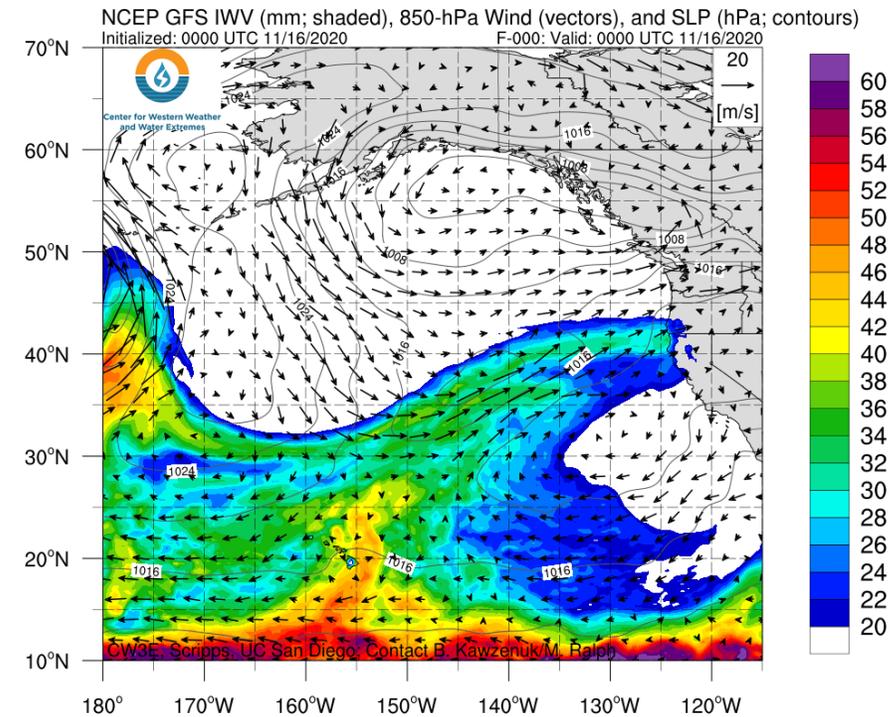
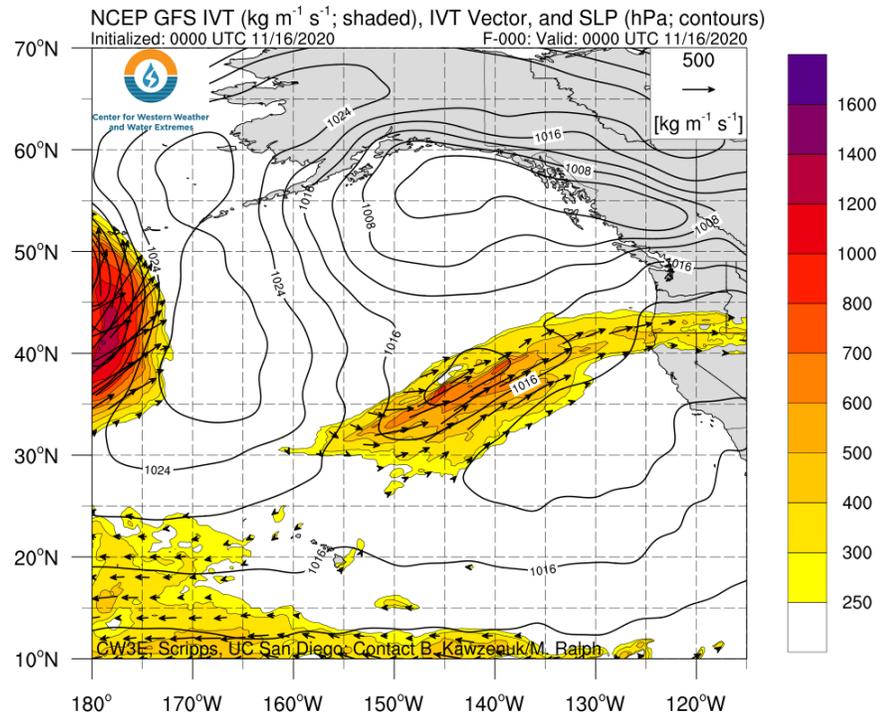


# CW3E Event Summary

## Powerful storm and AR bring rain, snow, and wind to the Western U.S.

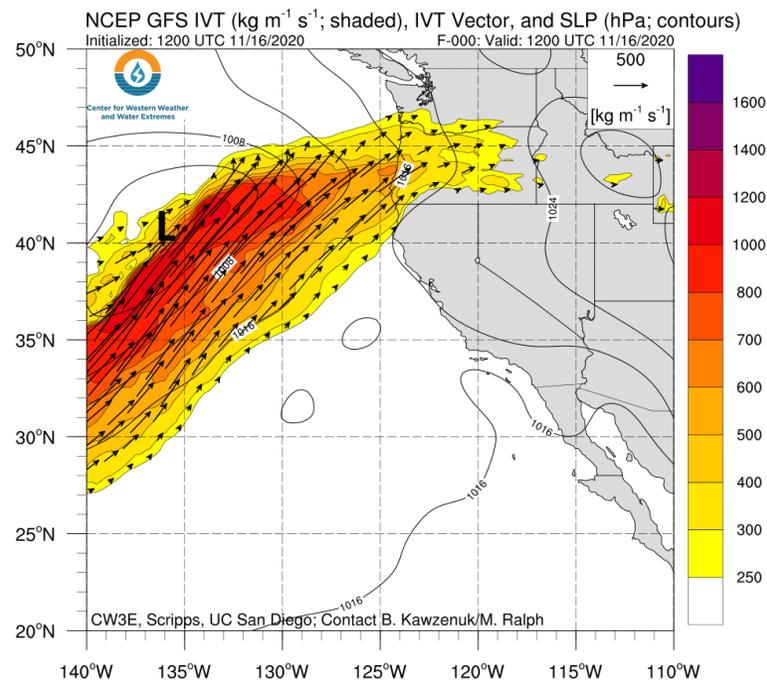
- A landfalling AR associated with a surface cyclone over the Northeast Pacific Ocean impacted the Pacific Northwest and Northern California during 16–18 Nov
- Coastal Oregon and Washington experienced AR 3/AR 4 conditions (based on the Ralph et al. 2019 AR Scale)
- About 2–5 inches of precipitation fell over the Pacific Coast Ranges, Cascades, and Northern Sierra Nevada, with locally higher amounts in the Olympic Mountains and North Cascades
- Snowfall accumulations exceeded 12 inches in portions of the Cascades, Sierra Nevada, and Rocky Mountains
- Strong winds caused minor coastal flooding and scattered power outages in Washington and Oregon



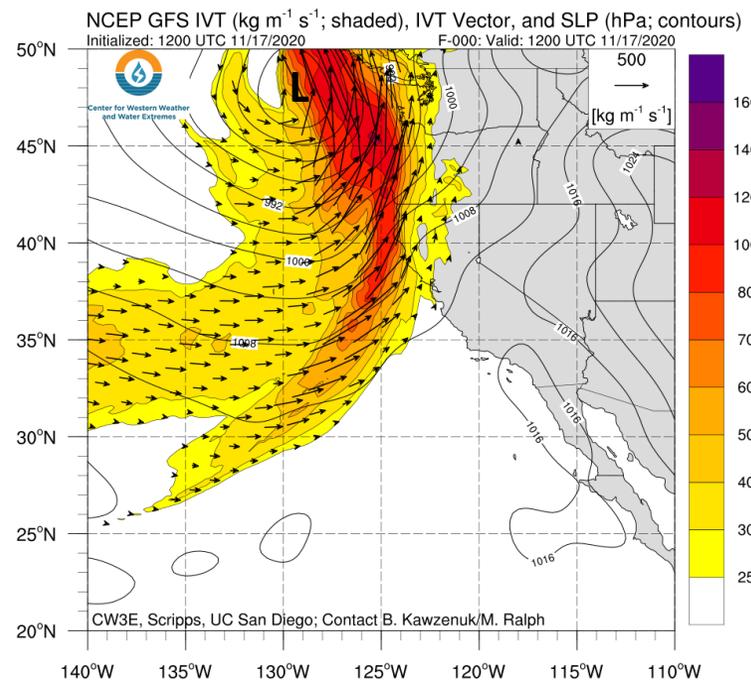
# Event Summary: 16–18 Nov 2020

## GFS IVT & SLP Analyses

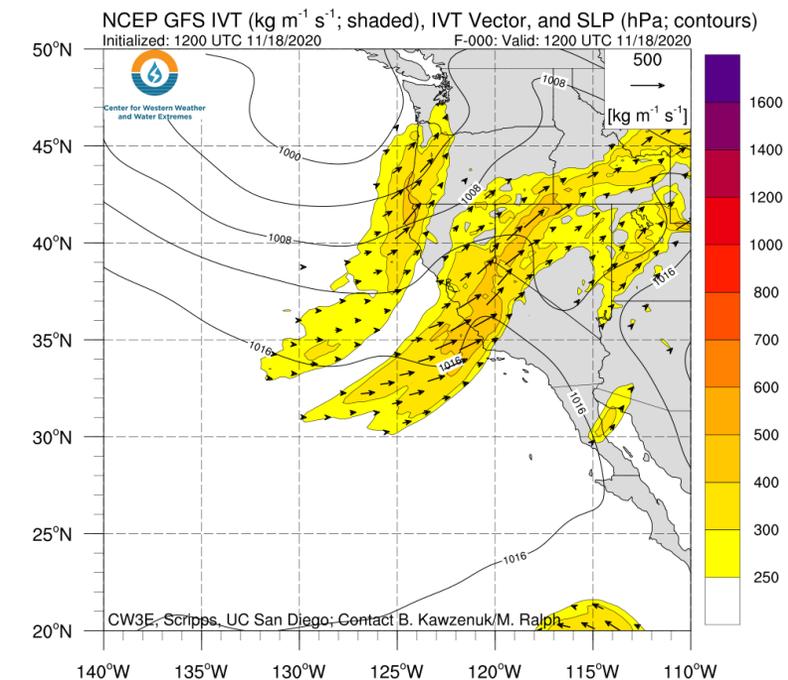
A) Valid: 1200 UTC 16 Nov



B) Valid: 1200 UTC 17 Nov



C) Valid: 1200 UTC 18 Nov

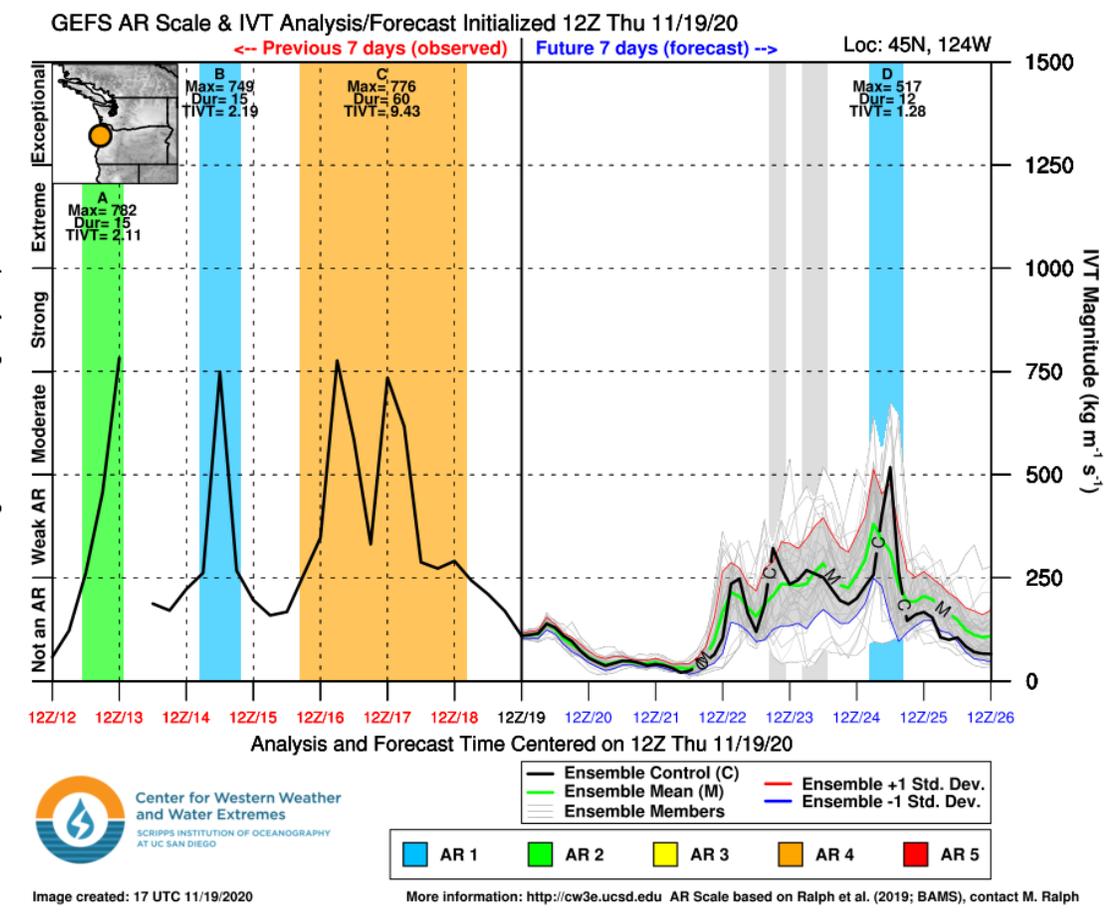
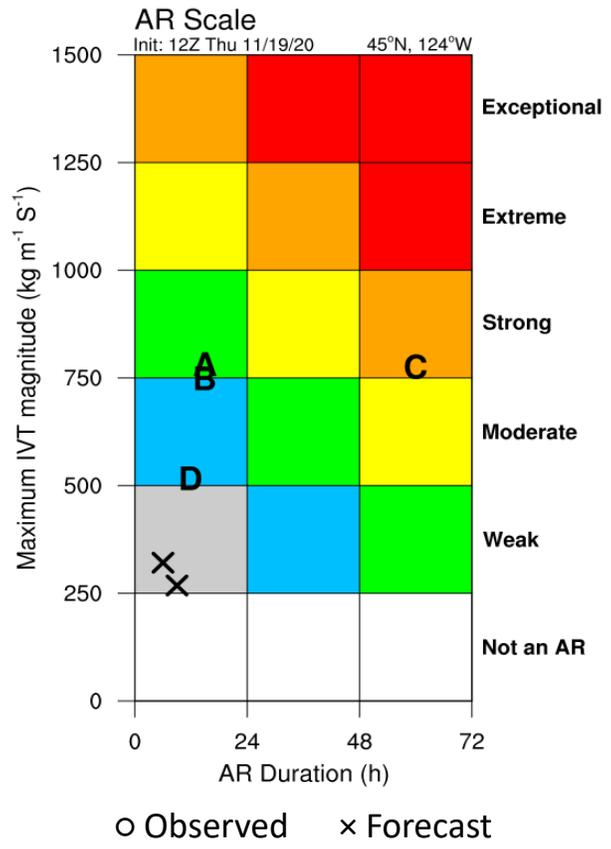
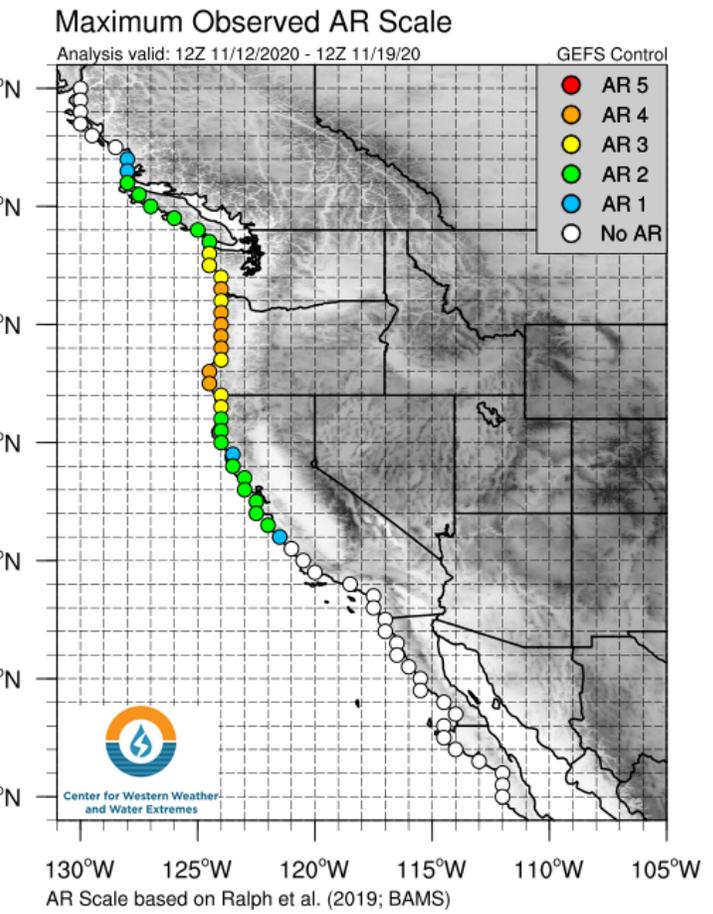


- This AR made landfall in Oregon in association with a developing surface cyclone over the Northeast Pacific Ocean (Figure A)
- Over the next 24 hours, the surface cyclone moved northeastward and deepened from  $\sim 1004$  hPa to  $\sim 976$  hPa (Figure B)
- As the cyclone approached the West Coast of North America, the core of the AR became aligned with the surface cold front
- Strong dynamical forcing along the cold front likely enhanced precipitation over coastal Washington, Oregon, and Northern California
- As the cyclone and AR began to weaken, high values of IVT spread into interior portions of the Western U.S. (Figure C)
- Upslope moisture flux likely enhanced precipitation over the higher terrain in the Sierra Nevada and the Intermountain West

# Event Summary: 16–18 Nov 2020

## GEFS IVT & AR Scale Analyses

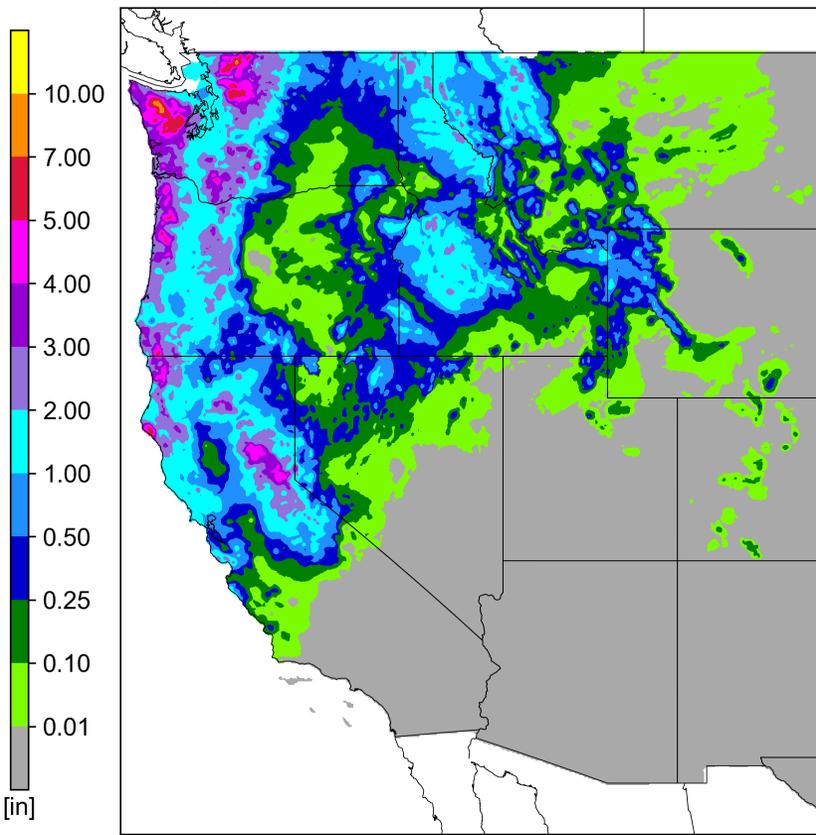
\*GEFS = NCEP Global Ensemble Forecast System



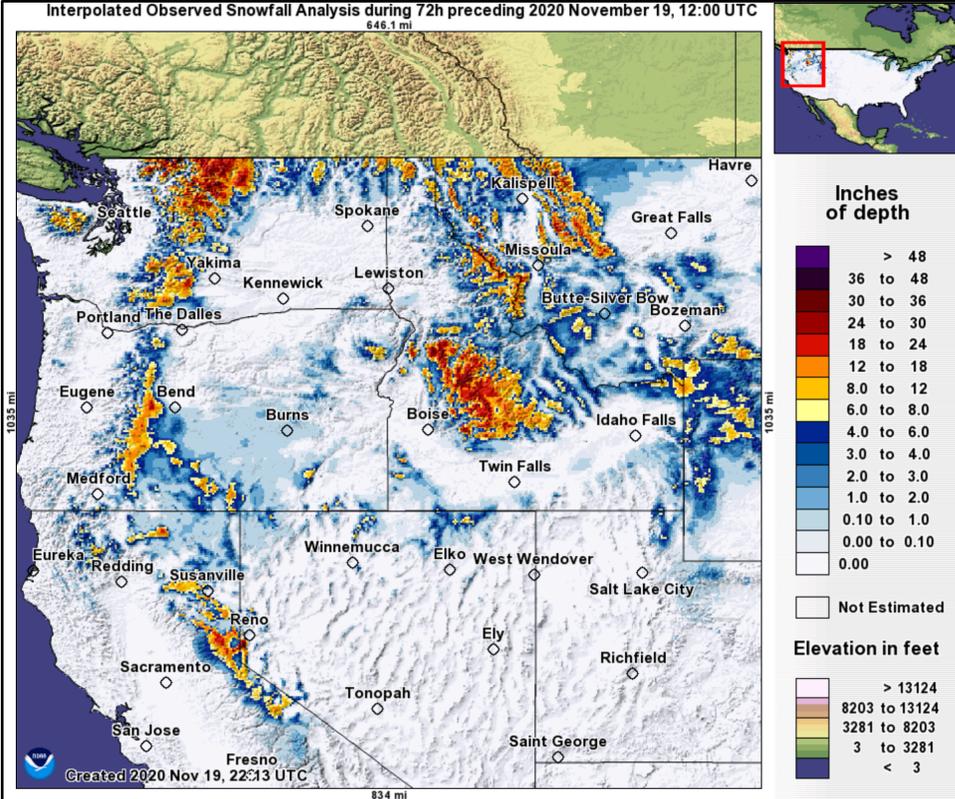
- Multiple ARs have made landfall along the U.S. West Coast during the past 7 days
- The most recent landfalling AR produced AR 3/AR 4 conditions (based on the Ralph et al. 2019 AR Scale) over coastal Oregon and Washington, and AR 2 conditions over coastal Central and Northern California

# Event Summary: 16–18 Nov 2020

NCEP Stage IV 72-h QPE: Valid 12Z 19 Nov

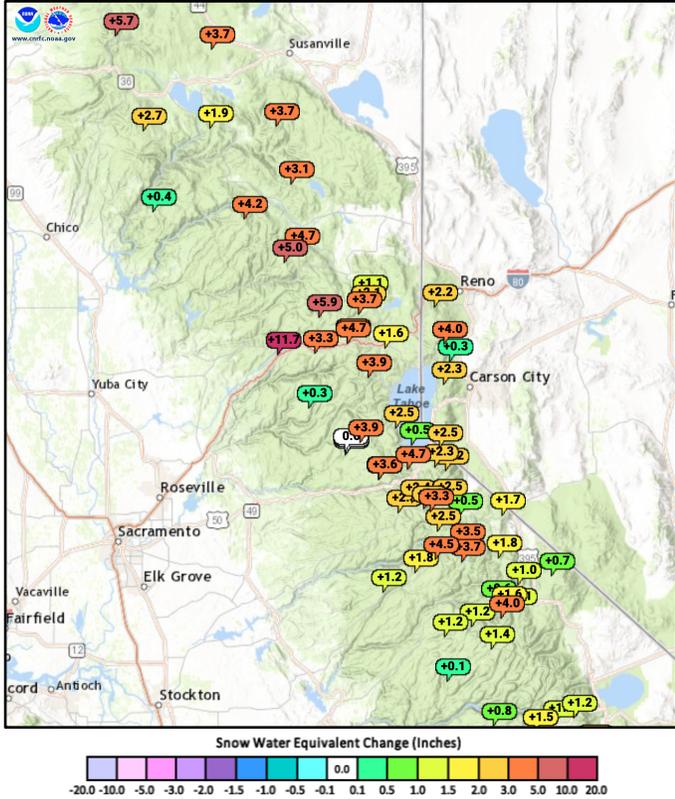


72-h Interpolated Snowfall: Valid 12Z 19 Nov



Source: NOAA/NWS NOHRSC, <https://www.nohrsc.noaa.gov/>

7-day SWE Change: Valid 12Z 19 Nov

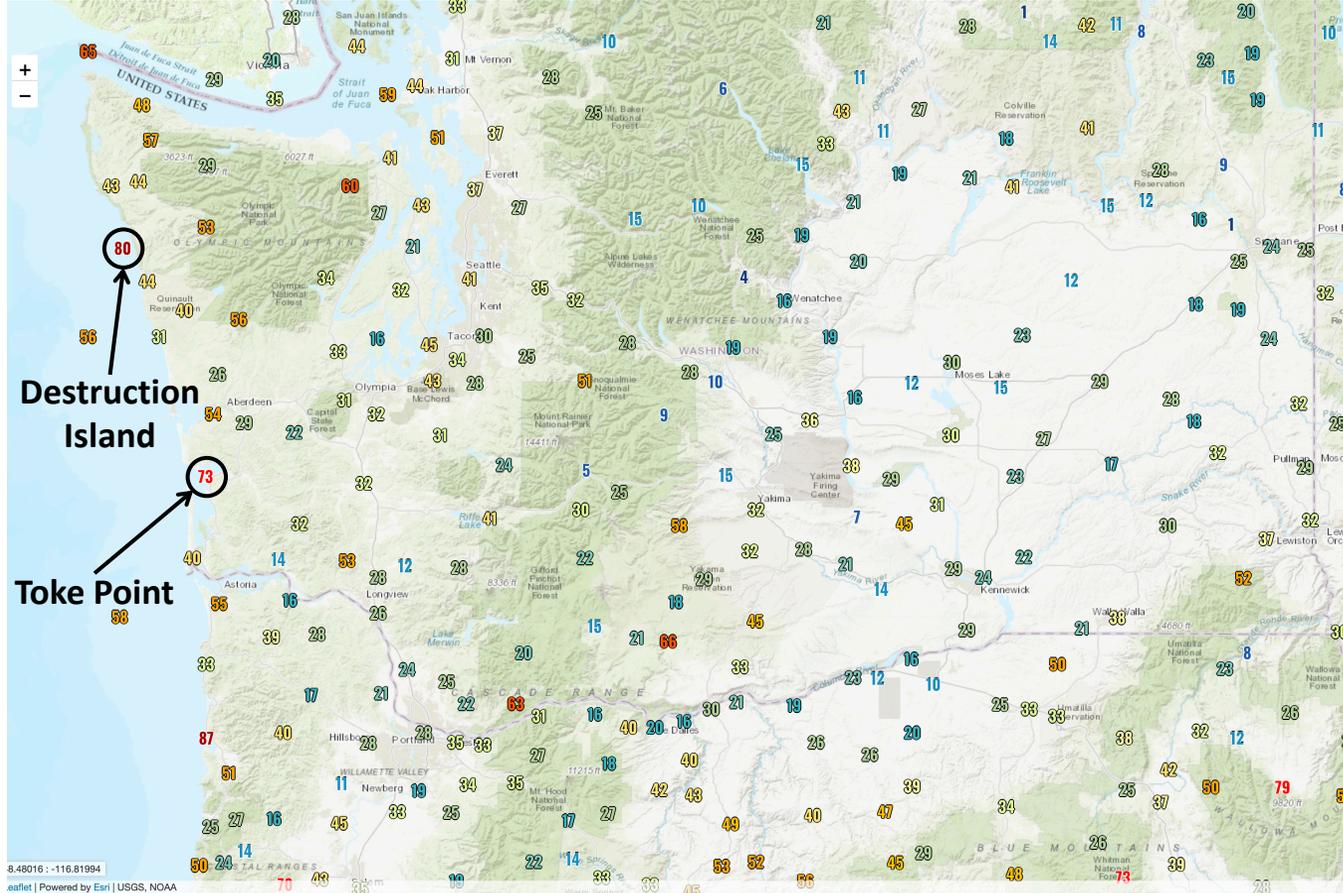


Source: NOAA/NWS CNRFC, <https://www.cnrnc.noaa.gov/>

- At least 2–5 inches (locally higher amounts in the Olympic Mountains and North Cascades) of precipitation fell over portions of the Pacific Coast Ranges, the Cascades, and the Northern Sierra Nevada during the 72-h period ending 1200 UTC (4 AM PST) 19 Nov
- Lighter precipitation (0.5–2 inches) fell over the remainder of Northern California, western Oregon and Washington, and the Intermountain West
- More than 12 inches of snow fell across portions of the Cascades, the Northern Sierra Nevada, and the Rocky Mountains in Idaho and Montana
- SWE has increased by 3–6 inches in parts of the Central and Northern Sierra Nevada over the past 7 days

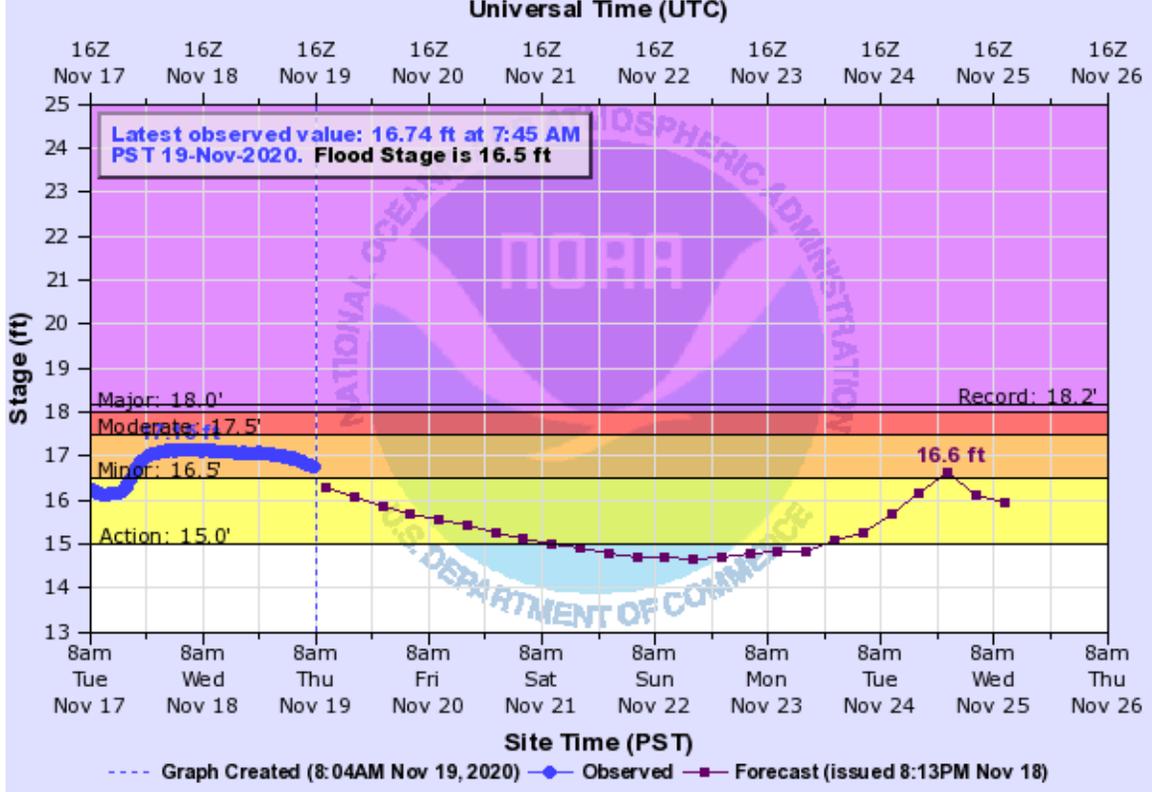
# Event Summary: 16–18 Nov 2020

## Daily Maximum Wind Gust: Valid 0000–2359 UTC 17 Nov



Source: NOAA/NWS Western Region Headquarters, <https://www.wrh.noaa.gov/>

## SKOKOMISH RIVER NEAR POTLATCH



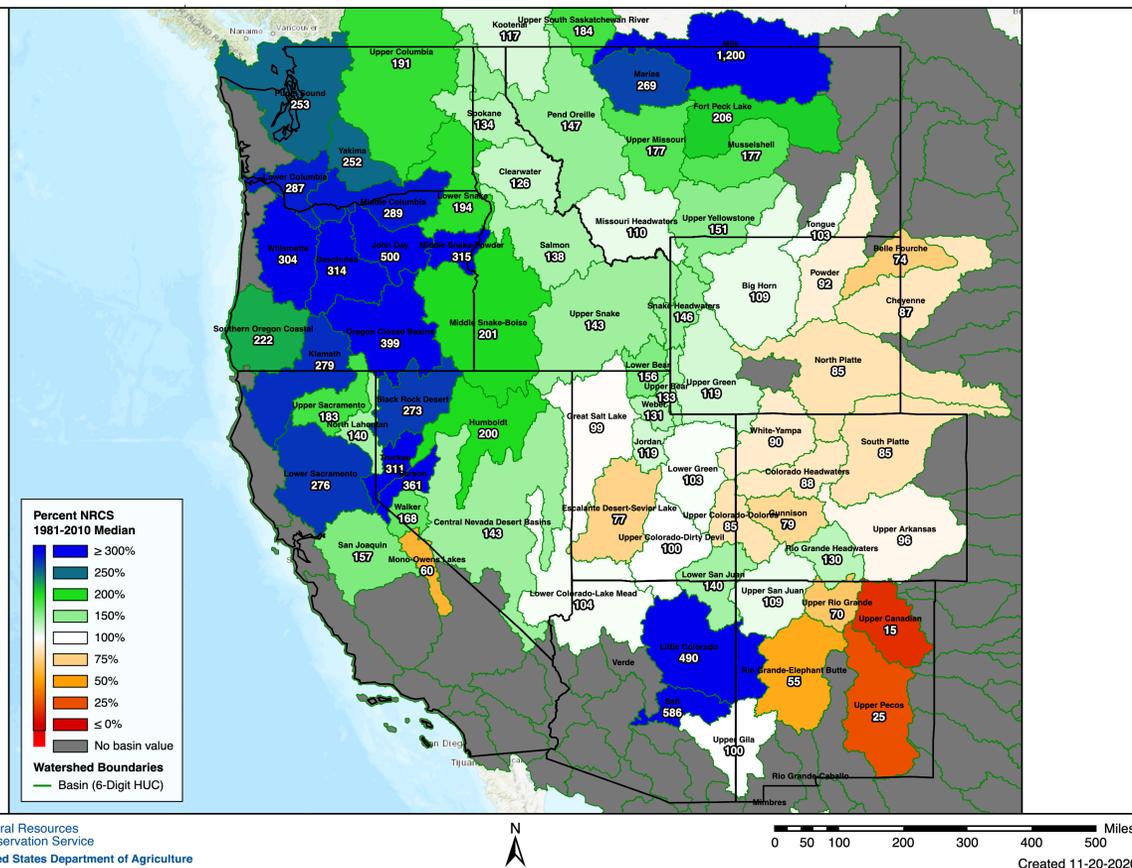
SRPW1(plotting HGIRG) "Gage 0" Datum: 10.67' | Observations courtesy of U.S. Geological Survey

Source: NOAA/NWS Advanced Hydrologic Prediction Service, <https://water.weather.gov/ahps/>

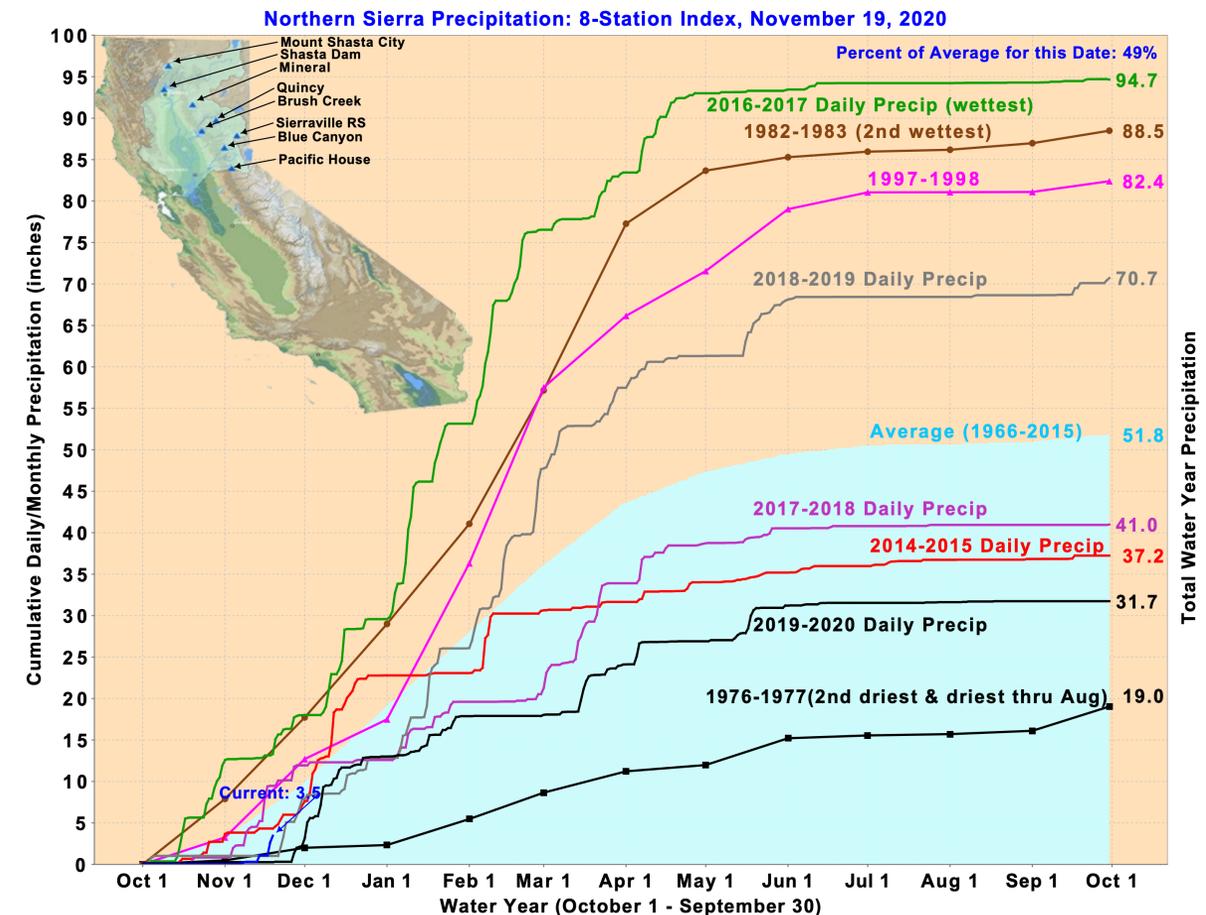
- The cyclone associated with this AR brought strong winds to coastal Washington and Oregon, resulting in minor coastal flooding and scattered power outages
- Destruction Island (WA) and Toke Point (WA) recorded peak wind gusts of 80 mph and 73 mph, respectively
- The Skokomish River (near Potlatch, WA) reached minor flood stage (16.5') on 17 Nov and remained above flood stage for at least 36 hours

# Event Summary: 16–18 Nov 2020

## SWE % of 1981–2010 Median (19 Nov)



Source: USDA/NRCS National Water and Climate Center, <https://www.nrcs.usda.gov/wps/portal/wcc/>



Source: California Department of Water Resources, <https://cdec.water.ca.gov/>

- SWE is above normal for this early season date across much of the Western U.S., particularly over Washington, Oregon, Northern California, northwestern Nevada, and north-central Montana
- Water-year-to-date (1 Oct – 19 Nov) precipitation in the Northern Sierra Nevada is only 49% of average (based on the 8-station index)