

# Coastal Flood Management Strategy Parks and Environment Committee

September 2024

## Outline

Provide input into park and environmental considerations in the Coastal Flood Strategy. Develop list of barriers and opportunities for parks and environment



- Background
- Project Phases
- Phase 1
  - Local Coastal Planning Context
  - Short and Long Term Goals
  - Scope of work for coastal Flood Modeling
    - Overview of Coastal Flood Hazard Analysis
    - Proposed Scenarios for the Port Moody Coastal Flood Assessment
- Next Steps
- Discussion
- Questions?

# Climate Action Plan Implementation



# Building Climate Action Overview

**Climate Action:** Develop a coastal flood management strategy for Port Moody

**2020 Climate Action Plan Goals:**

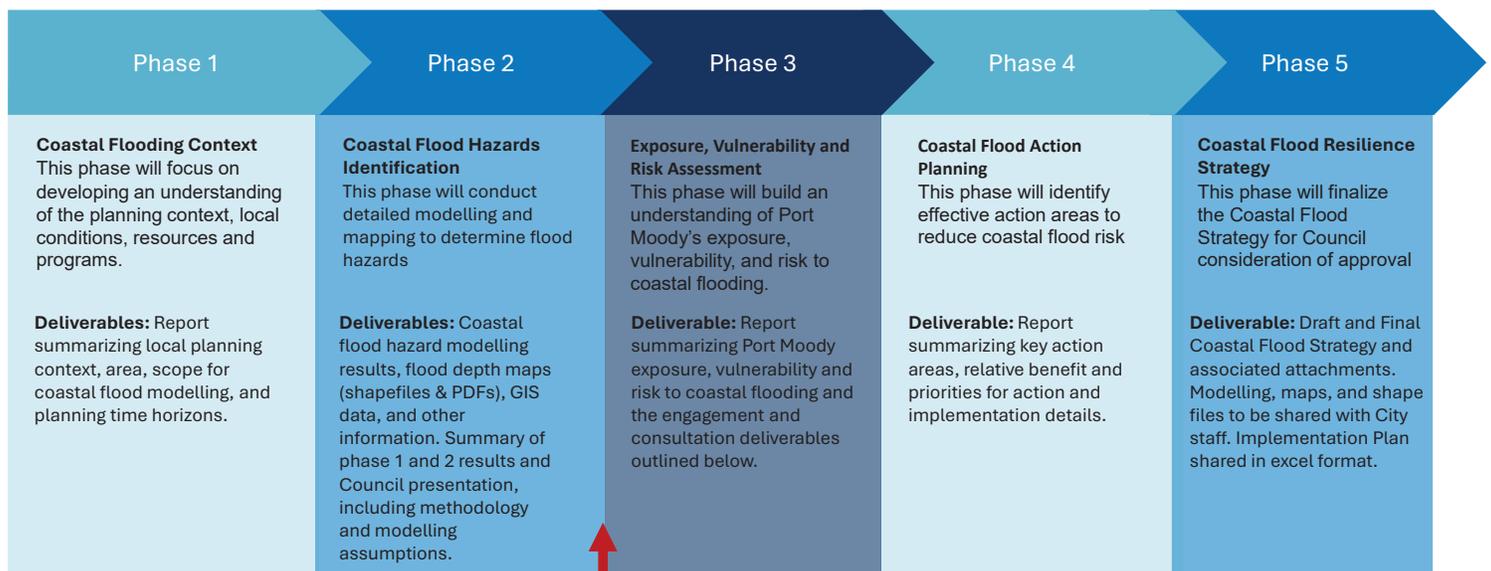
- Incorporate climate change risks and vulnerability assessments into land use planning and development; and
- Manage shoreline erosion from sea level rise and coastal flooding.



# Objectives of the Strategy

- Research sea level rise and coastal flooding risks and related hazards
- Develop flood models and maps to determine flood risk areas
- Conduct an impact analysis
- Assess and quantify the level of exposure, vulnerability and risks
- Establish adaptation options, concepts and prioritized actions
- Develop key partnerships to support risk and adaptive management
- Share information with the public and stakeholders
- Engage with stakeholders to inform strategies; and
- Establish an implementation and monitoring framework

# Project Phases



Current



## Phase 1

local flood planning context to understand the historical information available and highlight the basis of design for the coastal flood modelling in Port Moody.

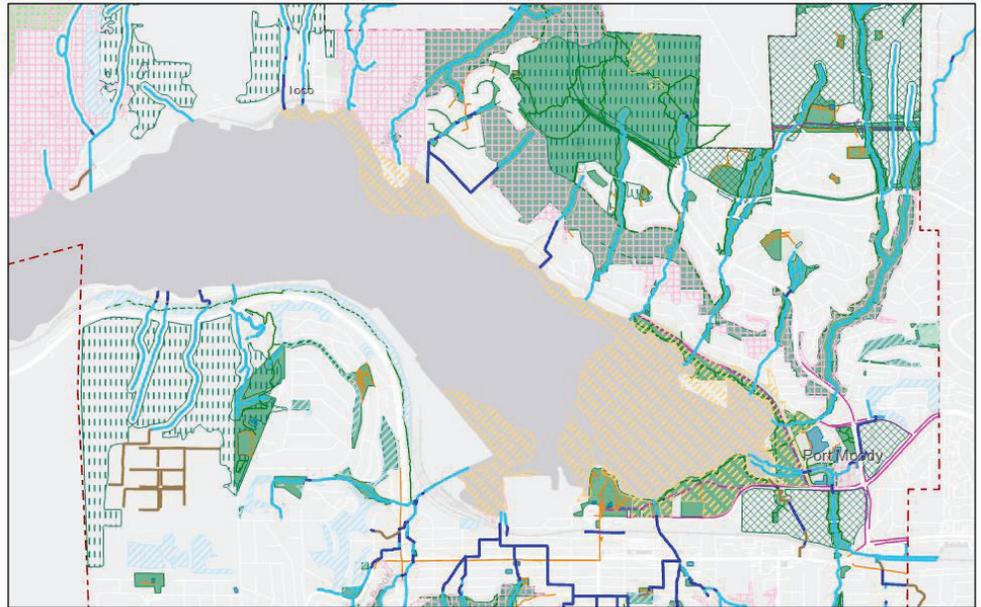
## Burrard Inlet and Coastal Flooding



- History of king tides
- History of coastal flooding events
- Greater precipitation anticipated
- Critical infrastructure and recreation along foreshore
- Homes and habitats along foreshore

# Parks and Environmentally Sensitive Areas along Burrard Inlet

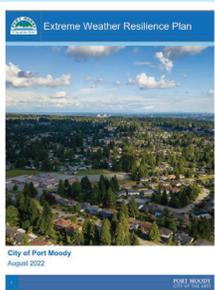
- Environmentally Sensitive Areas**
-  High
  -  Medium
  -  Low
  -  Special Feature / High
  -  Previous Agreements / Requirements
- Pathways**
-  BIKE PATH
  -  MULTI PATH
  -  TRAIL
- ESA Watercourses**
-  Stream
  -  Culvert
  -  Ditch
- Parks and Greenspace**
-  Parks



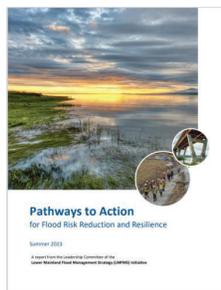
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# Local Coastal Planning Context- review



City of Port Moody Extreme Weather Resilience Plan (2022)

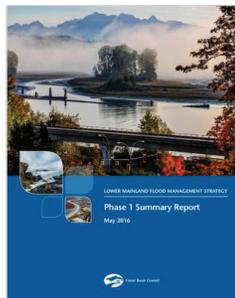


Lower Mainland Flood Management Strategy Phase 2 Report (2023)

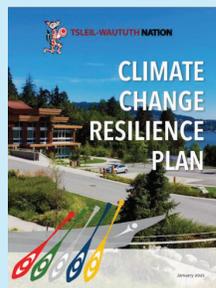


Cost of Adaptation – Sea Dikes and Alternative Strategies (2012)

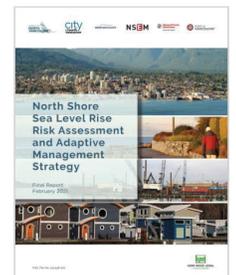
Lower Mainland Flood Management Strategy Phase 1 Report (2016)



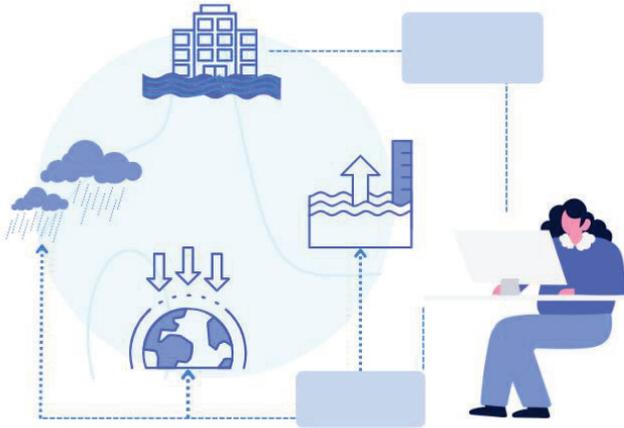
Tsleil-Waututh Nation Climate Change Resilience Plan (2021)



North Shore Sea Level Rise Risk Assessment and Adaptive Management Strategy (2021)



# Local Coastal Planning Context – Summary



Coastal flood mapping projects conducted in Burrard Inlet were based, to-date, on

- i) sea level rise,
- ii) storm surge, and
- iii) tide conditions.

The flooding associated with waves and wave run-up was missing and was acknowledged to be an important parameter in assessing coastal flood and ultimately flood construction levels.

Past studies highlighted the need to incorporate wave effects in future studies for a more complete and representative assessment.

Past studies have considered time horizons of 2050, 2100 and 2200.

- Limited information is currently available with regards to the extent of potential floods and impacted areas in Port Moody. That said, a regional study conducted in 2016 assessed an estimated \$2B for total building replacement of impacted infrastructure in Port Moody during an extreme coastal flood scenario.

## Short and Long Term Goals

Several short- and long-term goals have provided motivation for this project:

### Short-term goals:

- Quantify the extent of coastal flood hazards associated with various time horizons.
- Set priorities through the identification of areas which are most at risk.
- Understand future impacts due to climate change (particularly coastal floods in this project) and appropriately plan for them, acknowledging that unmitigated year 2100 coastal flooding could result in an estimated cost up to \$2B for the City of Port Moody (Fraser Basin Council).

### Long-term goals:

- Incorporate climate change risks and vulnerability assessments into land use planning and development.
- Manage shoreline erosion from sea level rise and coastal flooding.

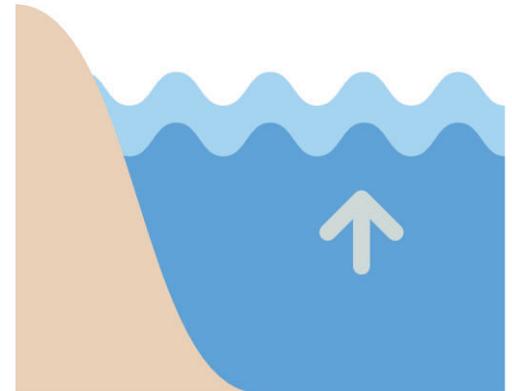
Along with Port Moody's 2020 Climate Action Plan, utilize the low carbon resilience (LCR) framework in the Coastal Flood Management Strategy

## Scope of work for Coastal Flood Modeling- Overview of Coastal Flood Hazard Analysis:

The concept of a Designated Coastal Storm Event will be used to carry out the analysis of the coastal storm hazard for storm surge and wave generation.

The hazard is essentially associated with water at high elevations; Water levels vary both in time and in space. There are three different categories of time scale over which water level varies at a location on the coast:

- **Long-term variation (years to decades)** is governed by mean sea level, as may be modified by sea level rise (SLR) due to climate change and crustal uplift or subsidence.
- **Medium-term variation (minutes to hours)** is governed by tides and storm surges:
  - Tides: Predictable in time and space; estimated through tidal harmonic analysis or tide station observations.
  - Storm Surges: Represent the difference between predicted tidal levels and observed water levels. These are less predictable and depend heavily on real-time meteorological conditions. Minor spatial variation in tides and surges is expected in the study area due to the basin's shape and shoreline length.
- **Short-term variation (seconds)** is governed by wave conditions, measured by wave buoys or estimated through numerical models. Spatial variation in waves is anticipated, necessitating the use of a numerical model for accurate quantification.



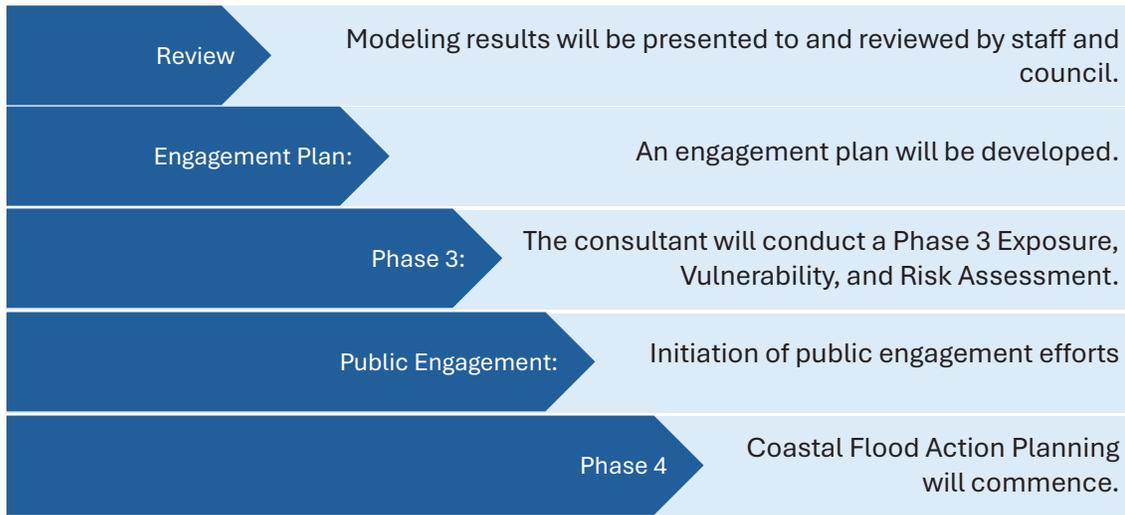
## Scope of work for Coastal Flood Modeling- Proposed Scenarios

Table 4.1: Proposed Scenarios for the Port Moody Coastal Flood Assessment

Scenario	Sea Level Rise [m]	Coastal Subsidence [m]	Storm Surge Return Period	Tidal Conditions	Wave Conditions
A1	0.5 m (horizon time: 2050)	+0.08 m	10-year (10%)	HHWLT	10-year (10%)
A2	0.5 m (horizon time: 2050)	+0.08 m	500-year (0.5%)	HHWLT	500-year (0.5%)
B1	1.0 m (horizon time: 2100)	+0.15 m	10-year (10%)	HHWLT	10-year (10%)
B2	1.0 m (horizon time: 2100)	+0.15 m	500-year (0.5%)	HHWLT	500-year (0.5%)

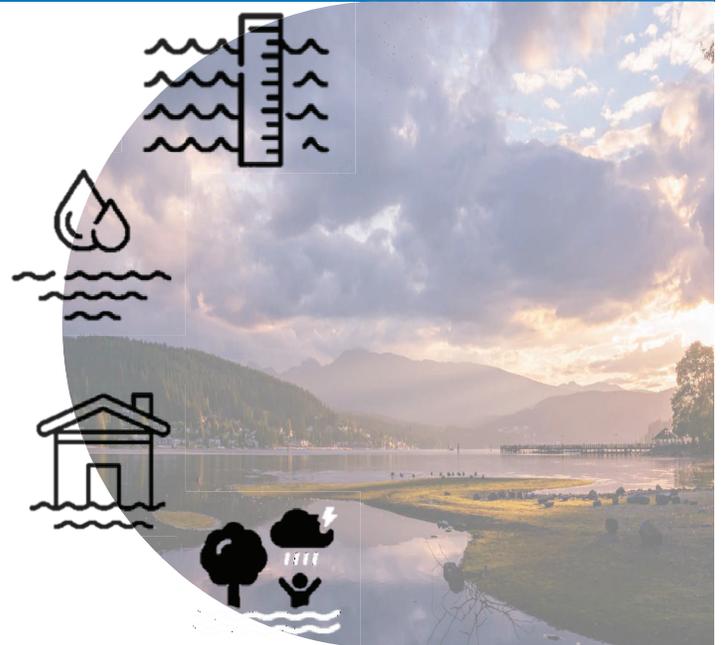
- Through a combination of 500-year and 10-year storm events, we can characterize anticipated typical flood extent in 2050 and 2100, along with providing a more conservative flood extent for planning/design purpose at these same times

## Next Steps



## Discussion Parks and Environment Perspective

- What key park and environmental considerations should be prioritized in the development of the Coastal Flood Strategy?
- What barriers and opportunities do you foresee for integrating parks and environmental considerations into the Coastal Flood Strategy?





Questions?

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