Coastal Flood

Occurs when ocean water levels are higher than normal due to storm surge, tides, waves, and wind effects. It is linked with coastal erosion

EXTENTS: LOCAL-REGIONAL

CONSEQUENCE: MODERATE

TYPE	DURATION	SEASONALITY	WARNING TIME	LIKELIHOOD
SHOCK	HOURS-DAYS	FALL-SPRING	DAYS	ALMOST CERTAIN

About the Hazard

Coastal flooding can damage a range of assets that are located in the floodplain, and hazard levels increase with flood depth and wave velocity. These forces affect shoreline dynamics, which can cause erosion and loss of land. Coastal flooding is **driven** by a range of phenomena. Large-scale low-pressure systems generate storm surges, which increase water levels. Flooding generally occurs during high tides (coupled with storm forces), which are governed by gravitational forces. Sea level rise, caused by large-scale climate change, is steadily increasing total water levels over time. Flood extents are mainly **modulated** by coastal morphological characteristics (slope, bathymetry, natural barriers), and coastal defenses and other construction.

What We Assessed

Coastal flood hazard mapping was conducted by others and was available for shorelines within the LSA, for an event with **annual exceedance probability of 0.5%** (a flood with an indicative return period of 200 years) for current conditions, as well as for **future (2050s)** and **far future (2100)** under climate change. Secondary erosion hazard mapping was also visualized.

Recent Past | Current | Future | Far Future

Challenges

- The current coastal flood mapping product was based on flood construction levels, which ignore the sequential inundation caused by a set of high tides and waves.
- Available information is limited to just a few severity scenarios and does not represent the potential for smaller and more frequent, or larger and less likely flood events.
- More modelling effort is required to understand coastal erosion.
- Climate change conditions did not consider changes in the likelihood and severity of storm surges, which is currently difficult to project.

Mapping Results

In general, the areas with coastal flood hazard under current conditions (see blue areas on the map) include Departure Bay, Duke Point, Downtown Nanaimo and SFN Reserve 1 (see Inset B on the map), Saysutshun Island, and Protection Island. Coastal flooding is relatively widespread in the Nanaimo Estuary and SFN Reserves 2, 3, and 4 (see Insets B and D on the map).

Although the coastline in the project area is relatively stable, there exist coastal erosion hotspots such as North Slope, where erosion and mass movement geohazards are also concerns (not shown on the map, see the relevant technical studies for details).

Climate Change Trends (2100)

Far future sea level rise (shown in pink on the map) is likely to:

- Exacerbate areas of current coastal flooding in limited areas (e.g., Neck Point, Departure Bay, and Protection Island).
- Increase the areas that flood under current conditions by approximately 13% in 2100.

In the next 5-10 years, the above trends are likely to apply, meaning that this hazard is trending toward getting worse.

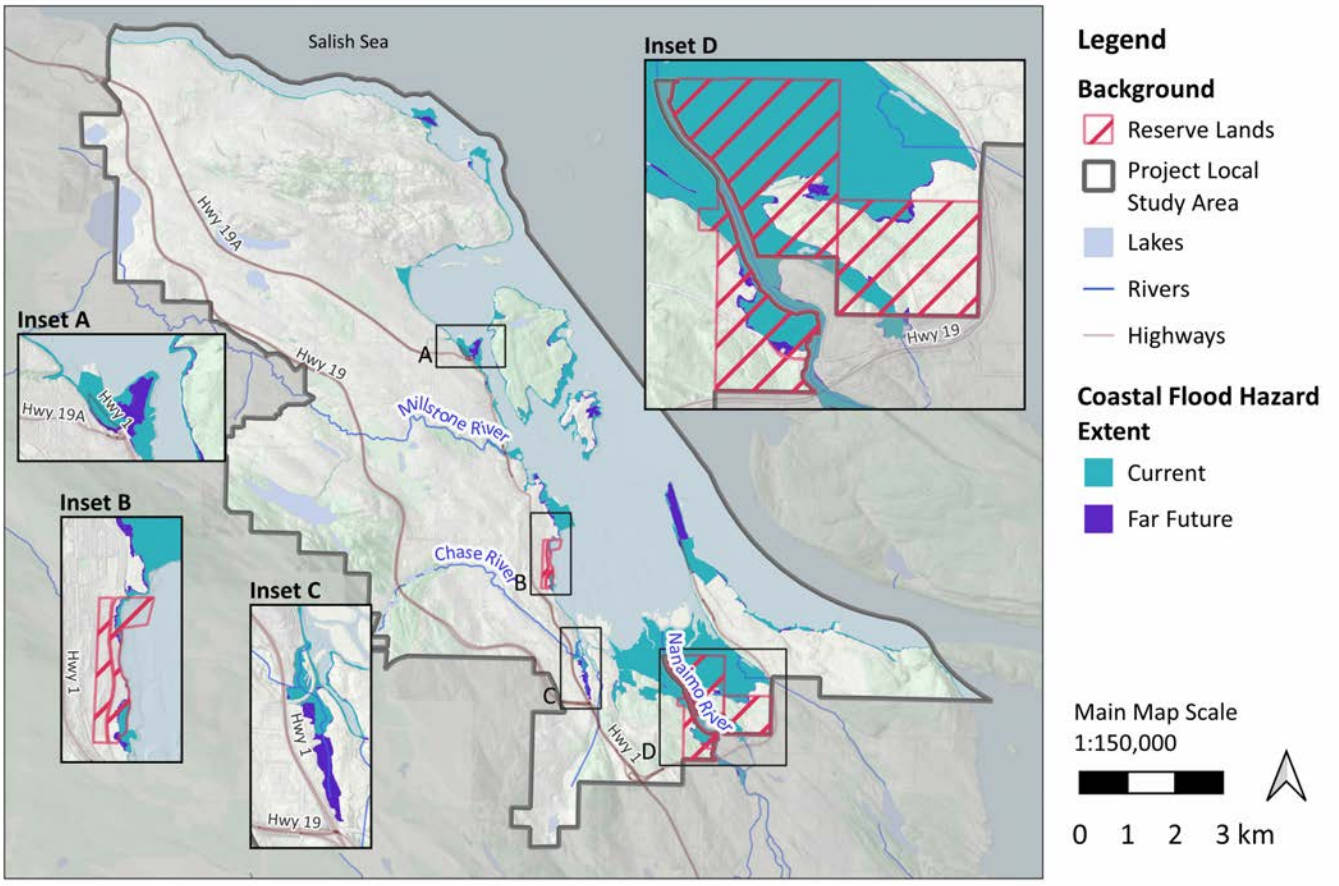
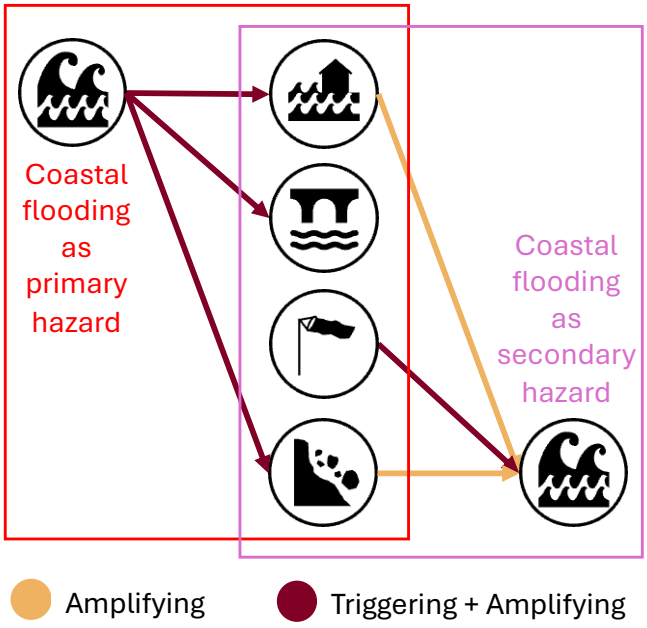


Figure 15-1: Coastal flood hazard within the LSA.

Interactions with Other Hazards

When coastal flooding is primary it triggers, amplifies, and coincides with riverine and stormwater flooding through backwater effects and by adding to total water volume. It is also inherently triggered by, amplified by, and coincides with the windstorms that generate storm surge, and can trigger, amplify, and coincide with coastal mass movements (e.g., cliff erosion). Coastal flooding events can be succeeded by periods of extreme heat or drought. As a secondary hazard, coastal flooding is amplified and coincided by riverine flooding, often coincides with extreme precipitation and stormwater flooding, and is triggered, amplified, and coincided by windstorms. Mass movements like submarine landslides can also trigger or amplify coastal flooding (e.g., tsunamis).



Emergency Management Considerations

- Utilize storm surge forecasts, and the existing flood mapping, to improve warning times and preparedness.
- The existing flood maps can be used to identify actions for specific areas in the lead-up to a forecasted flood.