



NATURAL RESOURCES CANADA - INVENTIVE BY NATURE

# Flood Risk Related Initiatives

Nicky Hastings (Geological Survey of Canada - Vancouver)  
Natural Resources Canada

October 22, 2020



Natural Resources  
Canada

Ressources naturelles  
Canada

Canada

# Flood Hazard Layers

- National Flood Hazard Layer
  - Existing flood hazard maps
- FDRP Maps (Flood Damage Reduction Maps)
- Active Floods in Canada (floods & river ice)
- Canadian Disaster Database (PSC)



# Flood Mapping Framework

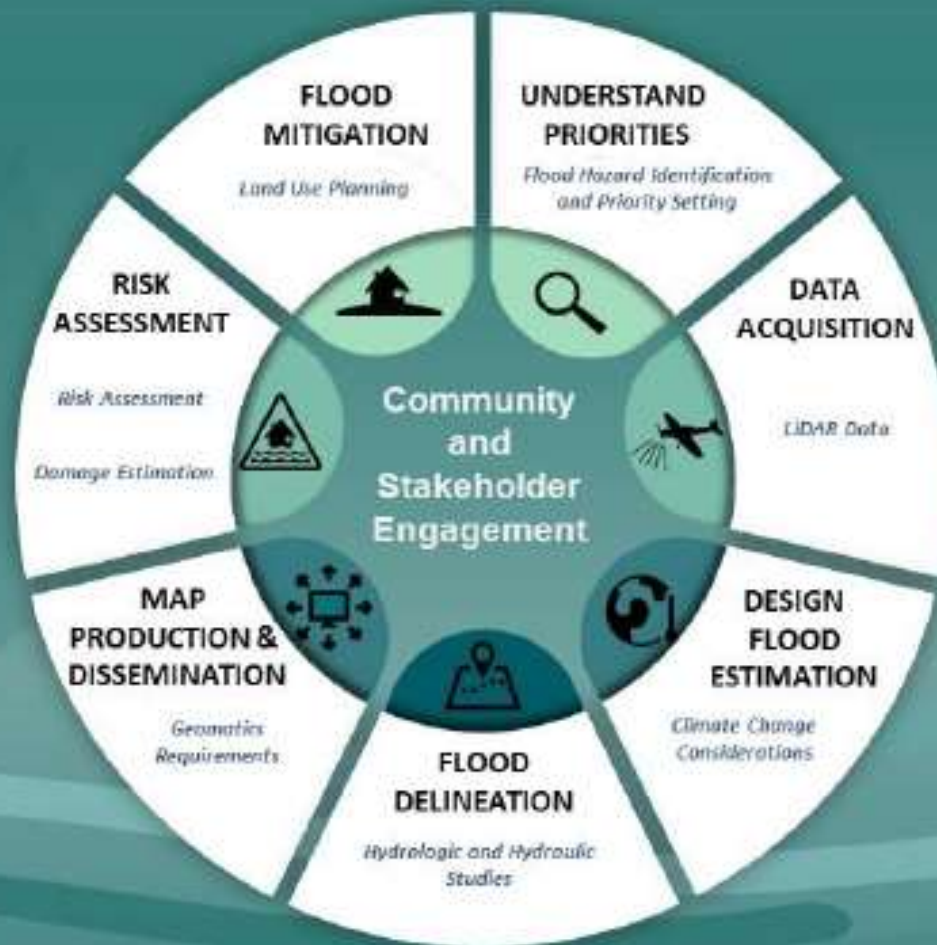


Figure 1: Flood Mapping Framework



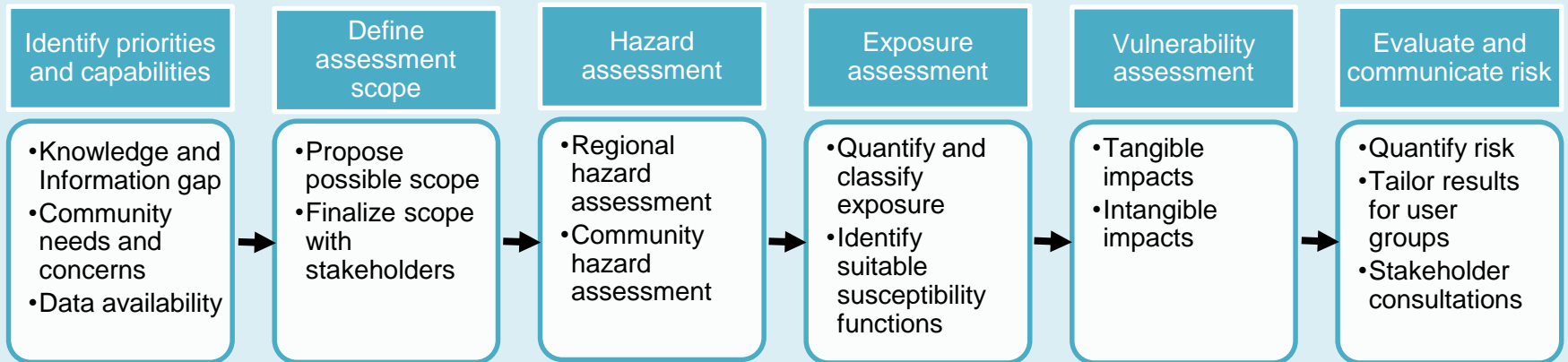


# Federal Flood Mapping Guidelines Series

<b>Federal Flood Mapping Framework</b>	<b>Published</b>
<b>Flood Hazard Identification and Priority Setting</b>	<b>In Progress</b>
<b>Federal Airborne LiDAR Data Acquisition Guideline</b>	<b>Published</b>
<b>Case Studies on Climate Change in Floodplain Mapping vol. 1</b>	<b>Published</b>
<b>Federal Hydrologic and Hydraulic Procedures for Flood Hazard Delineation</b>	<b>Published</b>
<b>Federal Geomatics Guidelines for Flood Mapping</b>	<b>Published</b>
<b>Federal Flood Risk Assessment Procedures</b>	<b>In Progress</b>
<b>Federal Flood Damage Estimation Guidelines for Buildings and Infrastructure</b>	<b>In Progress</b>
<b>Federal Land Use Guide for Flood Risk Areas</b>	<b>In Progress</b>
<b>Bibliography of Best Practices and References for Flood Mitigation</b>	<b>Published</b>

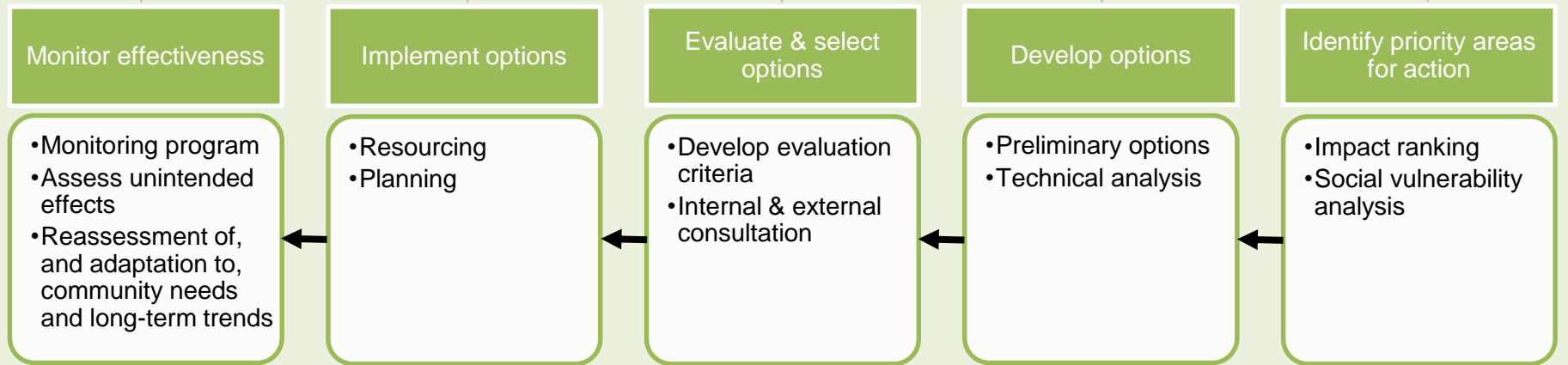


# COASTAL FLOOD RISK ASSESSMENT



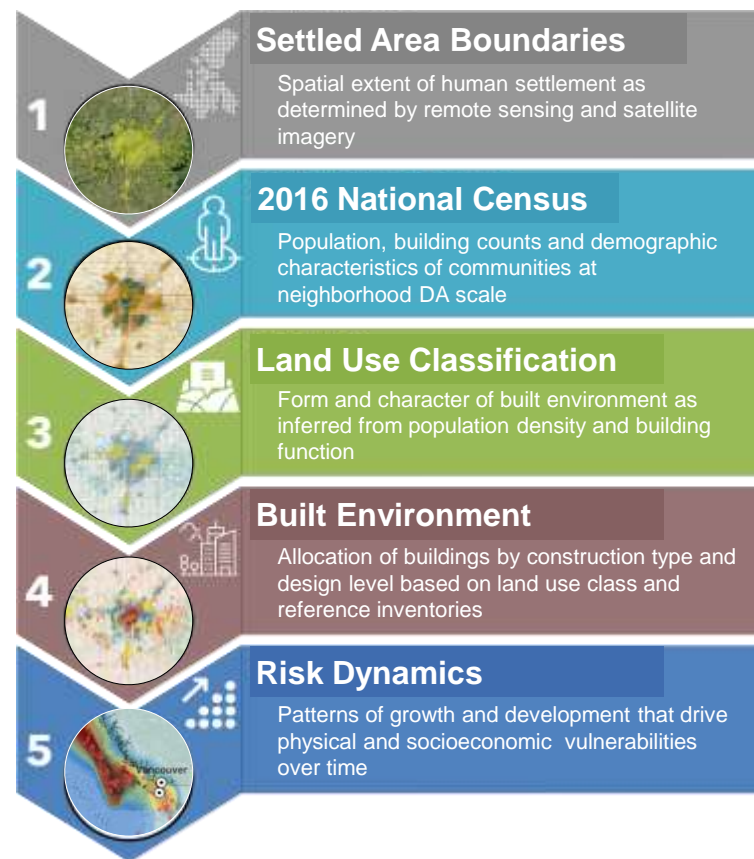
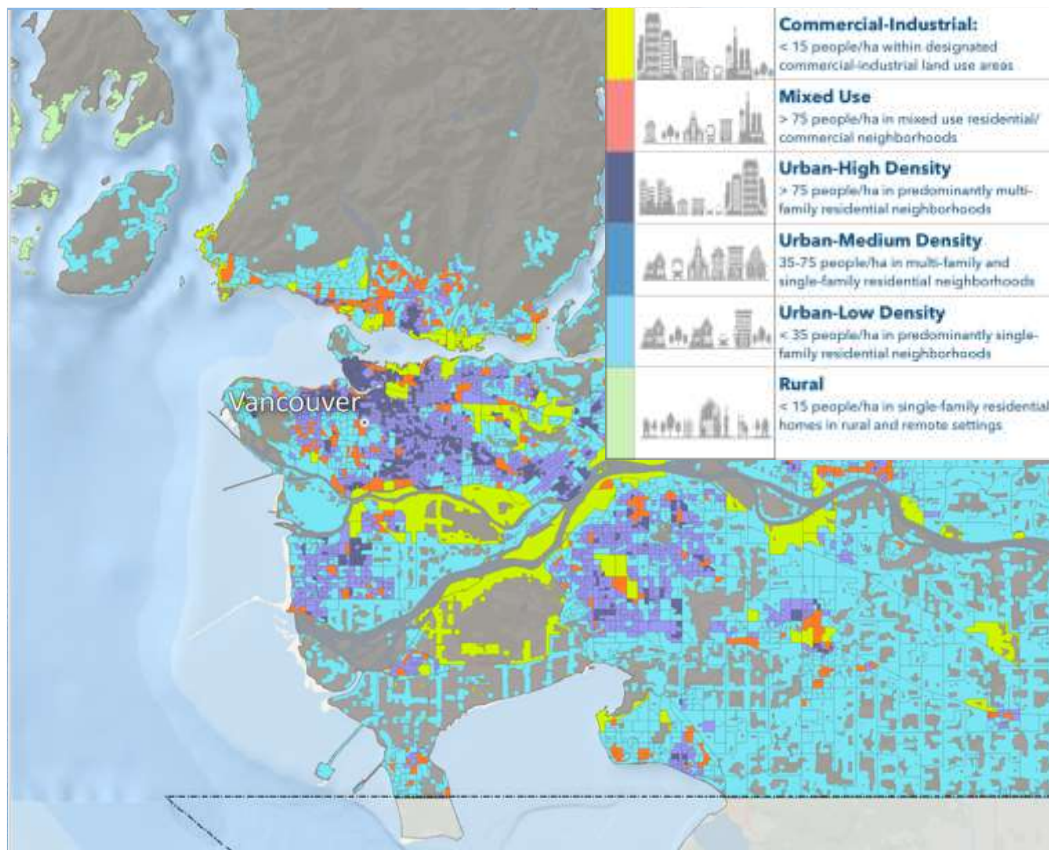
**COMMUNITY AND PARTNER ENGAGEMENT**

- Continued dissemination of findings and opportunities for feedback
- Continued discussion to evaluate alignment with community needs and fine-tune scope and priorities



# COASTAL FLOOD RISK REDUCTION

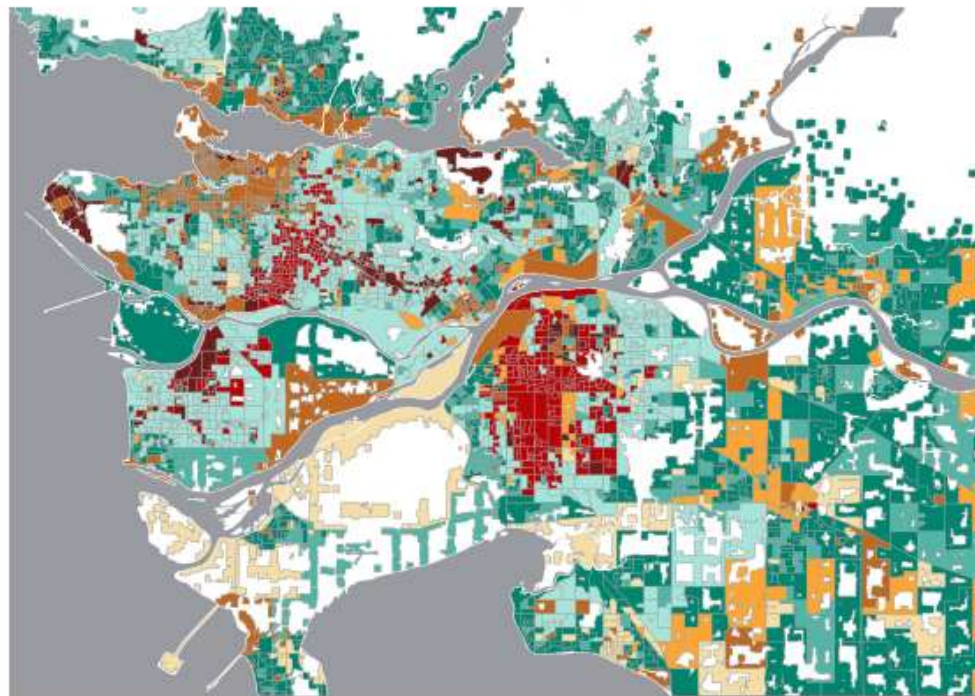
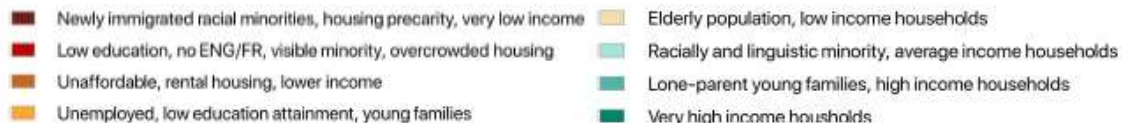
# National Human Settlement Model (2016)



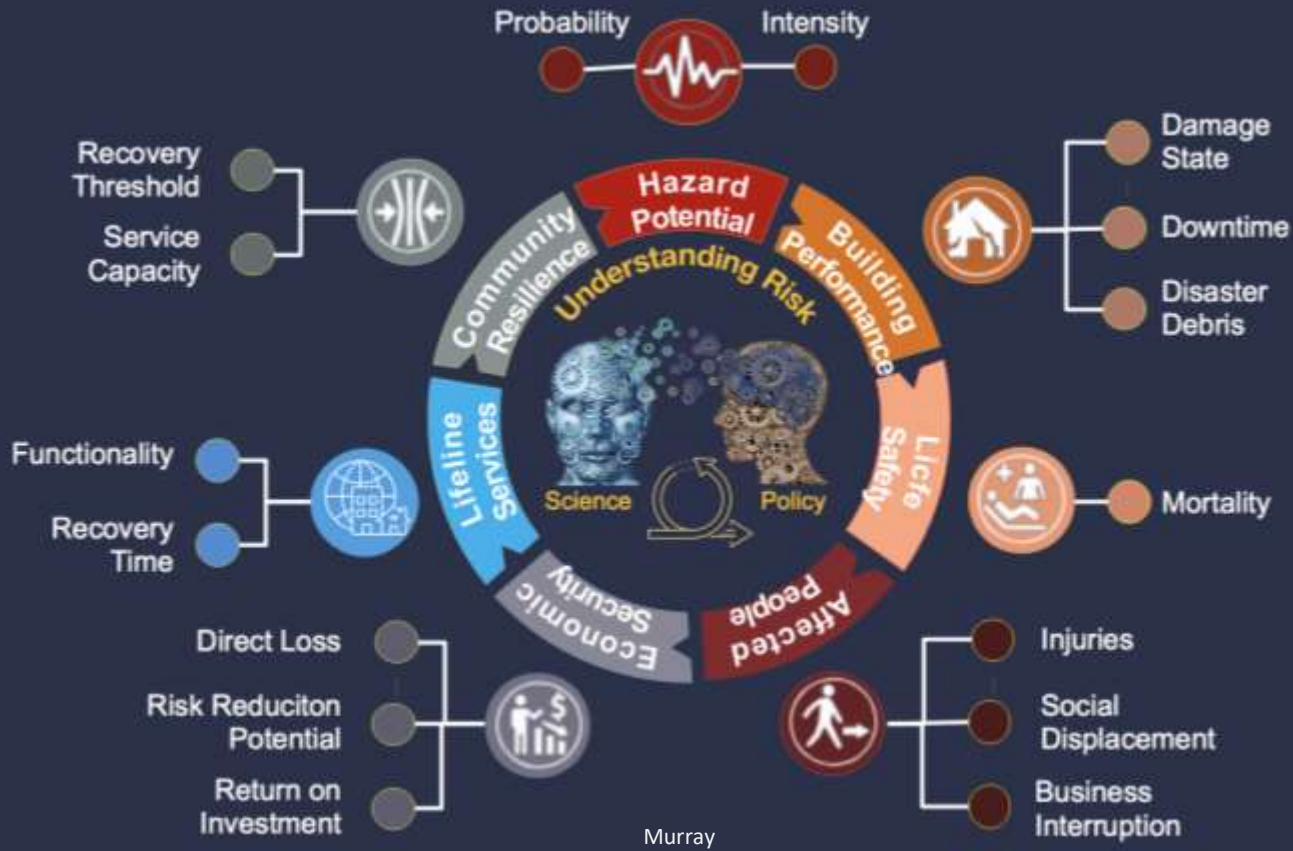
## NEIGHBOURHOOD VULNERABILITY PROFILES

*What are the possible drivers of vulnerability in different neighbourhoods?*

- *Identified 8 predominant profiles of socio-economic vulnerability in BC neighbourhoods*
- *Based on 12 indicators reflecting the same four themes*
- *Implemented across BC*

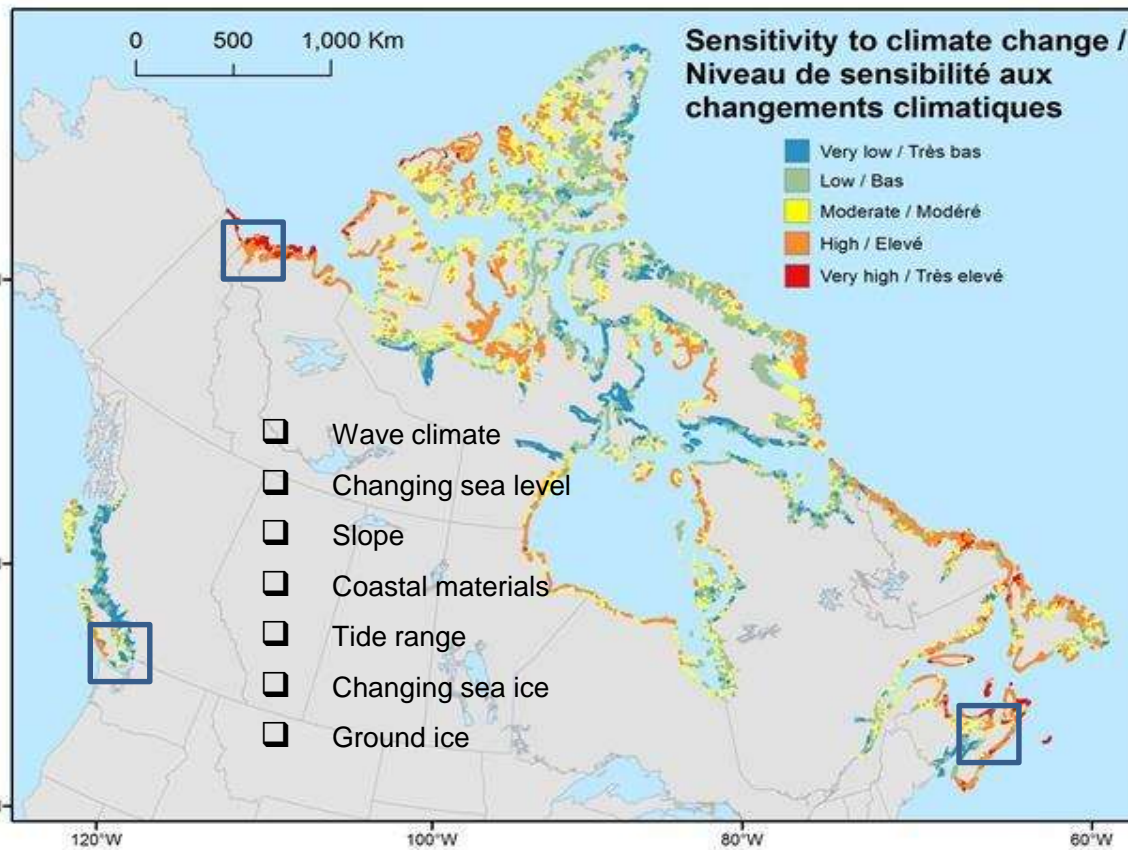


# Risk Profile indicators as a bridge to disaster resilience planning



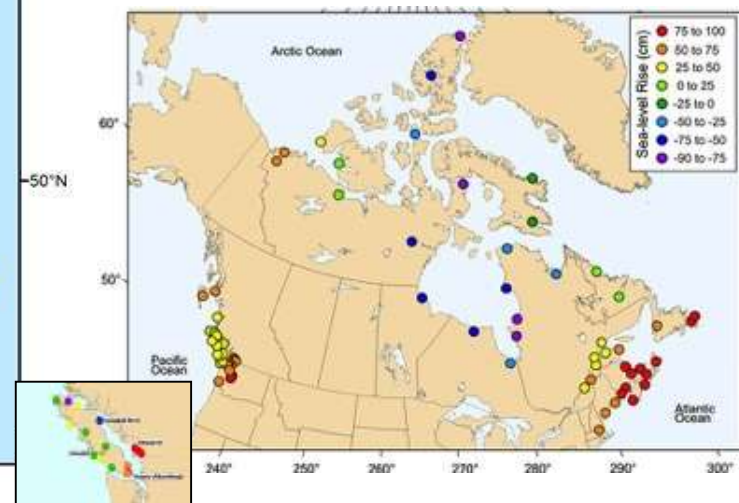


# Coastal Sensitivity

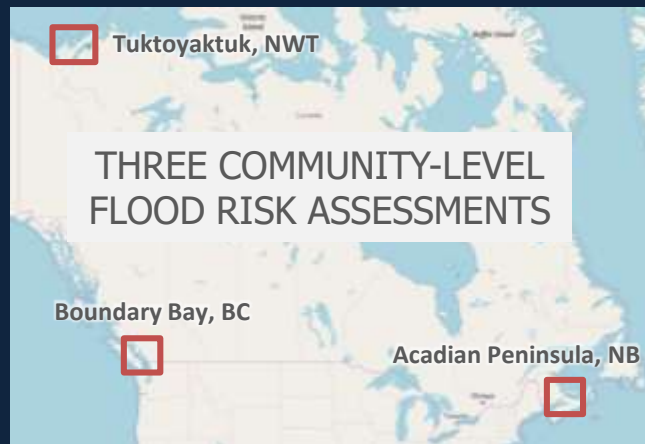


Credit: Gavin Manson (NRCan)

Credit: Dustin Whalen (NRCan)



## Coastal Flood Risk Project



### Informs Coastal Flood Risk Assessment Guideline

- Develop and demonstrate best practices
- Lessons-learned ensure guideline's applicability to diverse communities

### Generates New Hazard Modeling Data

- Flood hazard modelling data (Storm surge, sea-level rise, tsunami)
- Paleotsunami data

### Develop and demonstrate flood damage modeling tools

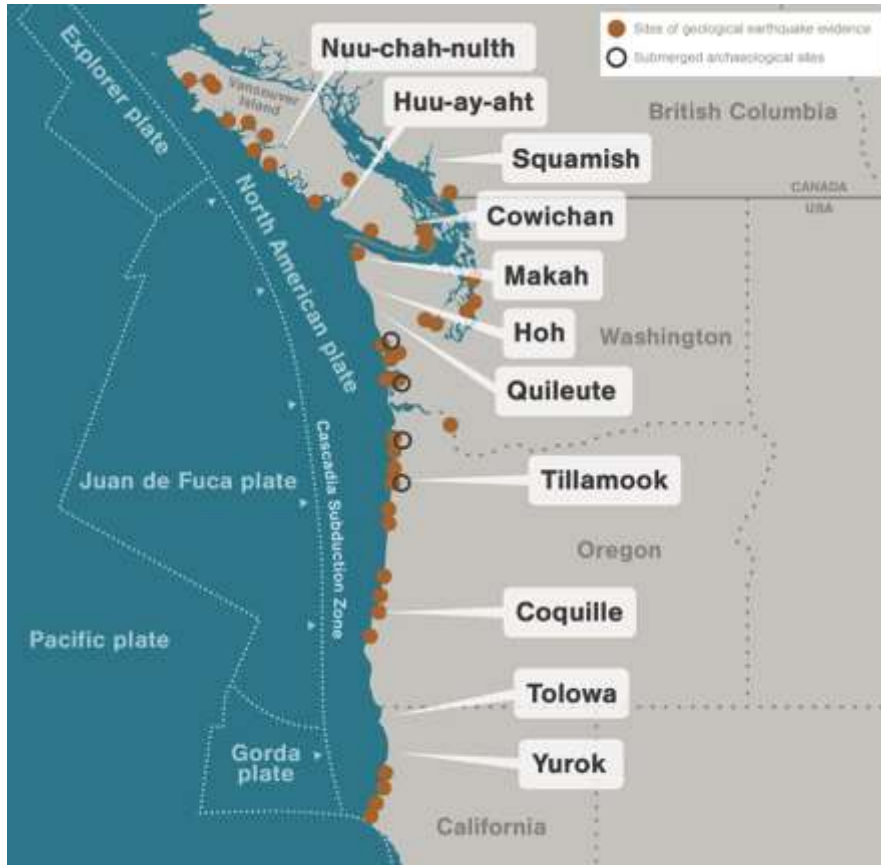
- Identify and adopt damage functions and models suitable for Canadian coastal communities

### Informs local risk reduction planning and decision-making

Risk assessments are conducted in partnership with local governing bodies to ensure results can help inform local planning



# Integrate Indigenous and Scientific Knowledge



**“Indigenous people’s terrifying tsunami stories are a history and a warning.”**



Nuu-chah-nulth artist Tim Paul—he got earthquake foot and his steps set off vast tremors.

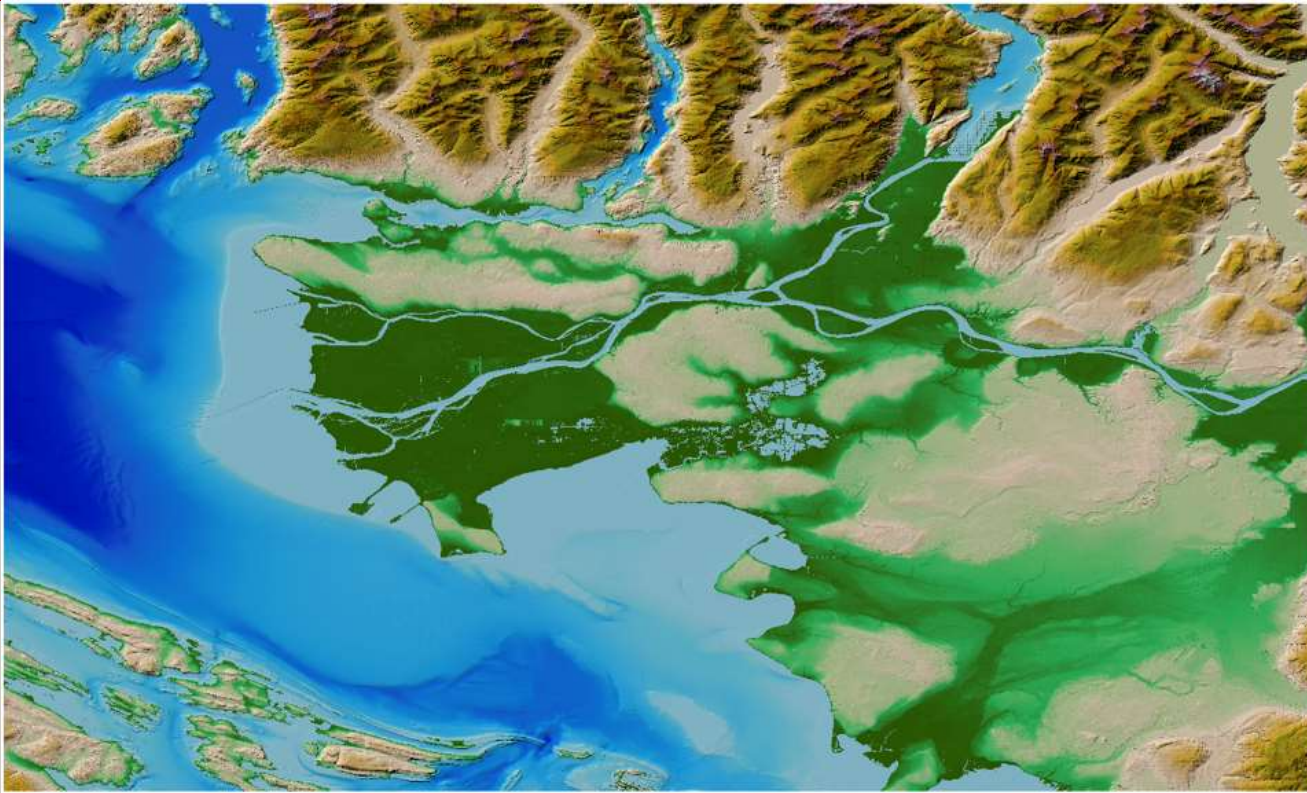
**“Mother Nature is the most powerful engineer”**



Identify  
priorities and  
capabilities

# Integrated DEM

*What flood risk information is needed and why? How much of that information can be provided by this assessment?*



High Resolution  
Land-River-Sea  
Elevation Model



Credit: Oceans Network Canada, NOAA

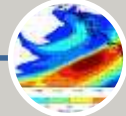
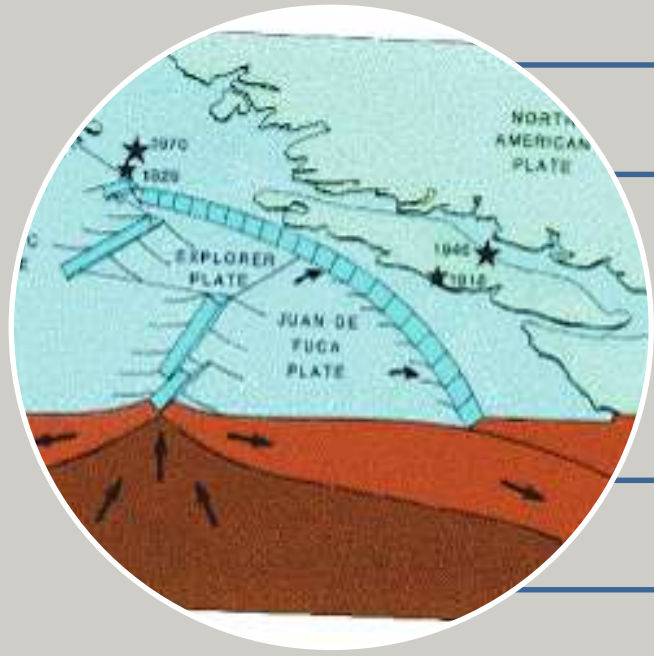


Natural Resources  
Canada

Ressources naturelles  
Canada

# Scenarios - Tsunami & Storm Surge

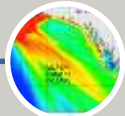
## Deterministic or Probabilistic?



Meteotsunamis



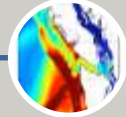
Crustal Faults



Distant Earthquakes



Landslide triggered



Cascadia Subduction

# OpenDRR Platform

*Provide tools to facilitate decision making prior to and during a crisis*



Risk Analyst



Emergency Planner, Risk Manager



Public

RiskProfiler



OQ

Canada



GitHub



OpenQuake Engine



Workflow

Share

Publish

Peer Review

Generate Scenario Outputs

Model Scenarios

Refine



Natural Resources  
Canada

Ressources naturelles  
Canada

Canada