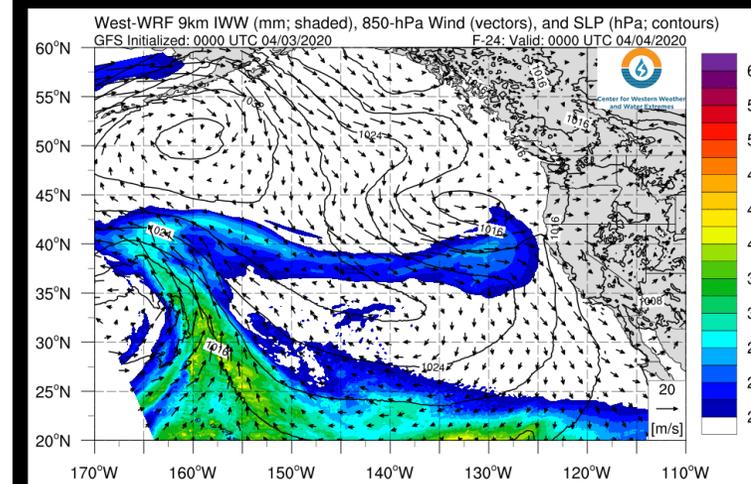
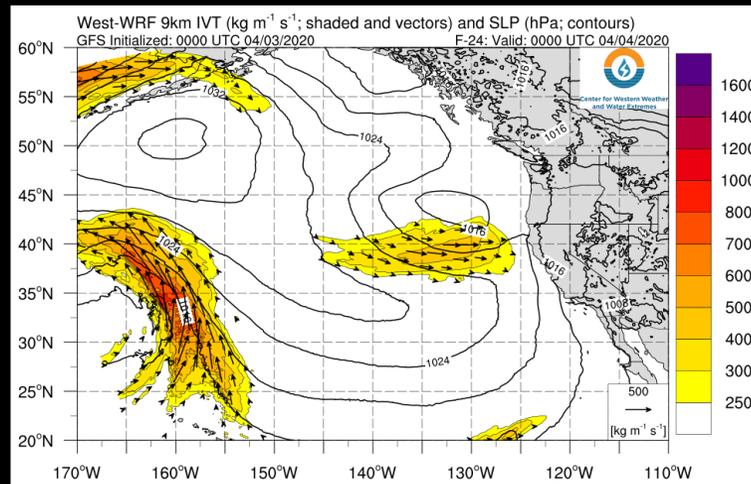




## An upper-level trough and a landfalling AR will bring rainfall and mountain snowfall to California

- An amplifying upper-level trough will form a closed low as it slowly moves along the U.S. West Coast
- A weak AR is forecast to develop south of the trough and bring AR conditions to Central and Southern California
- Moderate rainfall (0.5–2 inches) is expected at lower elevations, with higher amounts (2–4 inches) in the Northern California Coast Ranges, Klamath Mountains, and Southern California Transverse Ranges
- The heaviest precipitation (3–5 inches) is expected over the Sierra Nevada, with 2–4 feet of snow possible in some areas



# AR Outlook: 3 Apr 2020

For California DWR's AR Program



Center for Western Weather and Water Extremes

SCRIPPS INSTITUTION OF OCEANOGRAPHY  
AT UC SAN DIEGO



## Mountain Snow this Weekend

Saturday thru Monday, April 4-6, 2020

### Impacts



Possible chain controls



Travel delays and slick roads

### Snow Levels

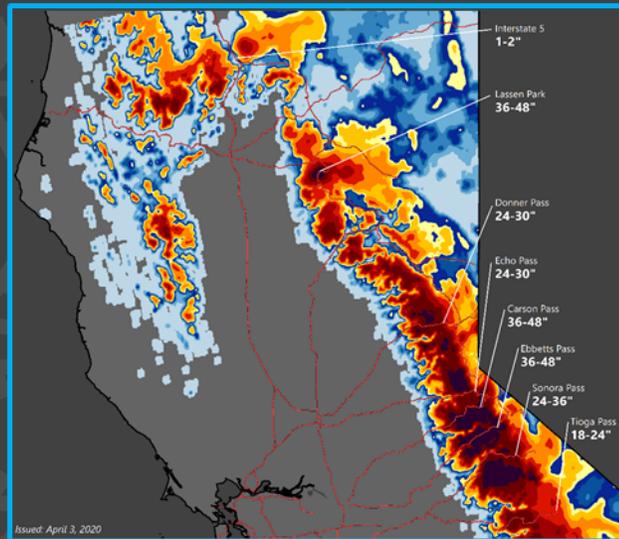


4000' – 5000' over the weekend,  
lowering to 3000' – 4000' on  
Monday

### Timing



Saturday thru Monday.  
Heaviest Sunday



Issued: April 3, 2020

NWS Sacramento  
Issued: April 3, 2020



## Valley Rain this Weekend

Saturday thru Monday, April 4-6, 2020

### Valley Impacts



Light rain to moderate rain



Longer than normal travel  
times

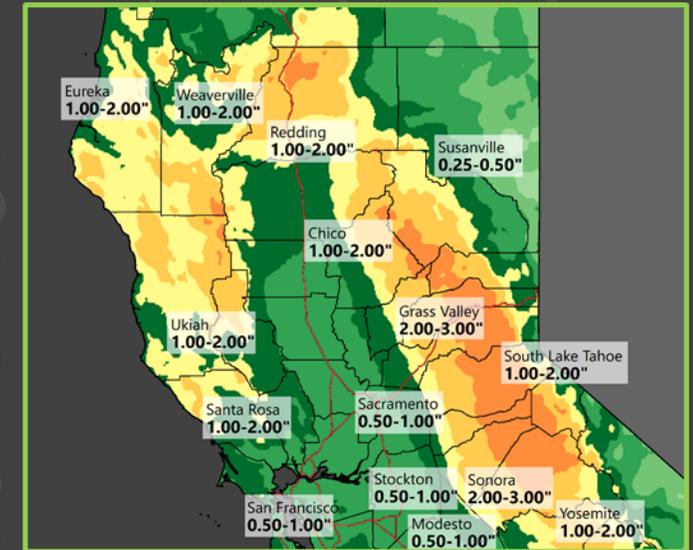


Isolated t-storms Sunday

### Timing



Saturday thru Monday.  
Heaviest Sunday



NWS Sacramento  
Issued: April 2, 2020



Source: NOAA/NWS Sacramento WFO, <https://www.weather.gov/sto/>

# AR Outlook: 3 Apr 2020

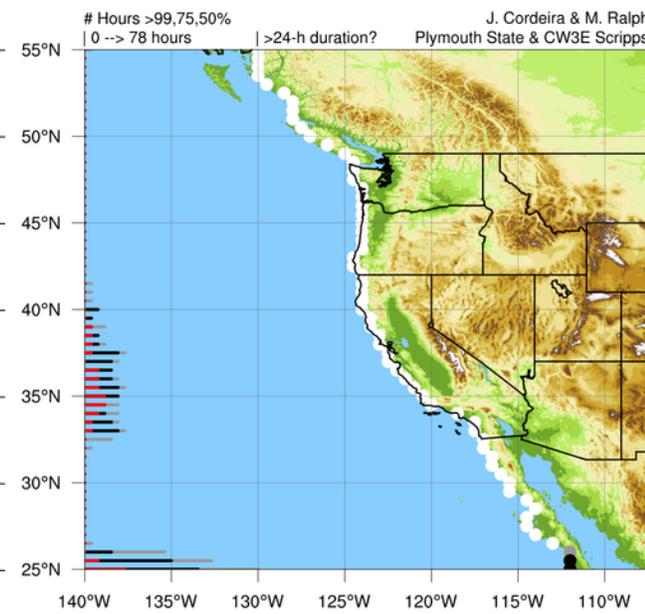
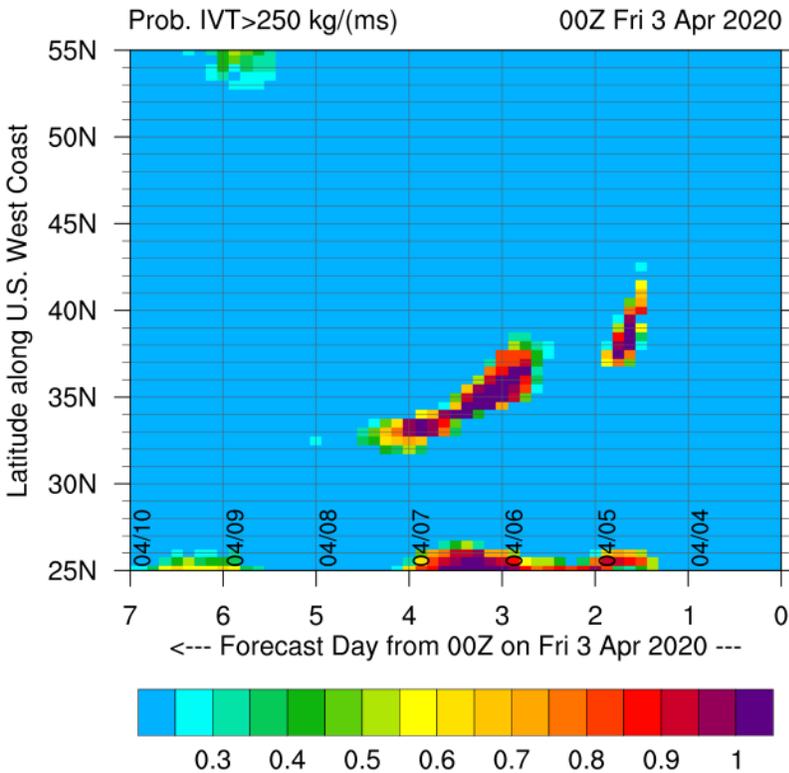
For California DWR's AR Program



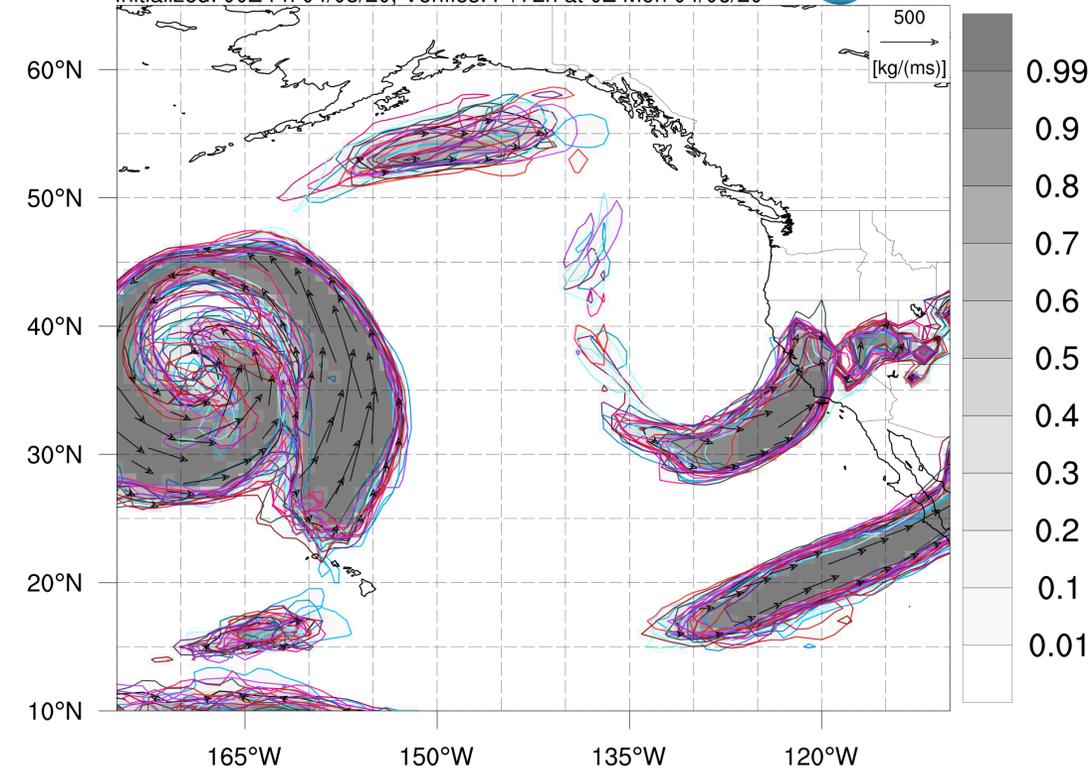
Center for Western Weather and Water Extremes

SCRIPPS INSTITUTION OF OCEANOGRAPHY  
AT UC SAN DIEGO

## GEFS AR Landfall Probability & IVT Spaghetti Plots



NCEP GEFS Prob IVT>250 kg/(ms) + 250 kg/(ms) Contours  
Initialized: 00Z Fri 04/03/20, Verifies: F+72h at 0Z Mon 04/06/20



- AR landfall tool shows high confidence (> 90%) in a brief period of AR conditions over Central and Southern California on 5–6 Apr
- There is good agreement among GEFS members regarding the location, orientation, and intensity of this landfalling AR
- A separate period of AR conditions over Northern California is also very likely (> 90% probability) on 4 April

# AR Outlook: 3 Apr 2020

For California DWR's AR Program

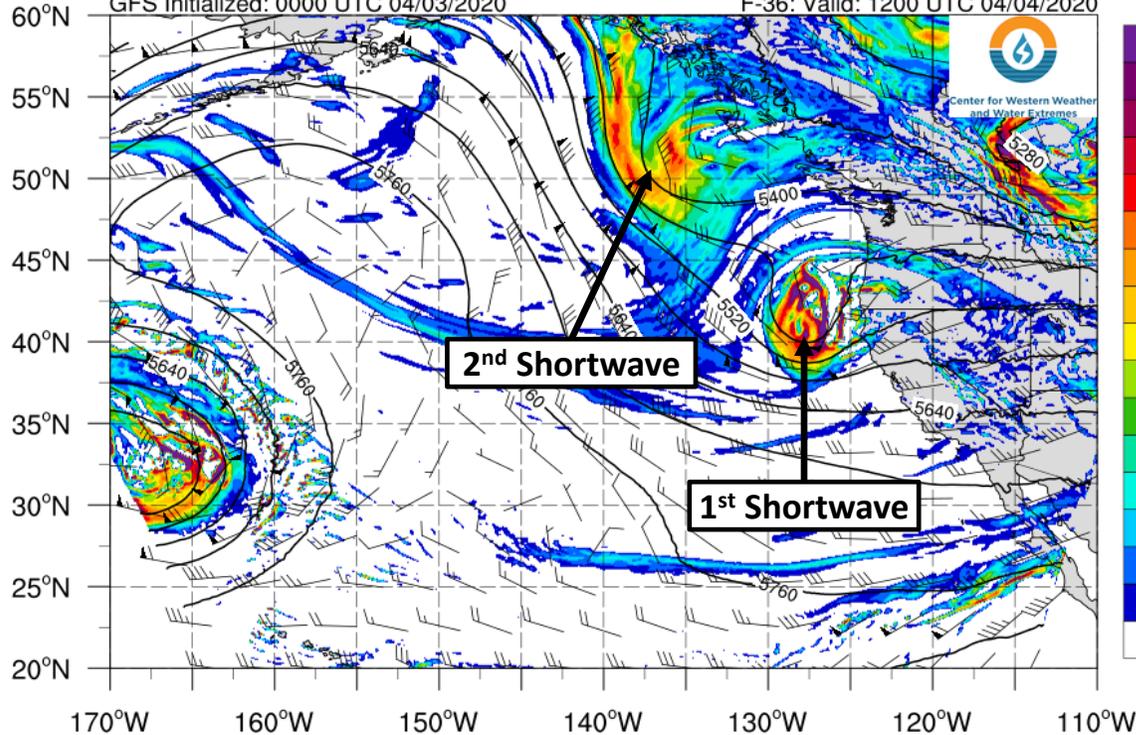


Center for Western Weather and Water Extremes

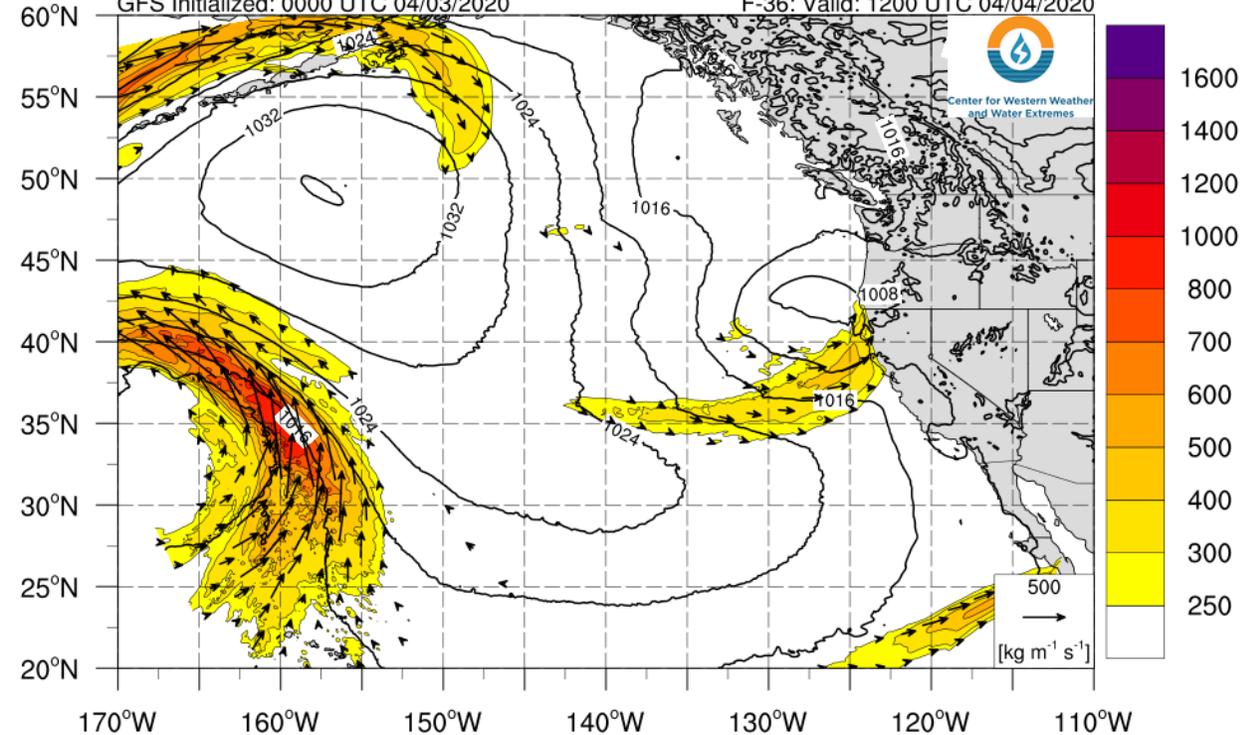
SCRIPPS INSTITUTION OF OCEANOGRAPHY  
AT UC SAN DIEGO

## West-WRF Forecasts: Valid 1200 UTC 4 Apr

West-WRF 9km 500-hPa Absolute Vorticity ( $\times 10^{-5} \text{ s}^{-1}$ ), Height (gpm), and Winds  
GFS Initialized: 0000 UTC 04/03/2020 F-36: Valid: 1200 UTC 04/04/2020



West-WRF 9km IVT ( $\text{kg m}^{-1} \text{ s}^{-1}$ ; shaded and vectors) and SLP (hPa; contours)  
GFS Initialized: 0000 UTC 04/03/2020 F-36: Valid: 1200 UTC 04/04/2020



- Before the main event, a 500-hPa shortwave trough and associated region of enhanced IVT will bring an initial period of precipitation to Northern California
- This region of enhanced IVT is expected to quickly dissipate as the shortwave propagates eastward
- Note the second 500-hPa shortwave trough, which will play a major role during the main precipitation event

# AR Outlook: 3 Apr 2020

For California DWR's AR Program

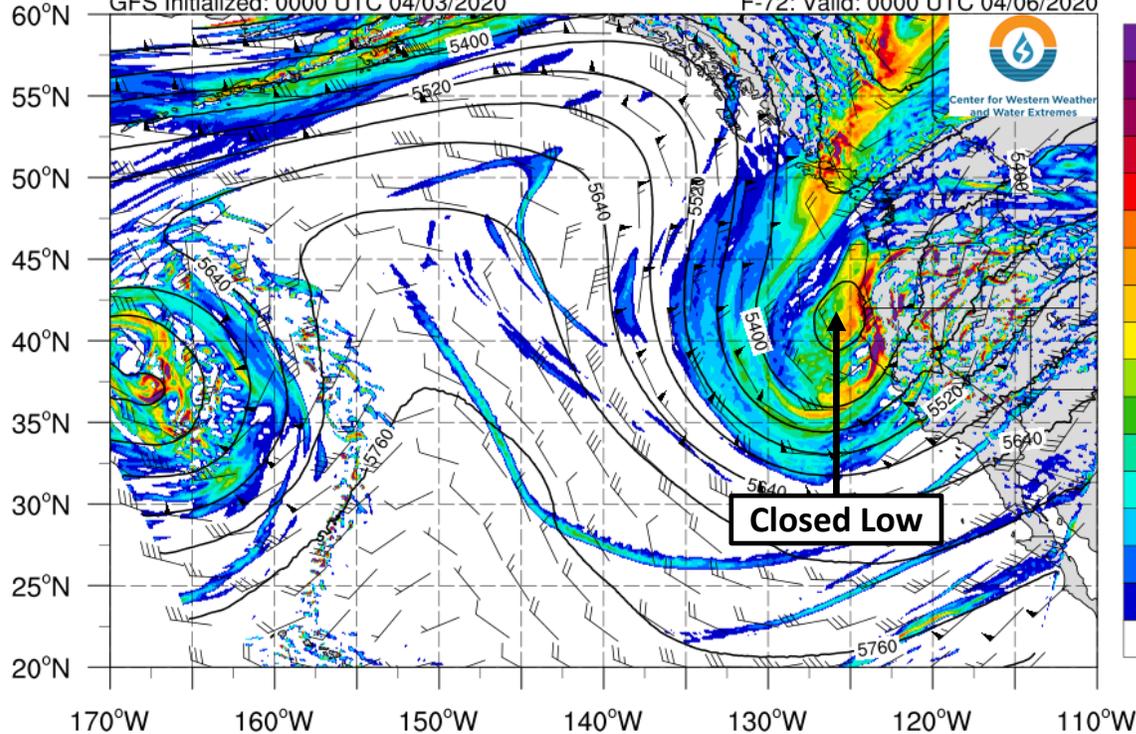


Center for Western Weather and Water Extremes

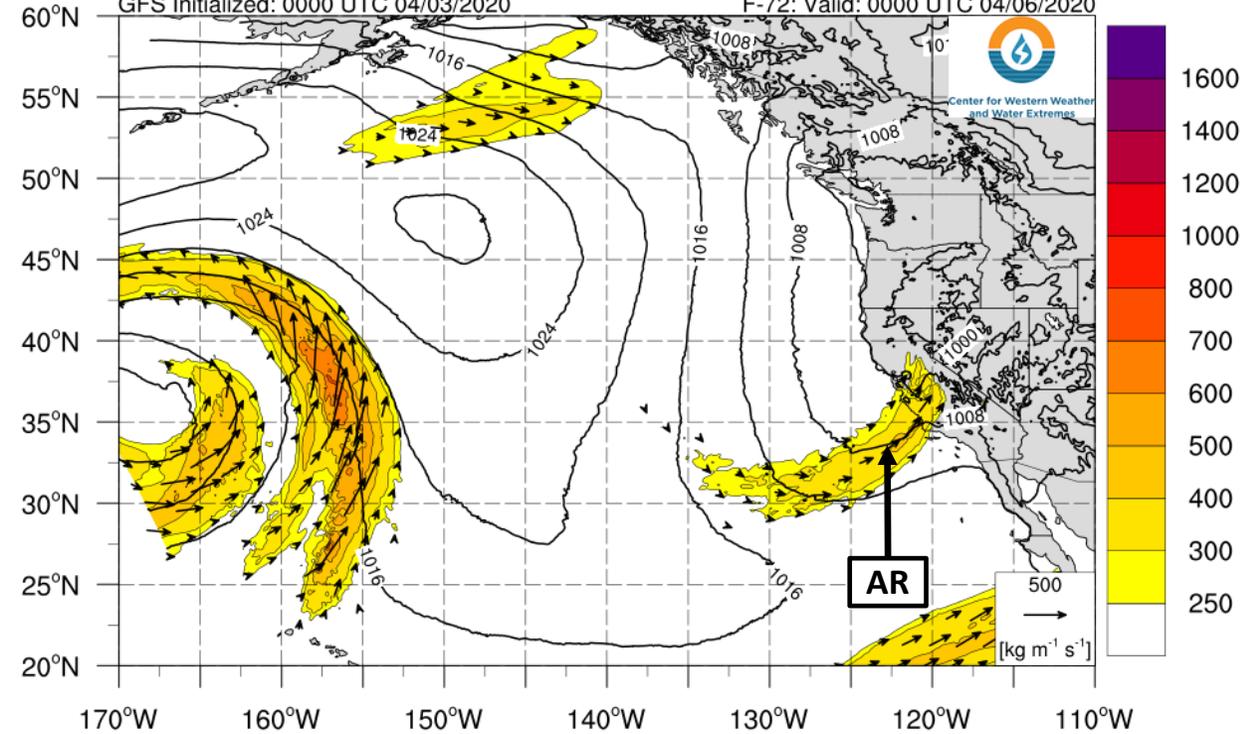
SCRIPPS INSTITUTION OF OCEANOGRAPHY  
AT UC SAN DIEGO

## West-WRF Forecasts: Valid 0000 UTC 6 Apr

West-WRF 9km 500-hPa Absolute Vorticity ( $\times 10^{-5} \text{ s}^{-1}$ ), Height (gpm), and Winds  
GFS Initialized: 0000 UTC 04/03/2020 F-72: Valid: 0000 UTC 04/06/2020



West-WRF 9km IVT ( $\text{kg m}^{-1} \text{ s}^{-1}$ ; shaded and vectors) and SLP (hPa; contours)  
GFS Initialized: 0000 UTC 04/03/2020 F-72: Valid: 0000 UTC 04/06/2020



- Over the next 36 hours, the second 500-hPa trough is forecast to amplify and form a closed low as it propagates southeastward
- Meanwhile, an AR is forecast to develop along the southern edge of this trough and make landfall near the San Francisco Bay Area
- The position of the trough axis at 0000 UTC 6 Apr suggests that differential cyclonic vorticity advection will provide dynamical forcing for ascent over Northern and Central California

# AR Outlook: 3 Apr 2020

For California DWR's AR Program

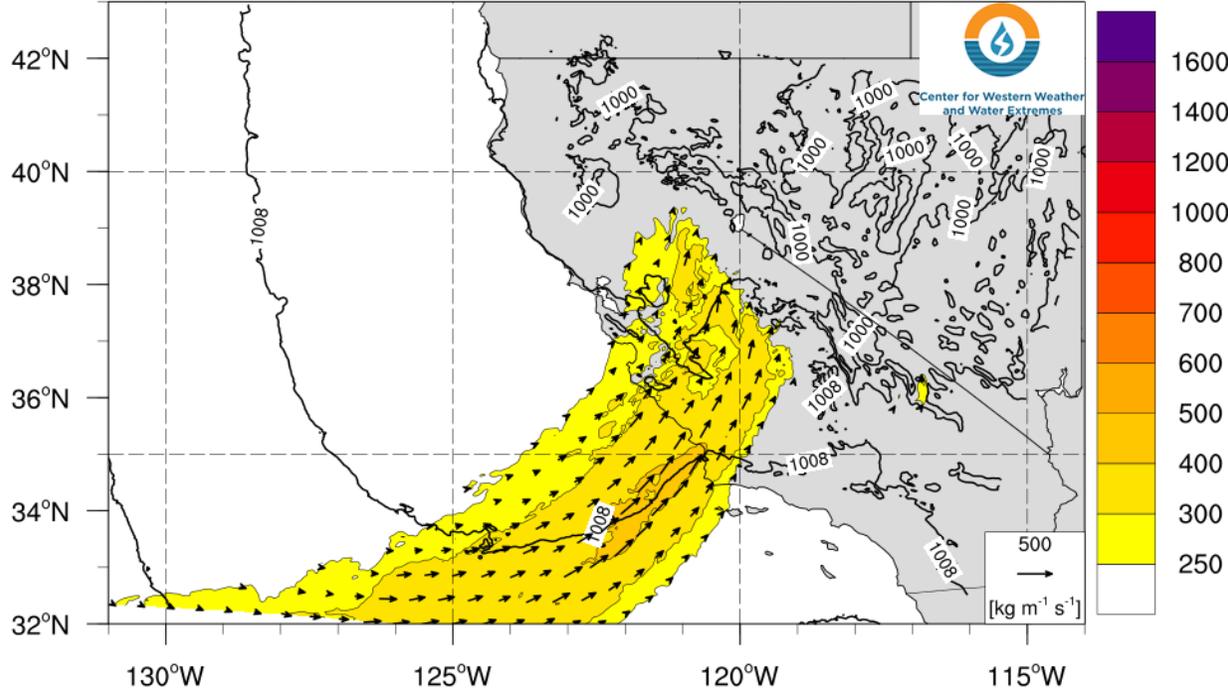


Center for Western Weather  
and Water Extremes

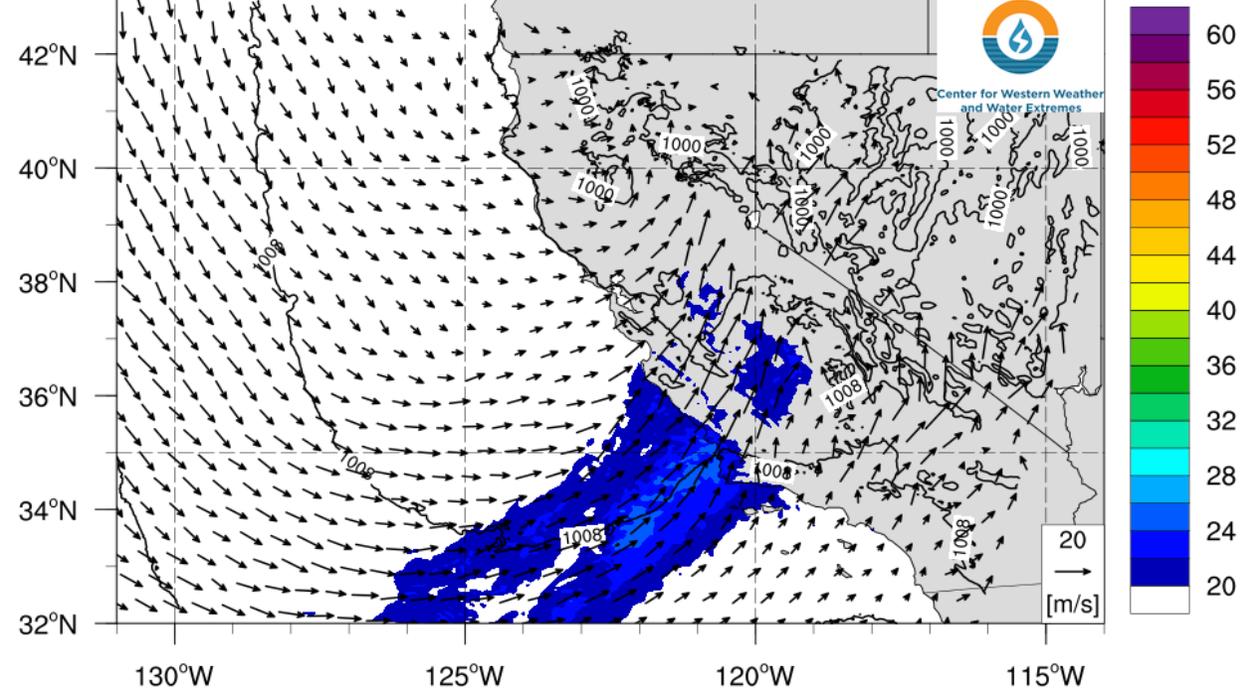
SCRIPPS INSTITUTION OF OCEANOGRAPHY  
AT UC SAN DIEGO

## West-WRF Forecasts: Valid 0000 UTC 6 Apr

West-WRF 3km IVT ( $\text{kg m}^{-1} \text{s}^{-1}$ ; shaded and vectors) and SLP (hPa; contours)  
GFS Initialized: 0000 UTC 04/03/2020 F-72: Valid: 0000 UTC 04/06/2020



West-WRF 3km IWW (mm; shaded), 850-hPa Wind (vectors), and SLP (hPa; contours)  
GFS Initialized: 0000 UTC 04/03/2020 F-72: Valid: 0000 UTC 04/06/2020



- This AR is forecast to develop in the absence of a tropical moisture source
- Although moisture will be somewhat limited, the orientation of the IVT vectors suggest that upslope moisture flux will lead to orographic enhancement of precipitation over the Sierra Nevada, Coast Ranges, and Transverse Ranges

# AR Outlook: 3 Apr 2020

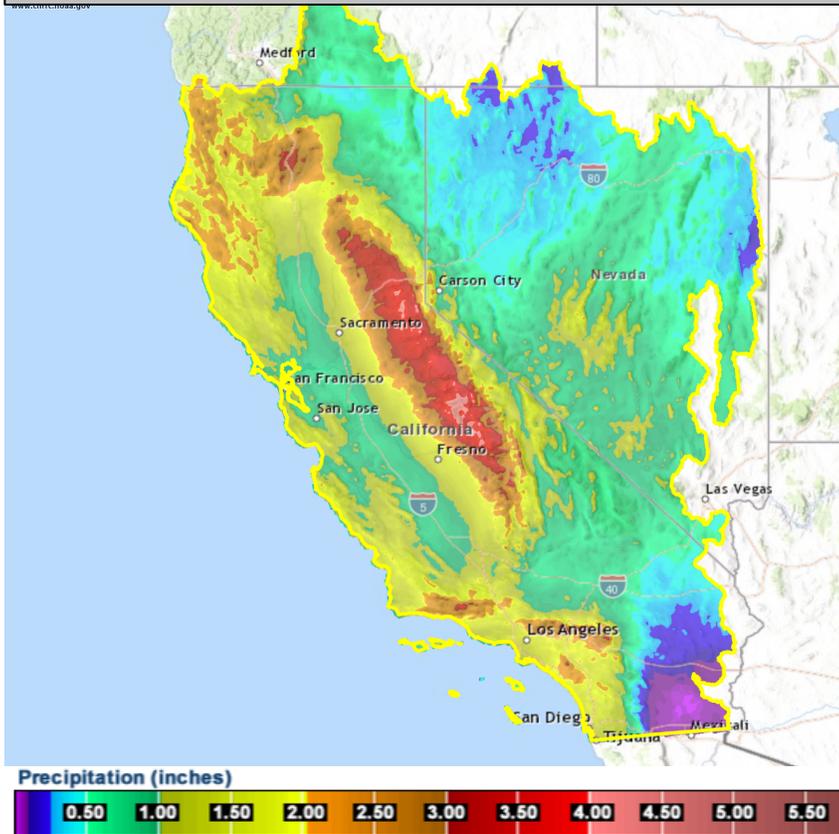
For California DWR's AR Program



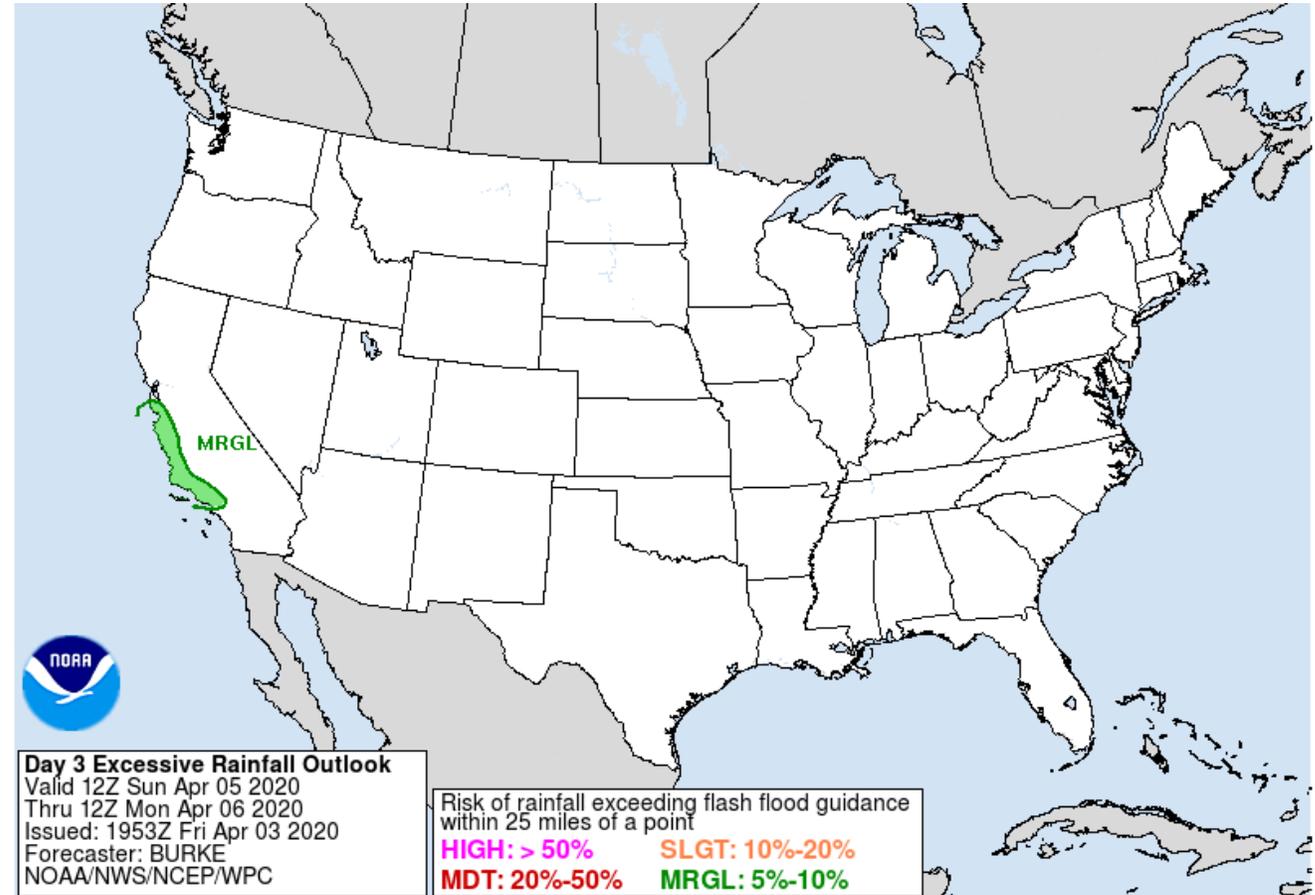
Center for Western Weather  
and Water Extremes

SCRIPPS INSTITUTION OF OCEANOGRAPHY  
AT UC SAN DIEGO

CNRFC 6-day QPF: Valid 1200 UTC 3–9 Apr



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



Source: NOAA/NWS WPC, <https://www.wpc.ncep.noaa.gov/>

- The heaviest precipitation (3–5 inches) is expected over the Sierra Nevada, with 2–4 feet of snow possible in the higher elevations
- Moderate-to-heavy precipitation (2–4 inches) is also forecast over the Northern California Coast Ranges, Klamath Mountains, and Southern California Transverse Ranges
- Lighter precipitation amounts (0.5–2 inches) are forecast at lower elevations
- NWS WPC has issued a slight risk of rainfall exceeding flash flood guidance over portions of coastal California

# AR Outlook: 3 Apr 2020

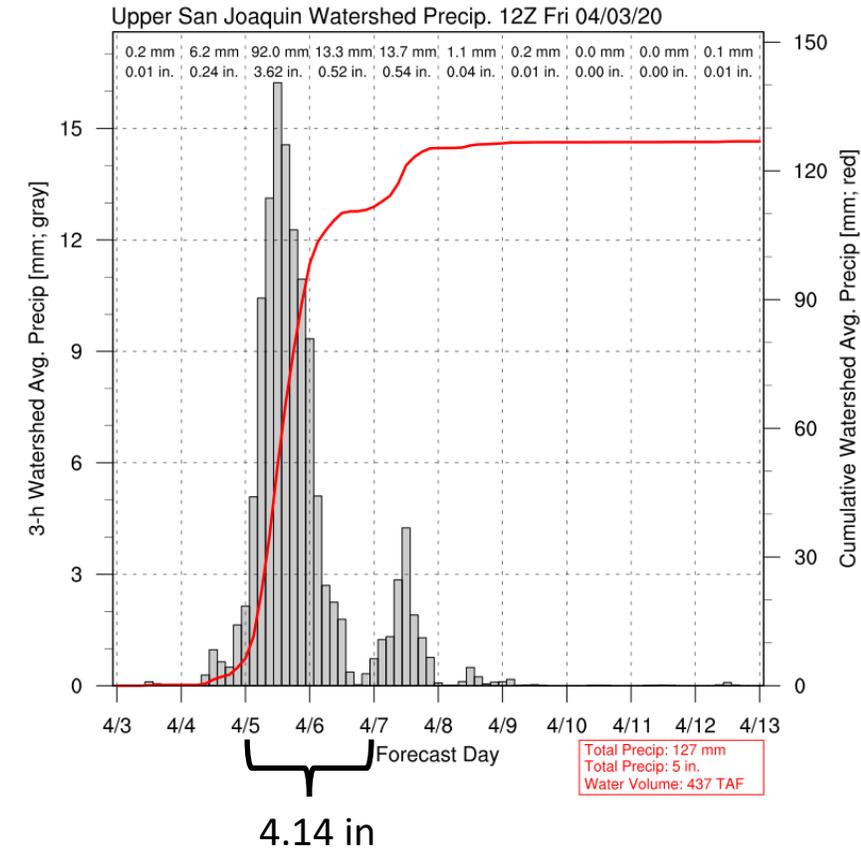
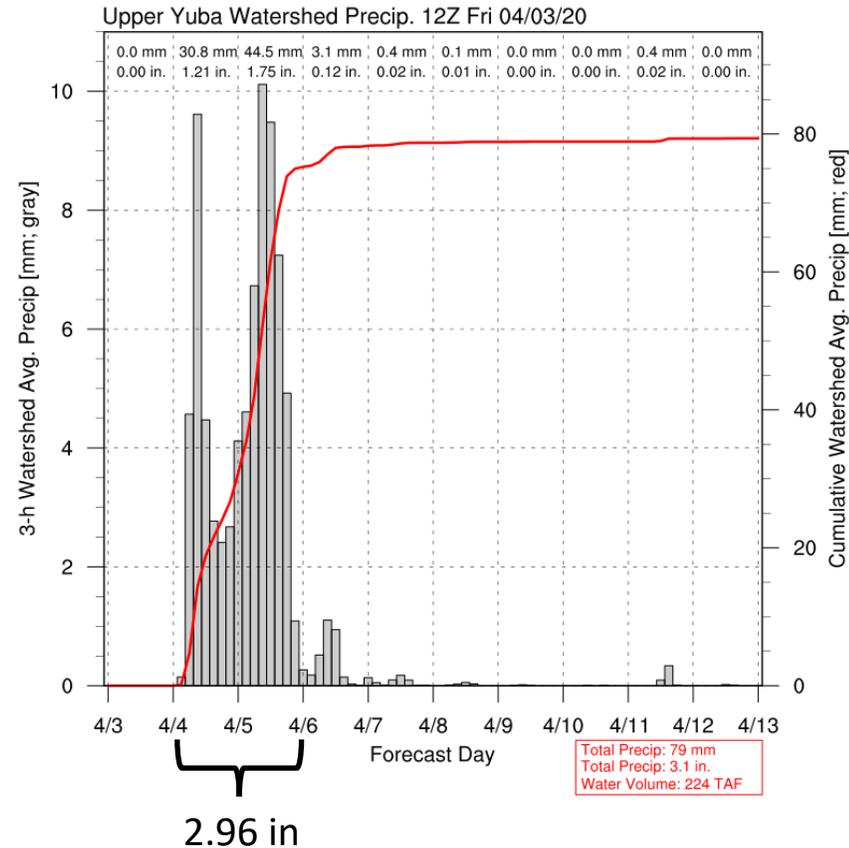
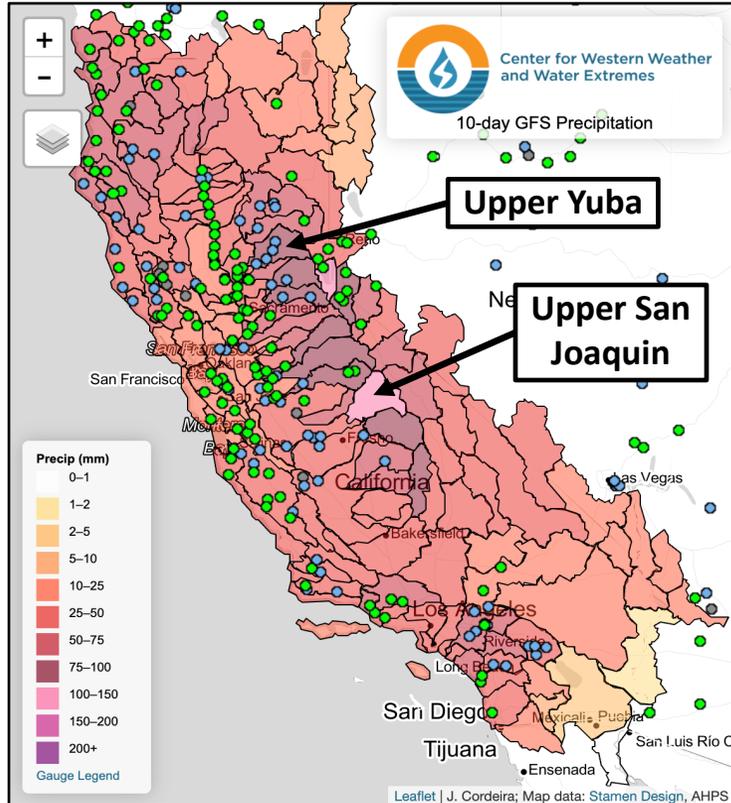
For California DWR's AR Program



Center for Western Weather and Water Extremes

SCRIPPS INSTITUTION OF OCEANOGRAPHY  
AT UC SAN DIEGO

## GFS 10-day Watershed Precipitation Forecasts



- The cutoff low and associated AR are forecast to bring significant precipitation to watersheds in the Sierra Nevada
- 00Z 3 Apr GFS run is forecasting nearly 3 inches of precipitation (aerial mean over the entire watershed) in the Upper Yuba Watershed between 1200 UTC 4 Apr and 1200 UTC 6 Apr
- More than 4 inches of precipitation are forecast in the Upper San Joaquin Watershed between 1200 UTC 5 Apr and 1200 UTC 7 Apr

# AR Outlook: 3 Apr 2020

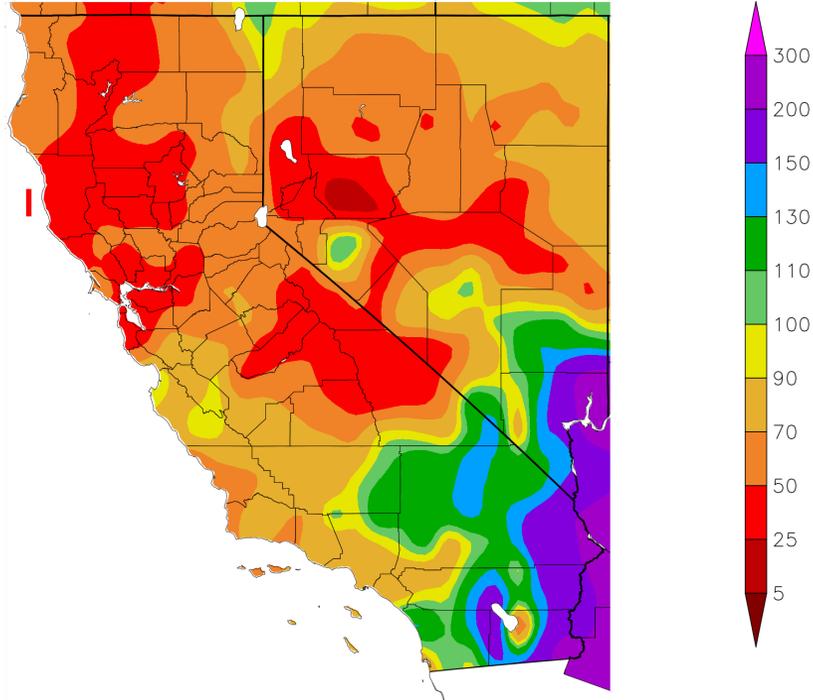
For California DWR's AR Program



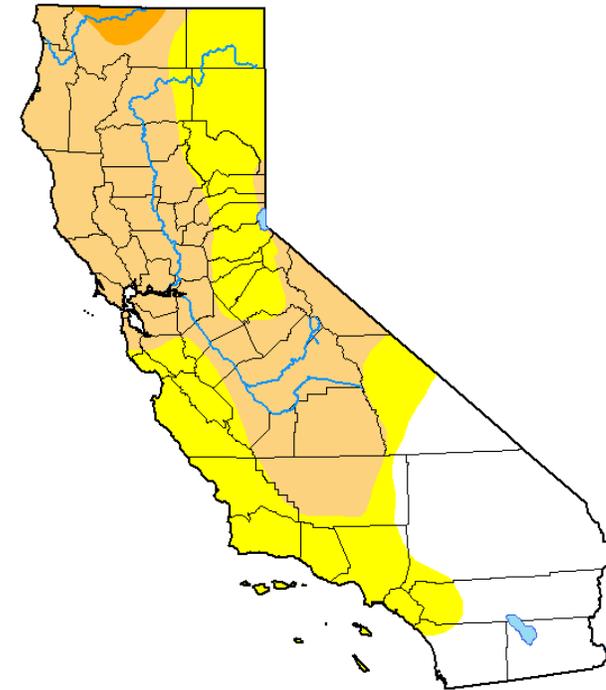
Center for Western Weather and Water Extremes

SCRIPPS INSTITUTION OF OCEANOGRAPHY  
AT UC SAN DIEGO

Percent of Normal Precipitation (%)  
10/1/2019 – 4/2/2020



## U.S. Drought Monitor California



March 31, 2020

(Released Thursday, Apr. 2, 2020)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	24.86	75.14	43.31	1.30	0.00	0.00
Last Week 03-24-2020	24.86	75.14	40.42	1.30	0.00	0.00
3 Months Ago 12-31-2019	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	4.71	2.06	0.00	0.00	0.00
One Year Ago 04-02-2019	93.42	6.58	0.00	0.00	0.00	0.00

Intensity:



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:

David Simeral  
Western Regional Climate Center



[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)

Generated 4/3/2020 at HPRCC using provisional data.

NOAA Regional Climate Centers

Source: High Plains Regional Climate Center, <https://hprcc.unl.edu/>

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

- Moderate-to-heavy precipitation will likely provide some drought relief to Northern and Central California
- As of 31 Mar, moderate drought conditions persisted over the Southern Sierra Nevada, Central Valley, and coastal Northern California
- Water year-to-date precipitation in some areas is less than 50% of normal