More on Coastal Storm Flood Hazard...

Components of Coastal Storm Floods

Deterministic (Predictable Components)

Tide — A periodic rise and fall of the ocean surface due principally to the gravitational interactions between the moon, sun and earth.

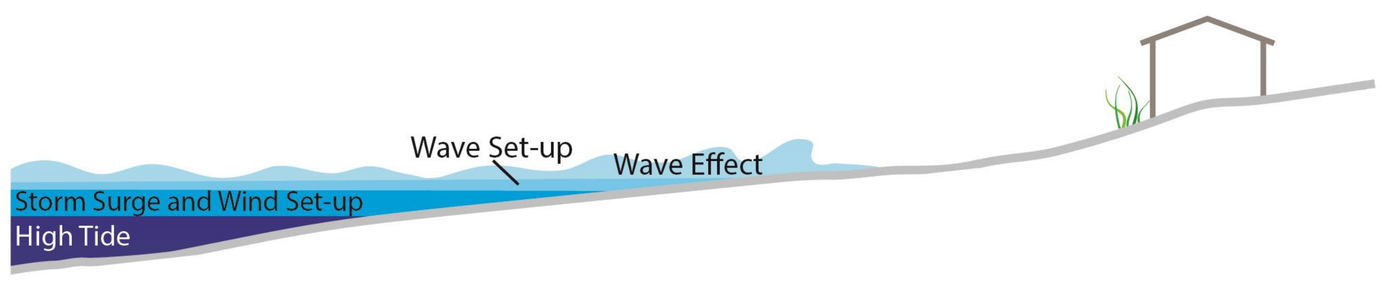
Probabalistic (Unpredictable Components)

Surge — A rise above normal water level on the open coast due to change in atmospheric pressure and wind stress on the water surface.

Waves — A disturbance on the ocean that transmits energy. Usually generated by wind blowing across the ocean's surface.

Set-Up — An increase in water level near the shore as a result of on-shore winds blowing over shallow water pushing it up and/or the increase in water level shoreward of breaking waves derived from the momentum of the waves

Total Water Level = Tide + Surge + Waves + Set-up



King Tide — A non-scientific term to describe the especially high tides seen when the moon is closest to the earth. They happen twice a year, but are typically more dramatic in the winter months (November through February)

Flooding induced by storms is assessed using a so-called "continuous simulation approach", where the total water level components are jointly analyzed over a historic period, using both observed water levels and numerical modelling. The frequency with which a specific storm size has occurred in the past is modelled. From that, estimates are made of how likely it is to occur in the future. This is done based on scenarios of **annual exceedance probabilities (AEPs)**. Combined with projections of **relative sea-level rise (RSLR),** a total of 20 coastal storm flood scenarios were modelled.

AEP The AEP describes the probability of an event occurring in any given year, written as a percentage. By comparing storms of different probabilities, we can see the impact of different sizes of storms on the coastline. To understand the range of impacts—from relatively small, common storms to very large, much rarer storms—five AEP floods were modelled. As shown in the table below, these are associated on a spectrum of frequent (small) to very rare (very large) floods. Modelling results from the 6.67% and 0.5% AEP floods were mapped.

AEP	Likelihood	Storm Size	Return Period (indicative)
6.67%	**Frequent**	**Small**	**15 year**
2%	Moderately frequent	Small-moderate	50 year
1%	Moderately infrequent	Moderate-large	100 year
0.5%	**Rare**	**Large**	**200 year**
0.2%	Very rare	Very Large	500 year

RSLR Relative sea-level rise (RSLR) describes the combined effect of rising sea levels from climate change and the slowly rising land surface in Ucluelet (due to rebounding after the last ice age). RSLR is critical to understanding how the hazard will change over time. RSLR of 0 m, 0.5 m, 1 m, and 2 m for each of the AEP floods was determined.

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