

# CW3E Atmospheric River Outlook

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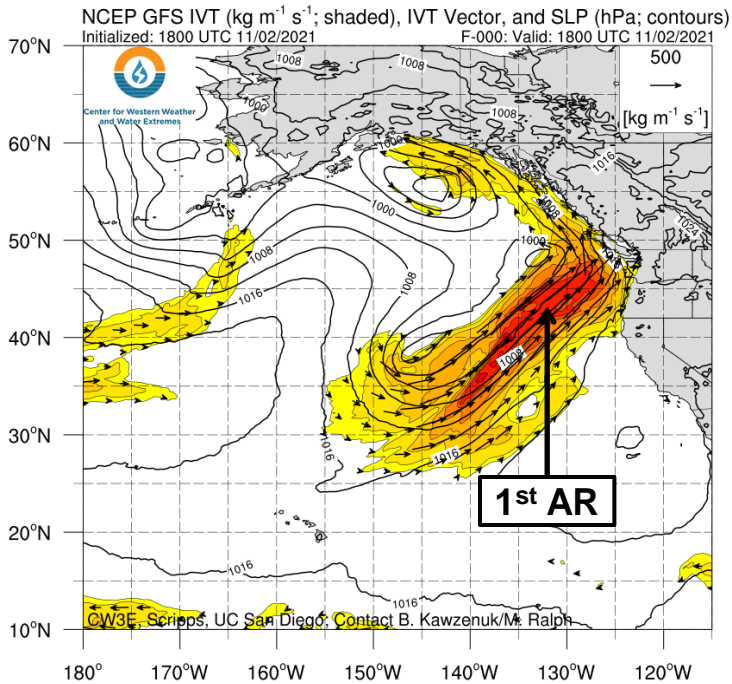
## Active Weather Pattern Expected to Continue Along US West Coast

- A series of low-pressure systems and atmospheric rivers (ARs) are forecasted to impact the western US this week into early next week
- The first AR made landfall last night across Washington and Oregon
- AR 4 conditions (based on the Ralph et al. 2019 AR Scale) are forecasted in portions of coastal Oregon
- AR 2/AR 3 conditions are forecasted elsewhere along the coast between Northern California and Washington
- After the first AR dissipates, multiple weak disturbances are forecasted to bring weak AR conditions to the US West Coast on Friday and Saturday
- Another stronger AR may make landfall early next week, but there is considerable uncertainty regarding the AR timing, location, and magnitude
- The first AR is forecasted to produce an additional 1–3 inches of precipitation across portions of Northern California, western Oregon, and western Washington, with higher amounts possible in the Olympic Mountains and near the California/Oregon border
- At least 3–7 inches of total precipitation is forecasted over the Pacific Coast Ranges, Cascades, and Sierra Nevada during the next 7 days, with more than 10 inches possible in the Olympic Mountains

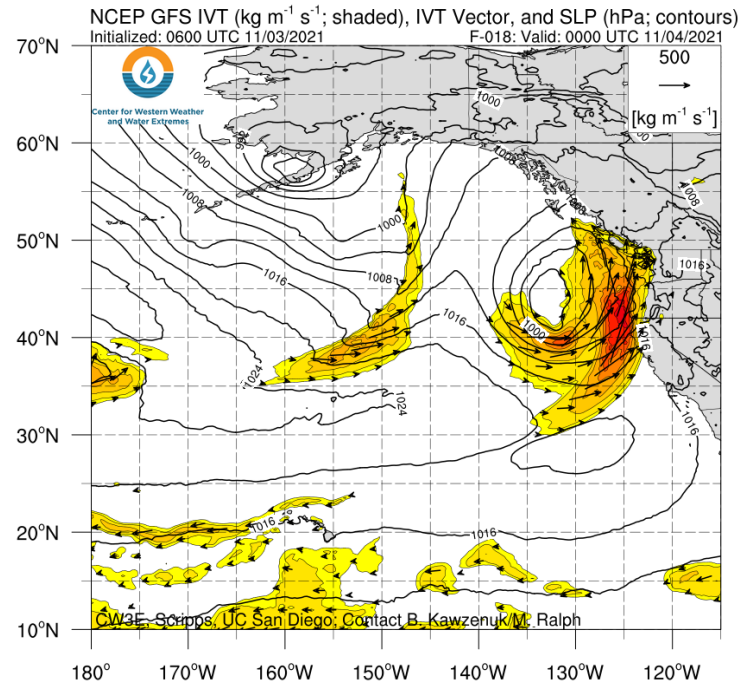
# AR Outlook: 3 Nov 2021

## GEFS IVT Analyses & Forecasts

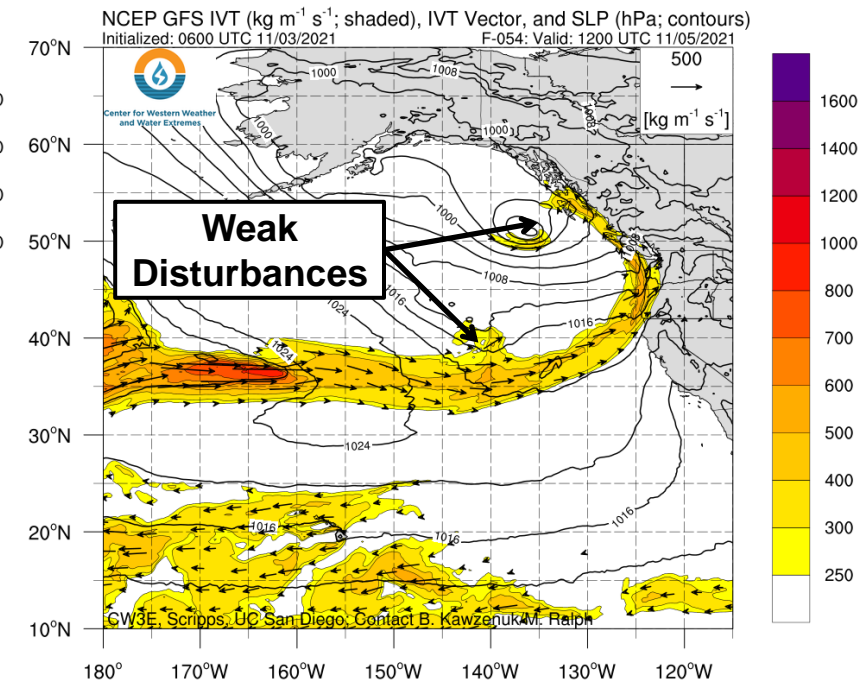
(A) Valid: 11 AM PT 2 Nov (F-0)



(B) Valid: 5 PM PT 3 Nov (F-18)



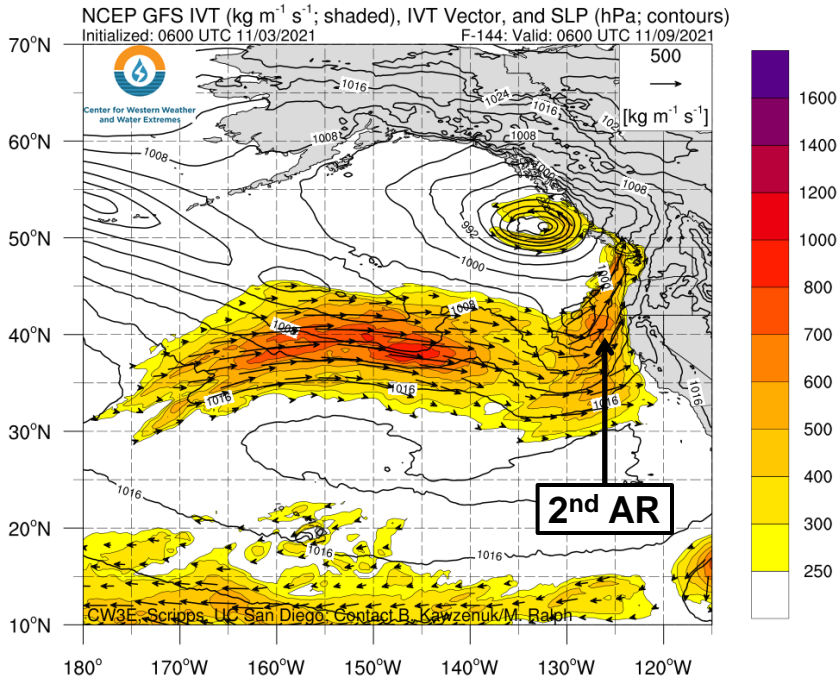
(C) Valid: 5 AM PT 5 Nov (F-54)



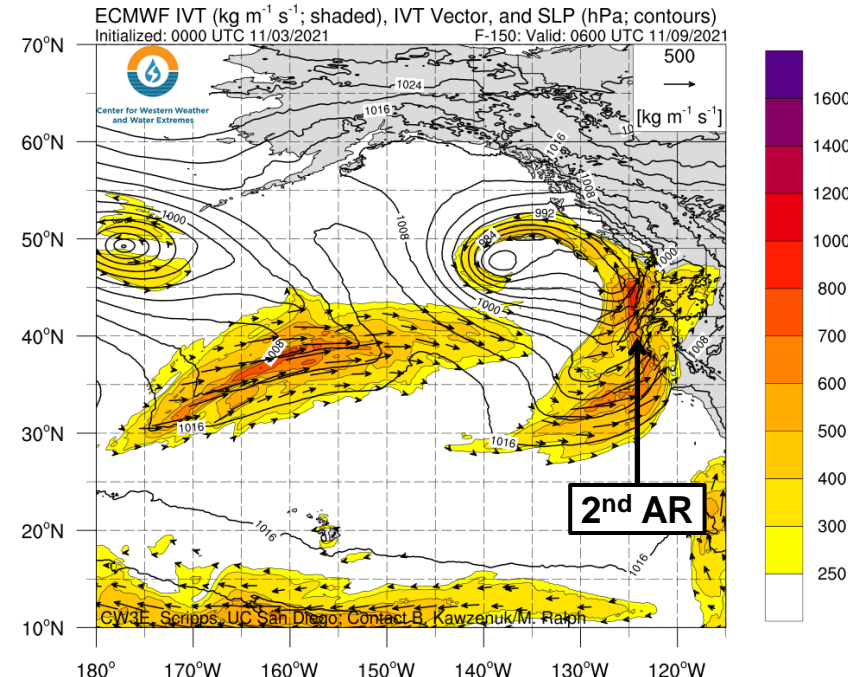
- The first AR made landfall over Washington and Oregon around midday yesterday (Figure A)
- The strongest moisture transport is forecasted to occur along the southwestern coast of Oregon this afternoon/evening, with IVT values  $> 1000 \text{ kg m}^{-1} \text{ s}^{-1}$  just offshore (Figure B)
- After the first AR dissipates, multiple weak disturbances are forecasted to bring weak AR conditions to portions of the US West Coast on 5–6 Nov (Figure C)

## Model IVT Forecasts

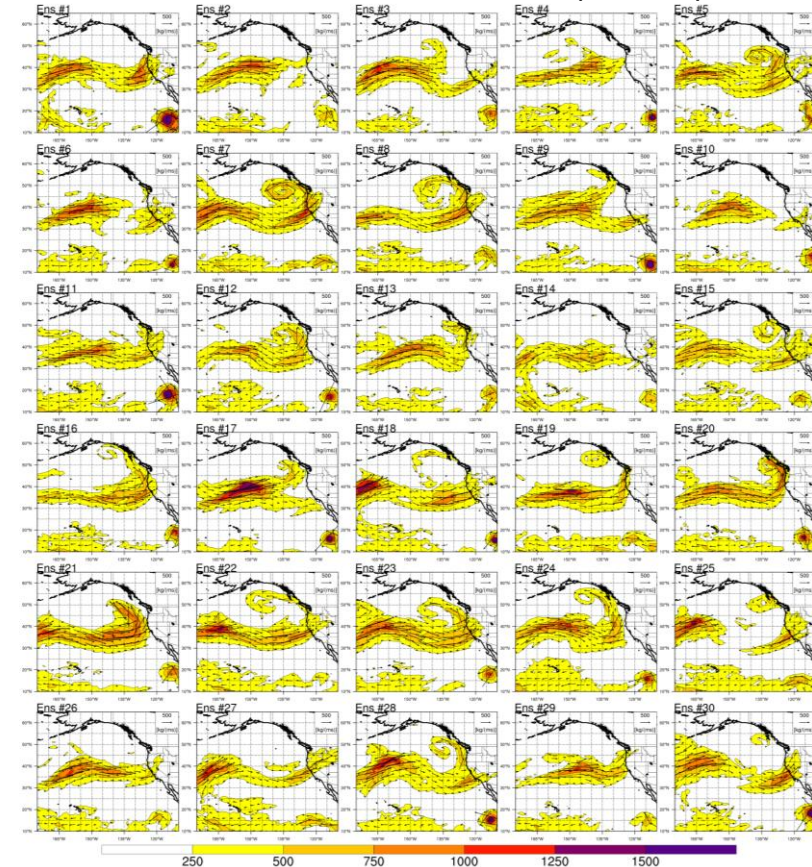
(A) GFS IVT Forecast  
Valid: 10 PM PT 8 Nov (F-144)



(B) ECMWF IVT Forecast  
Valid: 10 PM PT 8 Nov (F-150)

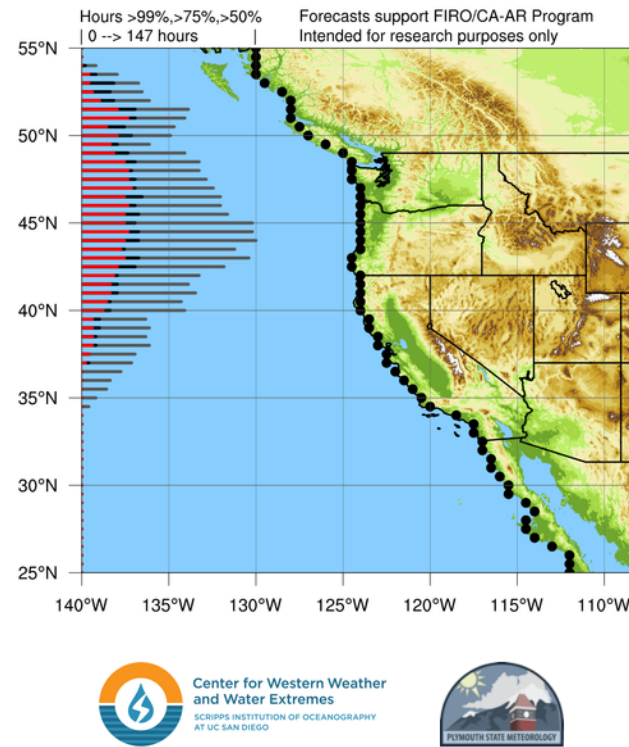
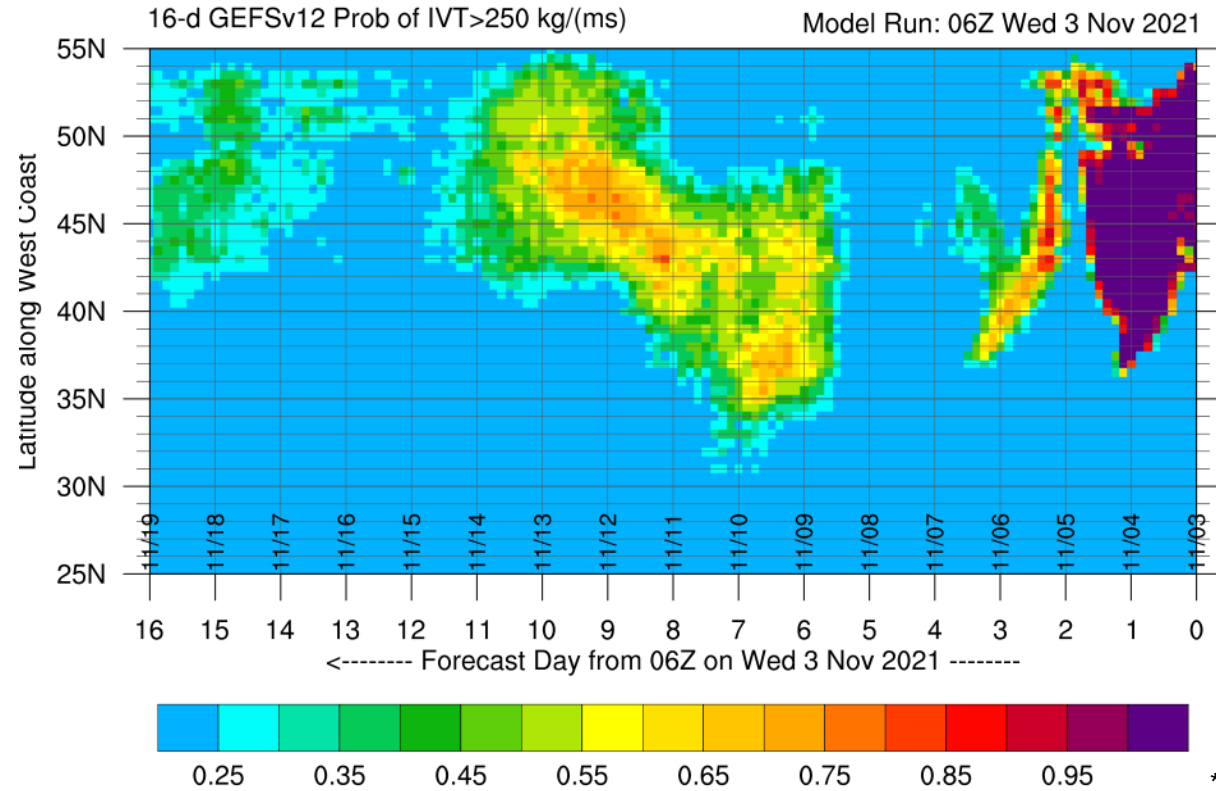


(C) GEFS IVT [ $\text{kg}/(\text{ms})$ ] Forecast  
Valid: 10 PM PT 8 Nov (F-144)

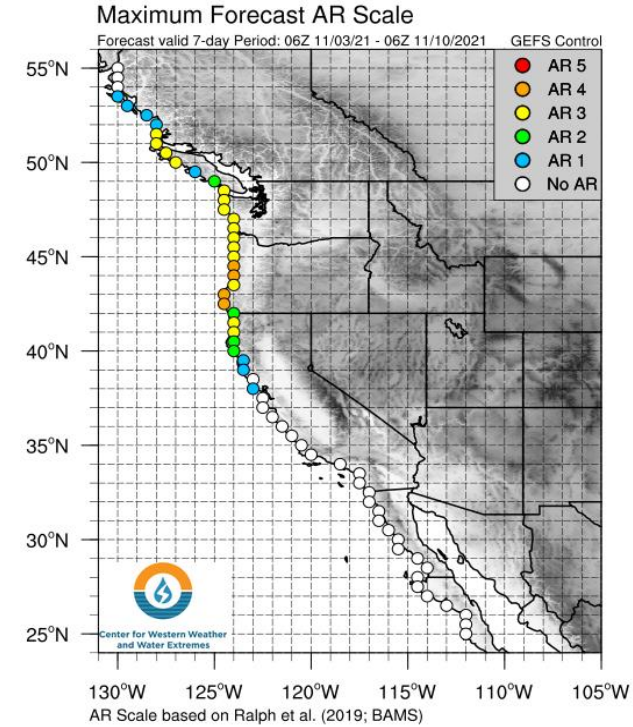


- Another AR is forecasted to impact the US West Coast on 8–9 Nov, but there is considerable uncertainty regarding the evolution of this AR and the associated low-pressure system (Figure A)
- The ECMWF deterministic model is currently forecasting an earlier AR landfall and higher IVT values in the core of the AR than the GFS deterministic model (Figure B)
- Several GEFS members are suggesting the possibility of a strong AR event in California, but there is large spread in the forecast timing, location, and strength of the AR (Figure C)

## Probability of AR Conditions Along Coast



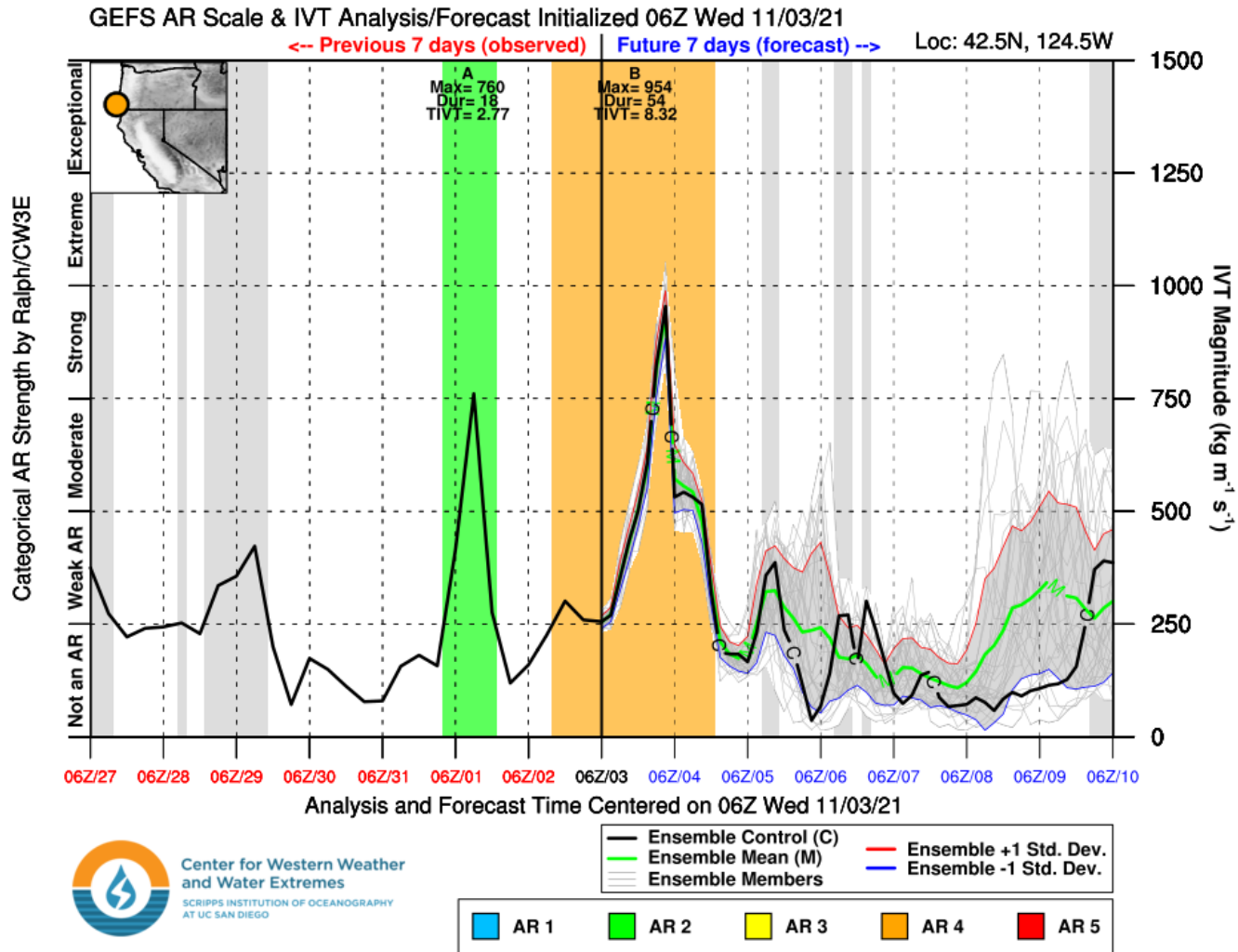
## AR Scale



\*GEFS = NCEP Global Ensemble Forecast System (United States)

- The 06Z GEFS is showing very high confidence (> 95% probability) in a period of AR conditions ( $IVT > 250 \text{ kg m}^{-1} \text{ s}^{-1}$ ) over coastal Washington, Oregon, and Northern California in association with the first AR
- An AR 4 (based on the Ralph et al. 2019 AR Scale) is forecasted in portions of coastal Oregon, where AR conditions are expected to persist for more than 48 hours
- AR 2/AR 3 conditions are forecasted elsewhere along the coast from Northern California northward
- A brief period of AR conditions is likely (> 70% probability) on 5–6 Nov
- Additional landfalling AR activity is somewhat likely (> 60% probability) during Days 5–10 (8–13 Nov)

## GEFS AR Scale and IVT Forecasts



- Both the 06Z GEFS control run and the GEFS ensemble mean are forecasting an AR 4 at 42.5°N, 124.5°W (Curry County, OR) based on the Ralph et al. 2019 AR Scale
- The 06Z GEFS control run is forecasting a maximum IVT of 954 kg m<sup>-1</sup> s<sup>-1</sup> and an AR duration of 54 hours at this location
- The strongest moisture transport is forecasted to occur this evening
- There is generally good ensemble agreement regarding the forecasted duration of AR conditions and maximum IVT magnitude

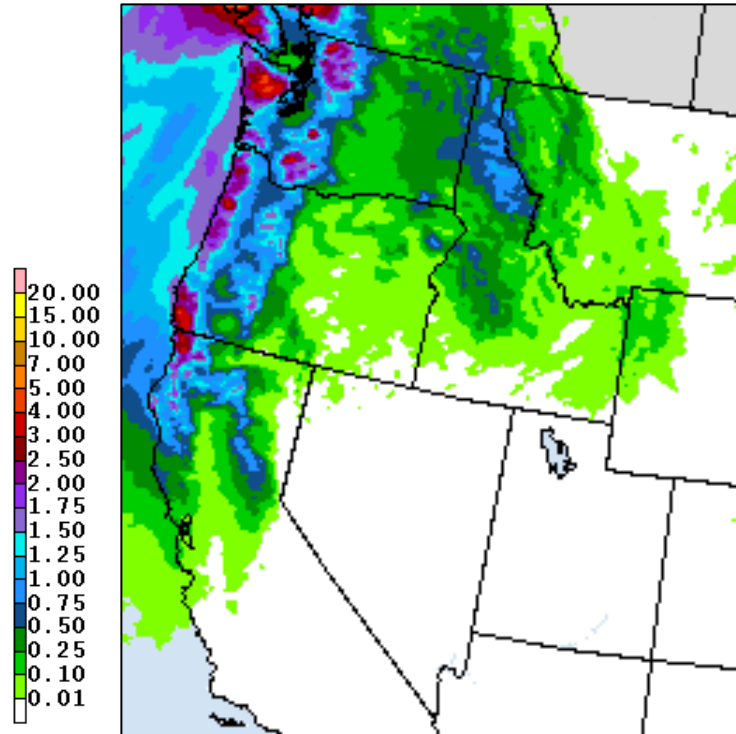


Image created: 10 UTC 11/03/2021

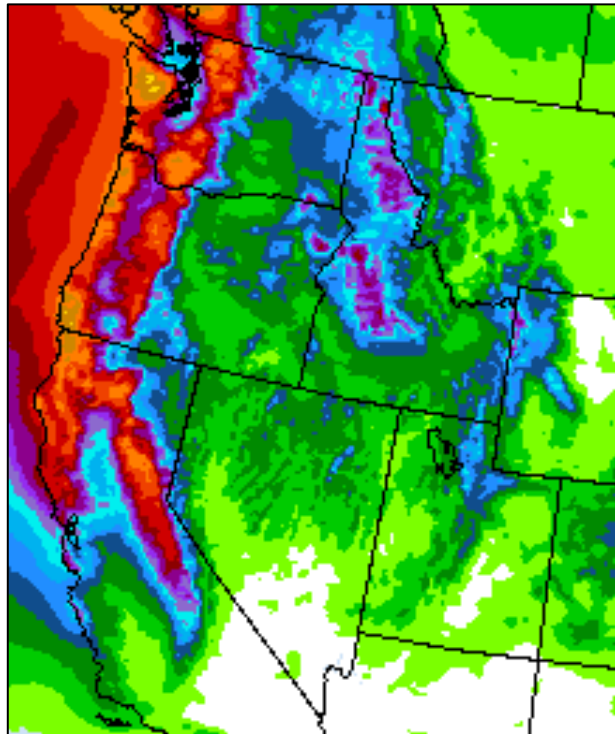
More information: <http://cw3e.ucsd.edu> AR Scale based on Ralph et al. (2019; BAMS), contact M. Ralph

## Precipitation Impacts

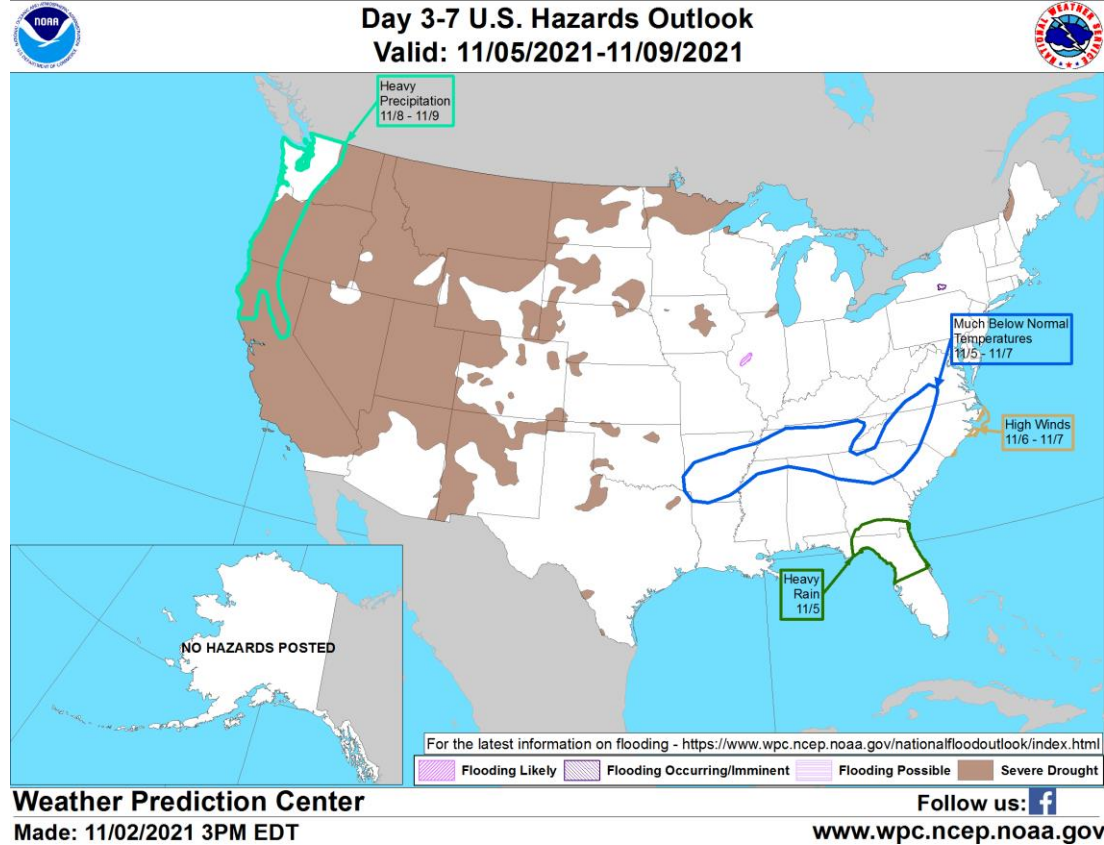
WPC 48-h QPF  
Valid 5 AM PT 3–5 Nov)



WPC 7-day QPF  
Valid 5 AM PT 3–10 Nov)

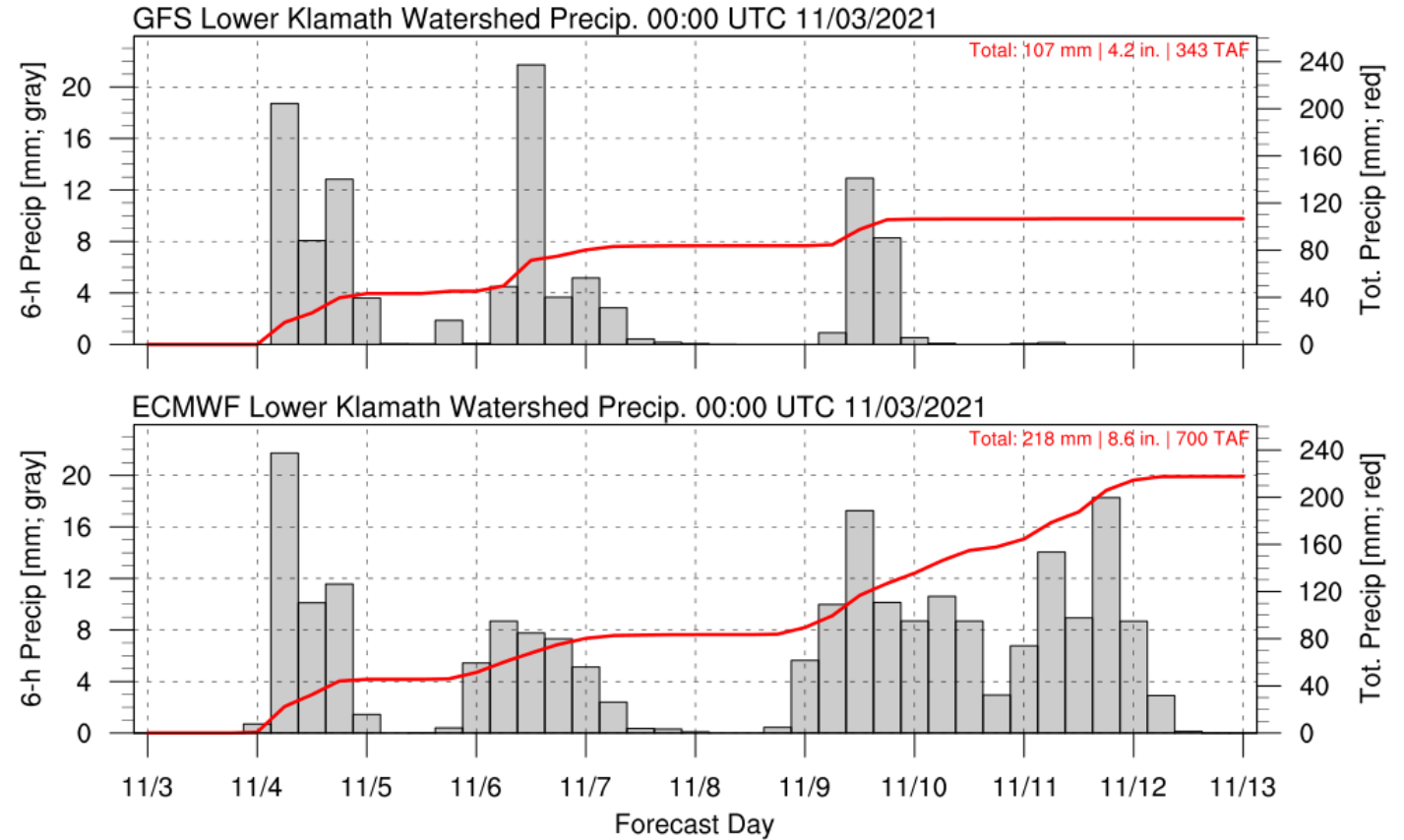
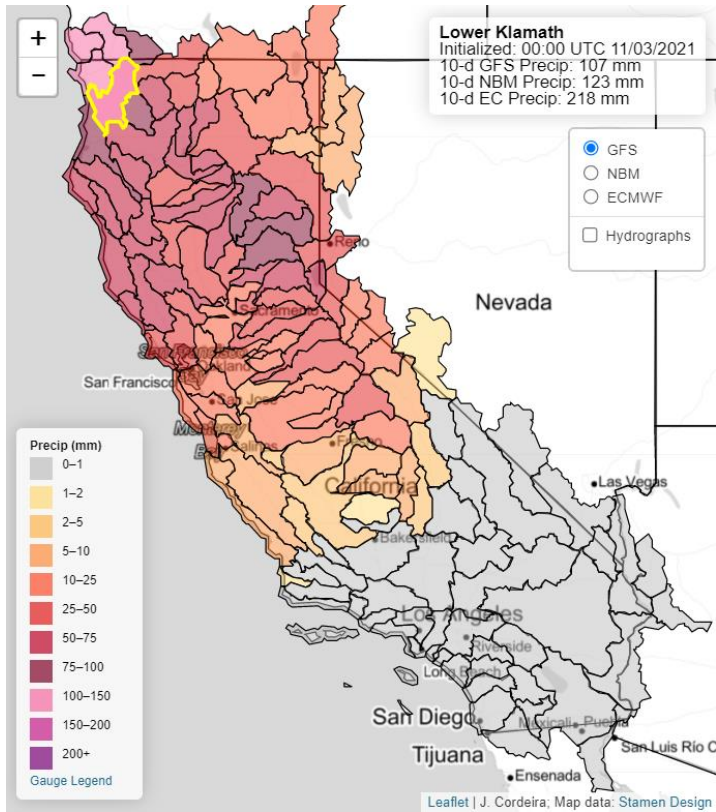


Source: NOAA/NWS WPC, <https://www.wpc.ncep.noaa.gov/>



- The first AR is forecasted to bring at least 1–3 inches of precipitation to parts of Northern California, western Oregon, and western Washington, with higher amounts possible in the Olympic Mountains and near the California/Oregon border
- The NWS Weather Prediction Center (WPC) is forecasting at least 3–7 inches of precipitation over the Pacific Coast Ranges, Cascades, and Sierra Nevada during the next 7 days, and locally more than 10 inches in the Olympic Mountains
- The WPC has issued an outlook for heavy precipitation in Northern California, western Oregon, and western Washington on 8–9 Nov

## 10-day Watershed Precipitation Forecasts: Lower Klamath



- The 00Z GFS and 00Z ECMWF are forecasting 4.2 inches (343 TAF) and 8.6 inches (700 TAF) of mean areal precipitation over the Lower Klamath watershed during the next 10 days
- There is significant disagreement between the models regarding the 9–11 Nov period, with the ECMWF forecasting significantly wetter conditions in northwestern California compared to the GFS