Quick Look at the Upcoming AR Activity over the Pacific Northwest

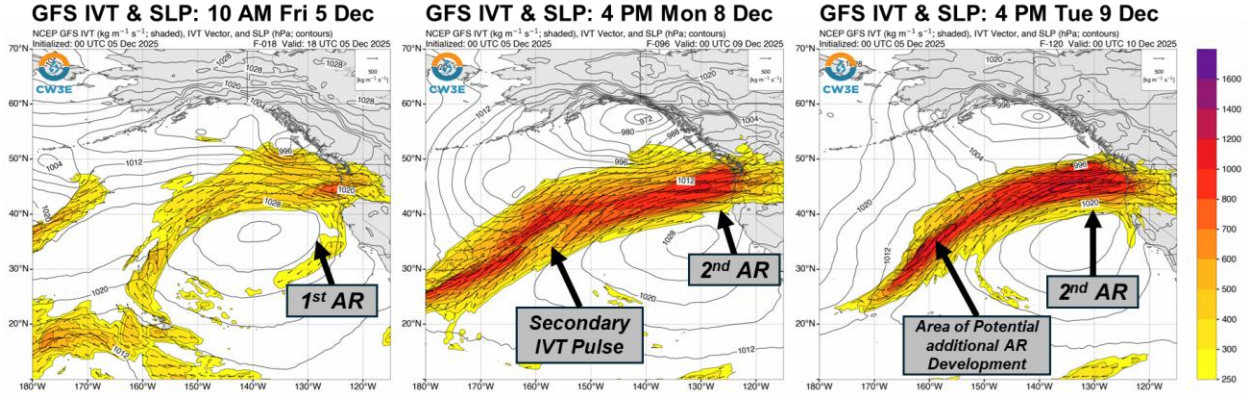
Updated: 5 December 2025

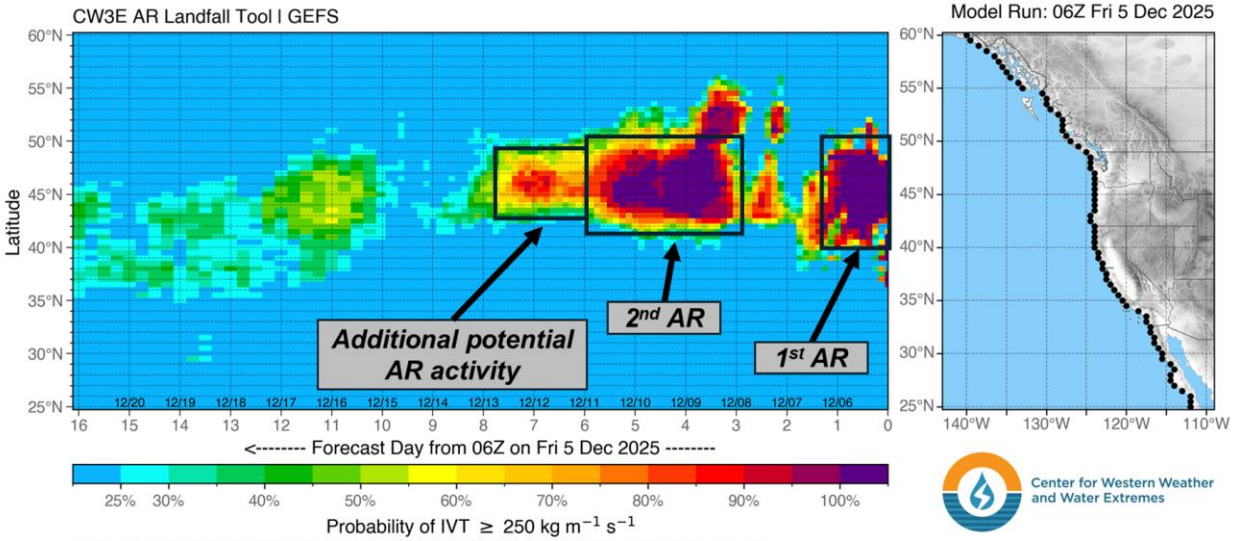
Multiple atmospheric rivers (ARs) are forecast to impact the Pacific Northwest through the middle of next week, with persistent rainfall forecast to lead to widespread riverine flooding.

Forecast Highlights:

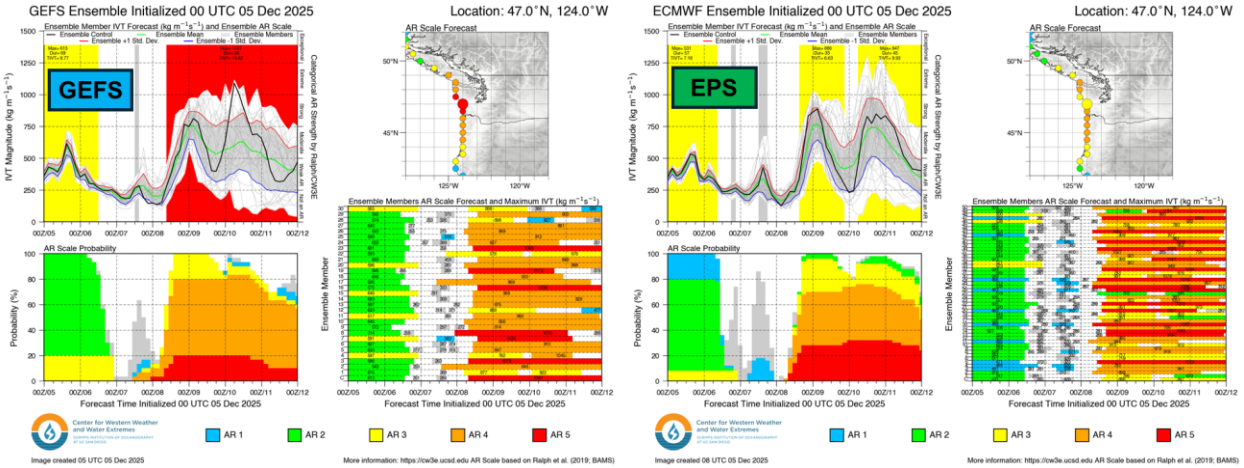
- An AR with maximum IVT >600 kg m^{-1} s^{-1} over coastal Oregon is forecast to continue over the Pacific Northwest today through early Sat 6 Dec.
- A second, stronger AR is forecast to move onshore over the PNW early on Mon 8 Dec and remain over the region through early Thu 11 Dec. This AR features two distinct pulses of moisture transport, with the second pulse potentially exceeding 1000 kg m^{-1} s^{-1} early Wed 10 Dec, leading to an extended period of AR conditions greater than 72 hours.
- These ARs are supported by robust transport of subtropical moisture on the western and northern side of a persistent high-pressure system. As these ARs move onshore, westerly IVT will likely be optimal for supporting orographic enhancement of precipitation.
- There is the potential for additional AR activity over the PNW later next week after these ARs, with probabilistic guidance suggesting high likelihoods (60–80% probability) of AR activity over the region for the period between Thu 11 Dec–Sat 13 Dec.
- The GEFS and ECMWF ensemble control members are forecasting AR4/AR5 (based on the Ralph et al. 2019 AR Scale) conditions with the second AR. In southern coastal Washington, ~70–80% of both GEFs and EPS members are forecasting at least AR4 conditions, while ~20–30% of both GEFS and EPS members are forecasting AR5 conditions.
- The NWS Weather Prediction Center (WPC) is forecasting 7-day precipitation totals of 4–7 in. broadly over western Washington and Oregon, with totals >10 in. possible in the coastal ranges, Olympic Peninsula, and Washington Cascades.
- NWS WPC has issued **marginal risk** (**≥ 5%; level 1 of 4**) and **slight risk** (**≥15%; level 2 of 4**) excessive rainfall outlooks over western Washington and Oregon between 4 AM Mon 8 Dec–4 AM Wed 10 Dec for flood risk due to heavy rainfall on soils primed by recent rainfall.
- Ensemble 10-day precipitation totals vary across the Pacific Northwest; the EPS is higher along the coast and over terrain in the Northern Cascades as compared to the GEFS ensemble. In the Duwamish watershed, the EPS and GEFS mean precipitation forecasts have converged to ~8.4 in. (>10% of normal annual precipitation).
- The NWS Northwest River Forecast Center is currently forecasting **2** streamgages to rise above **major flood** stage, **5** above **moderate flood** stage, **8** above **minor flood** stage, and 26 above action/bankfull in WA & OR, with the most significant rises forecast on 9 and 10 Dec from the sustained AR activity.
- Freezing levels are forecast to lower to ~4,000 feet on Sat 6 Dec with the present system and then rise to around 6,000 feet over the Cascades with the second AR after 8 Dec, although there is still significant uncertainty with the forecast beyond this time frame. Significant snowfall amounts will likely be limited to the highest elevations

Stay alert to official NWS forecasts, watches, and warnings at weather.gov





Forecasts support FIRO/CA-AR Program and NSF #2052972 | Intended for research purposes only




Center for Western Weather
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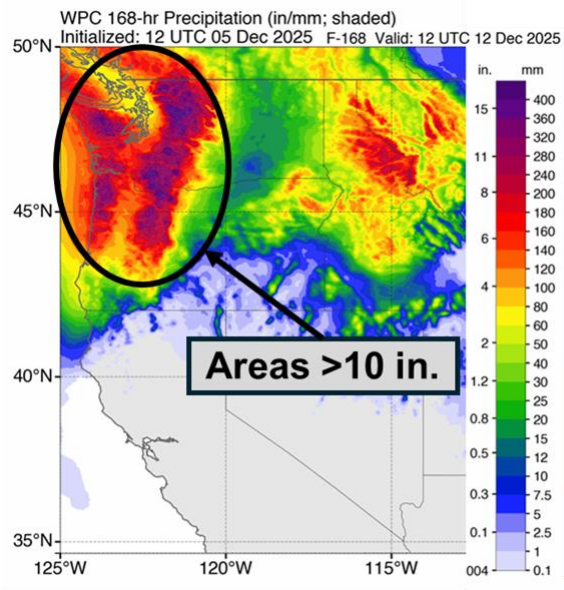
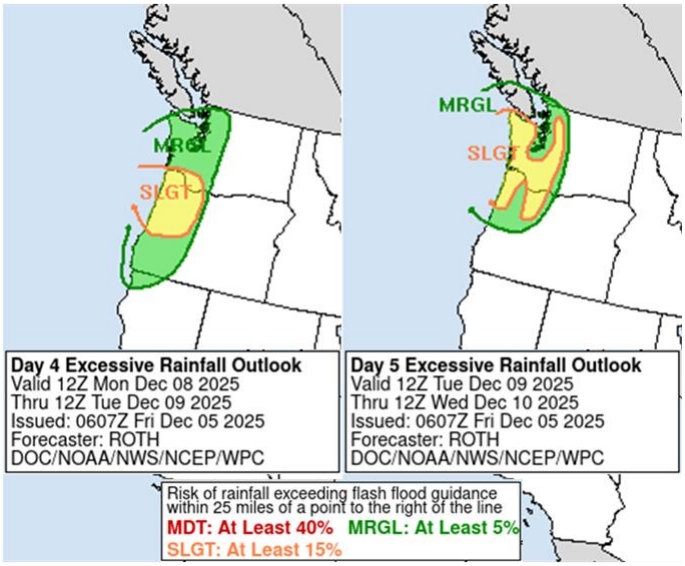
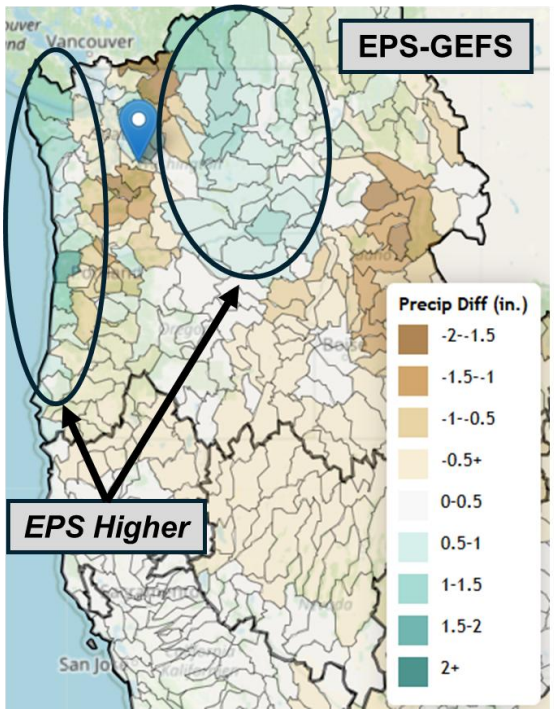
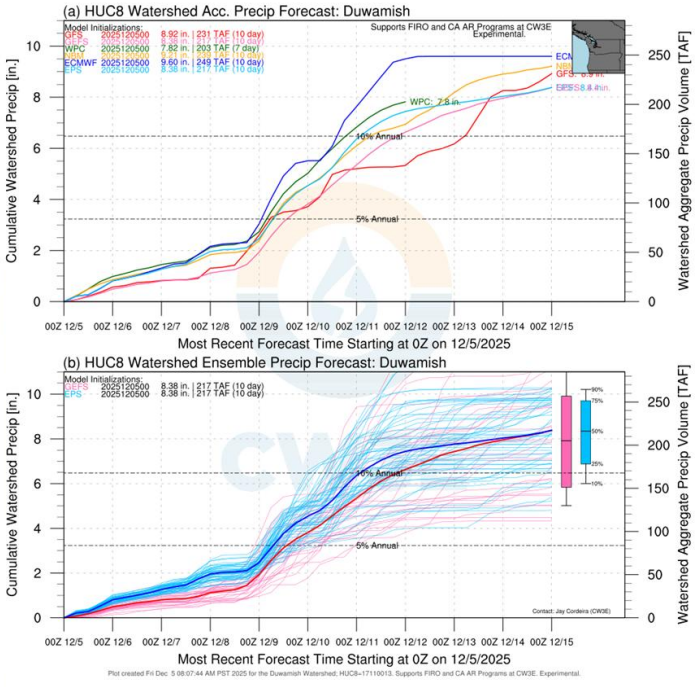
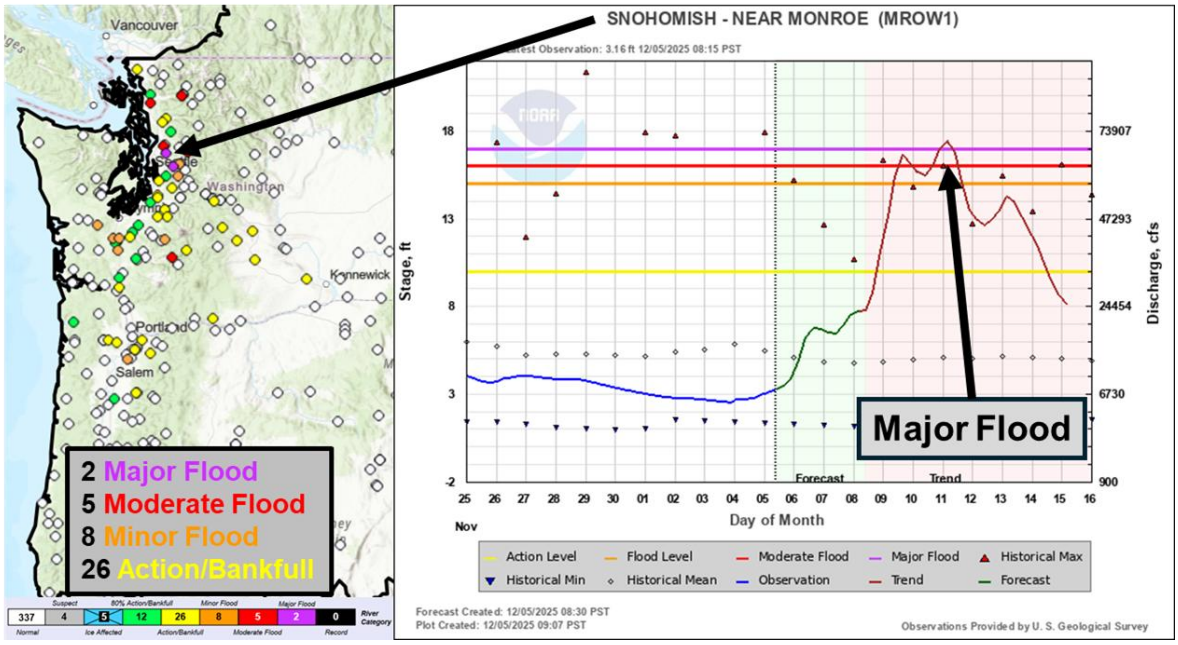

WPC 168-hr Precipitation (in/mm; shaded)
Initialized: 12 UTC 05 Dec 2025 F-168 Valid: 12 UTC 12 Dec 2025
50°N
45°N
40°N
35°N
125°W
120°W
115°W
in.
mm
Areas >10 in.

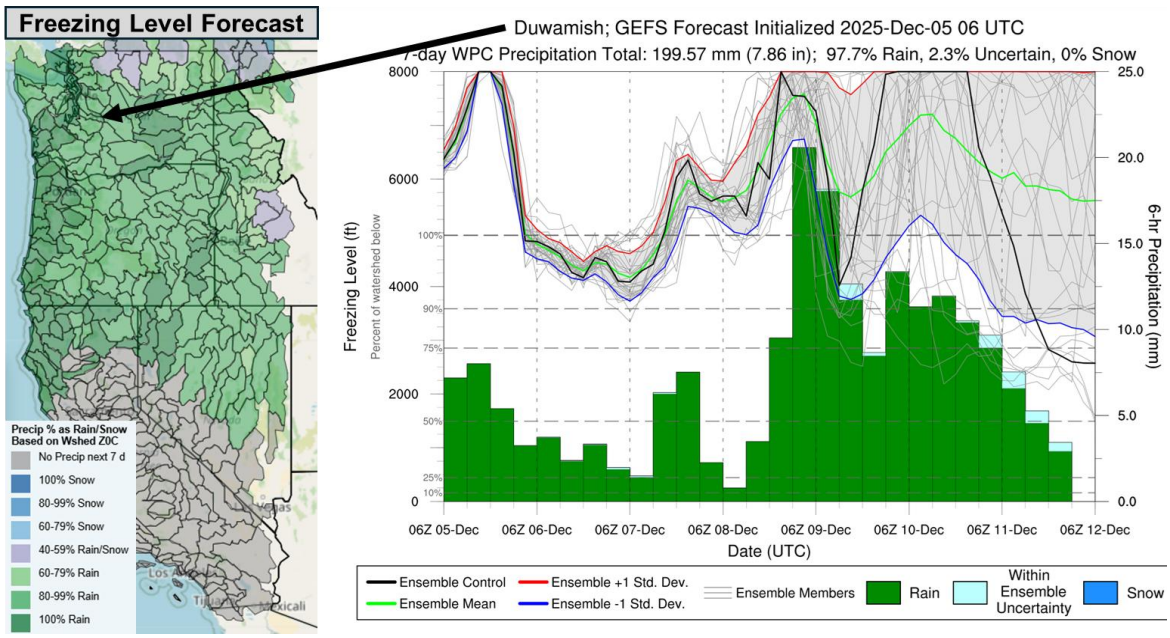

MRGL
SLGT
Day 4 Excessive Rainfall Outlook
Valid 12Z Mon Dec 08 2025
Thru 12Z Tue Dec 09 2025
Issued: 0607Z Fri Dec 05 2025
Forecaster: ROTH
DOC/NOAA/NWS/NCEP/WPC
Day 5 Excessive Rainfall Outlook
Valid 12Z Tue Dec 09 2025
Thru 12Z Wed Dec 10 2025
Issued: 0607Z Fri Dec 05 2025
Forecaster: ROTH
DOC/NOAA/NWS/NCEP/WPC
Risk of rainfall exceeding flash flood guidance
within 25 miles of a point to the right of the line
MDT: At Least 40%
MRGL: At Least 5%
SLGT: At Least 15%


EPS-GEFS
EPS Higher
Precip Diff (in.)
-2--1.5
-1.5--1
-1--0.5
-0.5+
0-0.5
0.5-1
1-1.5
1.5-2
2+


(a) HUC8 Watershed Acc. Precip Forecast: Duwamish
Supports FIRO and CA AR Programs at CW3E
Experimental.
WPC: 7.8 in.
10% Annual
5% Annual
Cumulative Watershed Precip [in.]
Watershed Aggregate Precip Volume [TAF]
Most Recent Forecast Time Starting at 0Z on 12/5/2025
(b) HUC8 Watershed Ensemble Precip Forecast: Duwamish
Contact: Jay Cordeira (CW3E)
Most Recent Forecast Time Starting at 0Z on 12/5/2025

NWS Northwest River Forecast Center Guidance: Snohomish





Additional Considerations:
Visit https://www.nwrfc.noaa.gov/ for specific river and stream forecasts and https://www.weather.gov/ for point specific forecasts.

In-depth AR forecasts products can be found here: http://cw3e.ucsd.edu/iwv-and-ivt-forecasts/

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