CW3E Atmospheric River Outlook: 6 October 2023

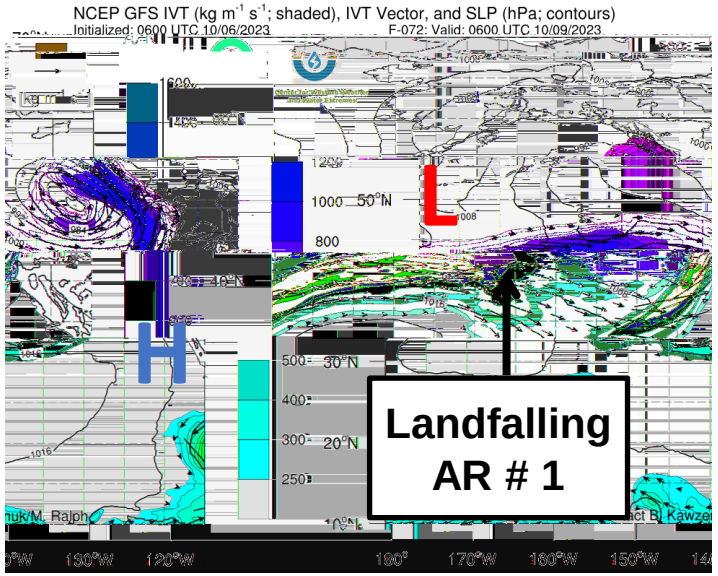
Pair of Atmospheric Rivers Forecast to Impact Pacific Northwest and Northern California

- A pair of atmospheric rivers (AR) are forecast to make landfall in the Pacific Northwest, the first early on Mon 9 Oct and the second on Tues 10 Oct
- AR1 conditions (based on Ralph et al. scale) are forecast during the first AR, with a ~24 hour period of IVT >500 kg m^{-1} s^{-1} forecast for Washington to Northern California
- AR2 conditions are forecast during the second AR for a more southerly latitude range along the coast of Central Oregon into Northern California, with a ~42 hour period of IVT >250 kg m^{-1} s^{-1} forecast in this region
- The 00Z GFS and 00Z ECMWF are forecasting 1 to 3 inches of precipitation over much of western Washington and Oregon over the next 10 days. Some of the precipitation is forecast to fall after the ARs
- The NWS Weather Prediction Center (WPC) is forecasting 7-day precipitation totals >3 inches over the Olympic Peninsula and 1-2 inches along the Oregon and Washington coasts and the windward (west) side of the Cascade Range
- Precipitation associated with these ARs are forecast to be primarily beneficial to the Pacific Northwest where widespread drought conditions are present, with no river levels forecast to rise above action stage within the boundaries of the NWS Northwest River Forecast center

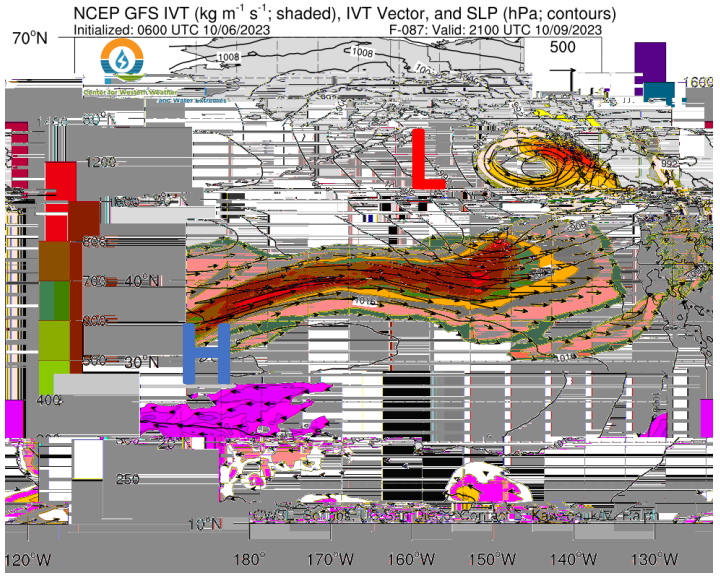
CW3E AR Outlook: 6 October 2023

GFS Model IVT Forecast: Initialized 06Z 6 Oct

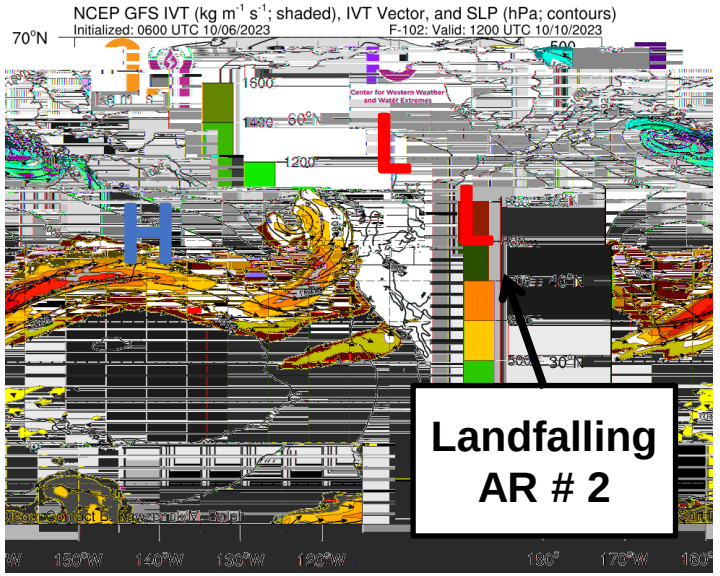
A) Valid 11 PM PST Sun 8 Oct (F-72)



B) Valid 2 PM PST Mon 9 Oct (F-87)



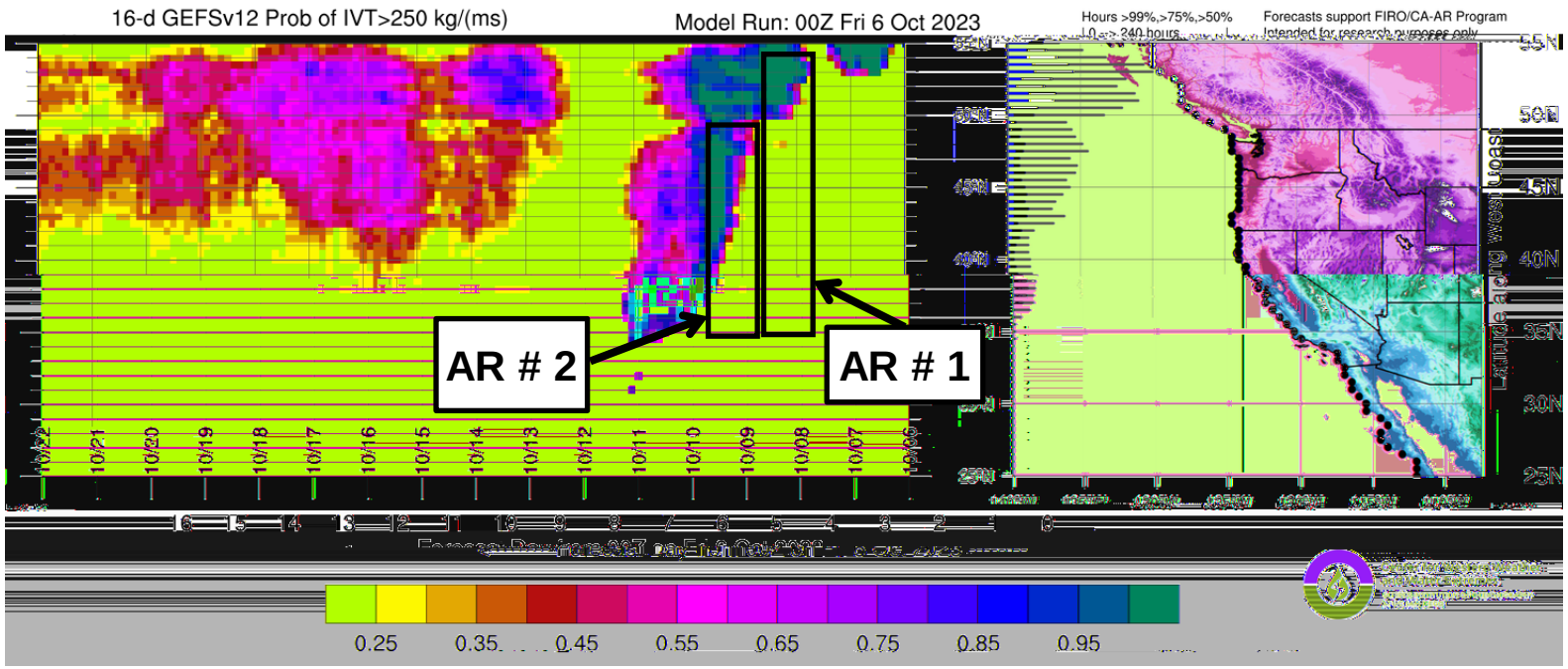
C) Valid 5 AM PST Tue 10 Oct (F-102)



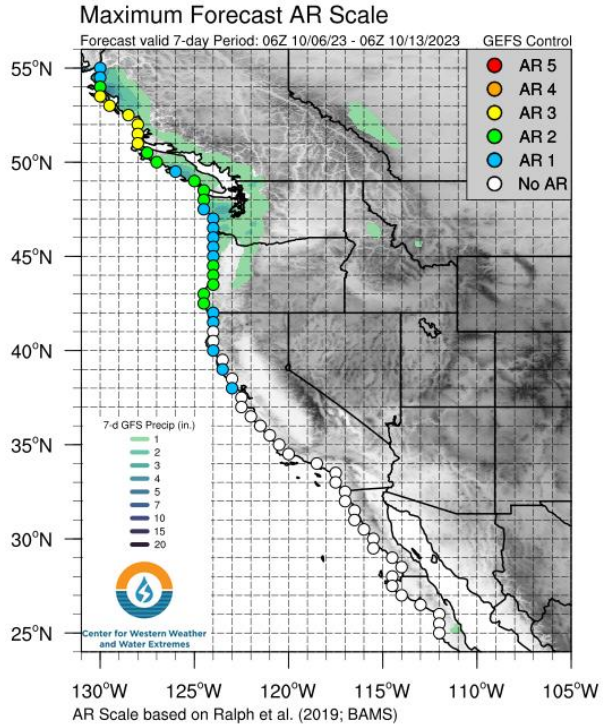
- The first AR is forecast to make landfall along the Pacific Northwest in association with a surface low pressure system moving to the northeast in the Gulf of Alaska on Mon 9 Oct
- 06Z GFS deterministic model forecast IVT magnitudes > 800 kg m^{-1} s^{-1} in the core of this AR as it makes landfall, with primarily a south-southwesterly to southerly orientation (Figure A)
- After a brief break in AR conditions in the region, a second AR is forecast to develop in association with a secondary surface low pressure that is forecast to develop in the eastern North Pacific and move towards the US west coast on Tue 10 Oct (Figure B)
- This second AR will bring additional moisture into coastal Oregon and far Northern California, with primarily a southwesterly orientation as it makes landfall (Figure C)

CW3E AR Outlook: 6 October 2023

Probability of AR Conditions Along Coast (GEFS)



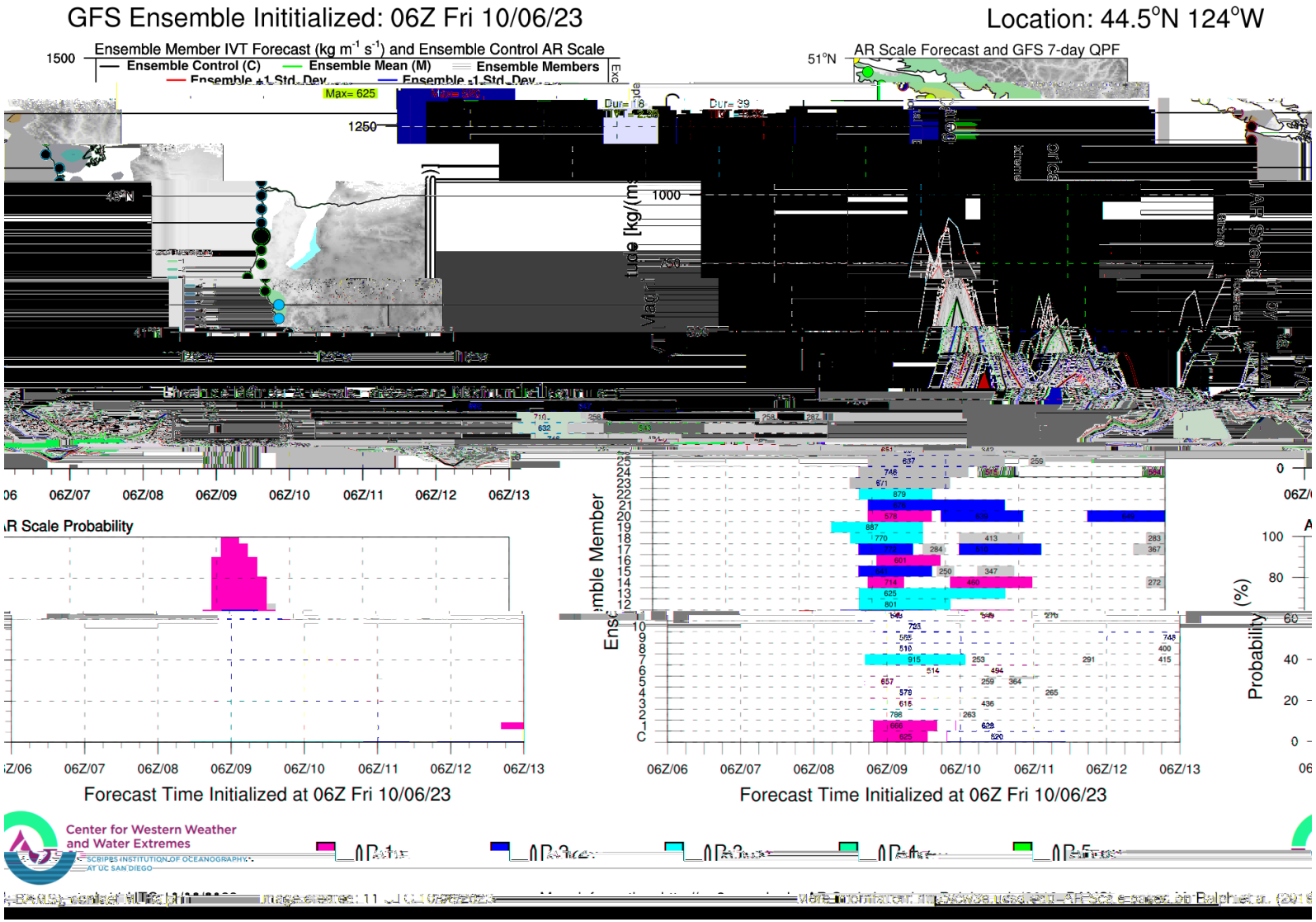
AR Scale(GEFS)



- The 00Z GEFS is showing very high confidence (> 95%) in a period of AR conditions (IVT > 250 kg m^{-1} s^{-1}) forecast along coastal Pacific Northwest and Northern California with the first AR beginning on Mon 9 Oct
- A secondary period of AR conditions is forecast with high confidence (>75%) slightly farther south, in coastal Oregon and far Northern California.
- These two ARs are forecast to bring an extended period of approximately 48 hours AR conditions to the Pacific Northwest and far Northern California from Monday into Tuesday

CW3E AR Outlook: 6 October 2023

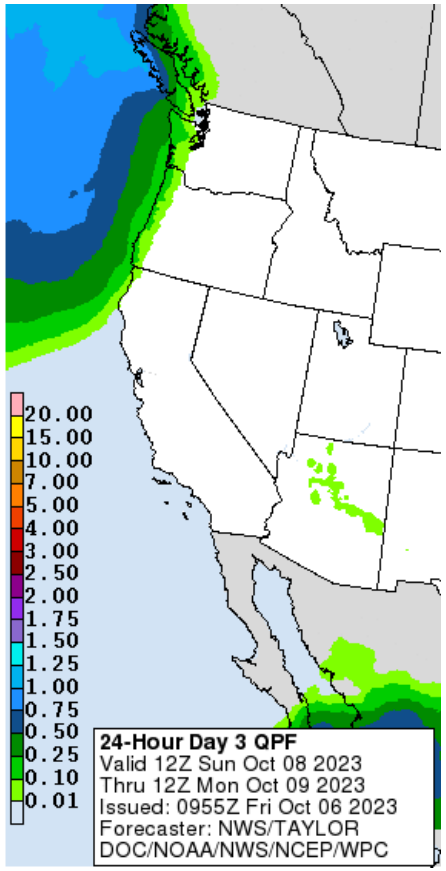
GEFS 7-day AR Scale and IVT Forecast

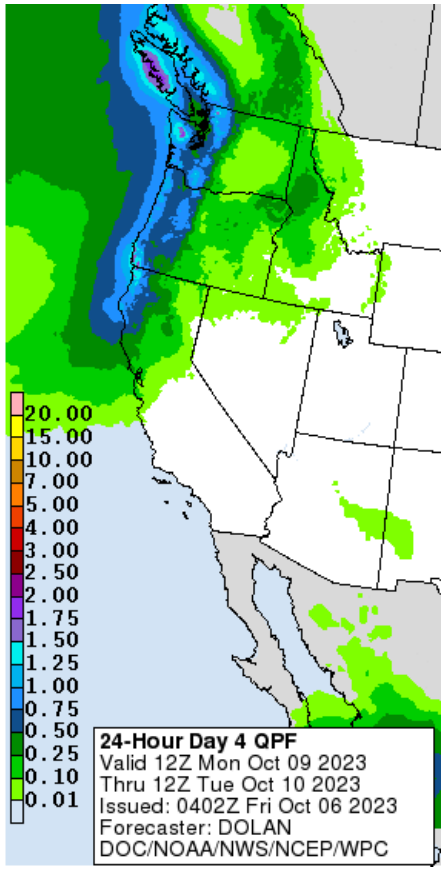


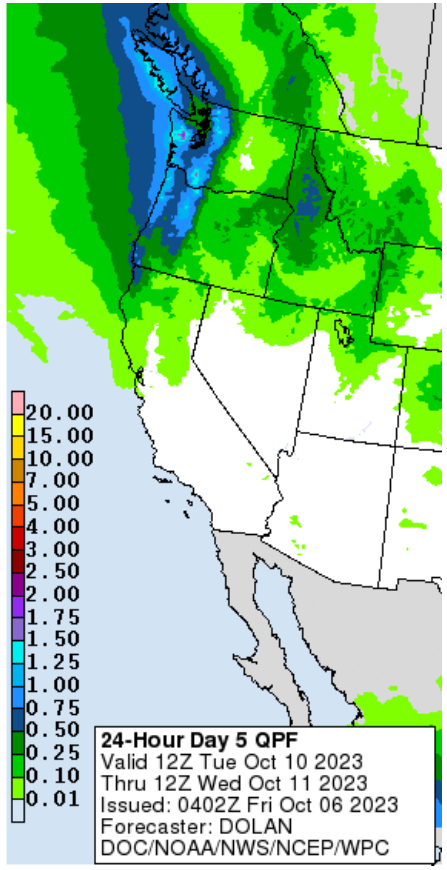
- The GEFS is forecasting AR1 conditions at 44.5° N, 124.0° W along the central Oregon Coast for the first AR
- For the first AR period, 20/31 (65%) GEFS ensemble members are forecasting at least AR2 conditions
- For the second AR period, 13/31 (42%) of GFS Ensemble members forecasting at least AR2 conditions.
- 9/31 (29%) of the members (including the control) do not forecast a break in the AR conditions at this location, resulting in some member forecasting AR3 conditions

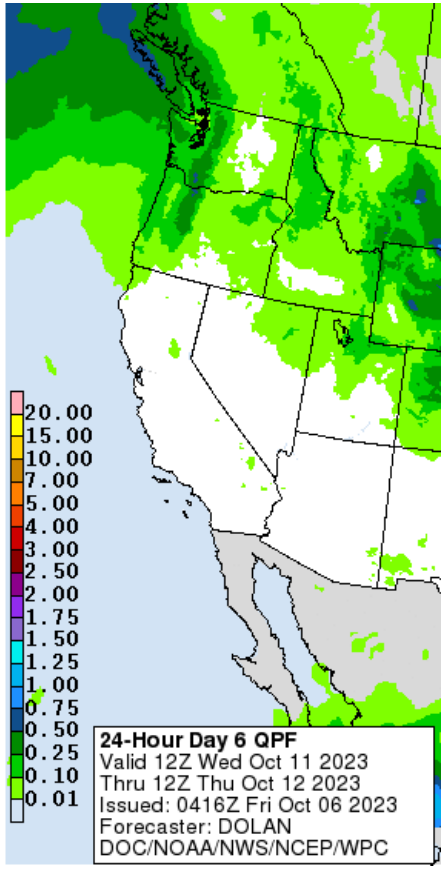
CW3E AR Outlook: 6 October 2023

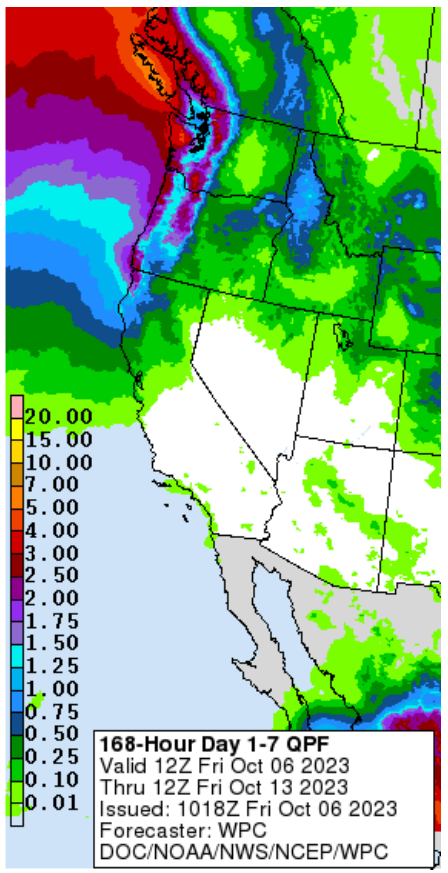
WPC Days 3-6 & Total Quantitative Precipitation Forecasts









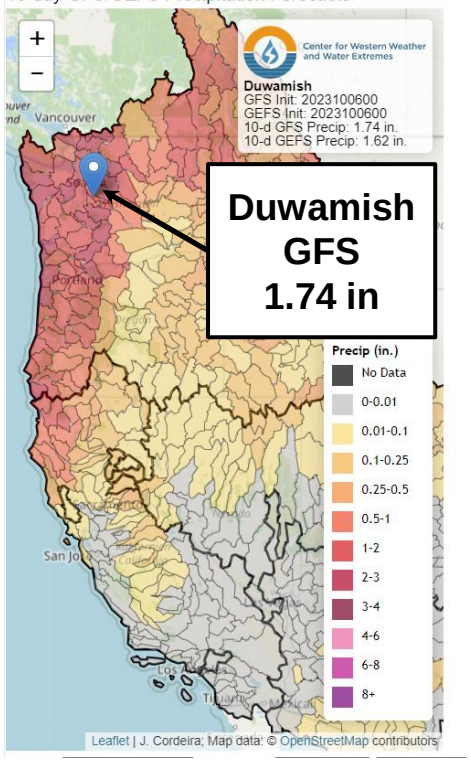


- The NWS WPC forecast precipitation totals >1 inches along the Oregon-California border, Olympic Peninsula and Vancouver Island on Monday through Wednesday (12Z 9-11 Oct) during the most impactful portions of these ARs
- The highest precipitation totals forecast during these ARs are located in the Coast Ranges of Washington, Oregon, extreme Northern California & the windward side of the Cascades, with the highest values forecast on the Olympic Peninsula.

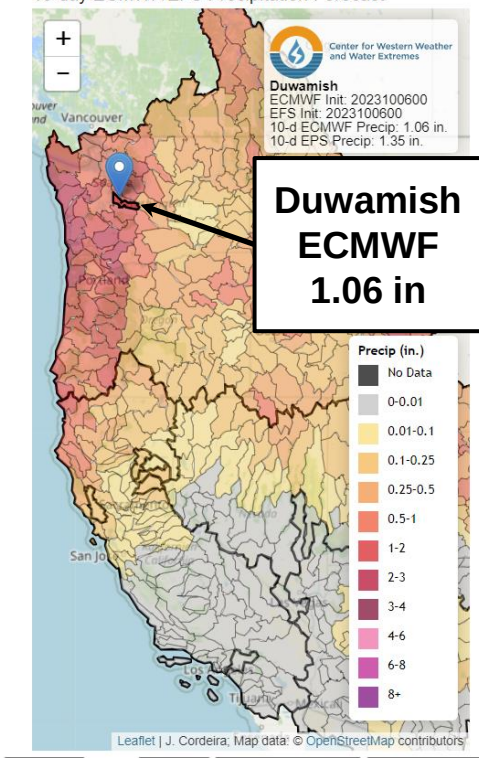
CW3E AR Outlook: 6 October 2023

10-day Watershed Precipitation Forecasts (Initialized 5 PM PT 5 Oct)

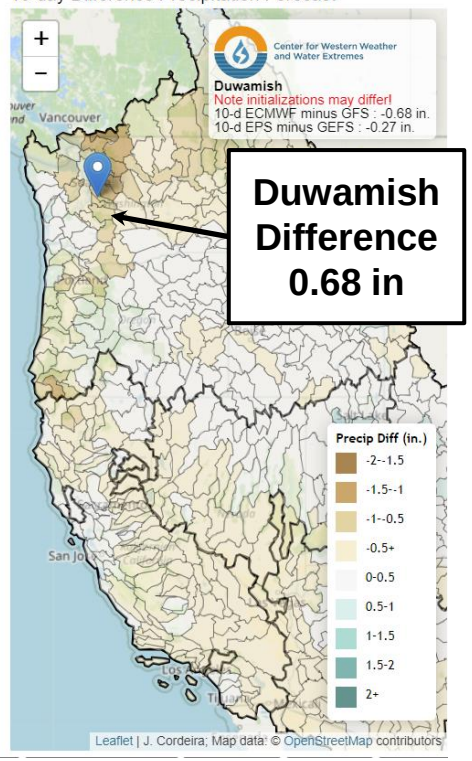
GFS

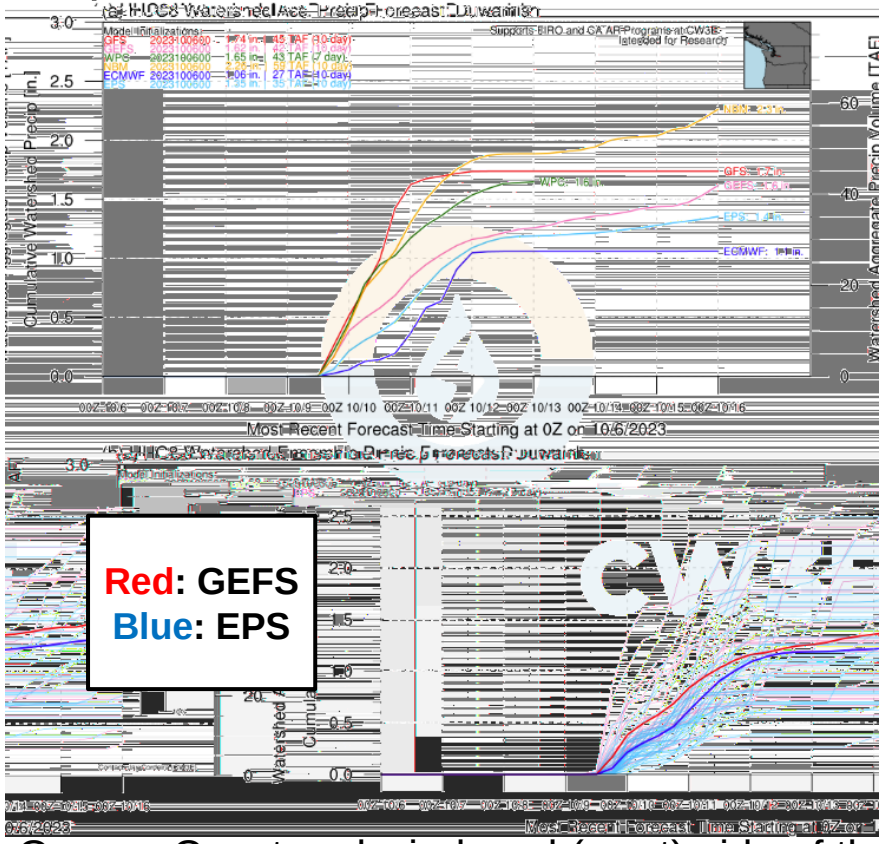


ECMWF



ECMWF minus GFS



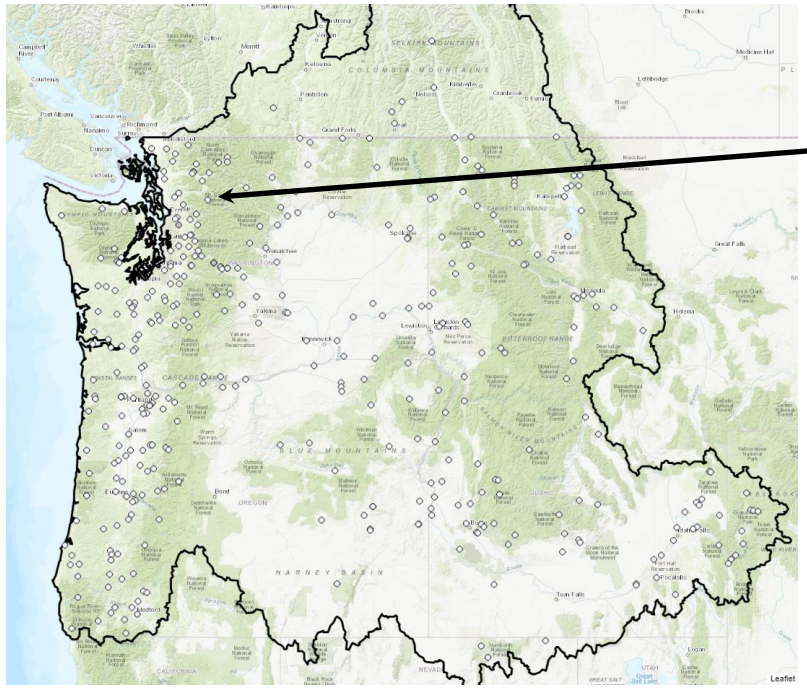


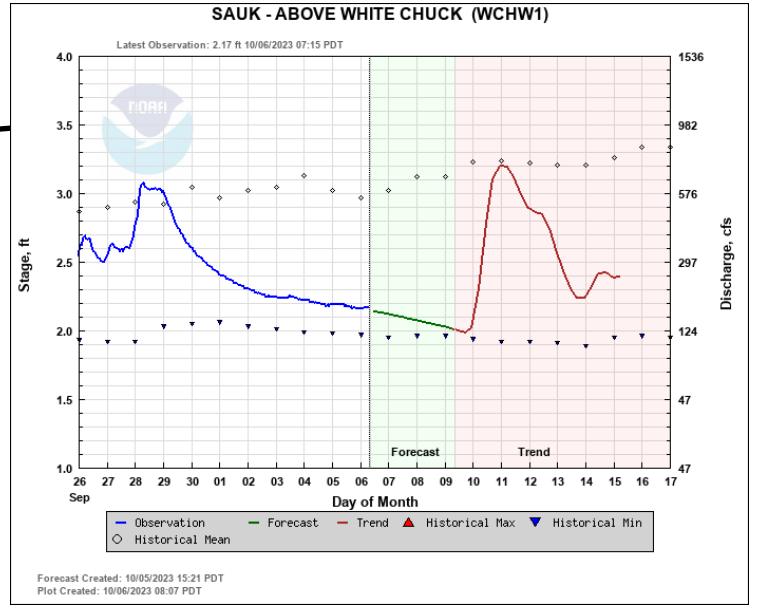
- The 00Z GFS is forecasting higher 10-day watershed precipitation totals in along the Oregon Coast and windward (west) side of the Cascade Range as compared to the 00Z ECMWF
- The 00Z GFS is forecasting 1.74 inches of mean areal precipitation in the Duwamish watershed over the next 10 days, while the 00Z ECMWF is forecasting 1.06 inches over the same watershed
- The GEFS and EPS forecasts show significant variability in the 10-day precipitation forecast for the Duwasmish, with 10-day precipitation totals ranging from ~0.25 inches to > 3 inches

CW3E AR Outlook: 6 October 2023

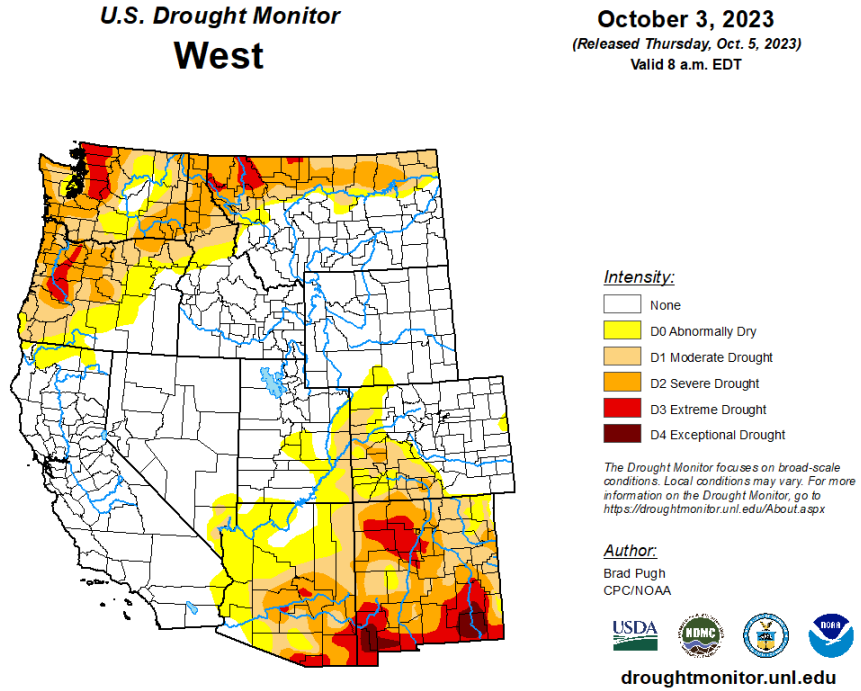
NWS River Stage Forecasts and Drought Monitor

NWS NWRFC





US Drought Monitor



- Drought conditions exist across much of the Pacific Northwest, with a broad region of Severe Drought along the windward (west) side of the Cascades and Coast Ranges of Washington and Oregon, with isolated regions of Extreme Drought

- River levels across the Pacific Northwest are forecast to rise as a results of the precipitation associated with this AR, but all stations within the NWS NWRFC are forecast to remain below the monitor or action stage