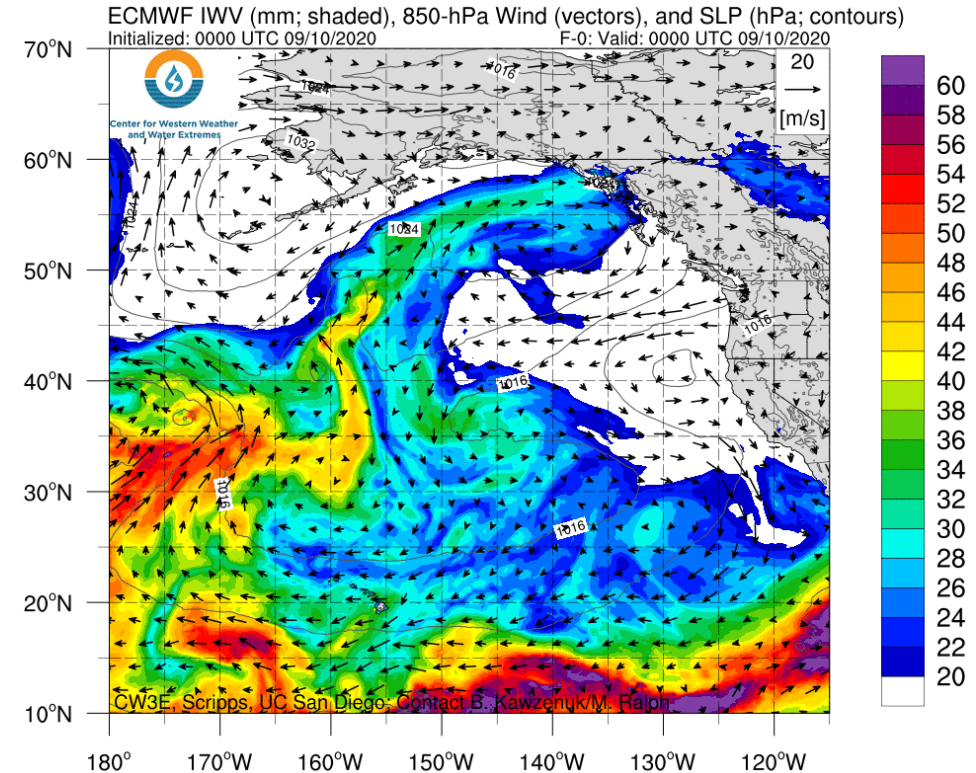
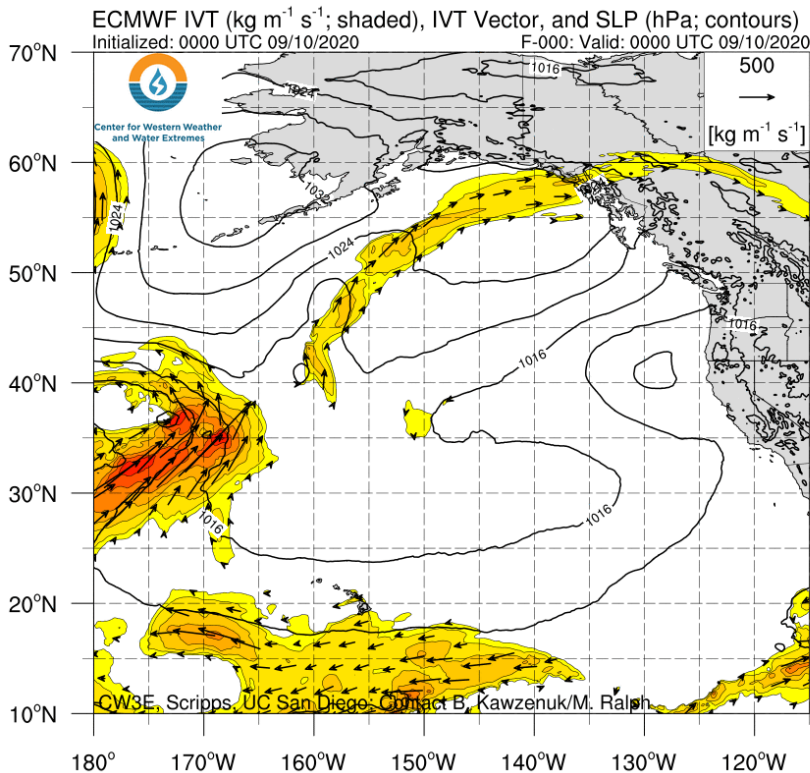




## A Landfalling Atmospheric River is Forecast to Potentially Bring Wildfire Relief to the Pacific Northwest

- An AR that is forecast to make landfall early next week could bring much needed precipitation to parts of Washington, Oregon, and potentially Northern California.
- Due to large lead times in the forecasts, there is currently very large ensemble and model-to-model uncertainties in AR conditions, magnitude, duration, and location.
- The large forecast uncertainties make it difficult to pinpoint where beneficial and wildfire relieving rains could fall
- The NOAA Weather Prediction Center is currently predicting as much as 2 inches over Coastal Washington/Northern Oregon, and ~1 inch over far Northern California.



# AR Outlook: 10 Sep 2020

For California DWR's AR Program

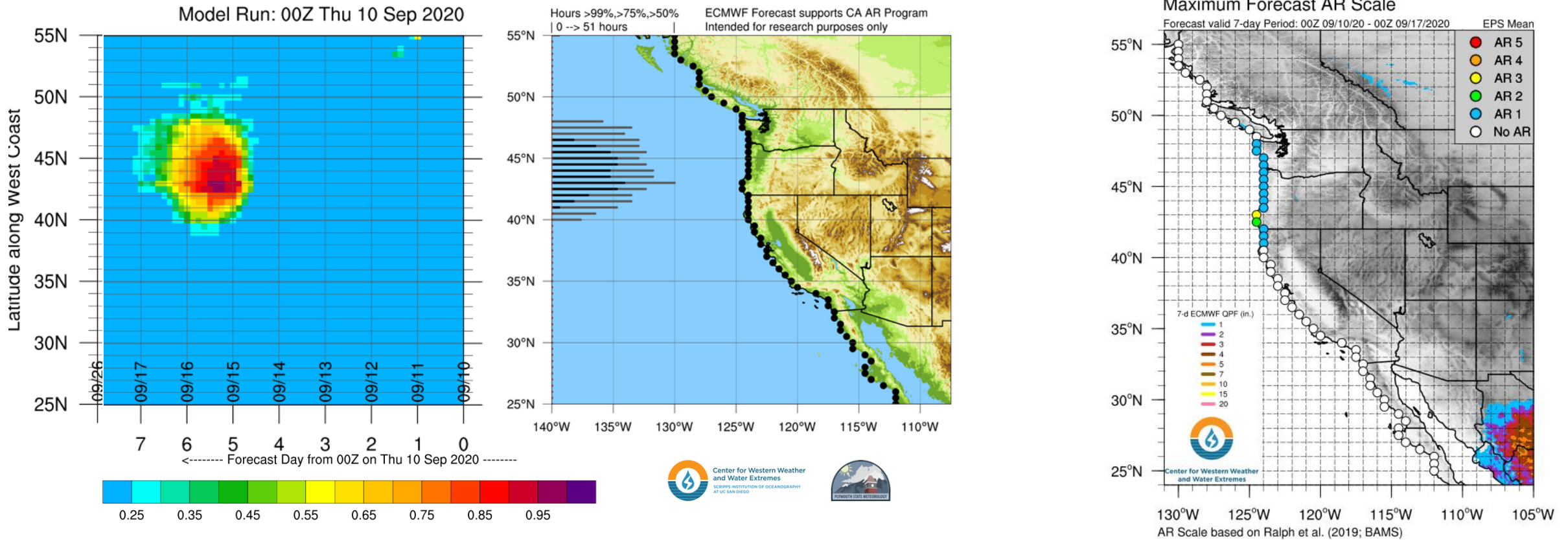


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## ECMWF EPS AR Landfall Probabilities & AR Scale (Coastal)

\*ECMWF EPS= European Center for Medium-Range Weather Forecasts Ensemble Prediction System



- The ECMWF EPS\* is currently exhibiting large ensemble uncertainty in forecasts of AR conditions ( $IVT > 250 \text{ kg m}^{-1} \text{ s}^{-1}$ ) from Coastal Washington to far Northern California
- There is large ensemble uncertainty in onset of AR conditions, duration of AR conditions, and northern/southern extent of AR conditions
- While ensemble uncertainty of AR conditions is currently large within this event, the ECMWF EPS ensemble mean is suggesting at least AR 1 conditions from coastal Washington to Northern California with the AR 2 & 3 conditions over Southern Oregon
- Despite the ensemble uncertainty there is high confidence ( $>90\%$  probability) in AR conditions along the Southern Oregon coast



# AR Outlook: 10 Sep 2020

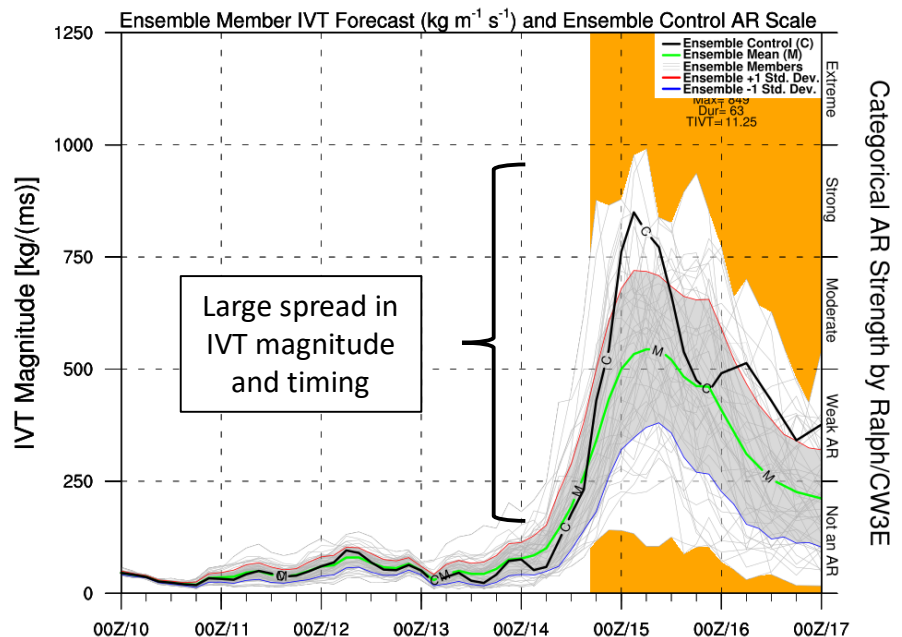
For California DWR's AR Program



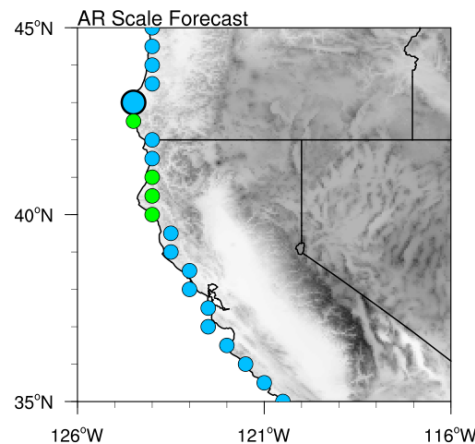
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ECMWF EPS Ensemble Initialized: 00Z Thu 09/10/20

Location: 43°N 124.5°W

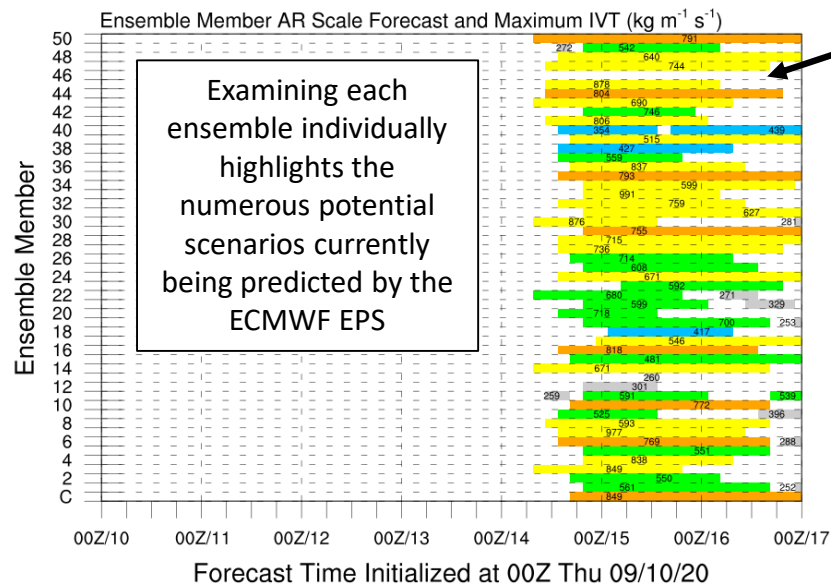
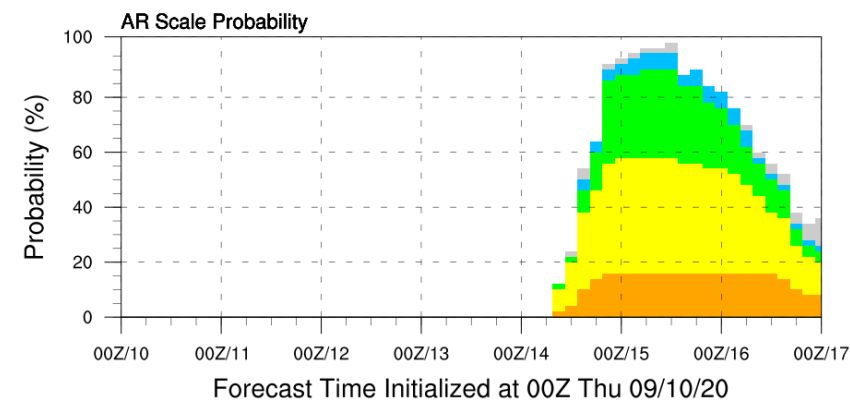


Categorical AR Strength by Ralph/CW3E



The large ensemble uncertainty in the forecasts of AR duration and magnitude is further illustrated via ensemble predictions of AR scale (Ralph et al. 2019).

For example, the control and 7 additional ECMWF EPS ensemble members (8 out of 51 total; ~16%) are currently predicting AR 4 conditions over Southern Oregon whereas 6 ensemble members are predicting AR 1 conditions or less (~12%).



Examining each ensemble individually highlights the numerous potential scenarios currently being predicted by the ECMWF EPS

The large uncertainty in overall magnitude, onset, and duration of AR conditions will make it difficult to pinpoint the location and accumulation of precipitation until the forecasts begin to converge.

AR 1 (blue) AR 2 (green) AR 3 (yellow) AR 4 (orange) AR 5 (red)

# AR Outlook: 10 Sep 2020

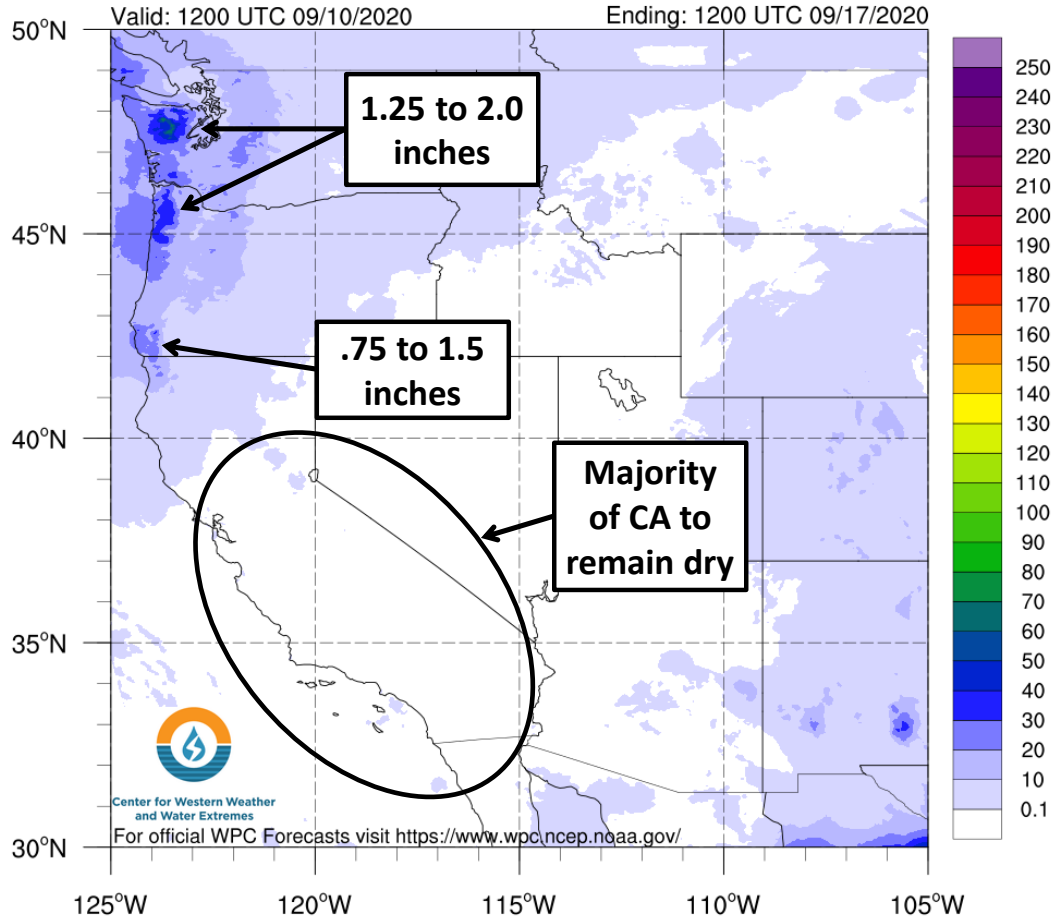
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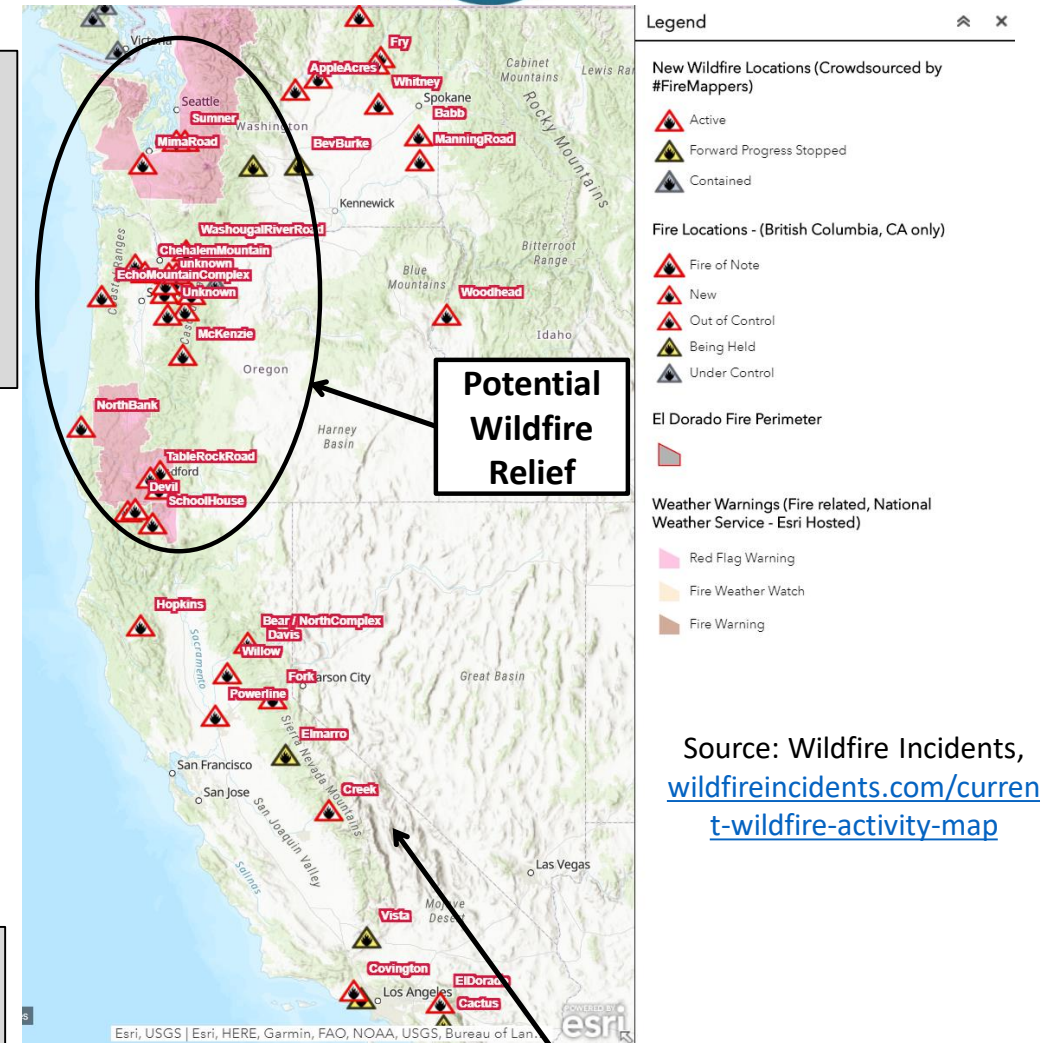
## WPC 7-day Precipitation Forecast (mm)



## Active Large Fires

- California (24)
- Oregon (16)
- Washington (16)

Source: National Interagency Fire Center, [nifc.gov/fireInfo/nfn.htm](https://nifc.gov/fireInfo/nfn.htm)



- The NOAA Weather Prediction Center is currently forecasting the largest precipitation accumulations to fall over the Coastal Mountains of Washington and Oregon (1.25 to 2 inches).
- The WPC is currently suggesting that this event will primarily impact OR, WA, and far Northern CA potentially bringing relief to the numerous fires that are burning in this region.

Unfortunately, this AR is not currently forecast to bring precipitation to a majority of CA where there are numerous additional active fires.

# AR Outlook: 10 Sep 2020

For California DWR's AR Program



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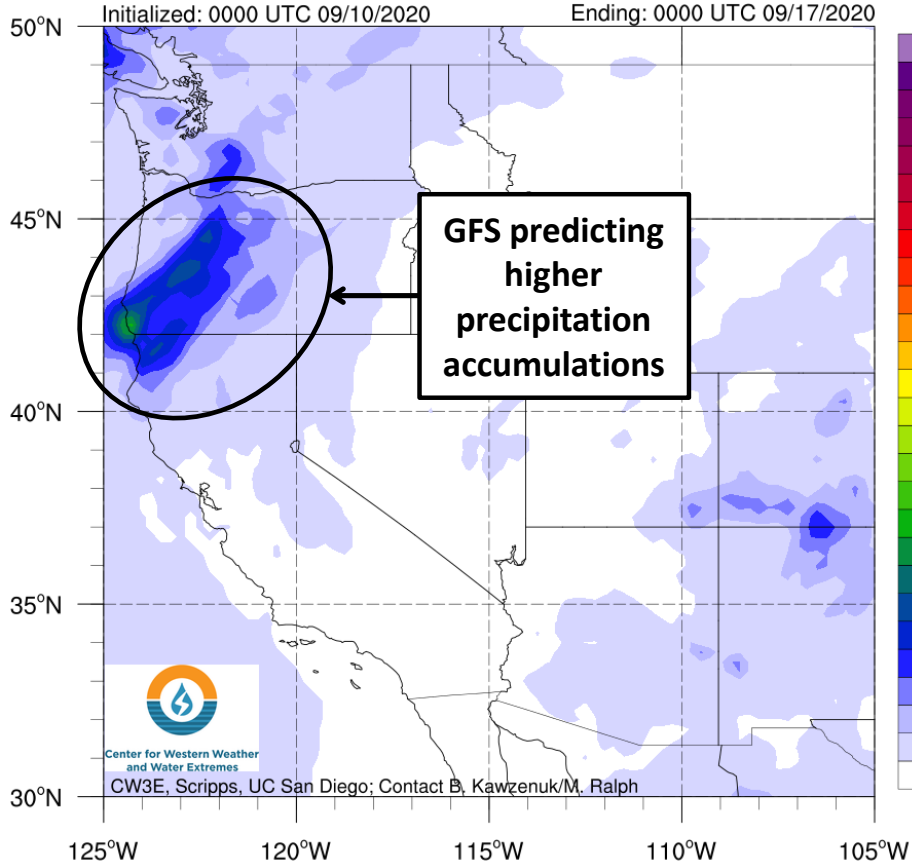
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## GFS and ECMWF 7-Day Quantitative Precipitation Forecasts

### GFS 7-day Precipitation Forecast (mm)

Initialized: 0000 UTC 09/10/2020

Ending: 0000 UTC 09/17/2020



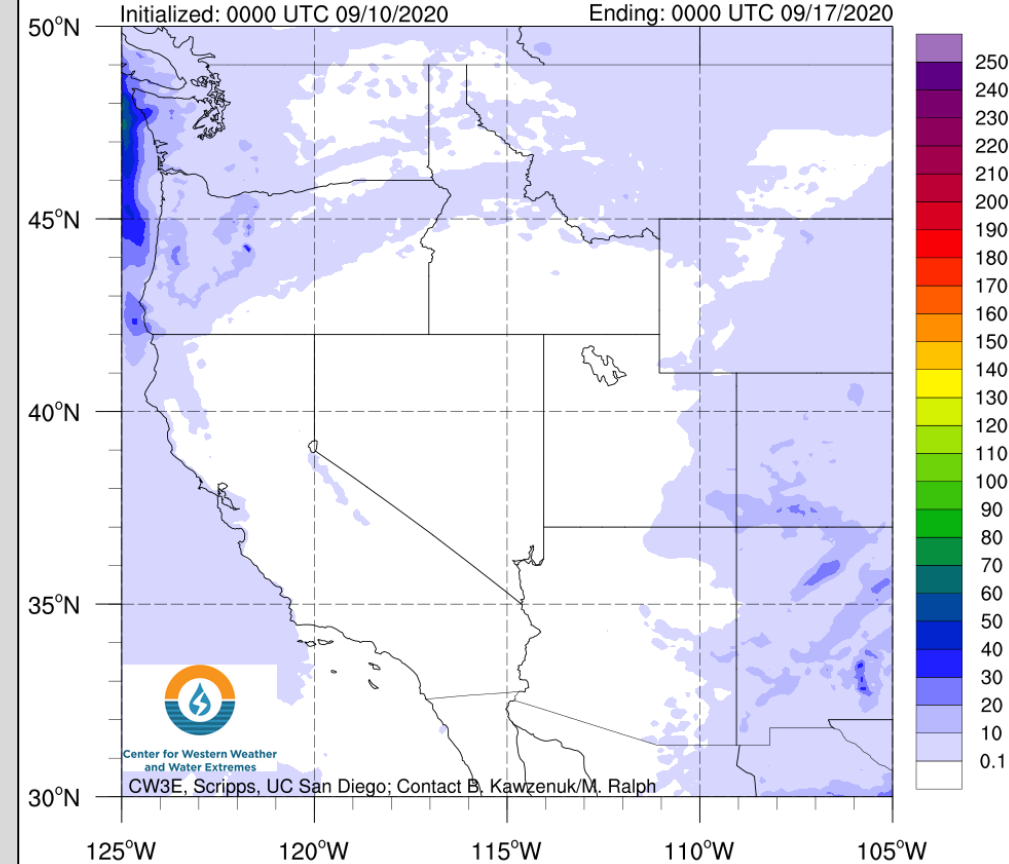
GFS predicting higher precipitation accumulations

- There is also large model-to-model uncertainty when comparing the GFS and ECMWF 7-day QPF.
- The GFS is currently suggesting that this AR will bring larger precipitation accumulations to Northern CA and Southern OR (+3 in. compared to ECMWF).
- The ECMWF is currently predicting considerably lower precipitation accumulations across a majority of the West including that a larger portion of CA will remain dry.

### ECMWF 7-day Precipitation Forecast (mm)

Initialized: 0000 UTC 09/10/2020

Ending: 0000 UTC 09/17/2020





# AR Outlook: 10 Sep 2020

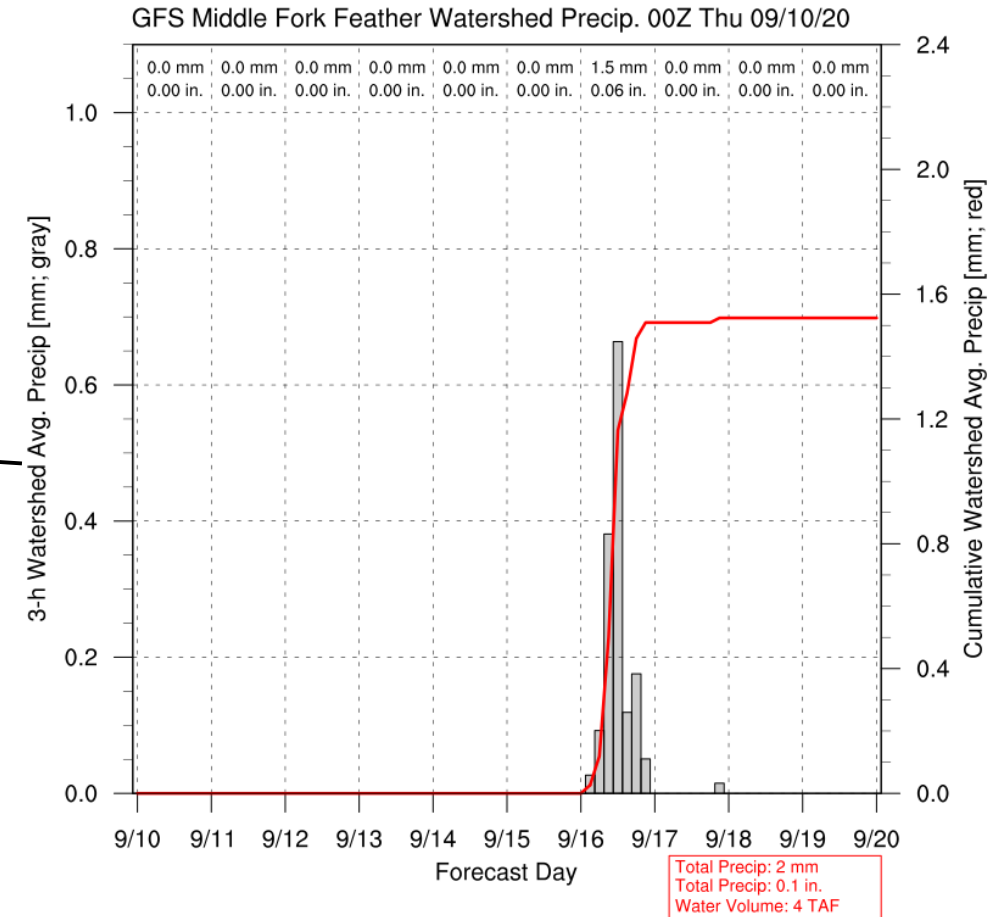
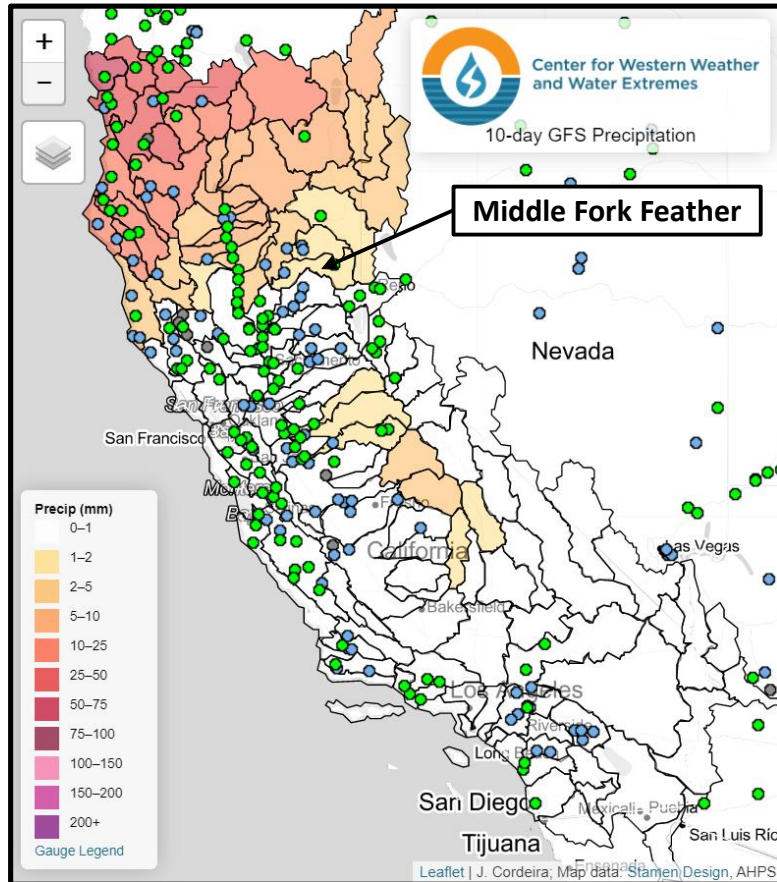
For California DWR's AR Program



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## GFS 10-day Watershed Precipitation Forecasts



- The 00Z 10 September GFS is currently predicting <.1 inches of watershed average precipitation over the Middle Fork Feather River Watershed, where the Bear Fire has burned nearly 250,000 acres
- While current precipitation forecasts are low, any precipitation would bring beneficial rain to the numerous active fires