CW3E Event Summary: 18–20 October 2024

Strong Atmospheric River Produces Heavy Rain and Flooding in British Columbia and Washington

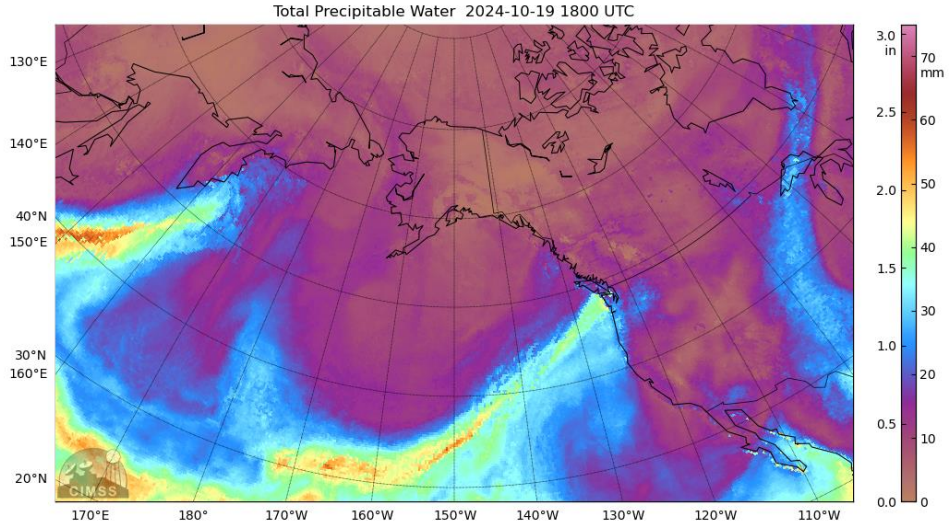
- An atmospheric river (AR) brought heavy precipitation to southwestern British Columbia and northwestern WA during 18–20 October.

The AR:

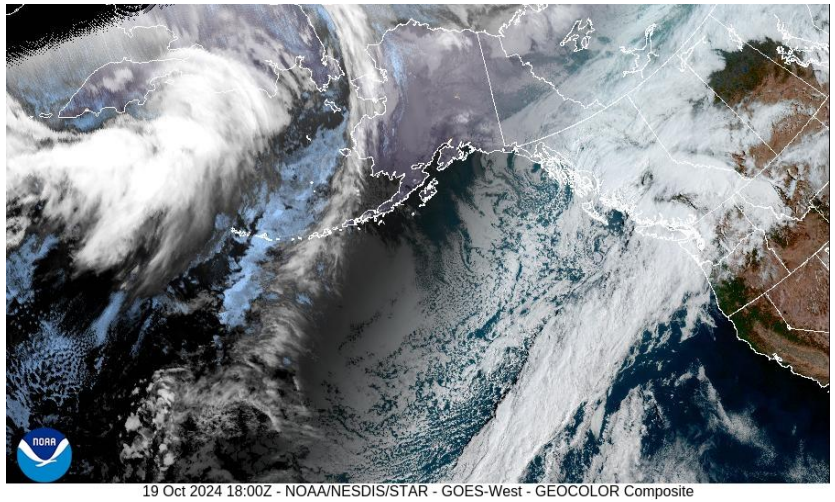
- The AR formed within a plume of subtropical moisture over the central North Pacific Ocean and made landfall in British Columbia on Fri 18 Oct.
- AR3–4 conditions (based on the Ralph et al. 2019 AR Scale) were observed in southern Vancouver Island and coastal WA.

Impacts:

- At least 5–10 inches of precipitation fell over much of southwestern British Columbia, the Olympic Peninsula, and the North Cascades.
- Heavy rain caused significant flooding on the Coquitlam River in Port Coquitlam, BC, with streamflow exceeding the previous record from March 2007.
- Minor riverine flooding also occurred in northwestern WA.



Source: Cooperative Institute for Meteorological Satellite Studies (CIMMS), University of Wisconsin-Madison



Source: NOAA/NESDIS Center for Satellite Applications and Research

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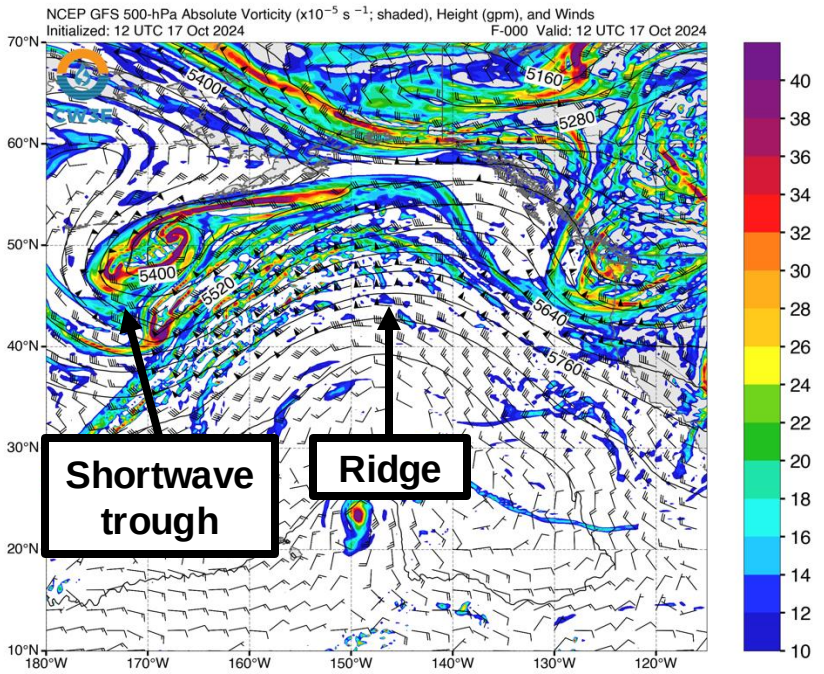
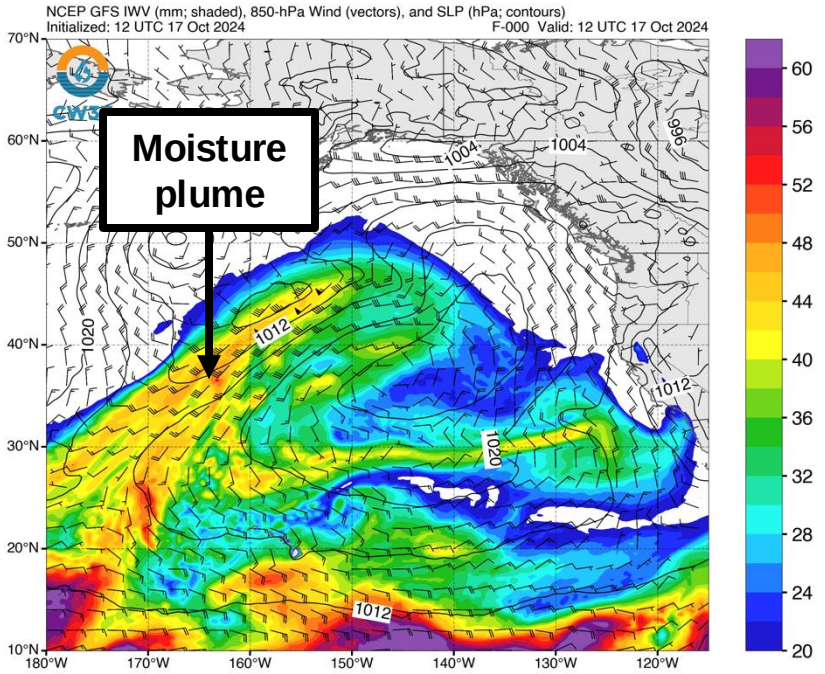
GFS Analyses of AR: Valid 4 AM PST 17 Oct 2024

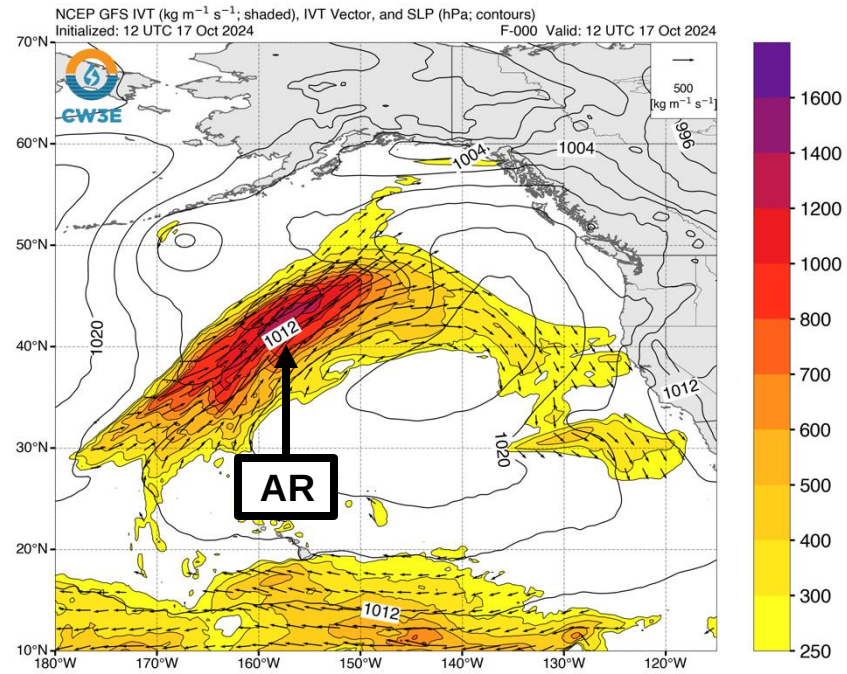
500-hPa Vorticity, Height, & Wind



IWV & 850-hPa Wind



IVT & SLP



- The atmospheric river (AR) formed within a plume of subtropical moisture extending northeastward from the central North Pacific Ocean.
- Intensification of the AR was facilitated by strong southwesterly mid-level flow downstream of a shortwave trough south of the Aleutian Islands and upstream of a ridge over the Northeast Pacific Ocean.

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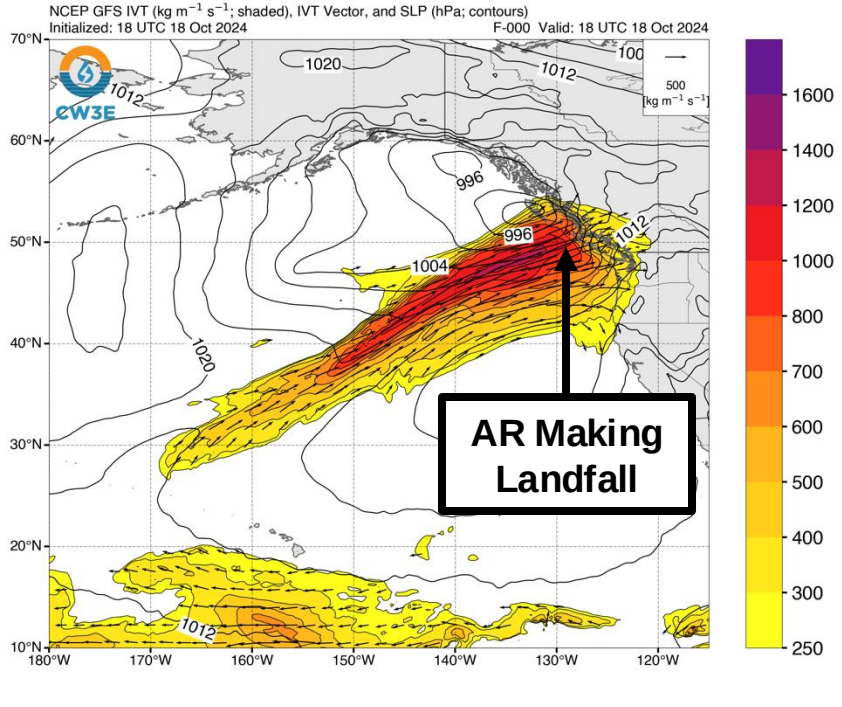
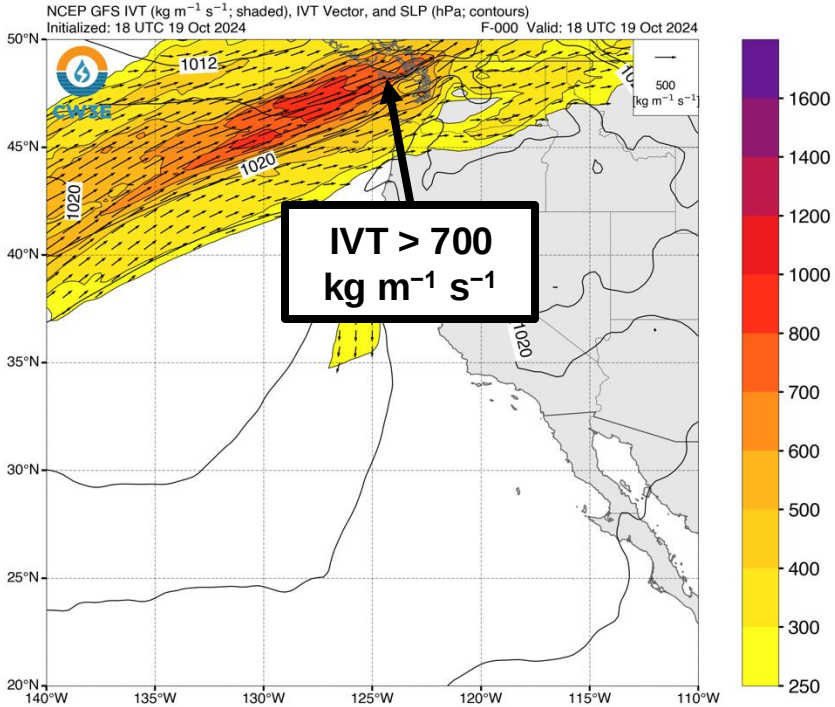
GFS Analyses of AR

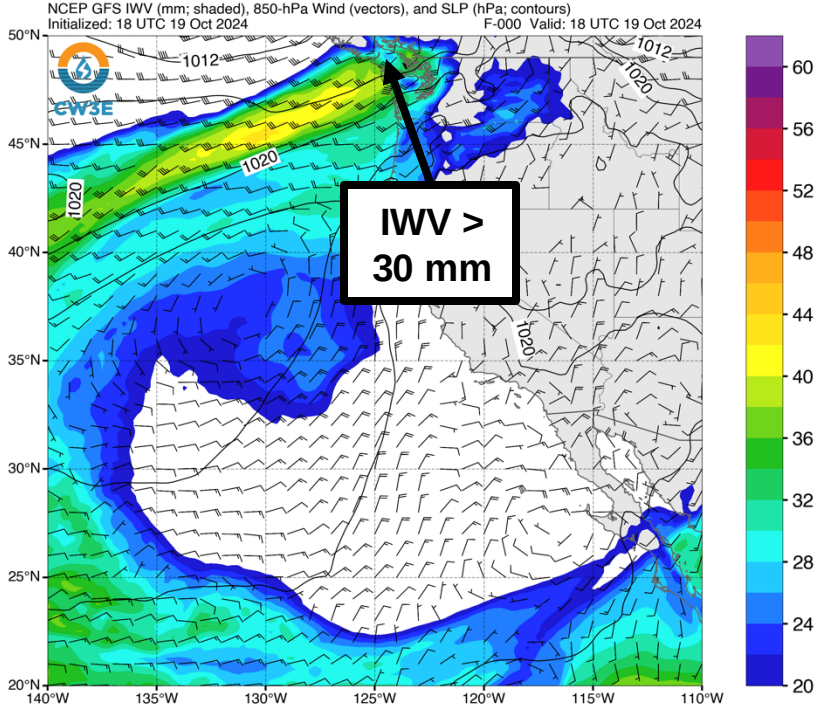
IVT & SLP
Valid: 10 AM PST 18 Oct 2024



IWV & 850-hPa Wind
Valid: 10 AM PST 19 Oct 2024



IVT & SLP
Valid: 10 AM PST 19 Oct 2024



- As time progressed, the AR propagated northeastward, making landfall over British Columbia during the morning of Fri 18 Oct.
- Strong west-southwesterly moisture transport (IVT > 700 kg m^{-1} s^{-1}) and ample moisture (IWV > 30 mm) in the supported heavy precipitation over the Olympic Peninsula, North Cascades, and Vancouver metro area on Sat 19 Oct.

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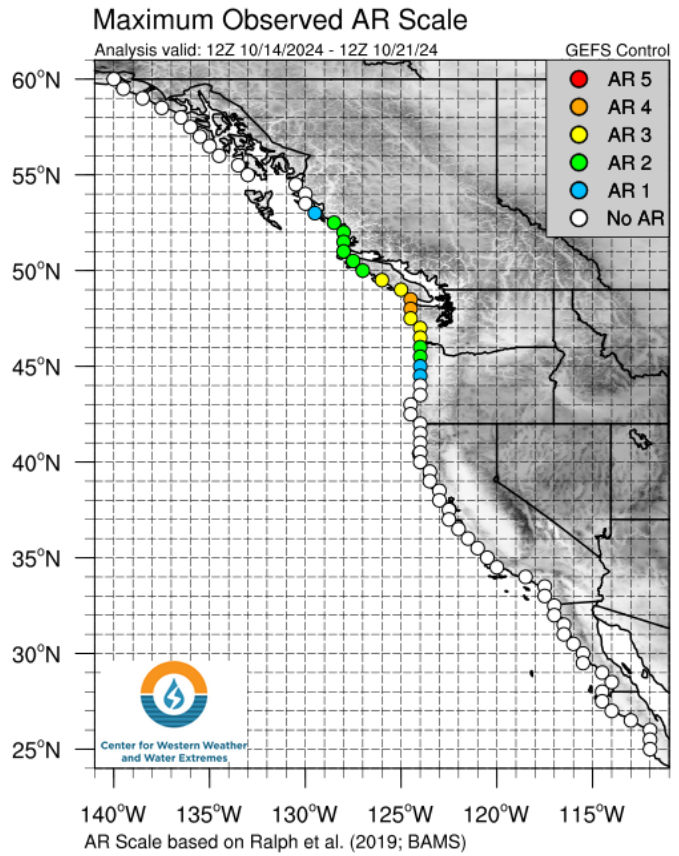
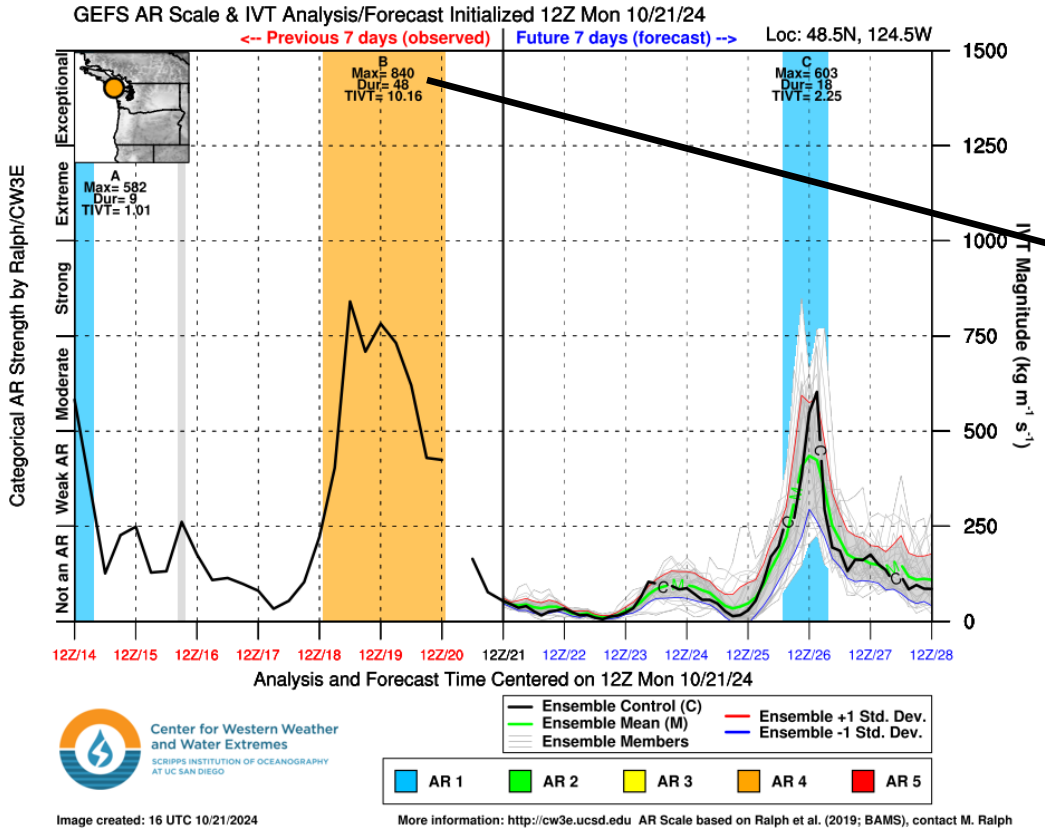
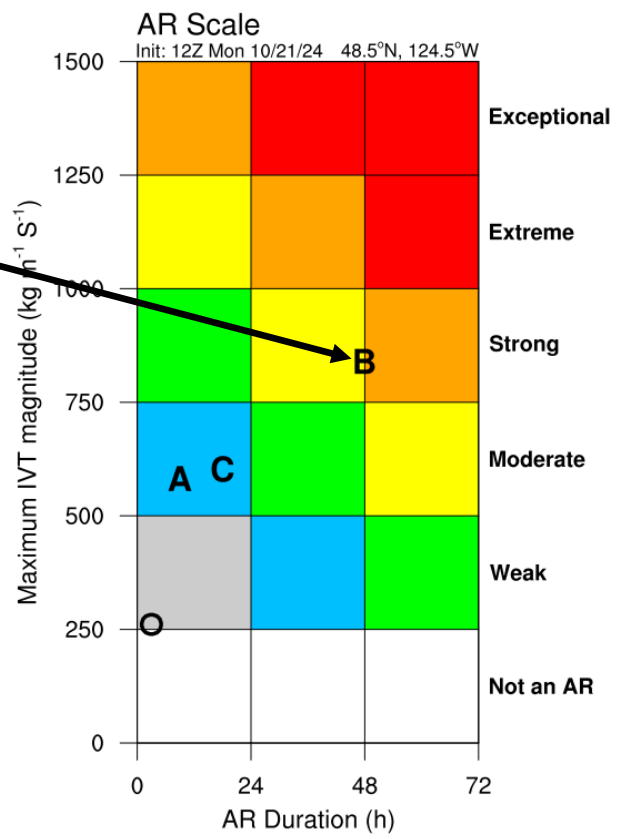
GEFS AR Scale Analysis (Coast)







- AR3–4 conditions (based on the Ralph et al. 2019 AR Scale) were observed over southern Vancouver Island and coastal WA.
- The GEFS AR Scale analysis shows a maximum IVT of 840 kg m^{-1} s^{-1} and an AR duration of at least 48 hours (note that there is missing data between 12Z 20 Oct and 00Z 21 Oct) at 48.5°N 124.5°W (near Cape Flattery, WA).

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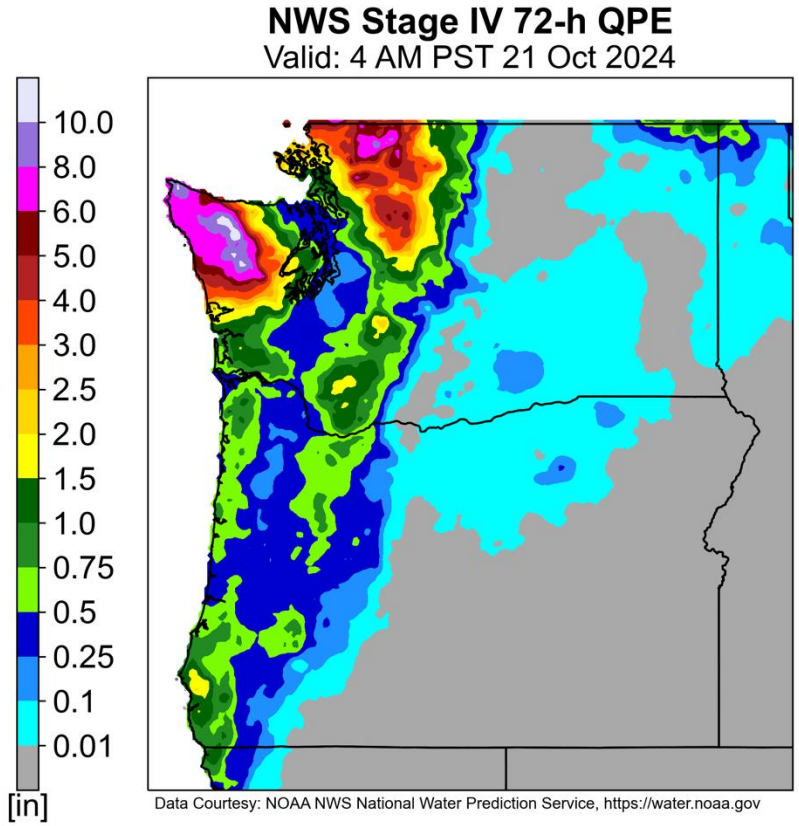
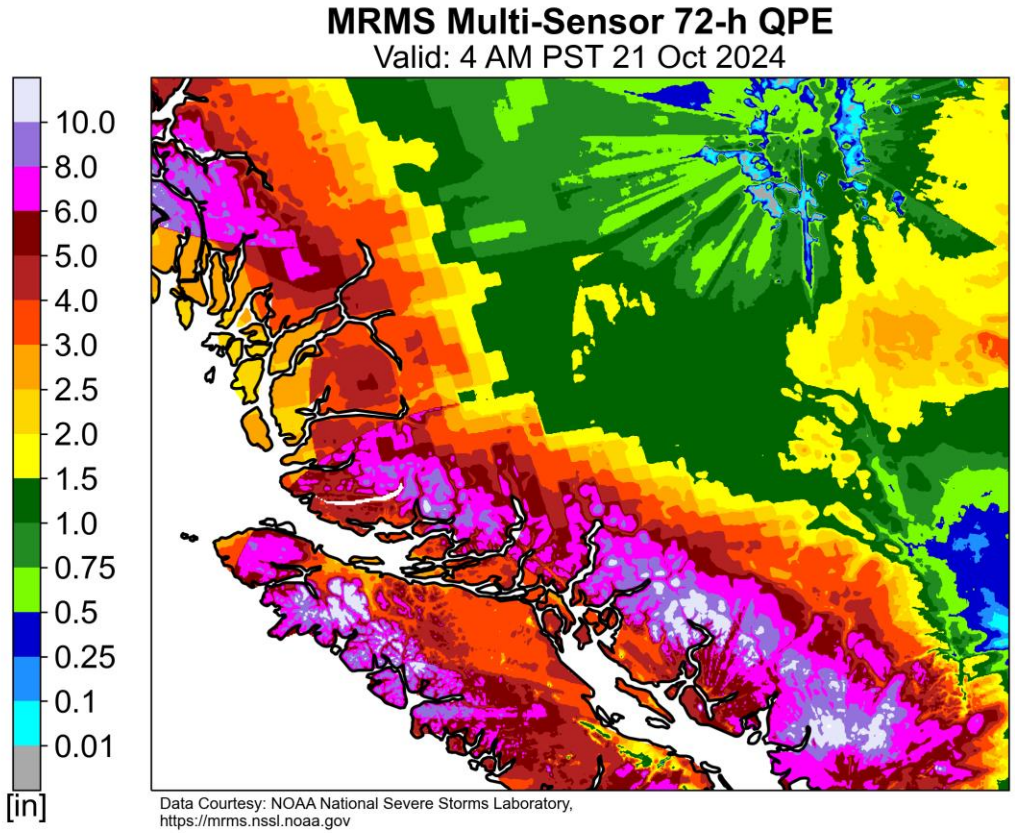
Observed Precipitation





- The AR produced at least 5–10 inches of precipitation over much of southwestern British Columbia (including the Vancouver metro area), the Olympic Peninsula, and the North Cascades.
- Strong upslope moisture flux and orographic lift on the western side of the Olympic Mountains resulted in significant rain shadowing over the Puget Sound.

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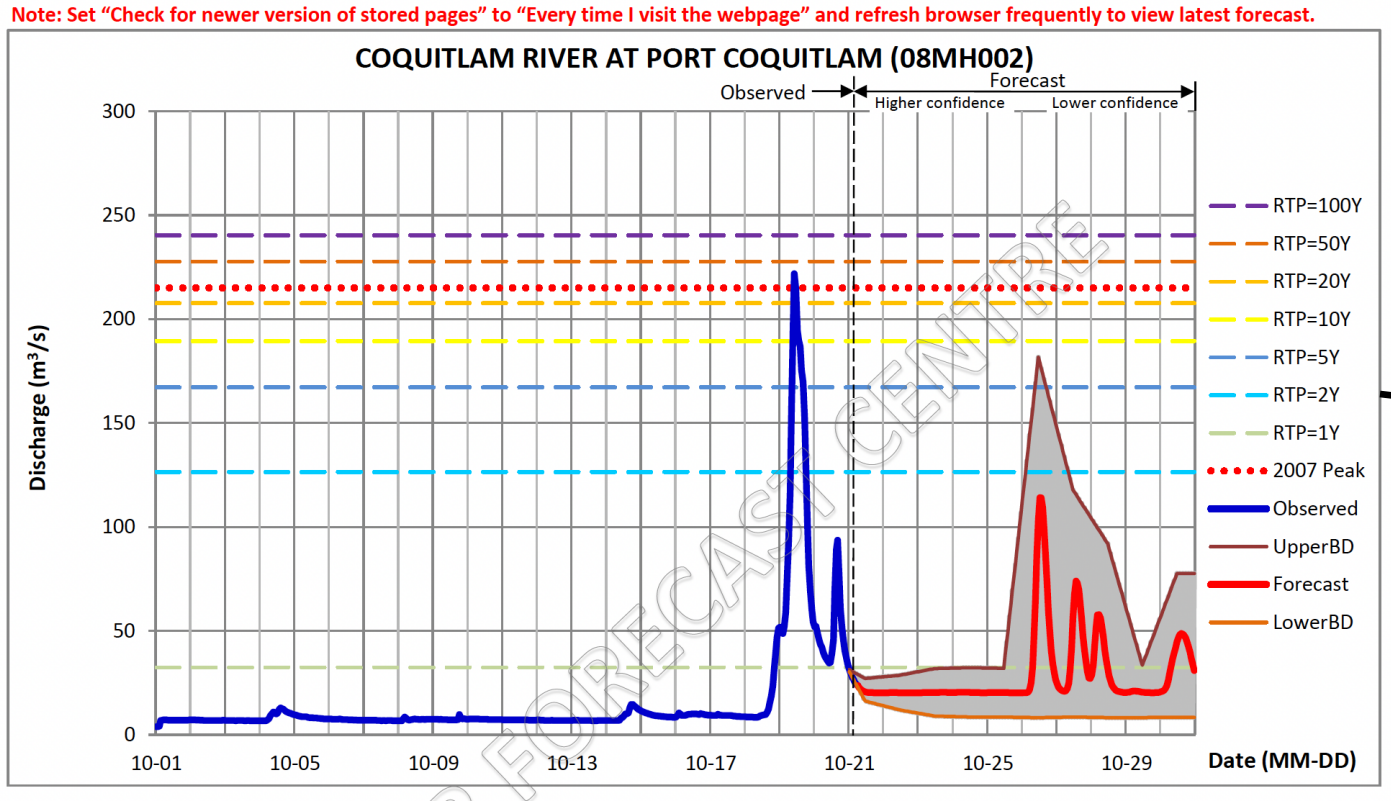
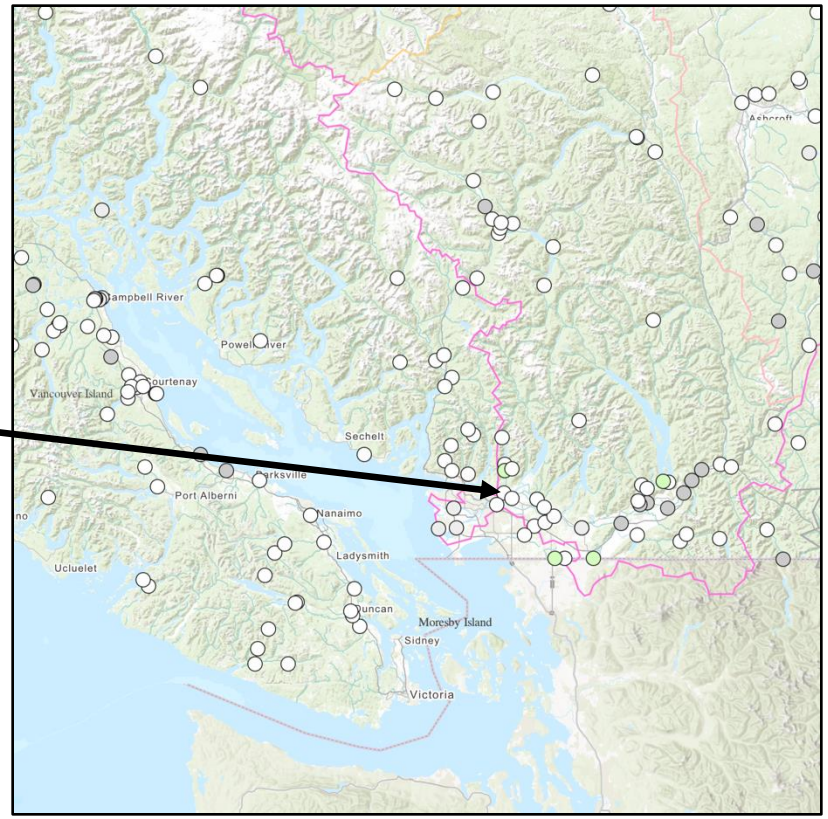
Hydrologic Impacts

Note: Set "Check for newer version of stored pages" to "Every time I visit the webpage" and refresh browser frequently to view latest forecast.





Source: British Columbia River Forecast Centre

- A period of very intense rainfall occurred over the Coquitlam Watershed (northeast of Vancouver, BC) on Sat 19 Oct, leading to flooding along the Coquitlam River.
- Streamflow on the Coquitlam River at Port Coquitlam exceeded the previous record flow observed on 11 Mar 2007, peaking at 228 $m^3\ s^{-1}$ (~8,050 cfs) around midday on Sat 19 Oct.

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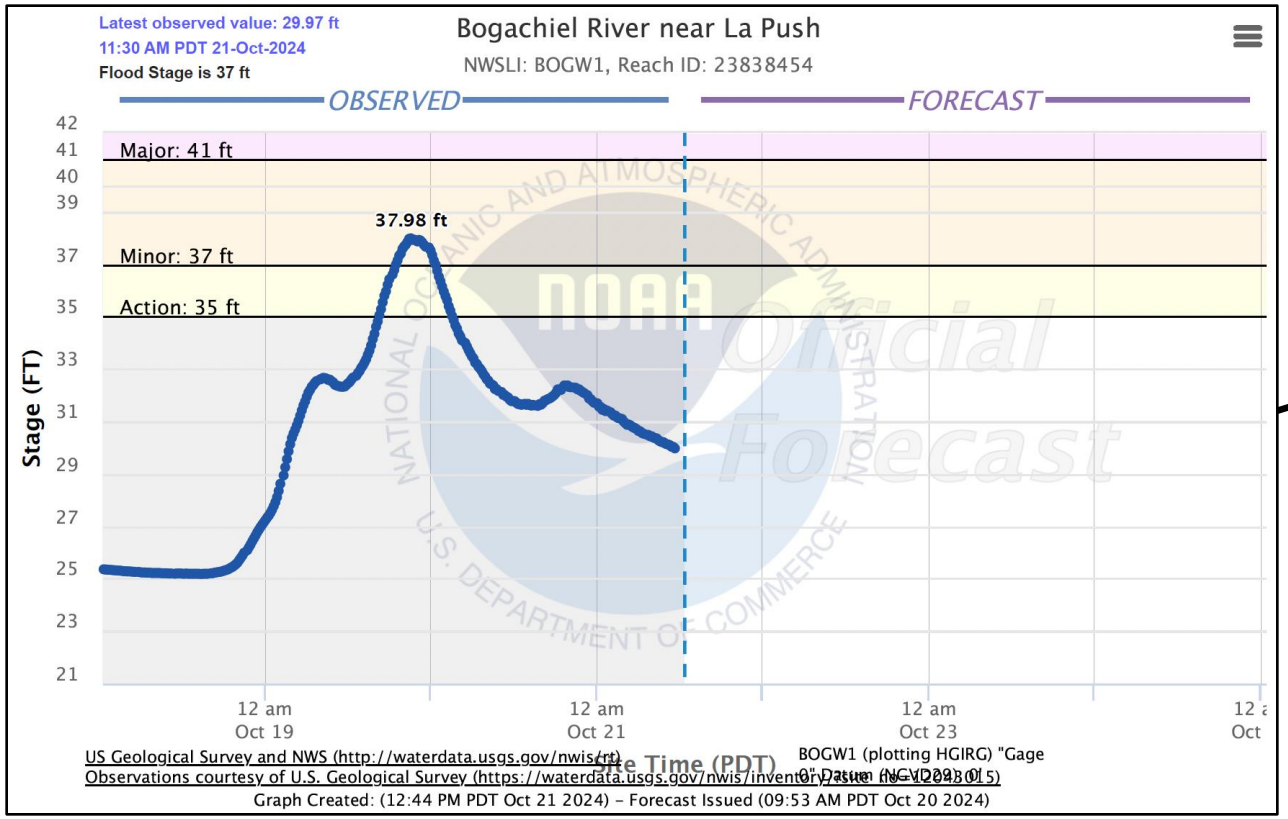
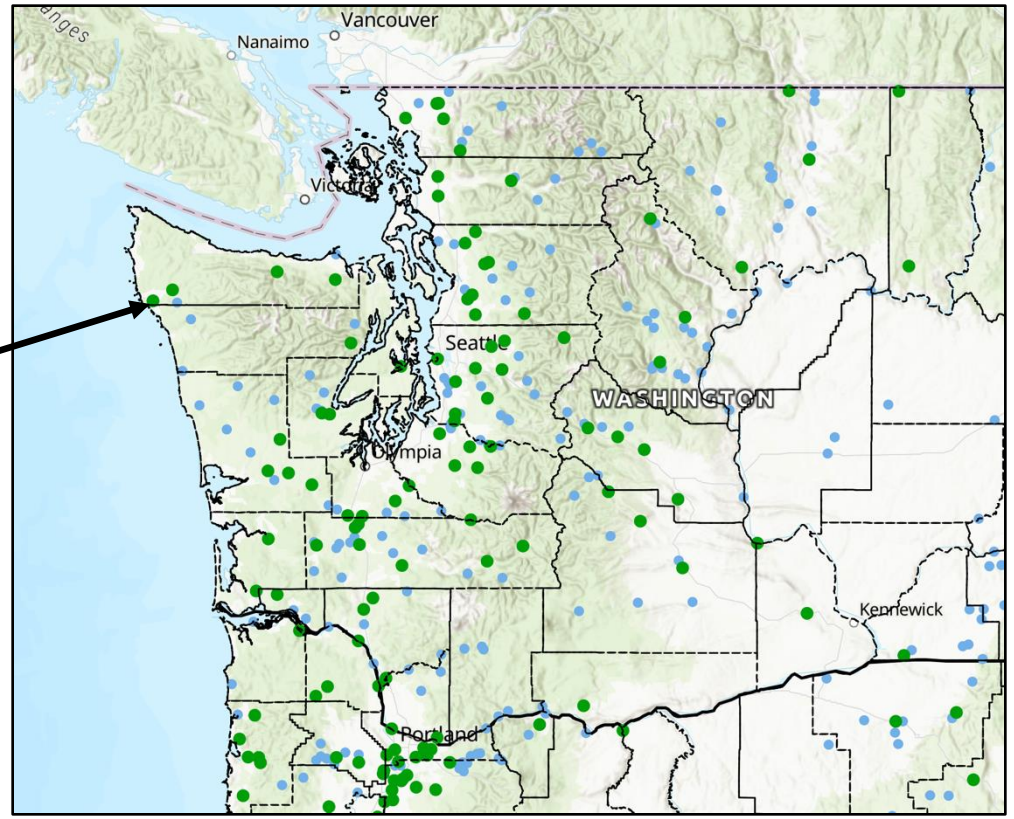
Hydrologic Impacts





Source: NOAA/NWS National Water Prediction Service and U.S. Geological Survey

- Heavy rain also caused localized minor flooding in northwestern Washington.
- The Bogachiel River near La Push, WA, rose about 12 feet in 24 hours, reaching **minor flood stage** (37.0 feet) during the evening of Sun 20 Oct.

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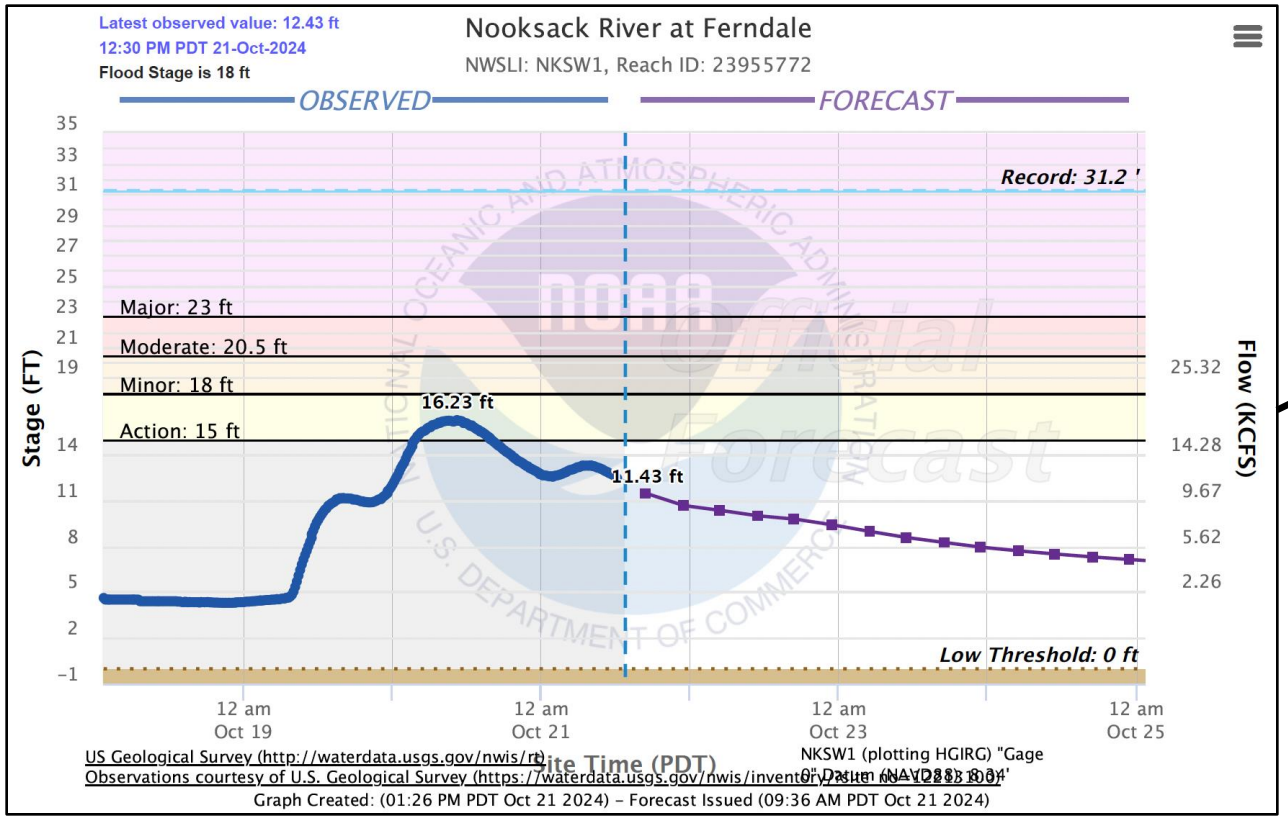
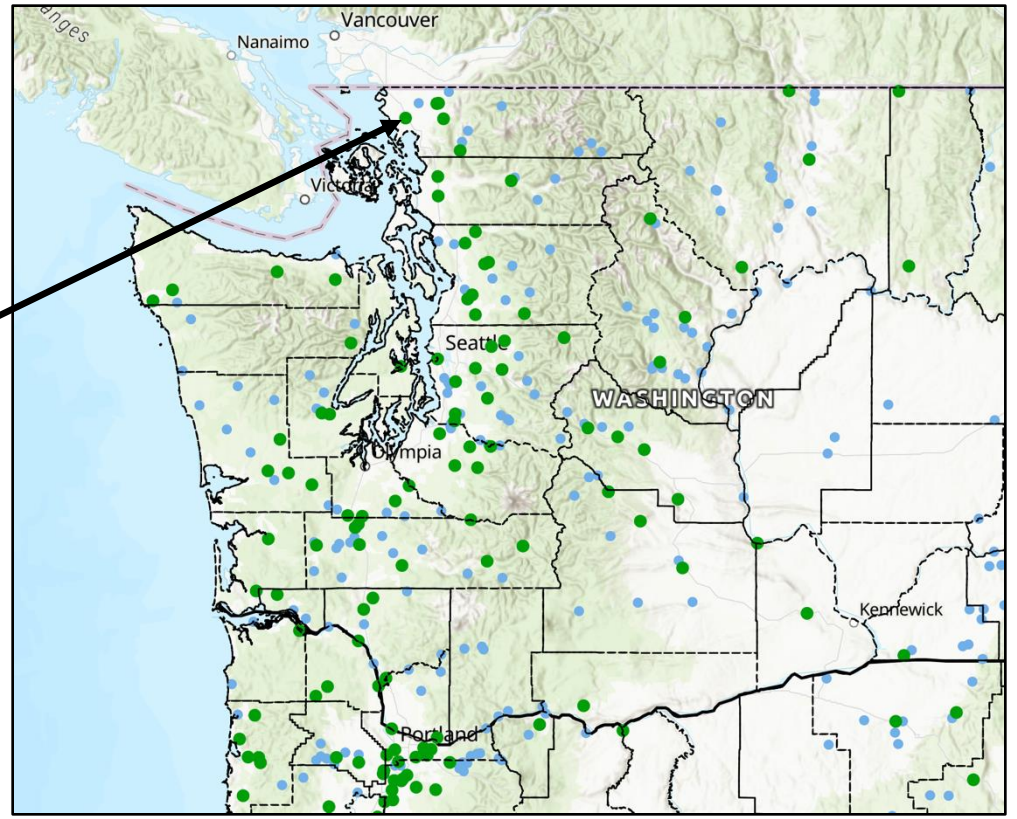
Hydrologic Impacts





Source: NOAA/NWS National Water Prediction Service and U.S. Geological Survey

- The Nooksack River at Ferndale, WA, reached action flood stage (15.0 feet) during the afternoon of Sun 20 Oct.

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Impacts

Flooding in Surrey, BC

Credit: Shane MacKichan

Flooding in North Vancouver, BC

Credit: Sohrab Sandhu/CBC

- Flooding inundated roadways and damaged homes and businesses in the Vancouver metro area.
- Three fatalities have been reported due to flooding and a debris flow.

Flooding in Burnaby, BC

Credit: Shane MacKichan

Debris Flow in Coquitlam, BC

Credit: Coquitlam Search and Rescue