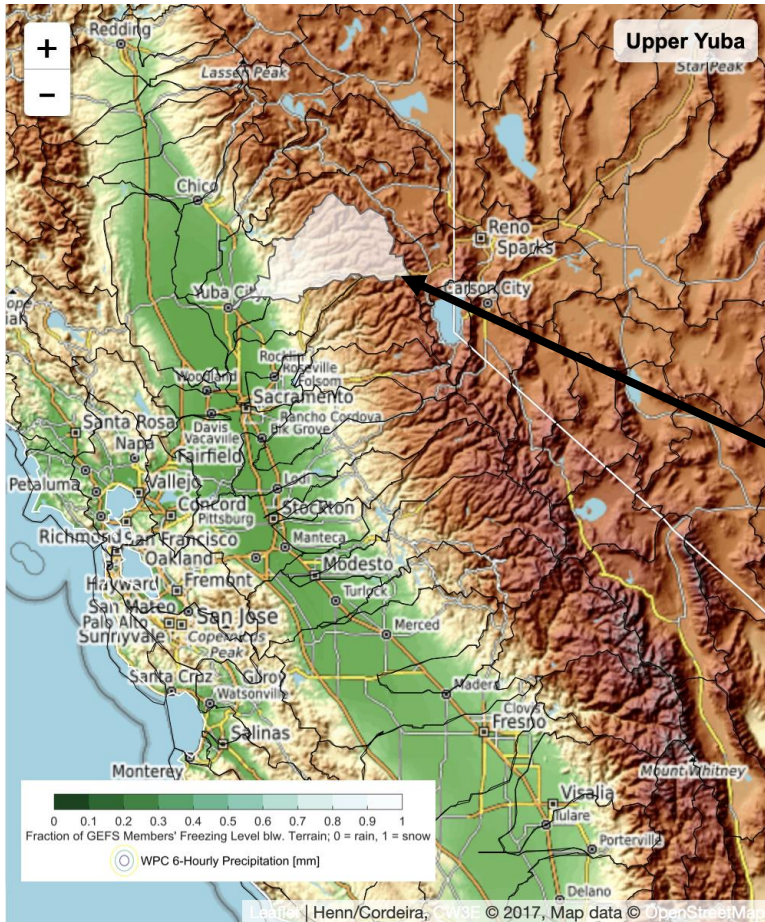
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- All GEFS members suggest a rapid decrease in freezing level over the Upper Yuba Watershed between 0000 UTC and 1200 UTC 14 Mar
- Beyond 1200 UTC 14 Mar, there is a large degree of uncertainty in forecast freezing level, and thus a large degree of uncertainty in how much precipitation will fall as rain versus snow

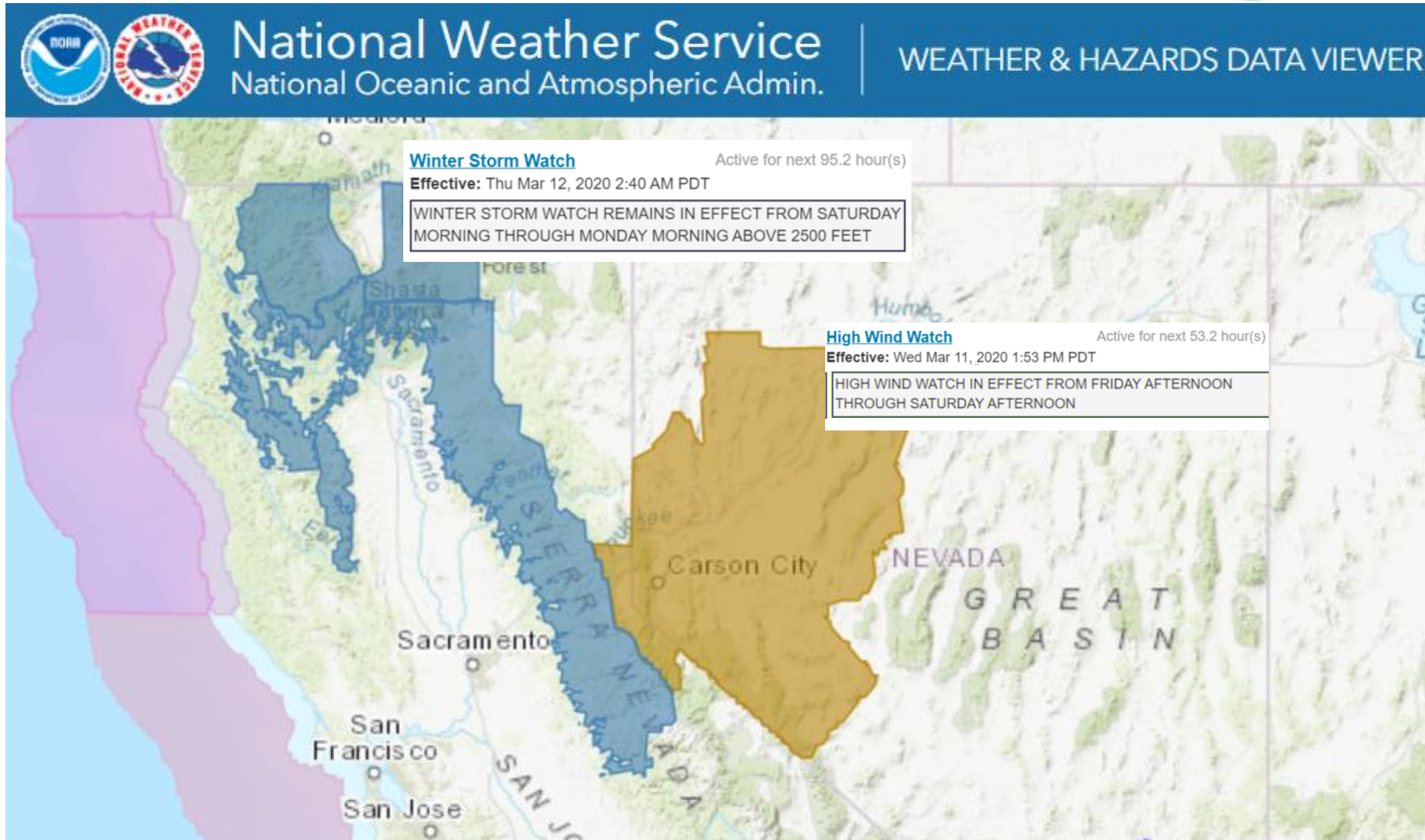
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- Due to the potential for heavy snow, the National Weather Service has issued a winter storm watch from Saturday morning through Monday morning for the Northern Sierra, Mt. Shasta, Trinity Alps, and a small portion of the Coastal Range

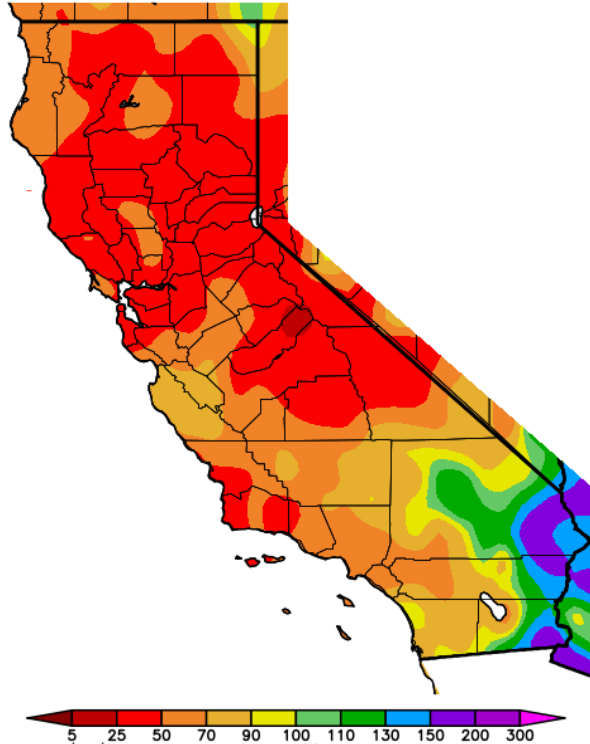
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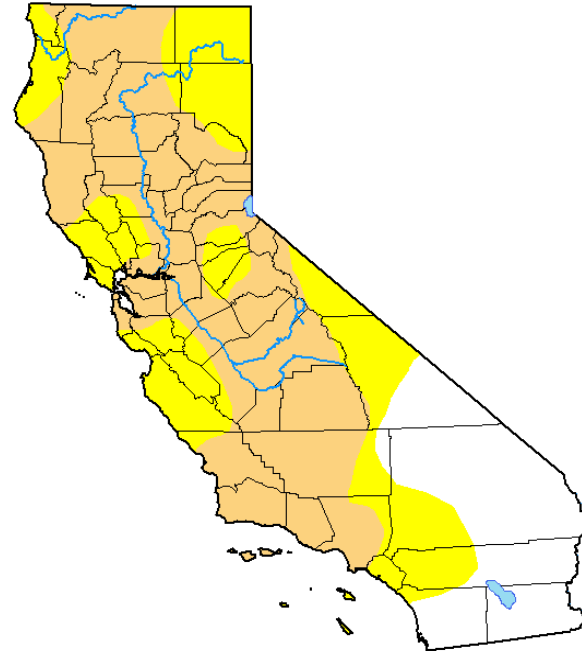
Percent of Average Precipitation (%)
10/1/2019 – 3/11/2020



Generated 3/12/2020 at WRCC using provisional data.
NOAA Regional Climate Centers

Source: WRCC, <https://wrcc.dri.edu/>

U.S. Drought Monitor California



March 10, 2020

(Released Thursday, Mar. 12, 2020)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0	D1	D2	D3	D4
Current	21.50	30.41	48.09	0.00	0.00	0.00
Last Week 03-03-2020	30.26	35.58	34.16	0.00	0.00	0.00
3 Months Ago 12-10-2019	96.43	3.57	0.00	0.00	0.00	0.00
Start of Calendar Year 12-31-2019	96.43	3.57	0.00	0.00	0.00	0.00
Start of Water Year 10-01-2019	95.29	2.64	2.06	0.00	0.00	0.00
One Year Ago 03-12-2019	93.42	6.58	0.00	0.00	0.00	0.00

Intensity:

None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate Drought	D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions.
Local conditions may vary. For more information on the
Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Adam Hartman
NOAA/NWS/NCEP/CPC



droughtmonitor.unl.edu

Source: National Drought Mitigation Center, UNL, <https://droughtmonitor.unl.edu/>

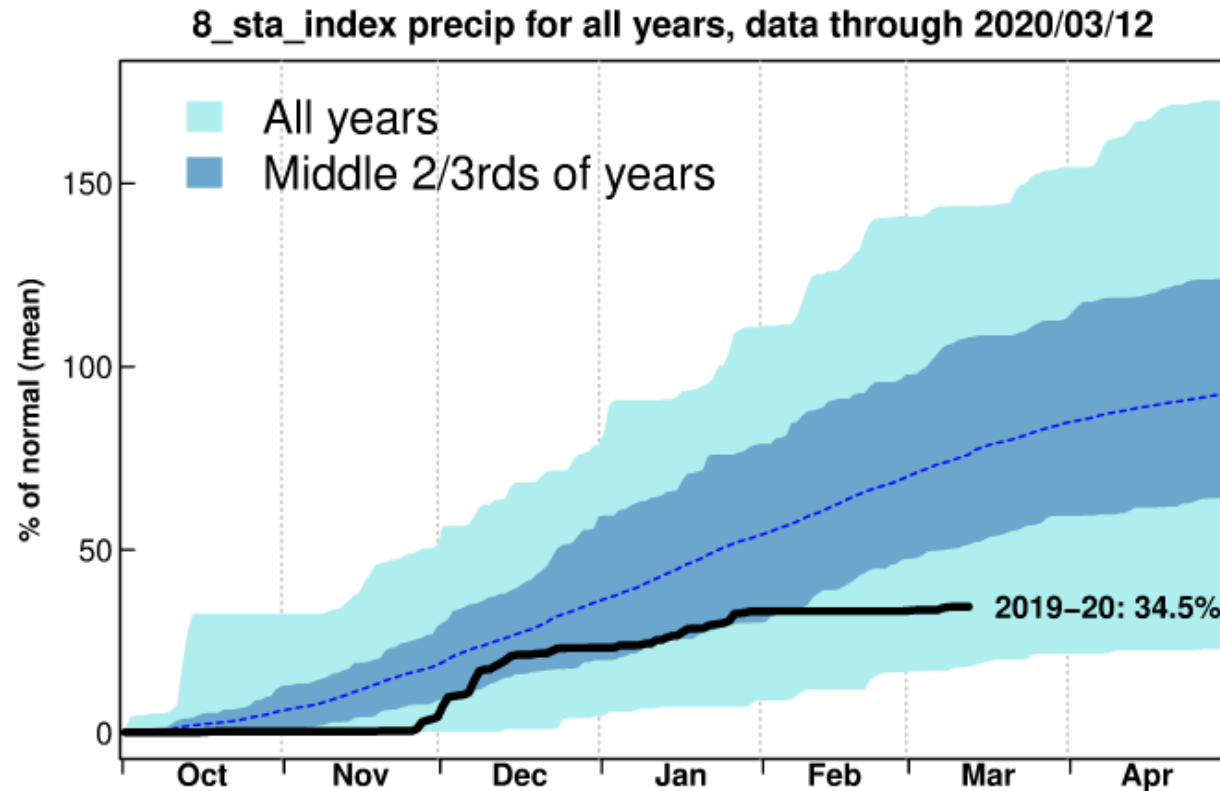
- This event will bring some relief to a region that has experienced abnormally dry conditions over the past two months
- Water year-to-date precipitation is less than 50% of normal over the Sierra Nevada
- A prolonged period of dry weather has led to the development of short-term drought conditions across Central and Northern California
- As of 10 Mar, 48% of the state was experiencing moderate drought conditions

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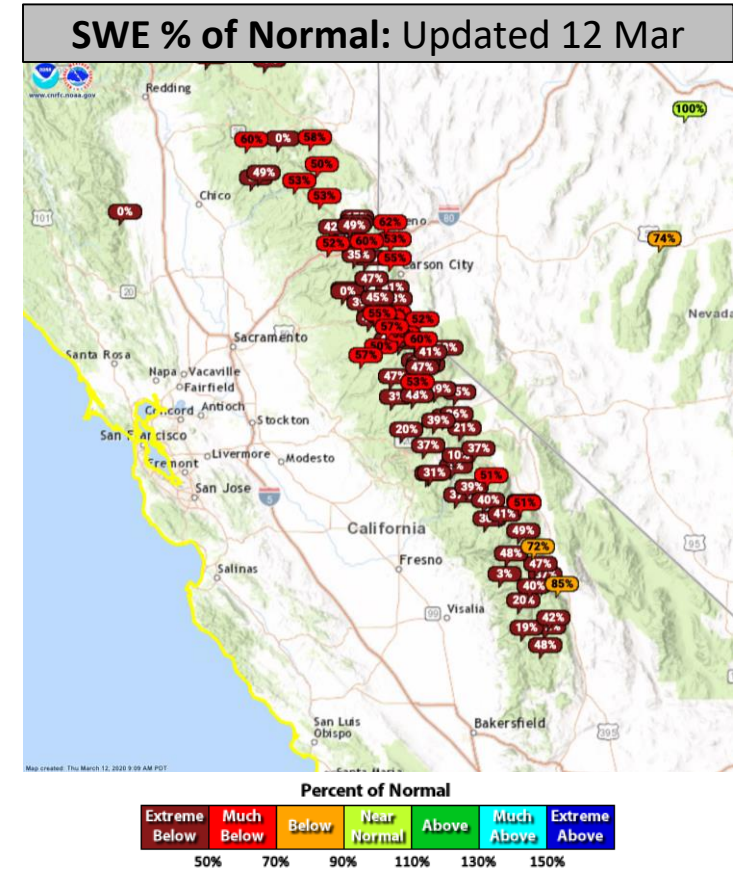
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Source: California-Nevada Applications Program, <https://scripps.ucsd.edu/programs/cnap/>



Source: NOAA/NWS CNRFC, <https://www.cnrfc.noaa.gov/>

- Based on the 8-station index, the Northern Sierras have received only 34.5% of the normal total water year precipitation through 12 Mar (compared to a typical value of 76%)
- As of 12 Mar, snow water equivalent is less than 50% of normal throughout much of the Sierra Nevada