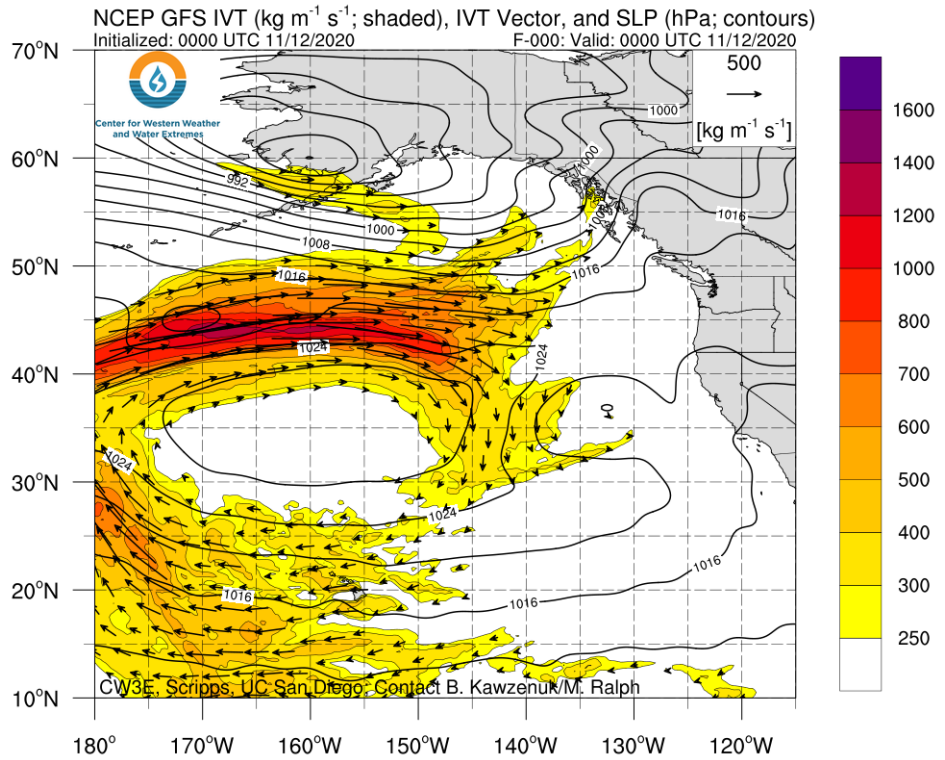
CW3E AR Outlook

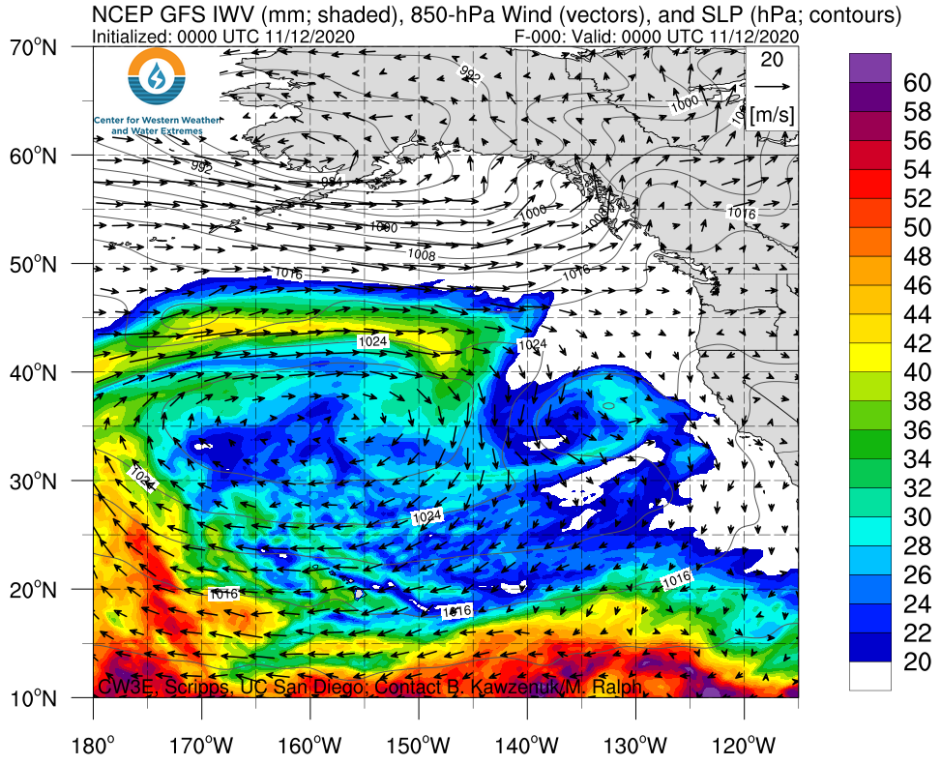
For California DWR's AR Program

Center for Western Weather and Water Extremes
SCRIPPS INSTITUTION OF OCEANOGRAPHY AT UC SAN DIEGO

Active weather pattern expected to bring heavy rainfall and snowfall to portions of the Western U.S.

- A series of storms and landfalling ARs are forecast to bring significant precipitation to portions of Northern California and the Pacific Northwest over the next 7 days
- AR 4/AR 5 conditions (based on the Ralph et al. 2019 AR Scale) are possible over coastal Oregon and Washington in association with the second landfalling AR
- The highest 7-day precipitation amounts (5–10 inches) are forecast over the Pacific Coast Ranges and Cascade Mountains
- More than 2 feet of snow is possible in the higher elevations of the Washington Cascades during the next 48 hours





AR Outlook: 12 Nov 2020

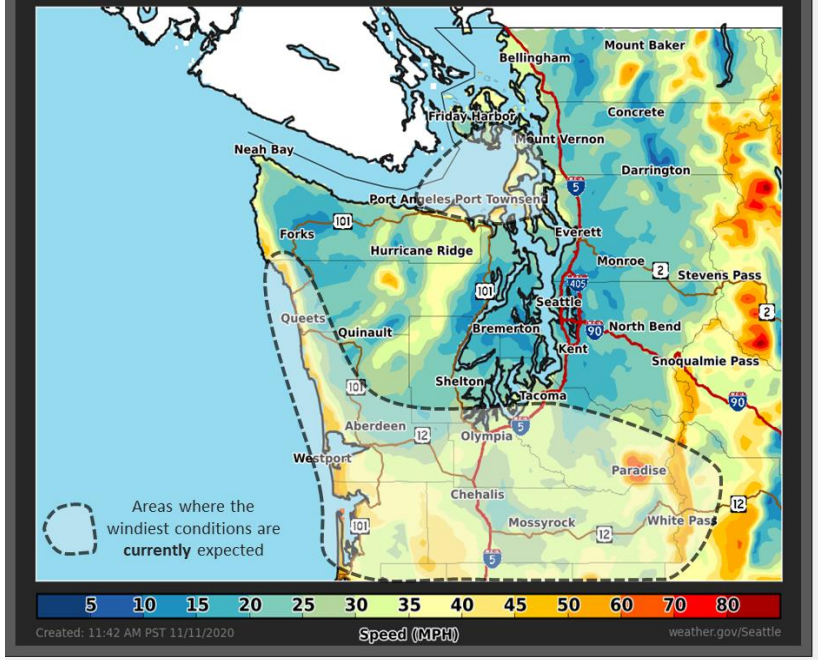
AMBASSADOR™ WRN WEATHER-READY NATION

Center for Western Weather and Water Extremes
SCRIPPS INSTITUTION OF OCEANOGRAPHY AT UC SAN DIEGO

Friday Weather System

Potential for Locally Gusty Winds. Heavy Mountain Snow Expected.

Wind Gusts Friday into Friday Night



What is the Concern?

A weather system will track through the area for breezy to windy conditions, as well as lowland rain and mountain snow.

What Do We Know?

Heavy mountain snow at times for the Cascade Passes Thursday night through Saturday morning. Locally gusty winds for portions of Western Washington on Friday.

What is Still Uncertain?

The exact **track**, **timing**, and **strength** of the storm. **Latest information suggests the strongest winds will be mainly south of Olympia into Oregon and along the coast.**

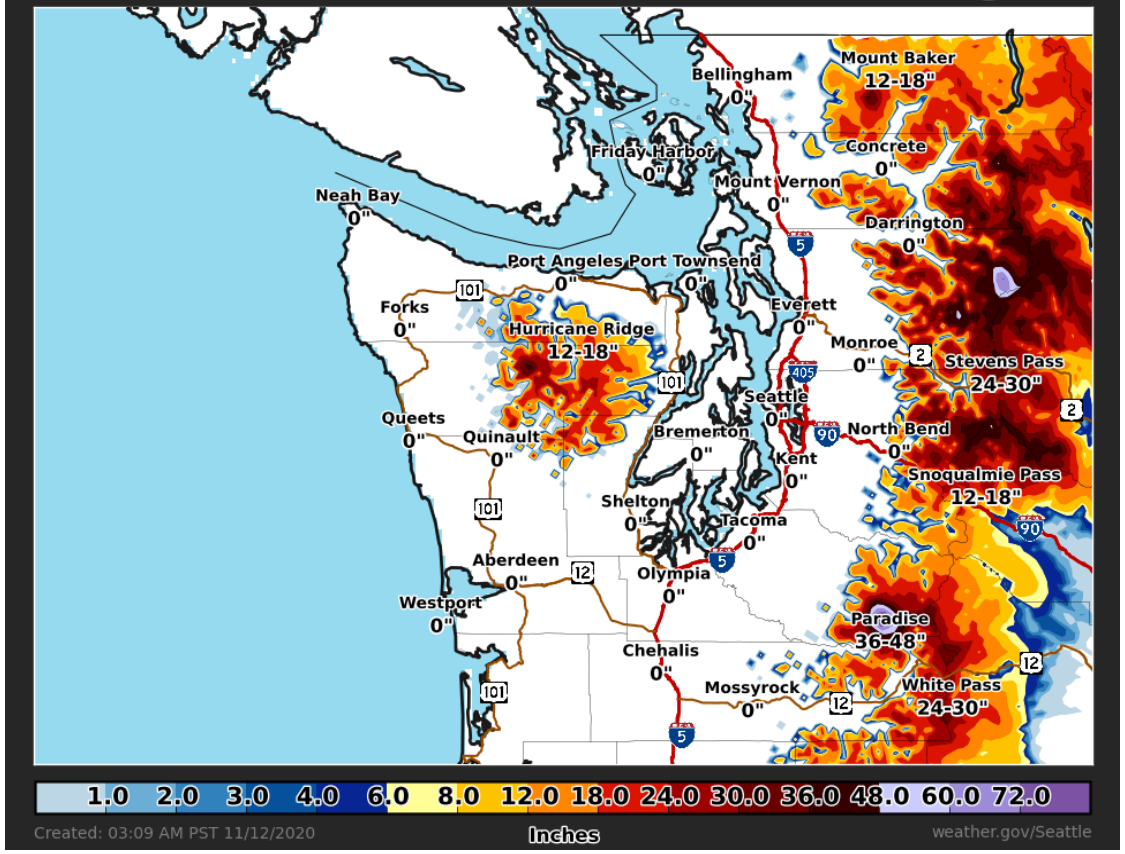
What Should You do?

Monitor the forecasts! The forecast will likely change as we get closer to the event.

NWS Seattle — November 11, 2020 | 1PM PST

Storm Total Snow Thursday afternoon through Saturday morning

11/12/2020 04:00 PM - 11/14/2020 10:00 AM PST



Source: NWS Seattle, https://www.weather.gov/sew/

- **Strong winds and heavy rainfall/mountain snowfall are expected Friday and Friday night across western Washington**
- **At least 12” of snow are forecast over the Olympic Mountains and Washington Cascades during the next 48 hours**
- **The highest elevations in the Cascades may receive 2–4 feet of snow by Saturday morning**

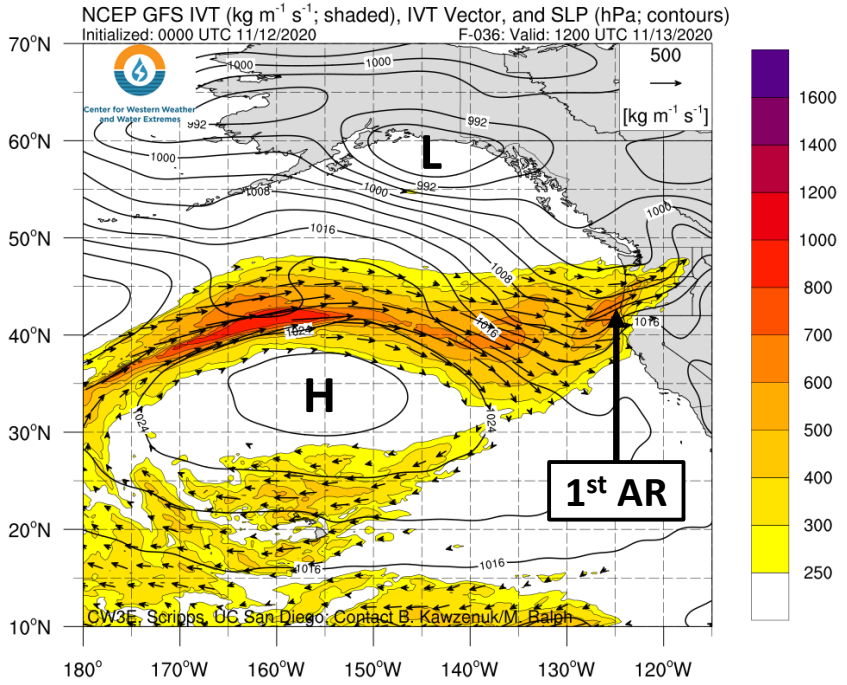
AR Outlook: 12 Nov 2020

For California DWR's AR Program

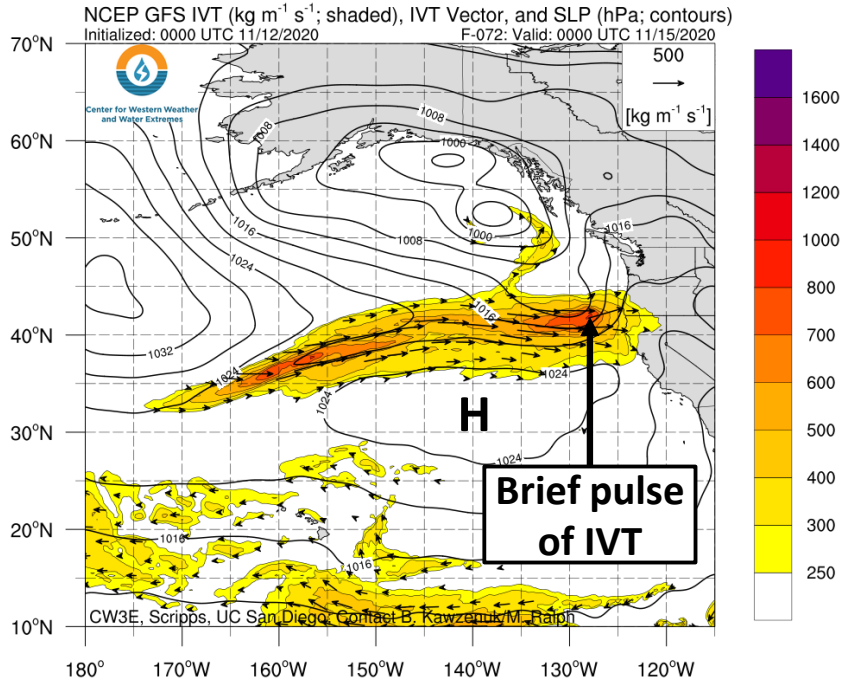
Center for Western Weather and Water Extremes
SCRIPPS INSTITUTION OF OCEANOGRAPHY AT UC SAN DIEGO

GFS IVT & SLP Forecasts

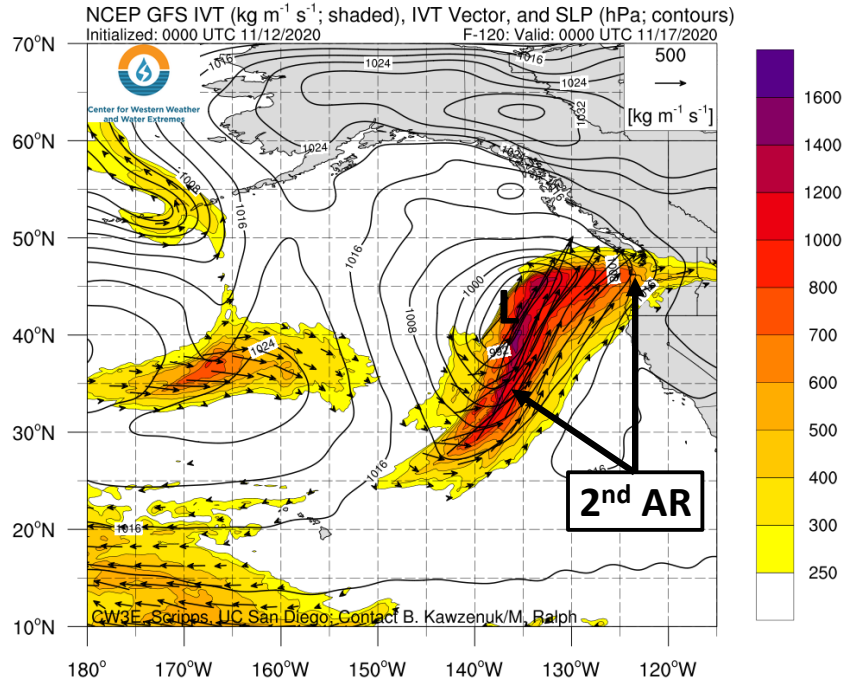
A) Valid 1200 UTC 13 Nov (F-036)



B) Valid 0000 UTC 15 Nov (F-72)



C) Valid 0000 UTC 17 Nov (F-120)



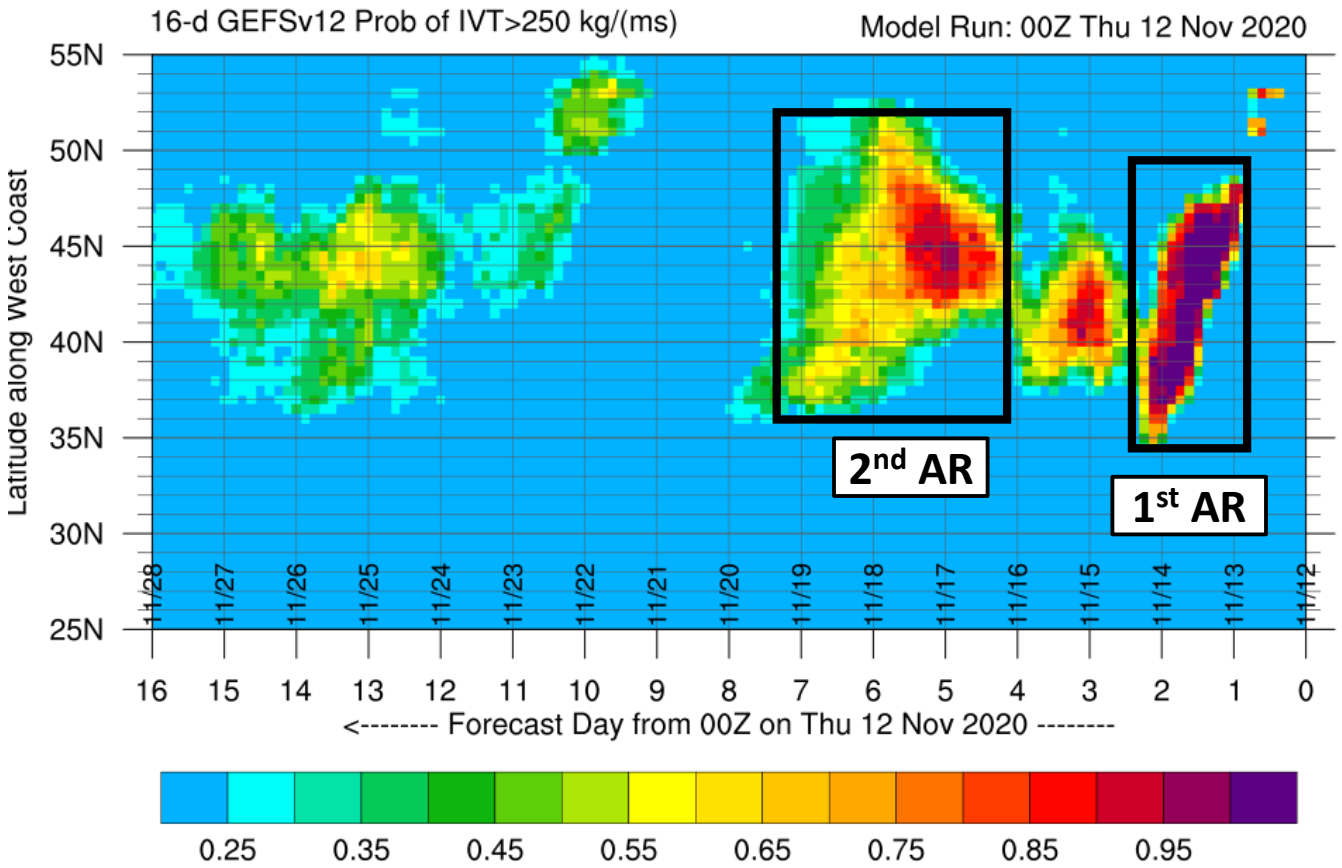
- **The first AR is forecast make landfall over coastal Oregon before 12Z 13 Nov in association with a weaking frontal boundary (Figure A)**
- **After the first AR dissipates, a weak frontal wave is forecast to bring a brief pulse of moisture transport to southern Oregon and Northern California (Figure B)**
- **A much stronger AR is forecast to make landfall over coastal Oregon and Washington on 16 Nov in association with a rapidly intensifying surface cyclone over the Northeast Pacific Ocean (Figure C)**

AR Outlook: 12 Nov 2020

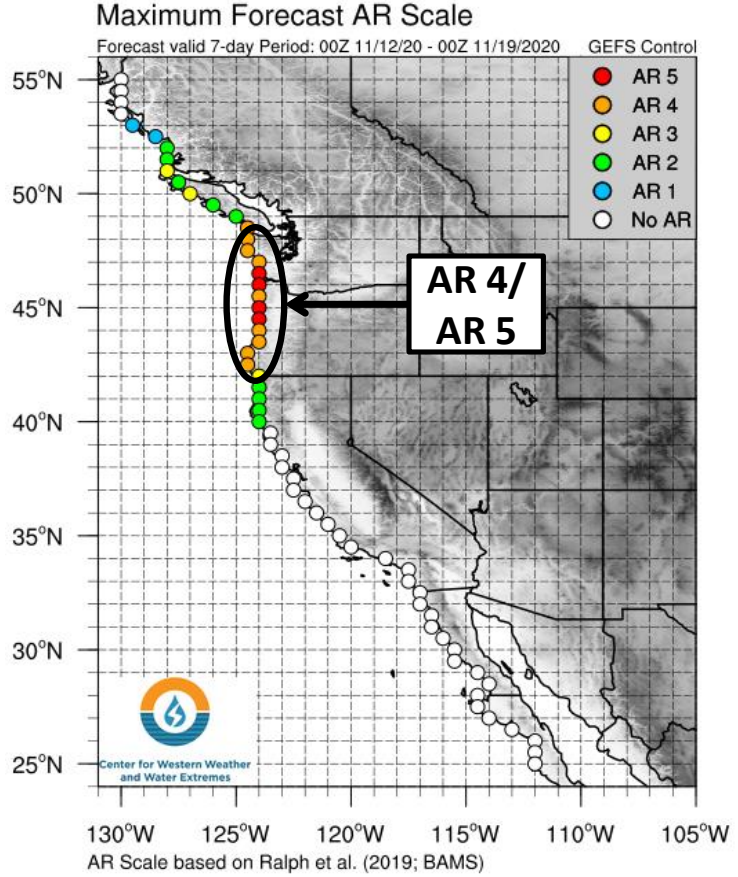
For California DWR's AR Program

Center for Western Weather and Water Extremes
SCRIPPS INSTITUTION OF OCEANOGRAPHY AT UC SAN DIEGO

Probability of AR Conditions: Coastal Transect



AR Scale: Coastal Transect



*GEFS = NCEP **G**lobal **E**nsemble **F**orecast **S**ystem (United States)

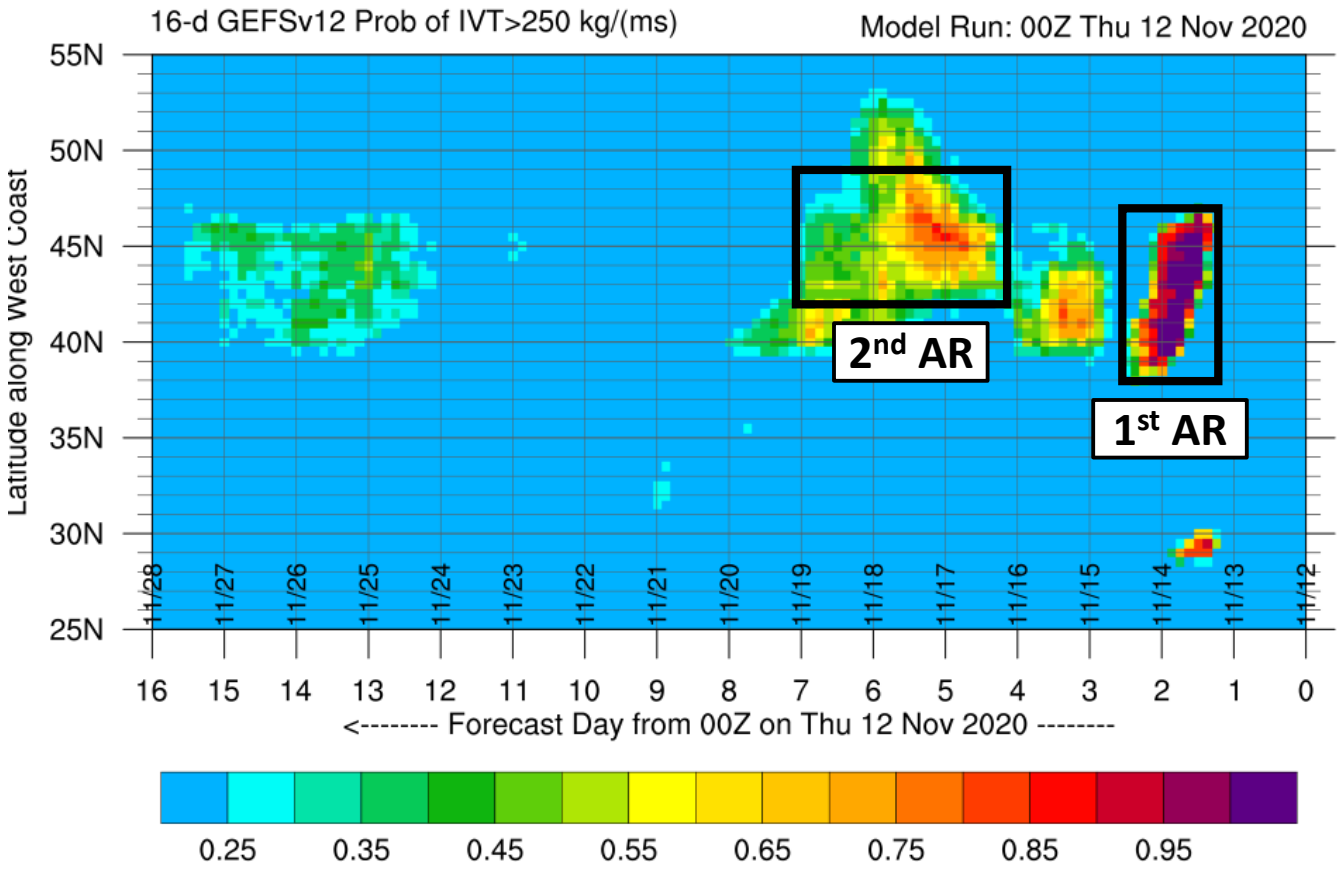
- **GEFS AR landfall tool shows very high confidence (> 95% probability) in a period of AR conditions (IVT ≥ 250 kg m^{-1} s^{-1}) along the U.S. West Coast in association with the first landfalling AR between 00Z 13 Nov and 00Z 14 Nov**
- **After the first AR, a brief period of weak AR conditions is likely (> 80% probability) over southern coastal Oregon and northern coastal California**
- **GEFS AR landfall tool also suggests the possibility of a long-duration AR over the Pacific Northwest between 16 Nov and 19 Nov, with the 00Z GEFS control member forecasting an AR 4/AR 5 (based on the Ralph et al. 2019 AR Scale) over coastal Oregon and Washington**

AR Outlook: 12 Nov 2020

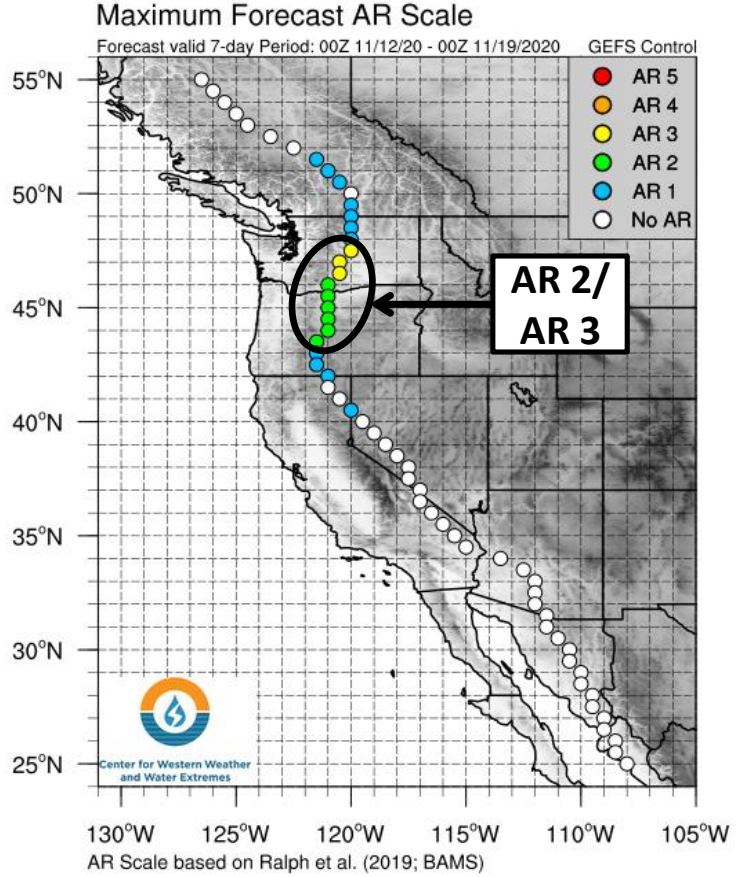
For California DWR's AR Program

Center for Western Weather and Water Extremes
SCRIPPS INSTITUTION OF OCEANOGRAPHY AT UC SAN DIEGO

Probability of AR Conditions: Inland Transect



AR Scale: Inland Transect



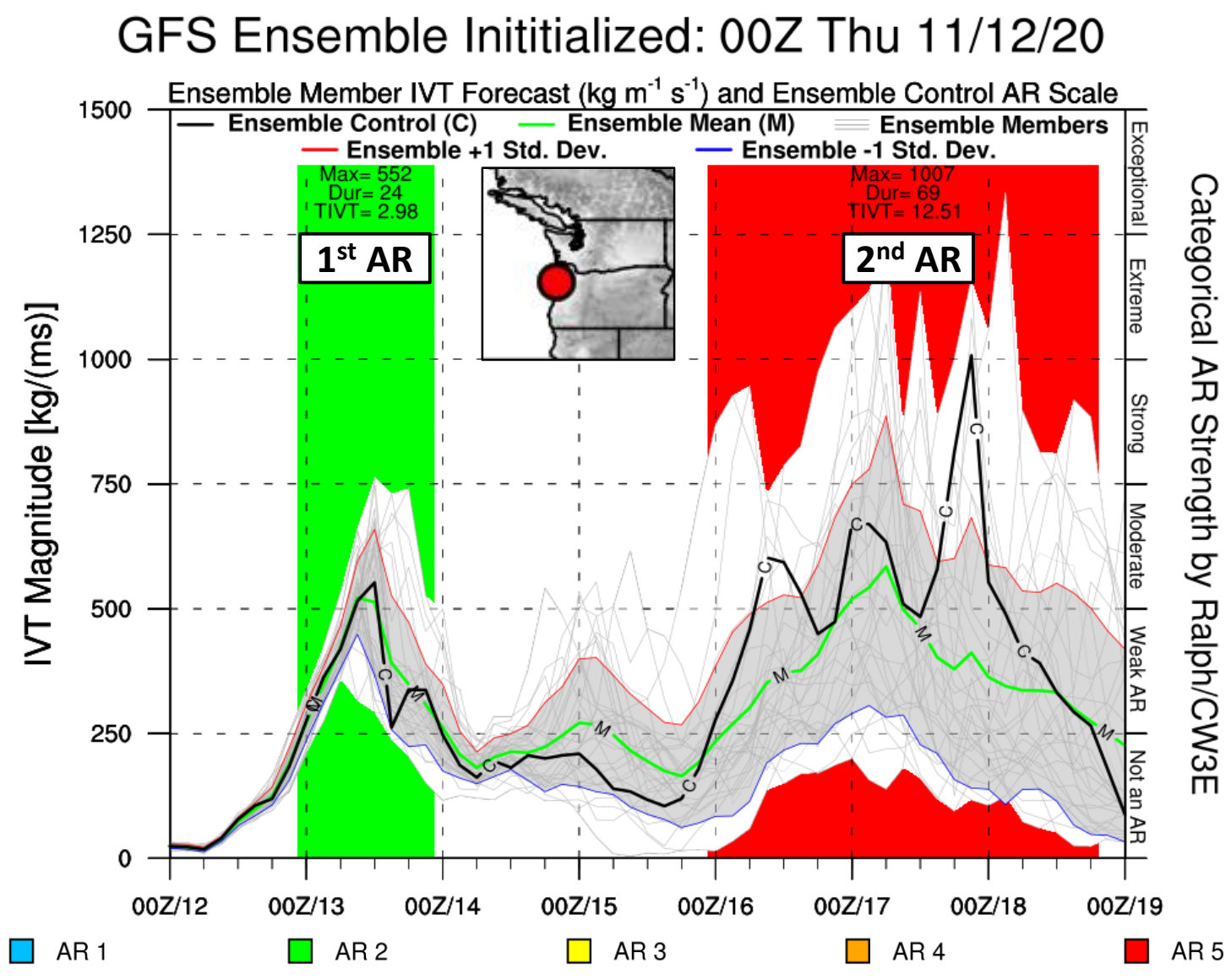
- GEFS AR landfall tool shows very high confidence (> 95% probability) in a brief period of AR conditions over interior portions of Northern California and Oregon in association with the first landfalling AR
- GEFS AR landfall tool also suggests that the second landfalling AR will penetrate into the interior Pacific Northwest
- The 00Z GEFS control member is currently forecasting an AR 2/ AR 3 over portions of interior Oregon and Washington in association with the second AR

AR Outlook: 12 Nov 2020

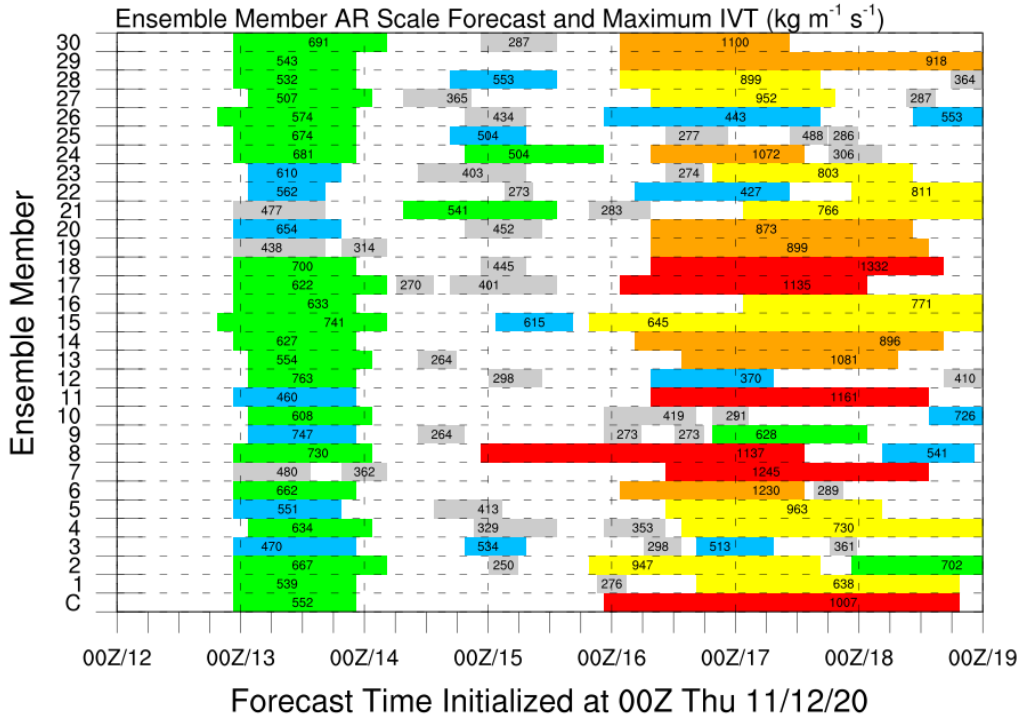
For California DWR's AR Program

Center for Western Weather and Water Extremes
SCRIPPS INSTITUTION OF OCEANOGRAPHY AT UC SAN DIEGO

GEFS AR Scale & IVT Forecasts



- **The 00Z GEFS control member is forecasting an AR 2 in association with the first landfalling AR at 45°N, 124°W (near Devils Lake, OR)**
- **An AR 5 is currently forecast in association with the second landfalling AR, but there is large uncertainty in the timing, magnitude, and duration of AR conditions**
- **25/31 (81%) ensemble members are forecasting an AR 3 or greater, and 10/31 (32%) ensemble members are forecasting a maximum IVT > 1000 kg m^{-1} s^{-1}**

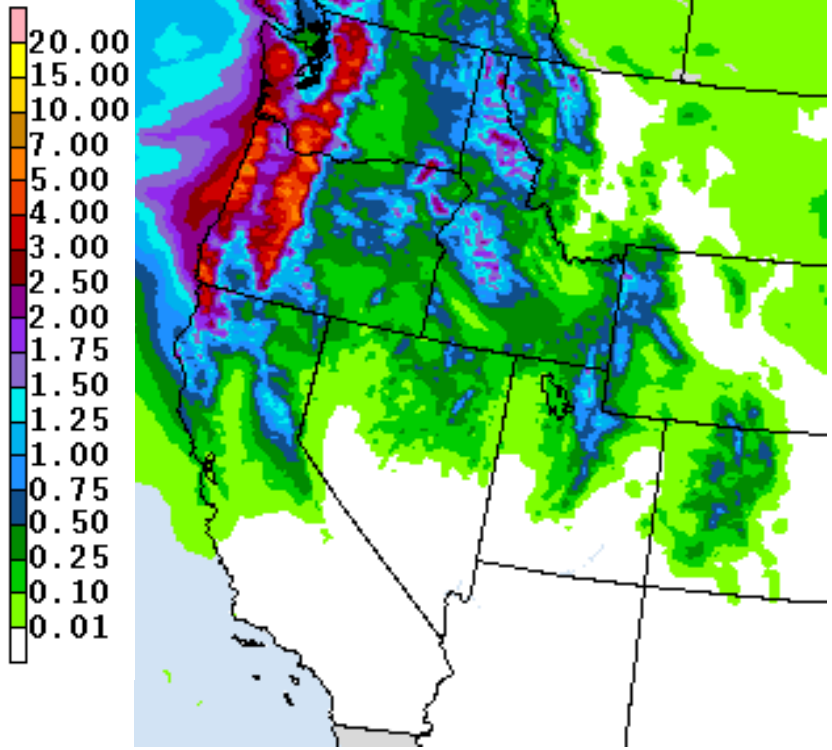


AR Outlook: 12 Nov 2020

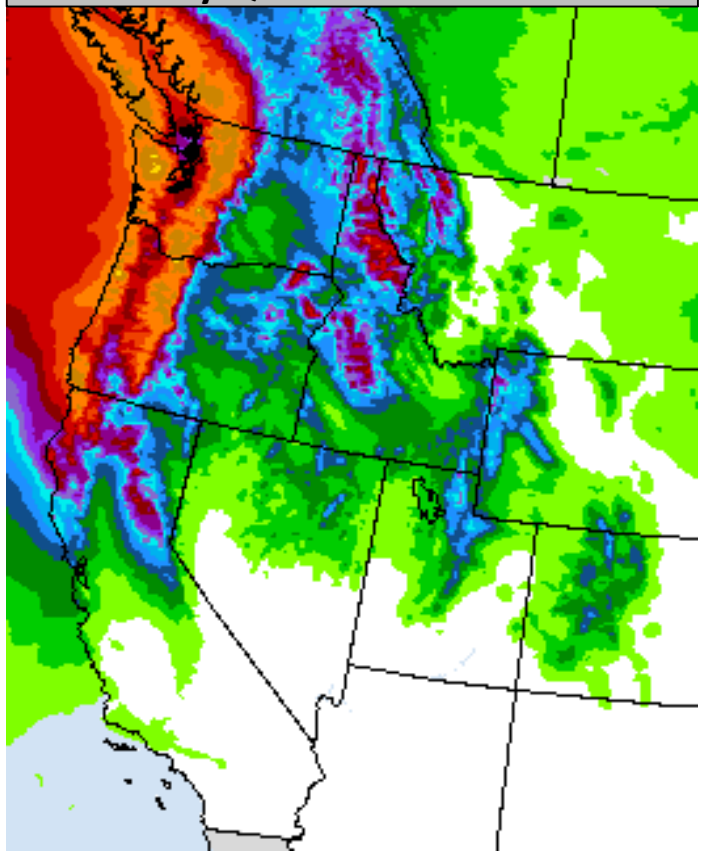
AMBASSADOR™ WRN WEATHER-READY NATION

Center for Western Weather and Water Extremes
SCRIPPS INSTITUTION OF OCEANOGRAPHY AT UC SAN DIEGO

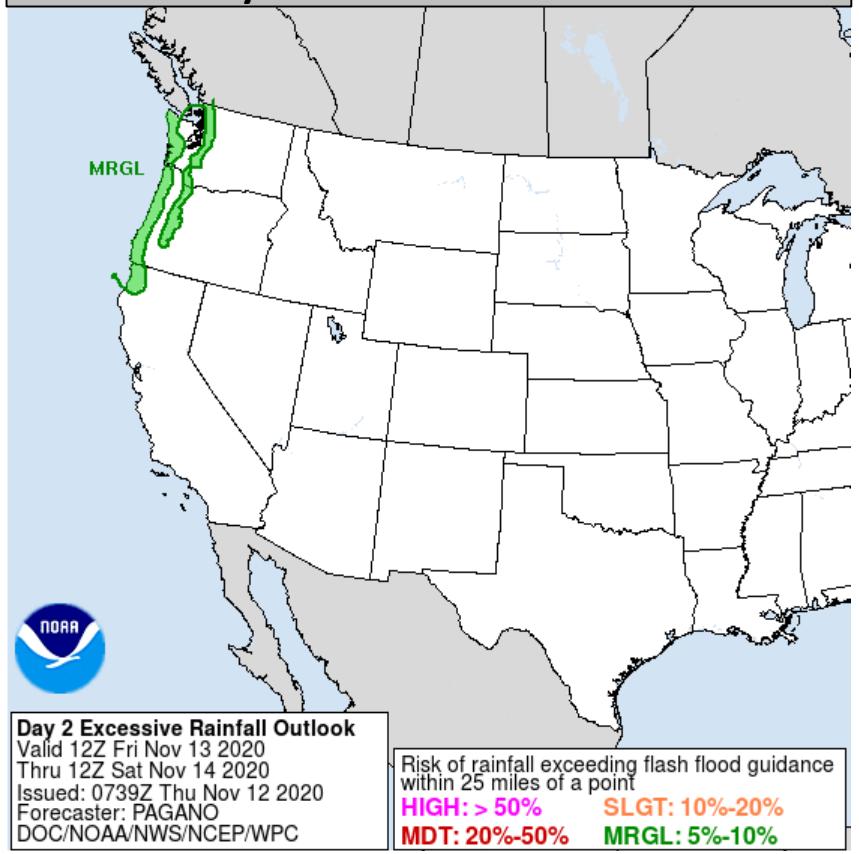
WPC 72-h QPF: Valid 12Z 12–15 Nov



WPC 7-day QPF: Valid 12Z 12–19 Nov



WPC Day 2 Excessive Rainfall Outlook



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

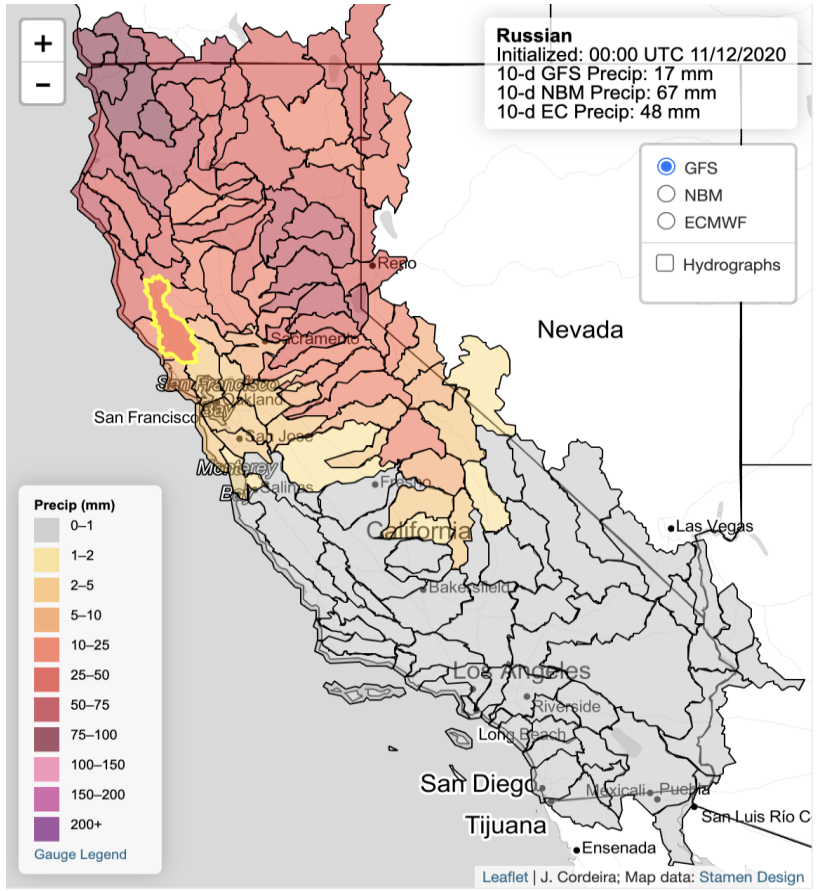
- **NWS Weather Prediction Center (WPC) is forecasting at least 2–5 inches of precipitation over portions of western Washington, western Oregon, and extreme northwestern California during the next 72 hours, with the highest amounts along the Oregon Coast Ranges and Cascades**
- **NWS WPC has issued an excessive rainfall outlook for these areas, with hourly precipitation rates > 0.50 inches and lowland flooding possible**
- **Intense rainfall over recent burn areas could lead to flash flooding and/or debris flows**
- **Total precipitation amounts of 5–10 inches are forecast along the Cascade Mountains and Pacific Coast Ranges over the next 7 days**
- **About 1–3 inches of total precipitation are forecast over the Northern Sierra Nevada and the higher terrain in the interior northwestern U.S.**

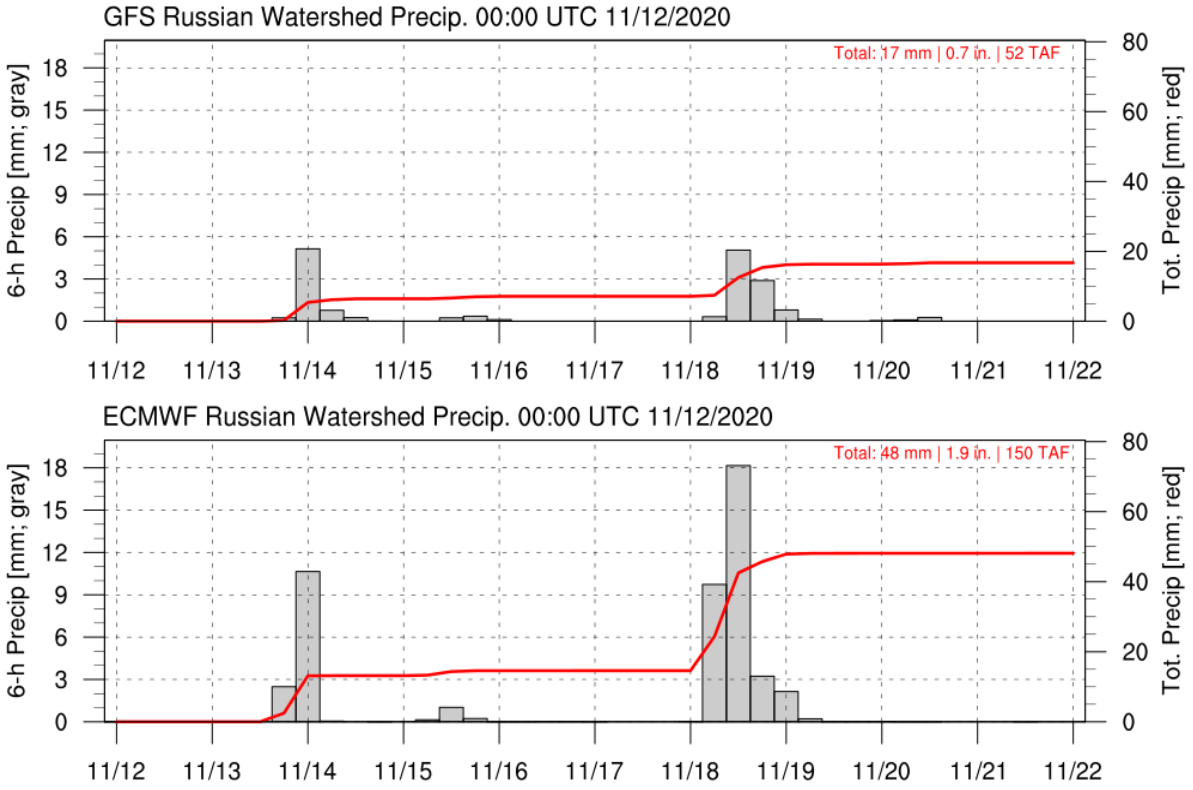
AR Outlook: 12 Nov 2020

For California DWR's AR Program

Center for Western Weather and Water Extremes
SCRIPPS INSTITUTION OF OCEANOGRAPHY AT UC SAN DIEGO

10-day Watershed Precipitation Forecasts





*GFS = NCEP **G**lobal **F**orecast **S**ystem (United States)

*ECMWF = **E**uropean **C**enter for **M**edium-Range **W**eather **F**orecasts (Europe)

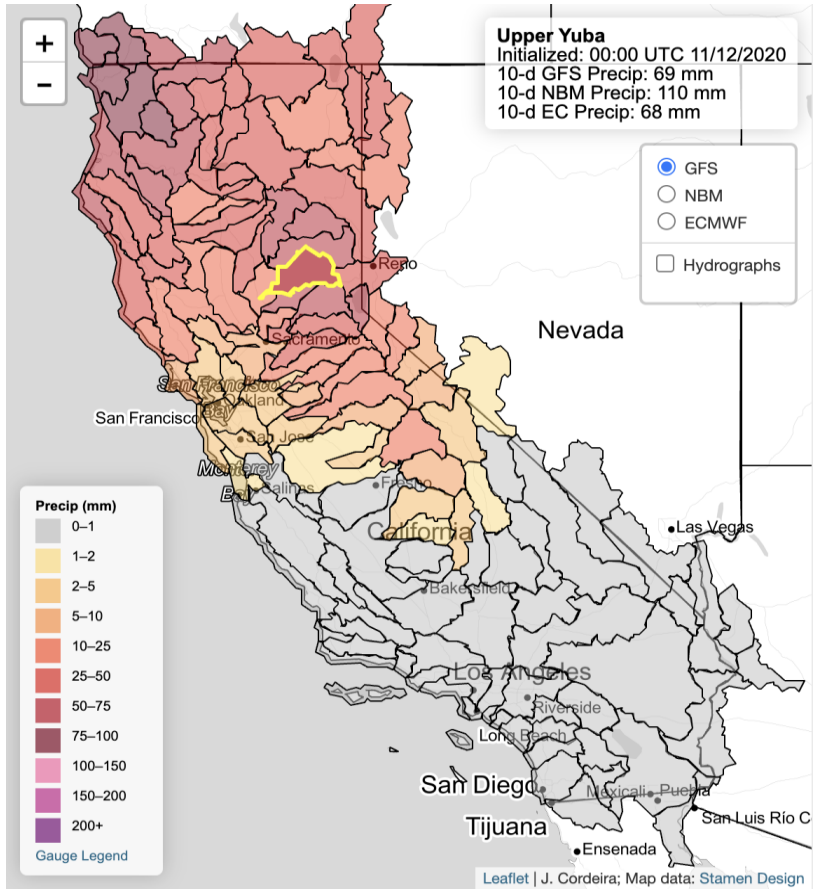
- **There is some model disagreement in 10-day forecast precipitation over coastal Northern California**
- **The 00Z GFS is forecasting only 0.7 inches of areal mean precipitation in the Russian River watershed during the next 10 days, whereas the 00Z ECMWF is forecasting 1.9 inches of areal mean precipitation**
- **The heaviest precipitation is forecast to occur in association with the second landfalling AR**

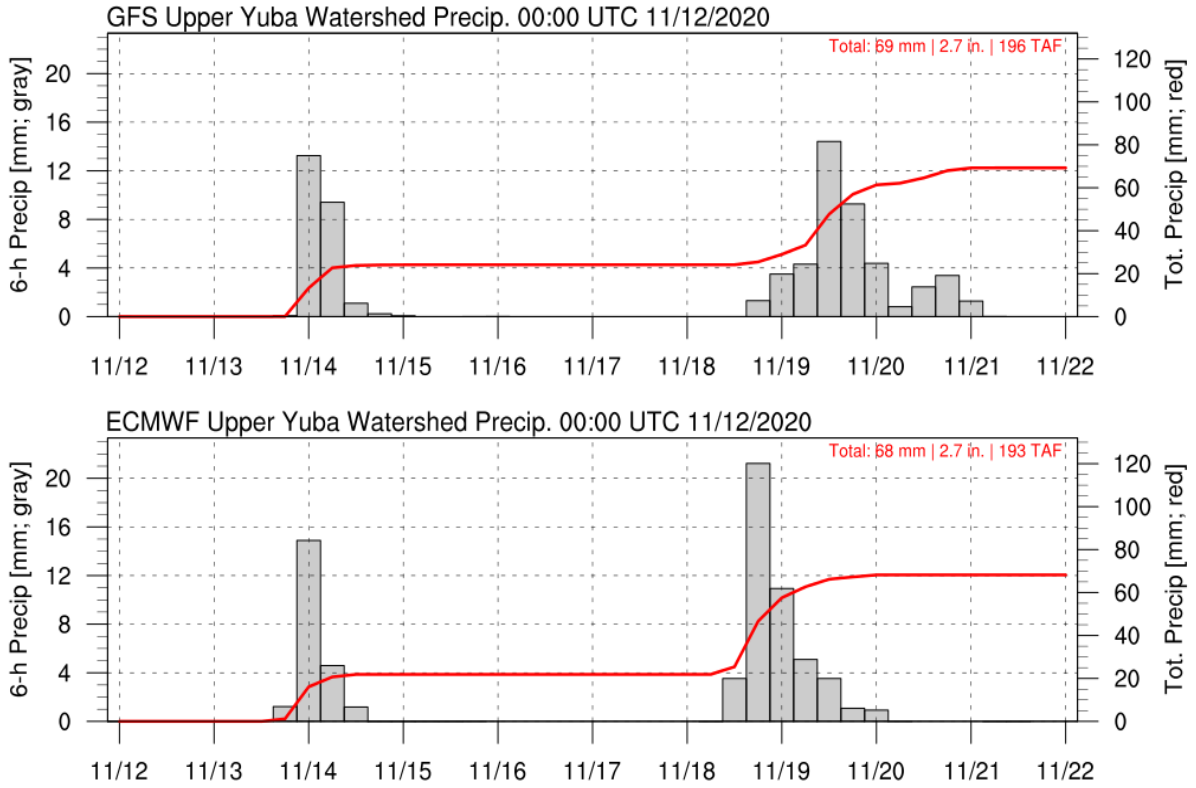
AR Outlook: 12 Nov 2020

For California DWR's AR Program

Center for Western Weather and Water Extremes
SCRIPPS INSTITUTION OF OCEANOGRAPHY AT UC SAN DIEGO

10-day Watershed Precipitation Forecasts





*GFS = NCEP **G**lobal **F**orecast **S**ystem (United States)

*ECMWF = **E**uropean **C**enter for **M**edium-Range **W**eather **F**orecasts (Europe)

- **The 00Z GFS and 00Z ECMWF are both forecasting 2.7 inches of areal mean precipitation in the Upper Yuba watershed during the next 10 days**
- **Once again, the heaviest precipitation is forecast to occur in association with the second landfalling AR**