



BC | Climate Resilience
Summit 2025

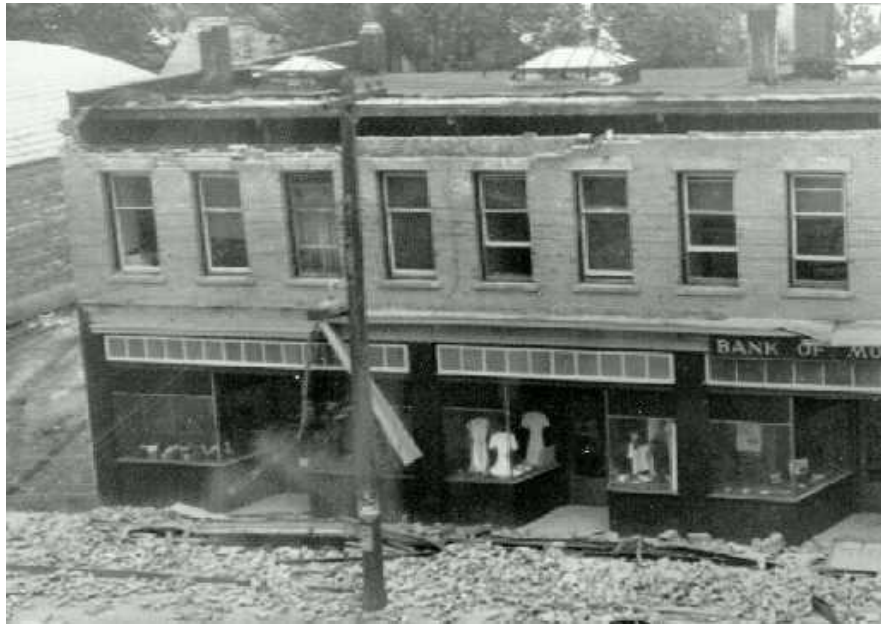
Vancouver, Robson Square March 3rd/4th

Seismic Risk in Canada: What You Need to Know and Where to Find It

Tiegan Hobbs, PhD | Geological Survey of Canada, UBC, UVic



Damaging Earthquakes in Canada



Vancouver Island
1946 M7.3



Val des Bois
2010 M5.0



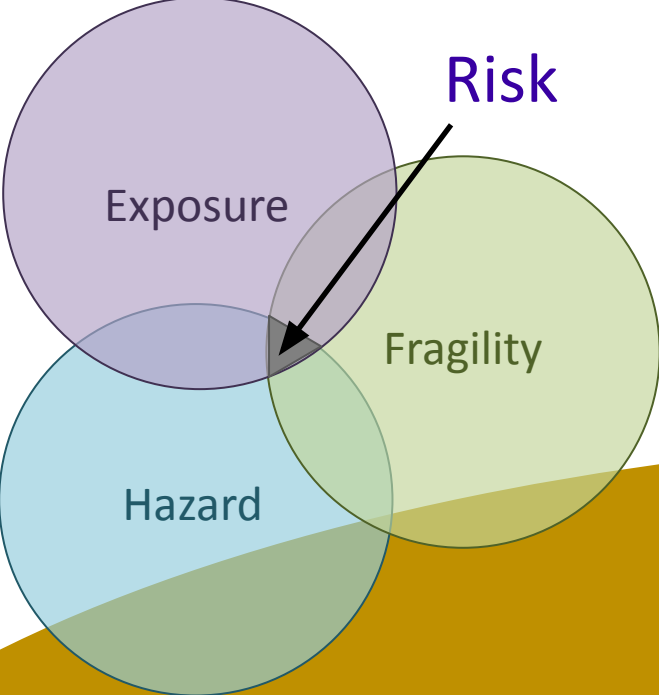
Haida Gwaii
2012 M7.8

Greg Brooks, NRCan



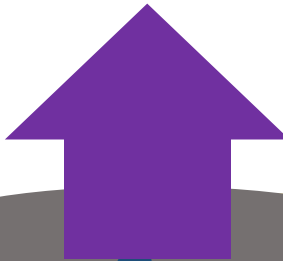
Jean Levac, Ottawa Citizen

Seismic Risk



Site Response

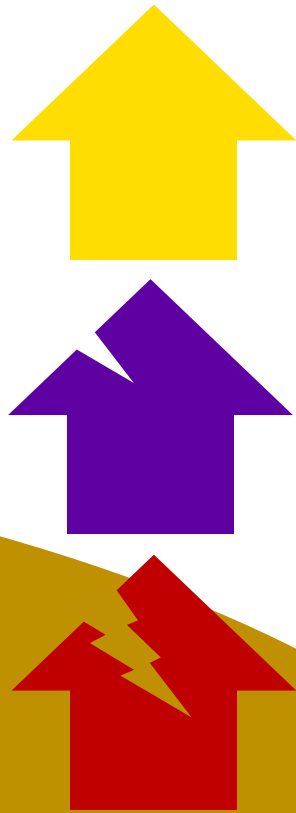
Exposure



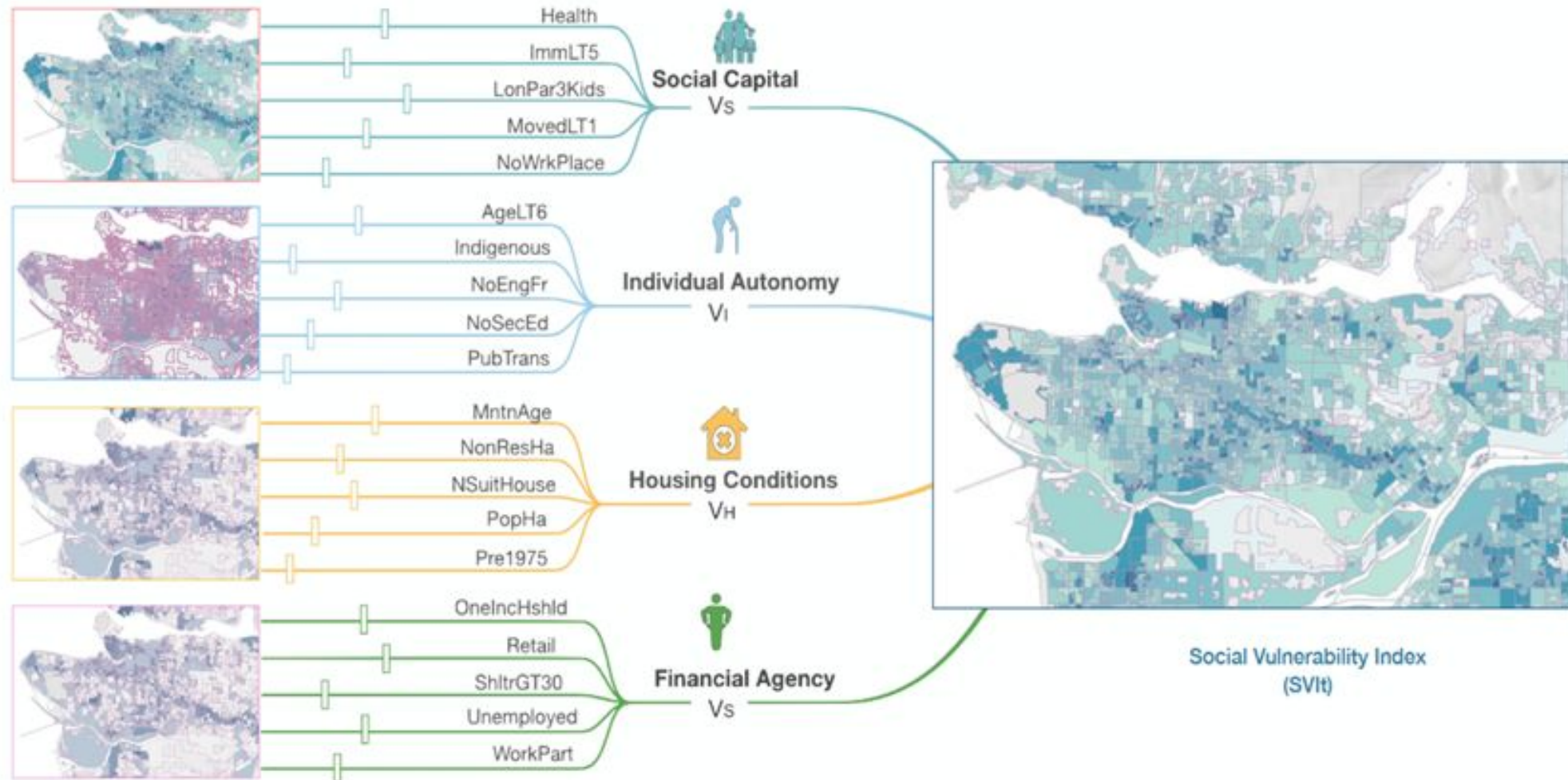
Ground Motion
Prediction
Equations

Fragility

Hazard

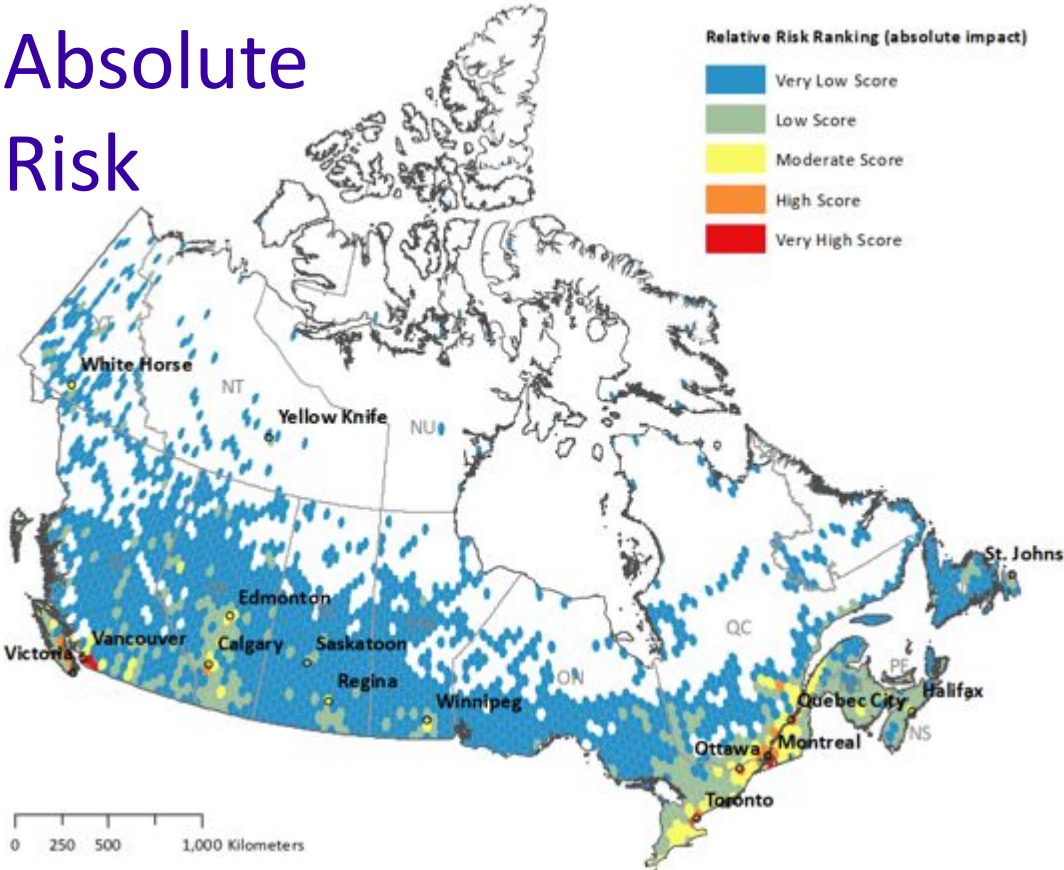


Social Vulnerability Model



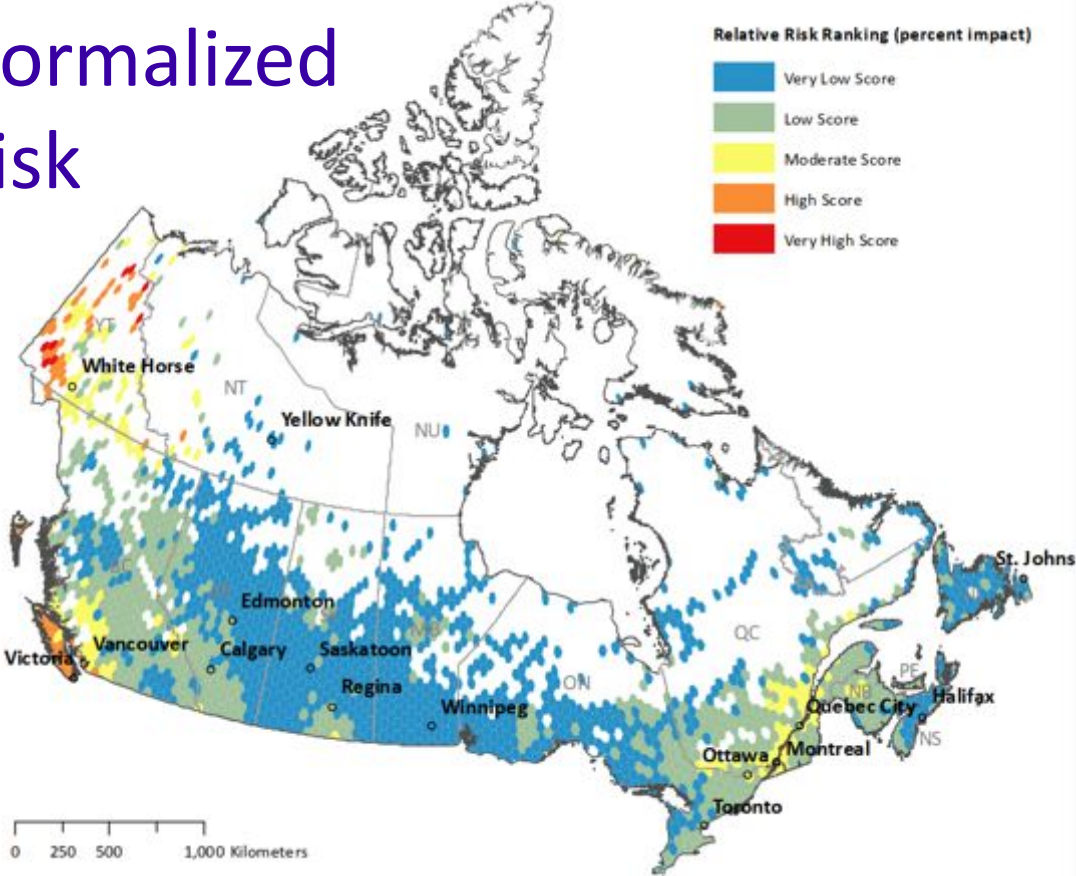
Results: Seismic Risk Index

Absolute Risk



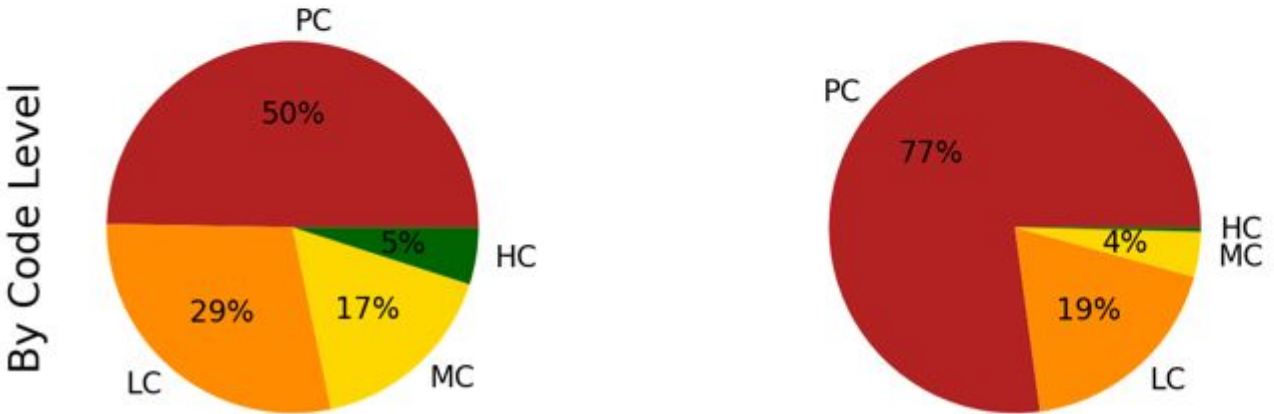
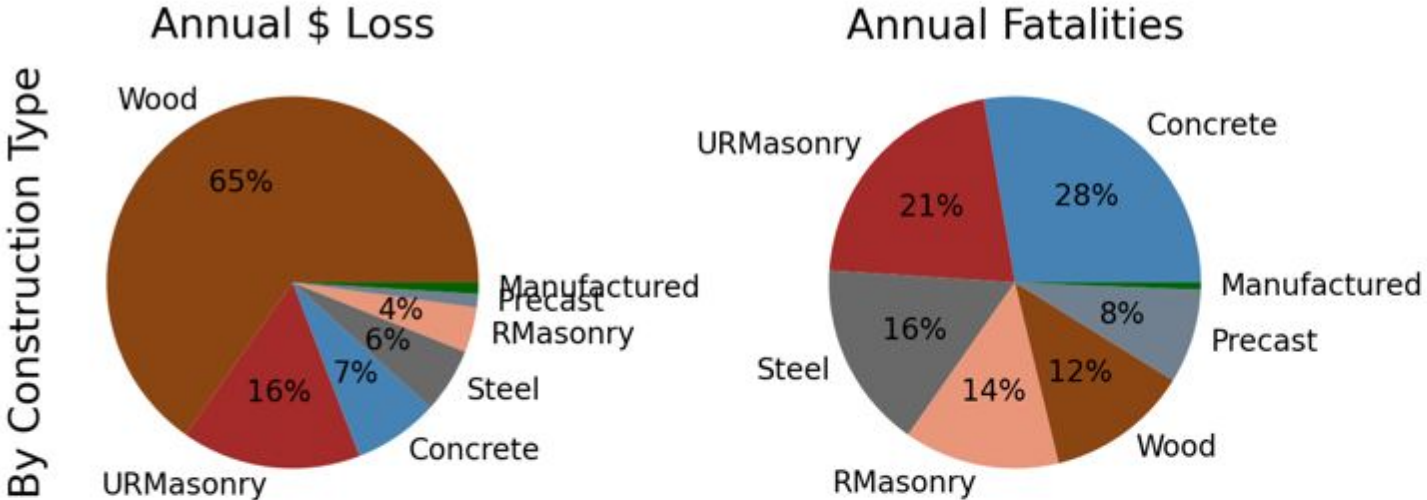
Montreal, Vancouver, Surrey, Richmond, Victoria

Normalized Risk



Skidegate, Zeballos, Duncan, Burwash Landing, Tsussie 6

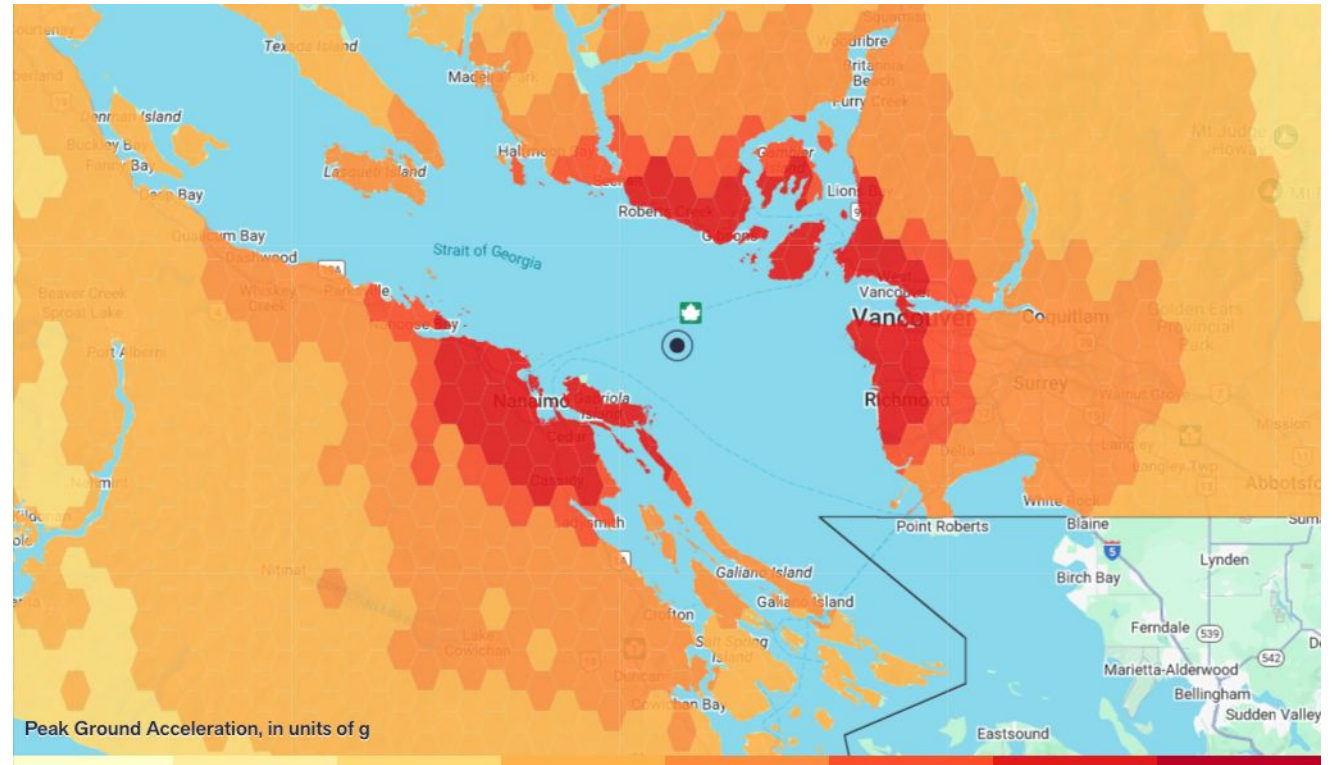
Results: Risky Buildings



URMasonry: Unreinforced Masonry,
 RMasonry: Reinforced Masonry
 PC: Pre-Code,
 LC: Low Code,
 MC: Mid Code,
 HC: High Code

Results: Major Event near Vancouver

- Moment Magnitude (M_w) 7.0
- Shaking lasts ~1-2 minutes
- Up to 57% of freefall [g]
- Likely no tsunami
- Likely liquefaction & landsliding
- Aftershocks for months

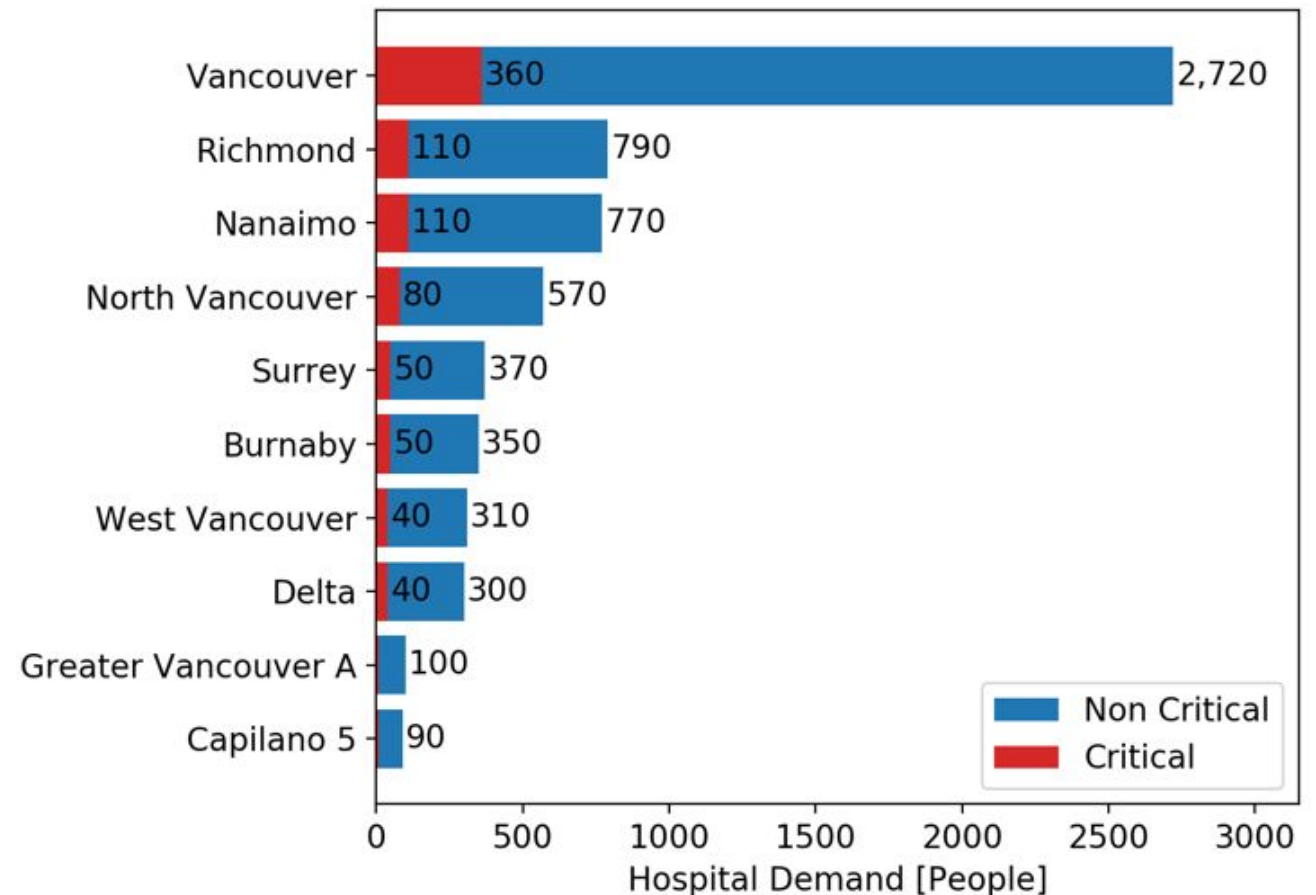


Results: Major Event near Vancouver

Indicator	Impact
Losses	\$30 Billion*
Unrepairable Buildings ('Red Tagged')	10,000
Displaced Households	70,000
Deaths	2,000
Critical Injuries	1,000
Total Hospitalizations	7,500

All figures are rounded

*Losses are building damage only



RiskProfiler

A Public Web Application for Seismic Risk Information in Canada

The image displays two overlapping screenshots of the RiskProfiler web application. The background screenshot is the landing page, and the foreground screenshot is a detailed view of a seismic scenario.

Landing Page (Background):

- Header: RiskProfiler, Explore Earthquake Scenarios, Consider Probabilistic Earthquake Risk, English, Français, LEARN MORE, DOWNLOAD DATA, CONTACT US.
- Main Text: Earthquake risk information for emergency management and planning in Canada.
- Subtext: Tools to help Canadians build resiliency to seismic risk through planning and emergency management.
- Image: Aerial view of a city with high-rise buildings.
- URL: <https://riskprofiler.ca/scenarios/index.html>

Scenario Detail Page (Foreground):

- Header: RiskProfiler, Explore Earthquake Scenarios, Consider Probabilistic Earthquake Risk, English, Français, LEARN MORE, DOWNLOAD DATA, CONTACT US.
- Navigation: Scenario Catalogue > Scenario, TOUR THIS PAGE, CHARTS, RETROFIT.
- Search: Type to search.
- Scenario List:

DEATHS	DAMAGE	DOLLARS
900 people	61 thousand buildings	\$20 billion CAD
M7.3 Leech River Fault (BC) + 7.3		
990 people	6.9 thousand buildings	\$20 billion CAD
M7.4 Denali Fault (YT) + 7.4		
Less than 10 people	50 buildings	\$74 million CAD
M7.5 Val-des-Bois (QC) + 7.5		
150 people	35 thousand buildings	\$75 billion CAD
M9.0 Cascadia Full Rupture Subduction Earthquake (BC) + 9.0		
3.4 thousand people	18 thousand buildings	\$38 billion CAD

Map: A map of Western Canada showing seismic risk levels. A red circle with the number '5' is centered over the Cascadia region, indicating the selected scenario. Other cities shown include Whitehorse, Skagway, Juneau, Sitka, Ketchikan, Vancouver, Seattle, Spokane, Portland, Boise, Idaho, Montana, Wyoming, Alberta, Saskatchewan, and North/South Dakota.

Footer: LEARN MORE, CONTACT US, RiskProfiler v1.0 • Built with API v1.4.3 • (10507) • © 2023 RiskProfiler. All rights reserved. Terms & Conditions. GEM GLOBAL EARTHQUAKE MODEL working together to assess risk. Natural Resources Canada.



buildings

DESCRIPTION

Full rupture of the Cascadia interface fault, the fault defining the boundary between the North American and Pacific Ocean plates. This magnitude 9.0 event, often referred to as 'The Big One', affects most communities in southwestern British Columbia.

INDICATORS

Shake Map

Injuries

First aid injuries

Noncritical hospital injuries

Critical hospital injuries

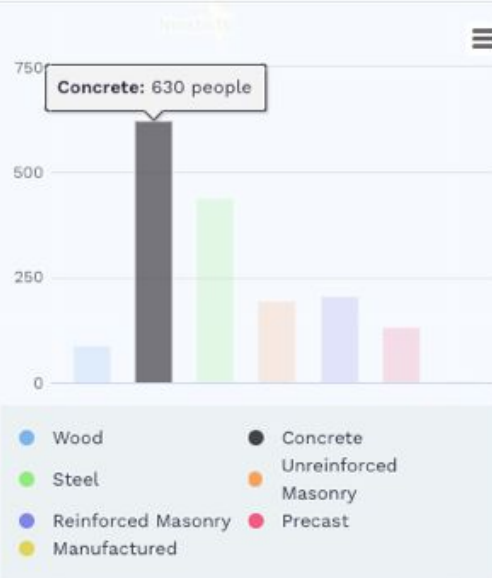
Fatalities and entrapments

Damage

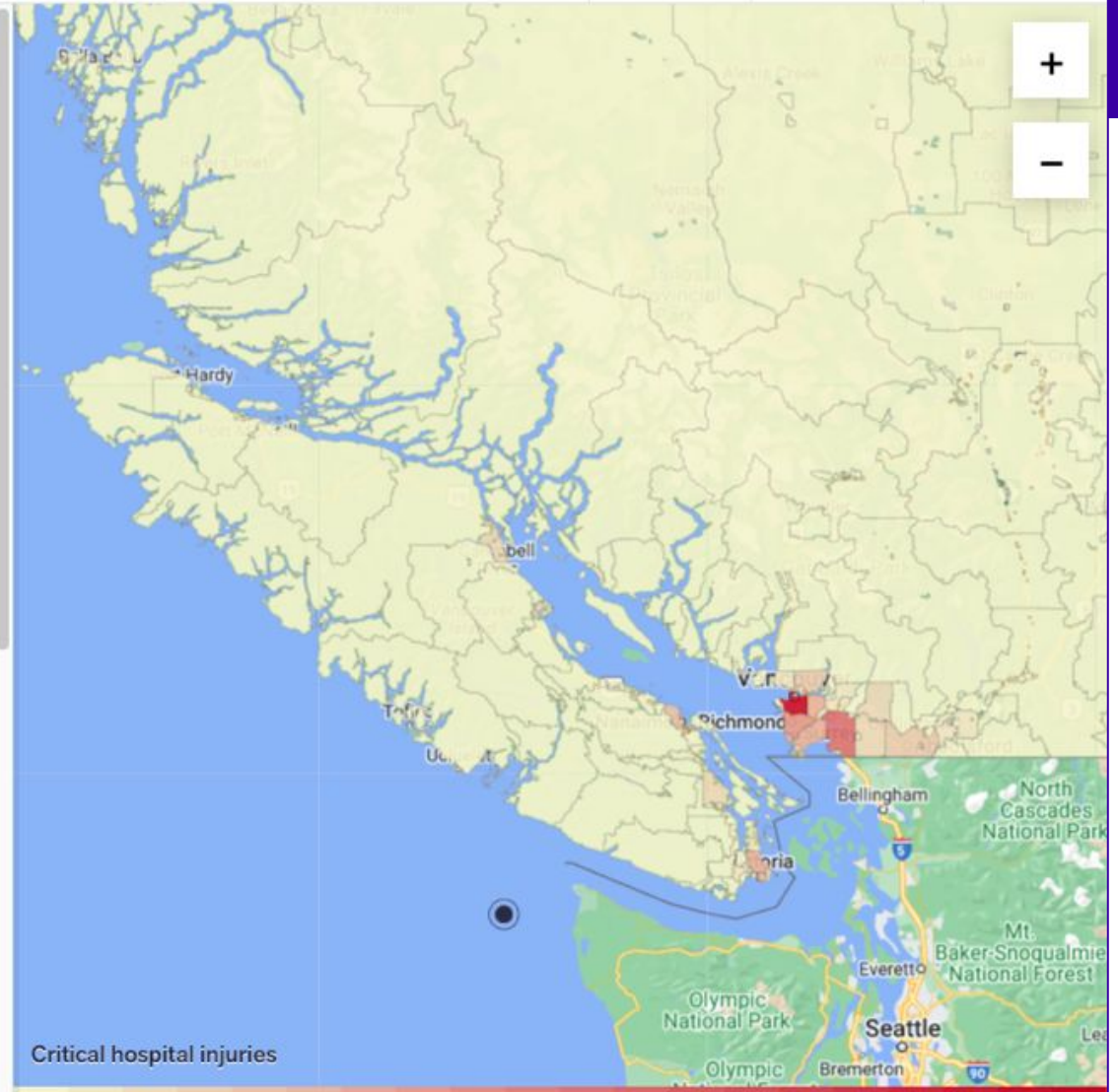
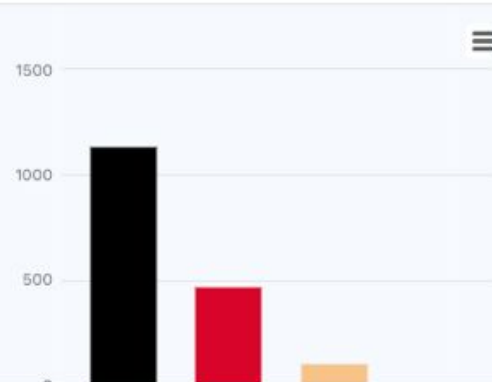
Dollars

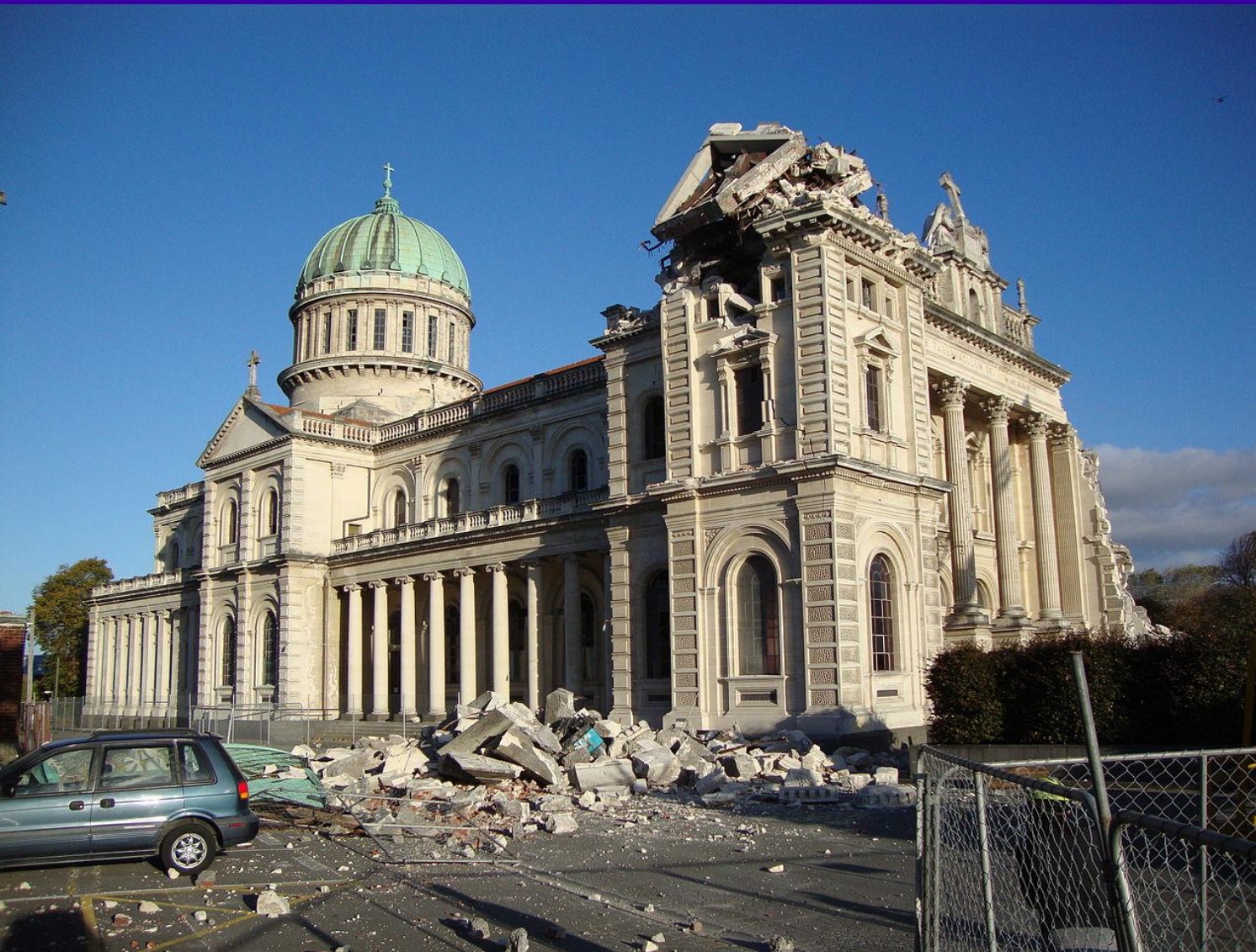
By Building Type

GENERAL SPECIFIC



By Design Level





Thank you
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