Flood Plain Mapping in Lower Mainland BC

How the heck do you decide where flood Mapping should be done when it is needed everywhere? (Or is it?)

22nd February 2025 | Western Flood Mapping Conference

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with EcoPlan International, Emergency Planning Secretariat, and team Ebbwater

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Historic Context

Vol. 1, No. 1, 1976

THE NATIONAL FLOOD DAMAGE REDUCTION PROGRAM

J.P. Bruce[1]

ABSTRACT: A national program to reduce flood damages was announced by the federal Minister of the Environment in April, 1975. Considerations that went into the program and its evolution are presented. Past governmental contributions to flood relief and flood control structures have not curbed floodplain investment processes nor the concomitant increase in damage potential. The new program is intended to coordinate federal and provincial strategies by clearly defining flood-risk areas, by discouraging continuing investment in those areas, and by following up with appropriate measures to limit damage to existing development. General agreements are being negotiated with most provinces which will confirm the underlying principles and facilitate flood-risk mapping as the first step in a $20 million cost-shared program. Other sub-agreements may be developed subsequently to deal with forecasting, flood-proofing and property acquisition or easements. Six pilot projects on flood-risk mapping are in various stages of completion across the country.

Sound familiar?

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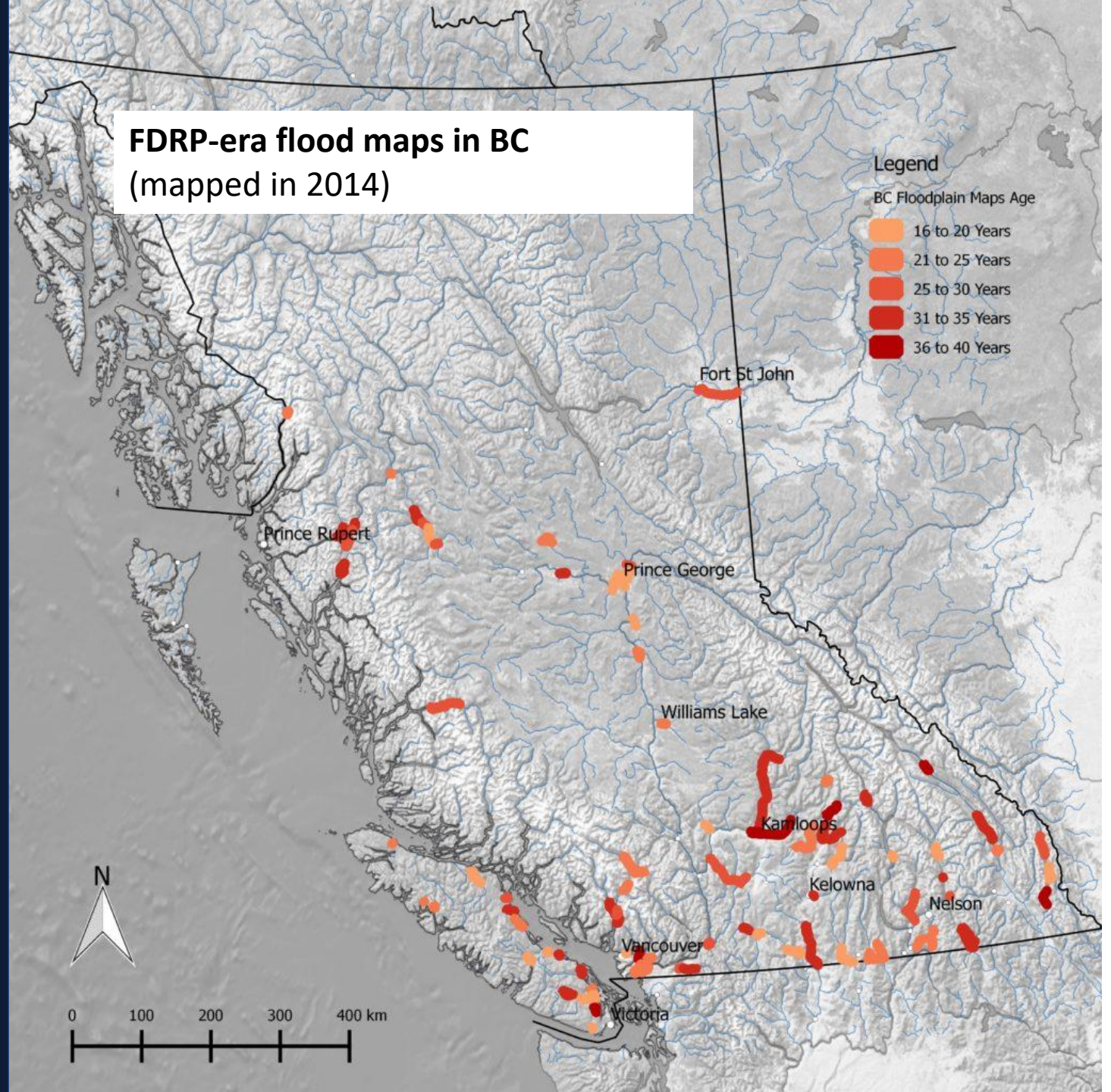
Historic Context



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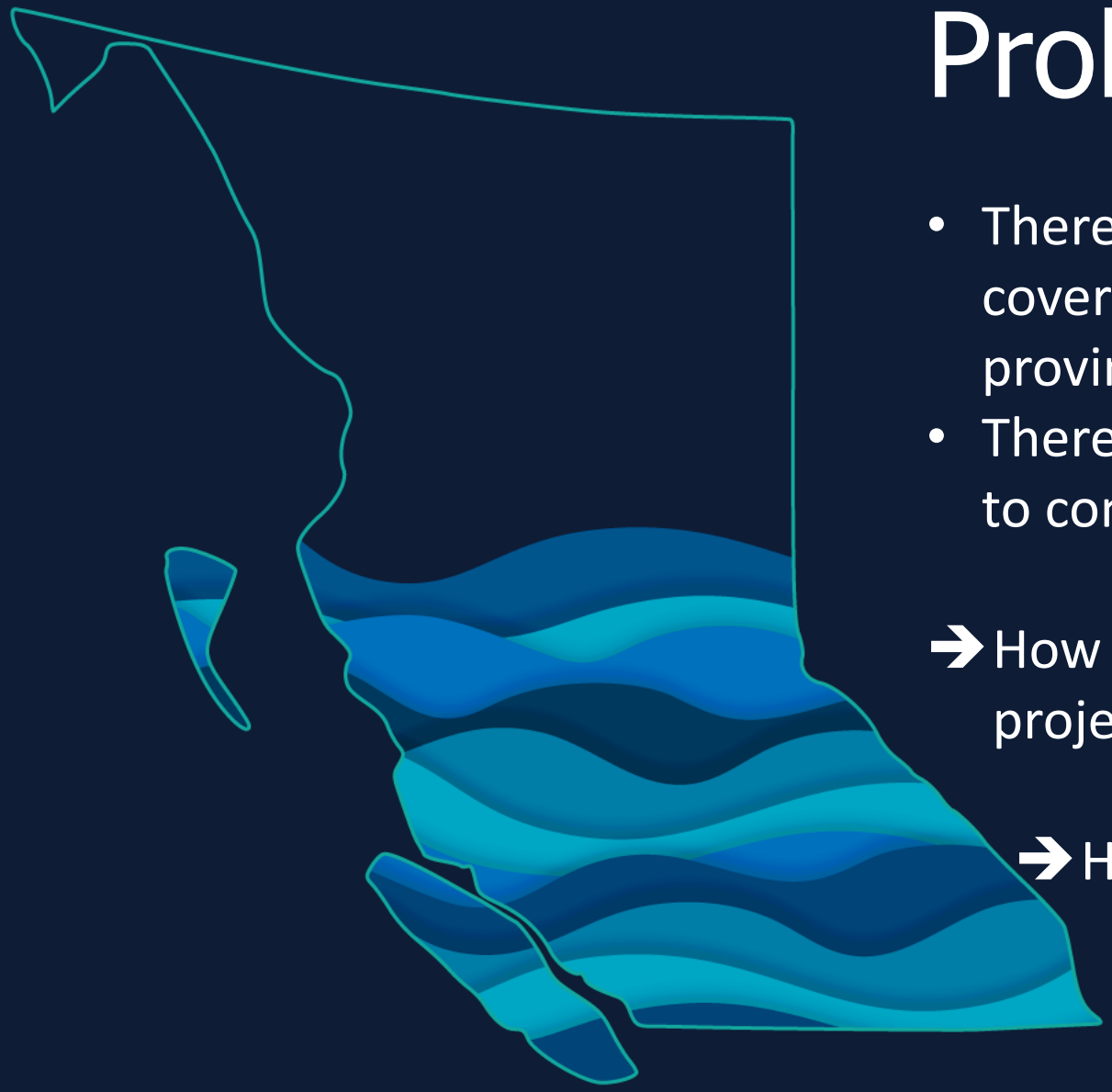

Problem Statement

- There is a need to improve the quality and coverage of flood plain mapping across the province.
- There are also limited resources ($ and expertise) to conduct flood plain mapping.

➔ How should we prioritize flood plain mapping projects?

➔ How do we do better than last time?

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Draft Principles for Flood Mapping Prioritization

1. Risk-based

2. Place-based

3. Success-based

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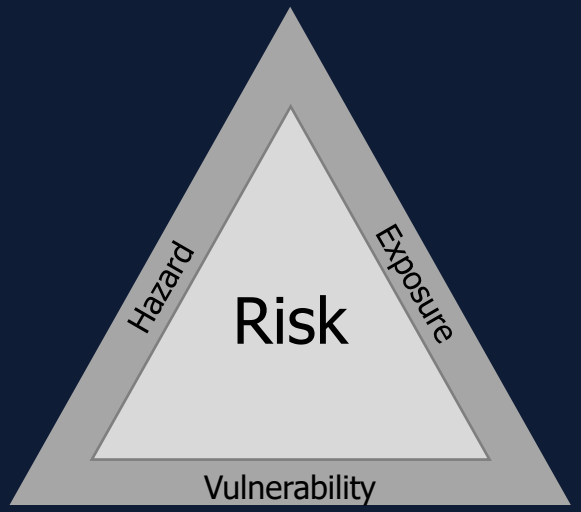
Why Risk-Based?

1. Policy
2. Common-sense



0.2 % AEP Flood

Exposed Population

Population Layer: Corbane, Christina; Florczyk, Aneta; Pesaresi, Martino; Politis, Panagiotis; Syrris, Vasileios (2018): GHS built-up grid, derived from Landsat, multitemporal (1975-1990-2000-2014), R2018A. European Commission, Joint Research Centre (JRC) doi:10.2905/jrc-ghsl-10007 PID: http://data.europa.eu/89h/jrc-ghsl-10007

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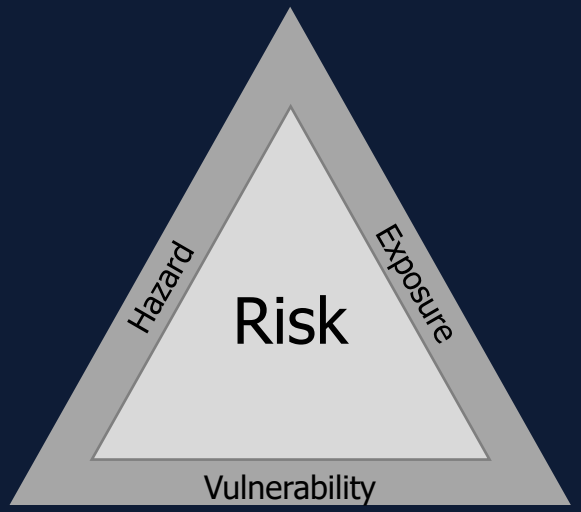
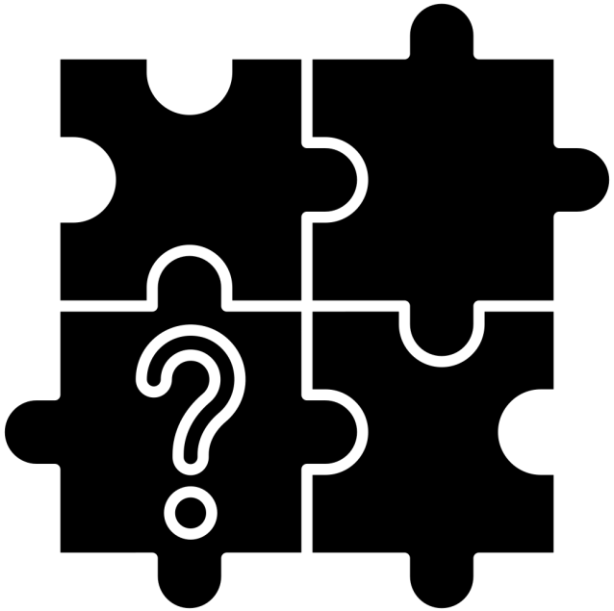
Challenges



Catch-22:

Risk-based or informed prioritization requires risk information, which requires comprehensive hazard information.



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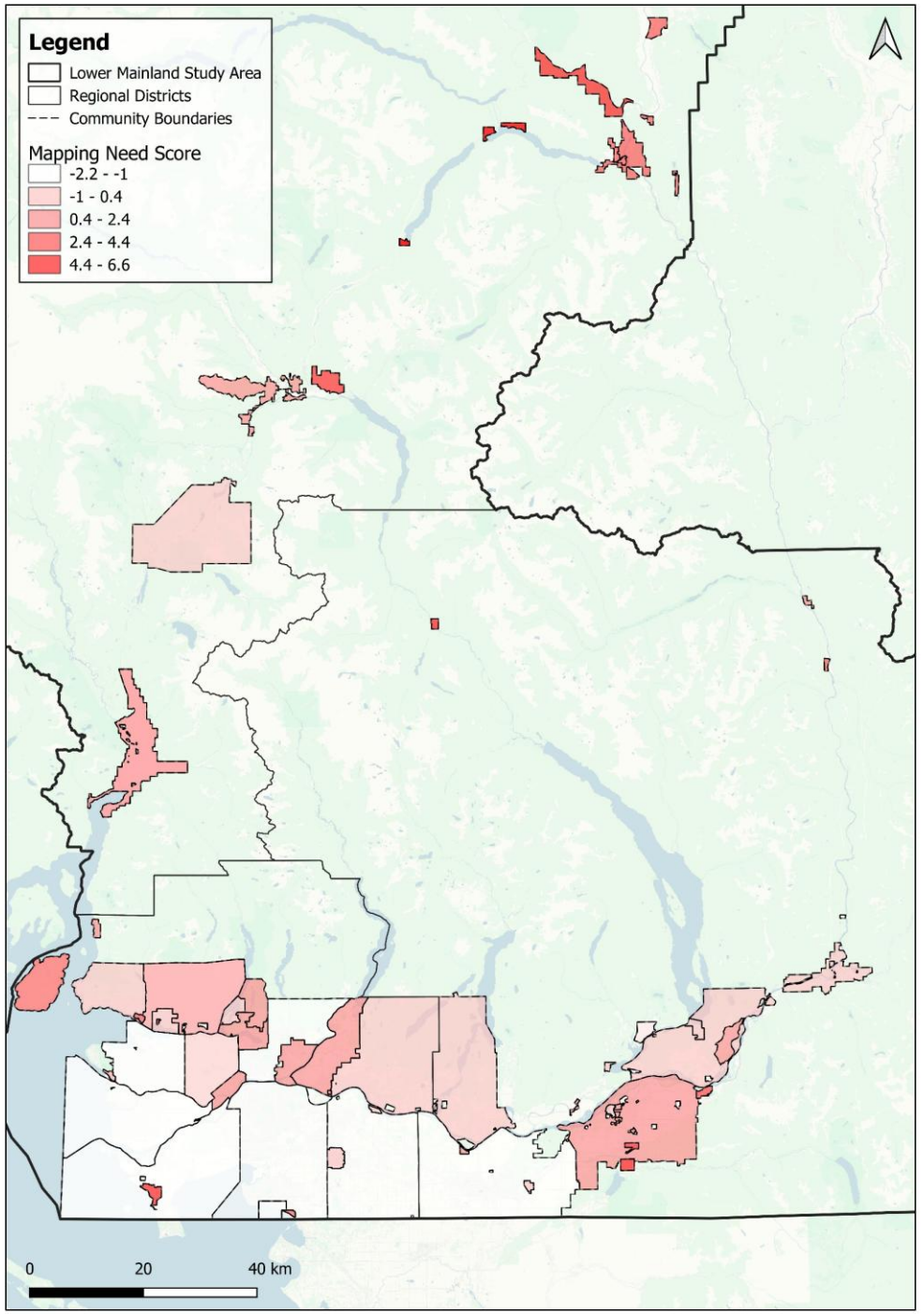
Why Place-Based?



- UNDRIP [2019]
- EDMA [2023]

"Mapping Needs" for BC Lower Mainland determined through FHIMP Flood Scoping Project.

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Challenges

Determining place-based need requires:

- Broad engagement with many communities on a specific and complicated topic.
- A capacity to break away from past siloed thinking:
  - Is flood hazard limited to clearwater flooding only?
  - If there is no observed (gauged) records of floods does it mean it does not happen?

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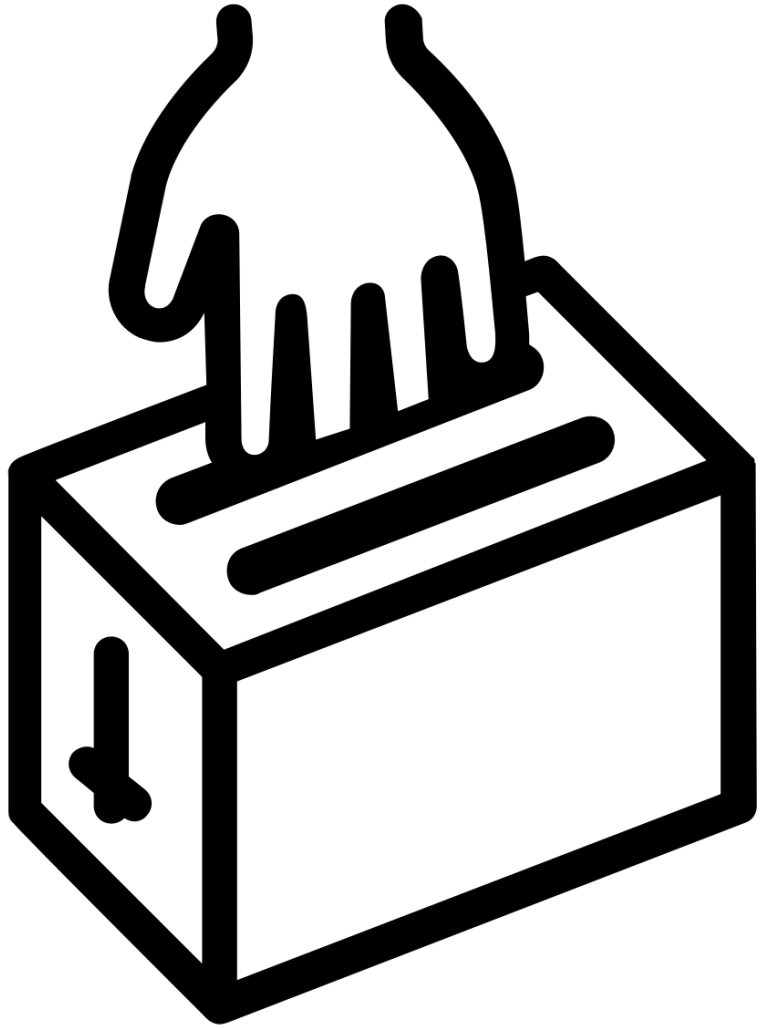
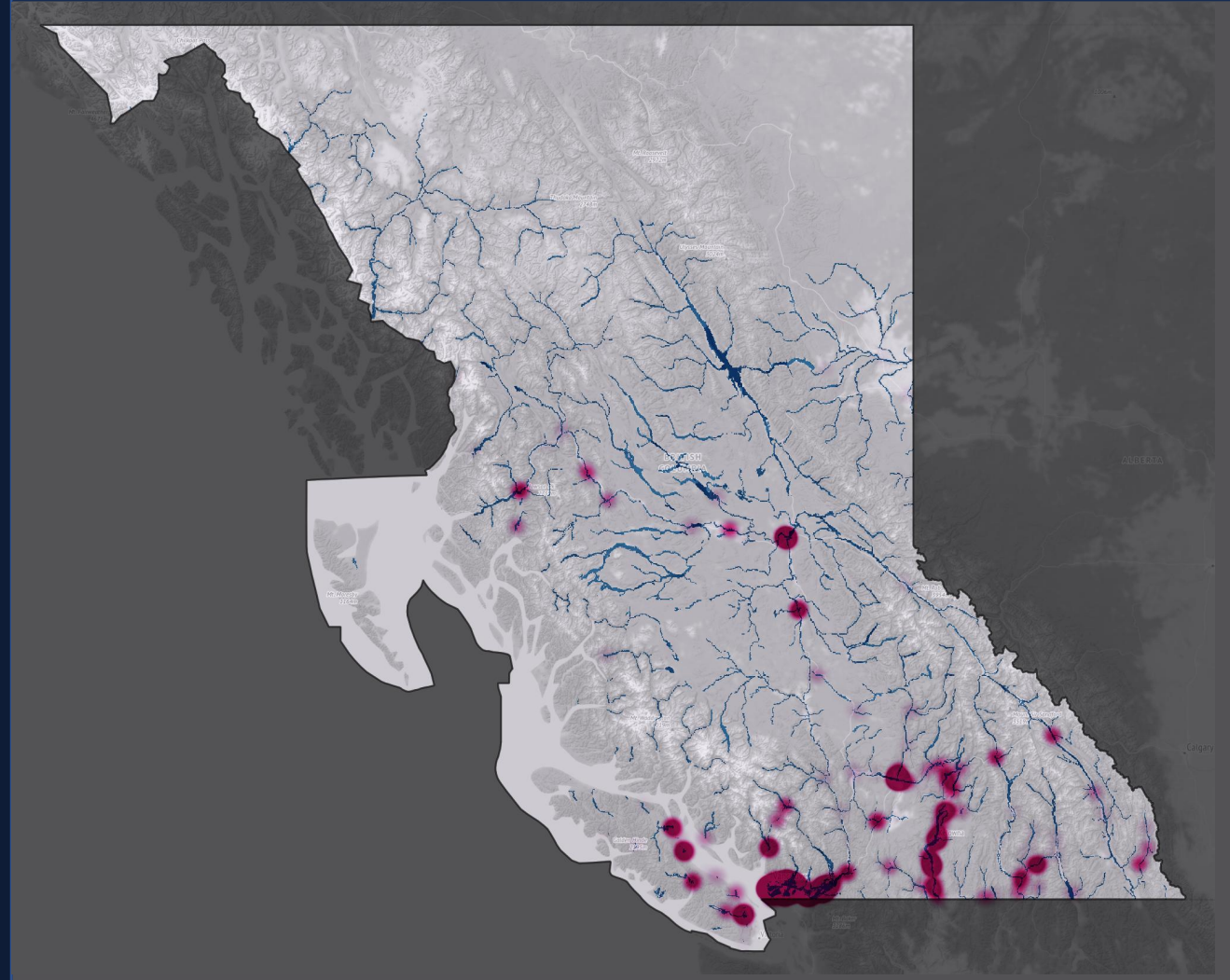
Why Success-Based?

- Common sense!



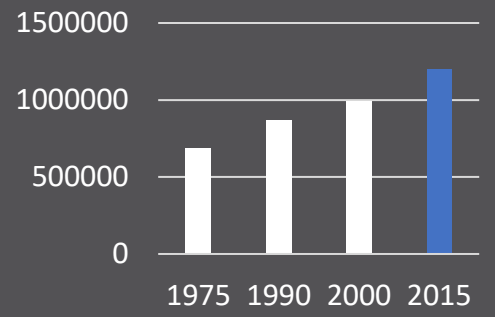
Defining Success?



0.2 % AEP Flood

Exposed Population

1,200,000



"The areas of greatest risk have the greatest potential for risk reduction"

→ True with a few caveats.

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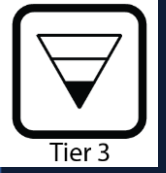

Tiers of Flood mapping

What do we actually need to reduce risk?

Tier Level of Detail	1: Hazard Identification Mapping Low	2: Base Level Hazard Assessment Mapping Medium	3: Detailed Hazard Assessment Mapping High
Target Use	Emergency response planning Prioritization Insurance	Some land use planning (e.g., to delineate the area subject to regulation and/or additional review) Input to most risk assessments Emergency response planning	Engineering design Building control bylaws Detailed regulatory land use planning Site level assessments
Limitations to Use	Not appropriate for engineering design Not appropriate for site level assessments Not appropriate for most land use planning	Not appropriate for engineering design Not appropriate for site level assessments	Appropriate for some engineering design purposes (e.g., conceptual design), but additional site-level detail may still be required for detailed design

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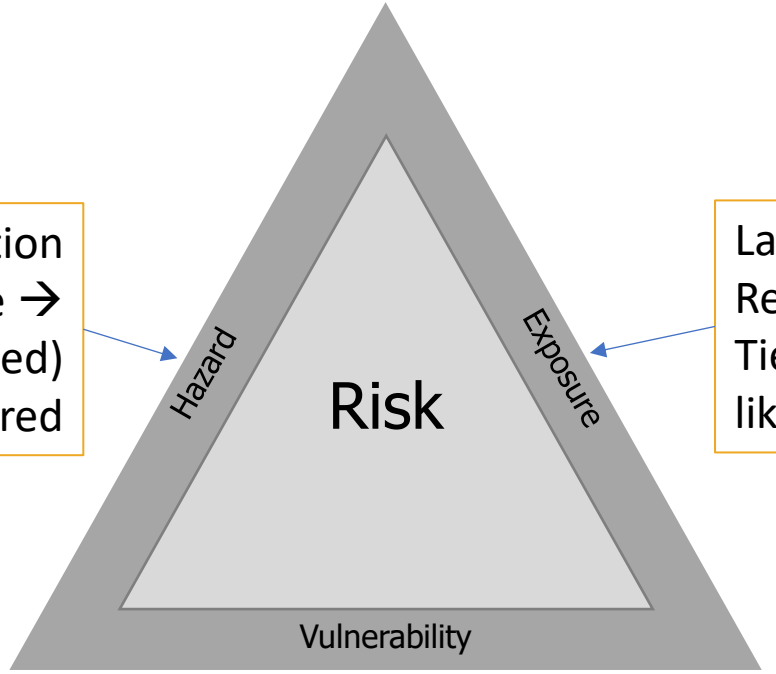
Tiers of Flood mapping

What do we actually need to reduce risk?



Flood protection infrastructure → Tier 1 (Detailed) mapping required

Land Use Regulations → Tier 2 mapping likely adequate

Building Controls → Tier 1 (Detailed) mapping required

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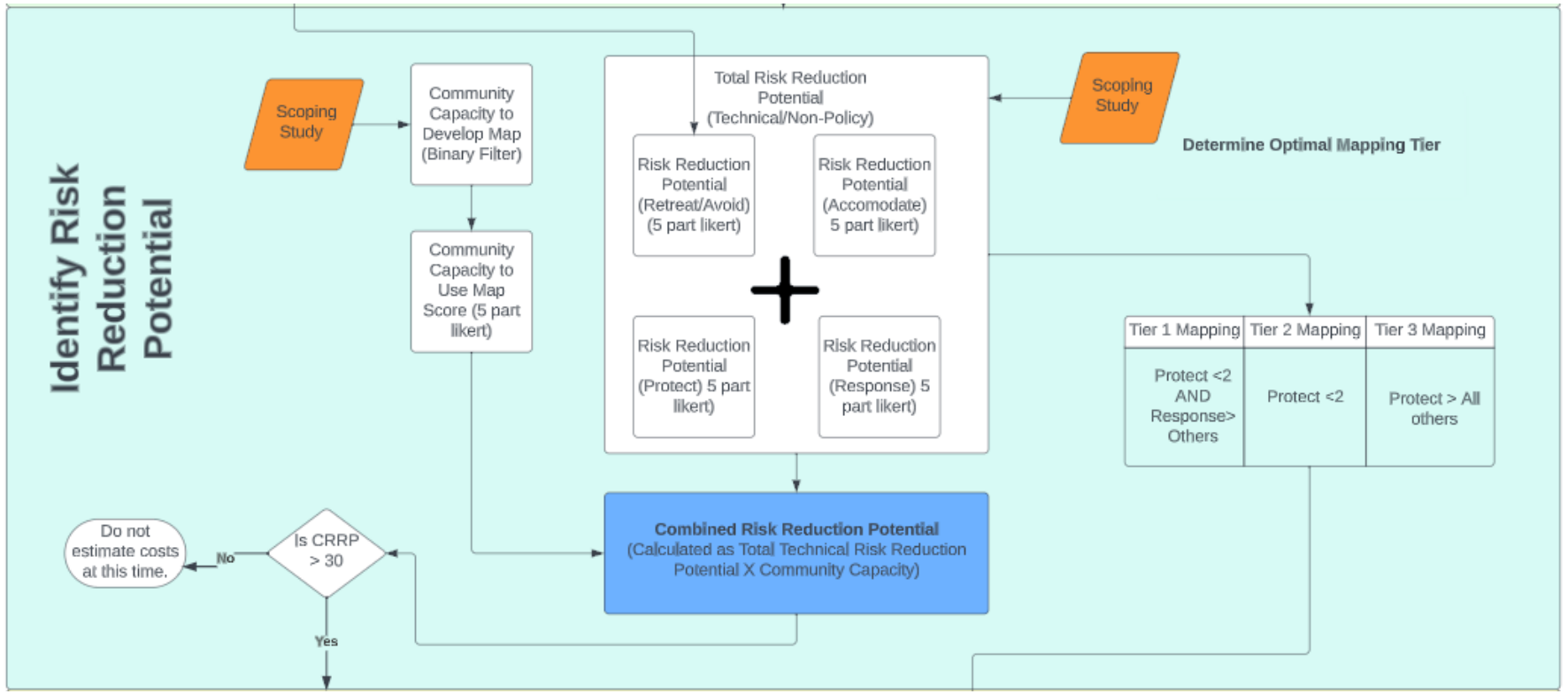
Defining Success?

Identification of **Risk Reduction Potential (RRP)**



Essentially, seeking to develop a framework to understand if making a map (detailed or simple) will actually reduce risk.

Not straightforward! And only, preliminary framework developed.

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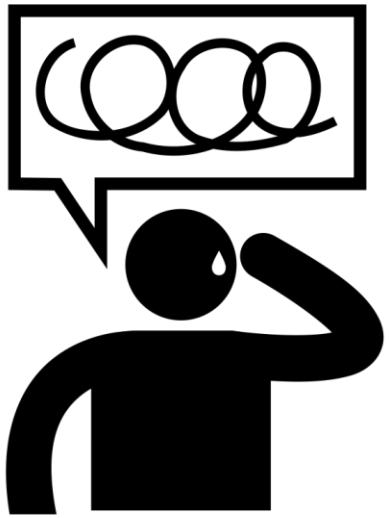
Challenges

1. Complicatedness (not complexity…this is solvable)
2. Data
3. Consistency

4. And….bias to past paradigms



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Next Steps

Spending our dwindling resources wisely should be a no brainer. Let's get there:

1. Simple risk mapping required (and coming to support other initiatives, here's a co-benefit).
2. Recognition that we don't always need detailed flood mapping to reduce risk; we need a shift from engineering to plangineering.
3. Education, of practitioners (see #2) and communities.

Essentially – let's do what was proposed in 1976!!!

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Next Steps (are really our predecessors banging their heads against the wall)

The Policy

What kinds of solutions make sense in the Canadian context? One could ignore the wider dimensions of the problem and advocate the "status quo." This, in our view, would result in continued escalation of governmental expenditures on disaster assistance, continued hardship to flood victims and no prospect of a long-view solution.

Alternatively, one could envisage expanded programs of flood control structures. In addition to the cost of such structures, and their environmental impacts, such structures will serve to increase potential damages by attracting more investment to the flood plain.

...

Taking these factors into account, our new federal strategy follows the co-operative federal-provincial approach of the Canada Water Act and is based on the following principles.

a) Programs of federal agencies concerned with flooding must be coordinated, both at the federal level and with related programs at the provincial level. This coordination can take place through federal-provincial general agreements, and through federal inter-departmental coordination mechanisms that have now been established.

b) The cornerstone of a coordinated program will be flood-risk maps, as a basis for joint agreement on the definition of flood-prone lands.

c) Information on floods, on federal policies and programs and on the susceptibility of specific areas to flooding, through flood-risk maps, must be provided to the public, the municipalities and all others concerned.

J.P. Bruce (1976) THE NATIONAL FLOOD DAMAGE REDUCTION PROGRAM , Canadian Water Resources Journal, 1:1, 5-14, DOI: 10.4296/cwrj0101005

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