Federal Flood Mapping Activities and Web-based Flood Risk Assessment (ER2)

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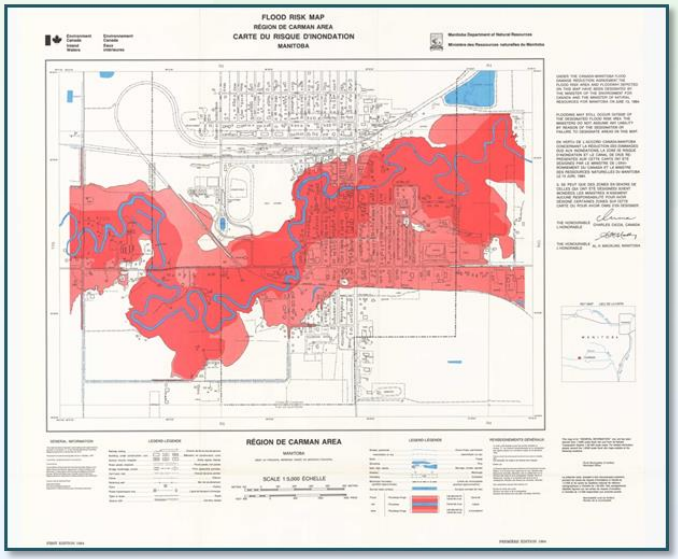
Overview

1. The current state of flood mapping in Canada
2. An update on the Guidelines Series
3. Data and Mapping update
4. Long-Term Vision for flood mapping in Canada
5. Web-based Flood Risk Assessment (ER2)

State of Flood Mapping in Canada

Photo by: Nauman, Marvin/FEMA News, August 19, 2007.

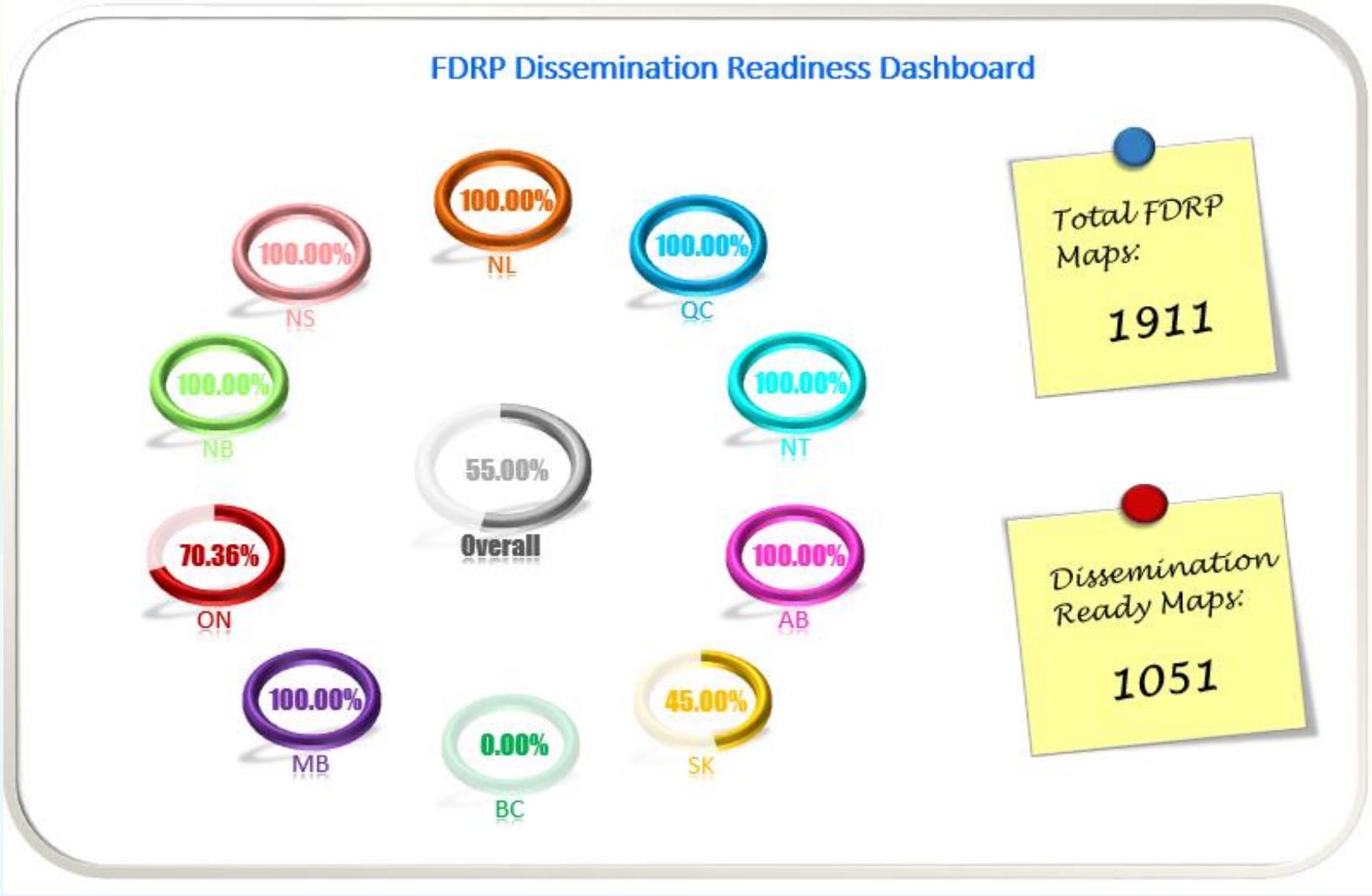
Floods are the most common and costliest natural hazard in Canada.



Guidelines Series

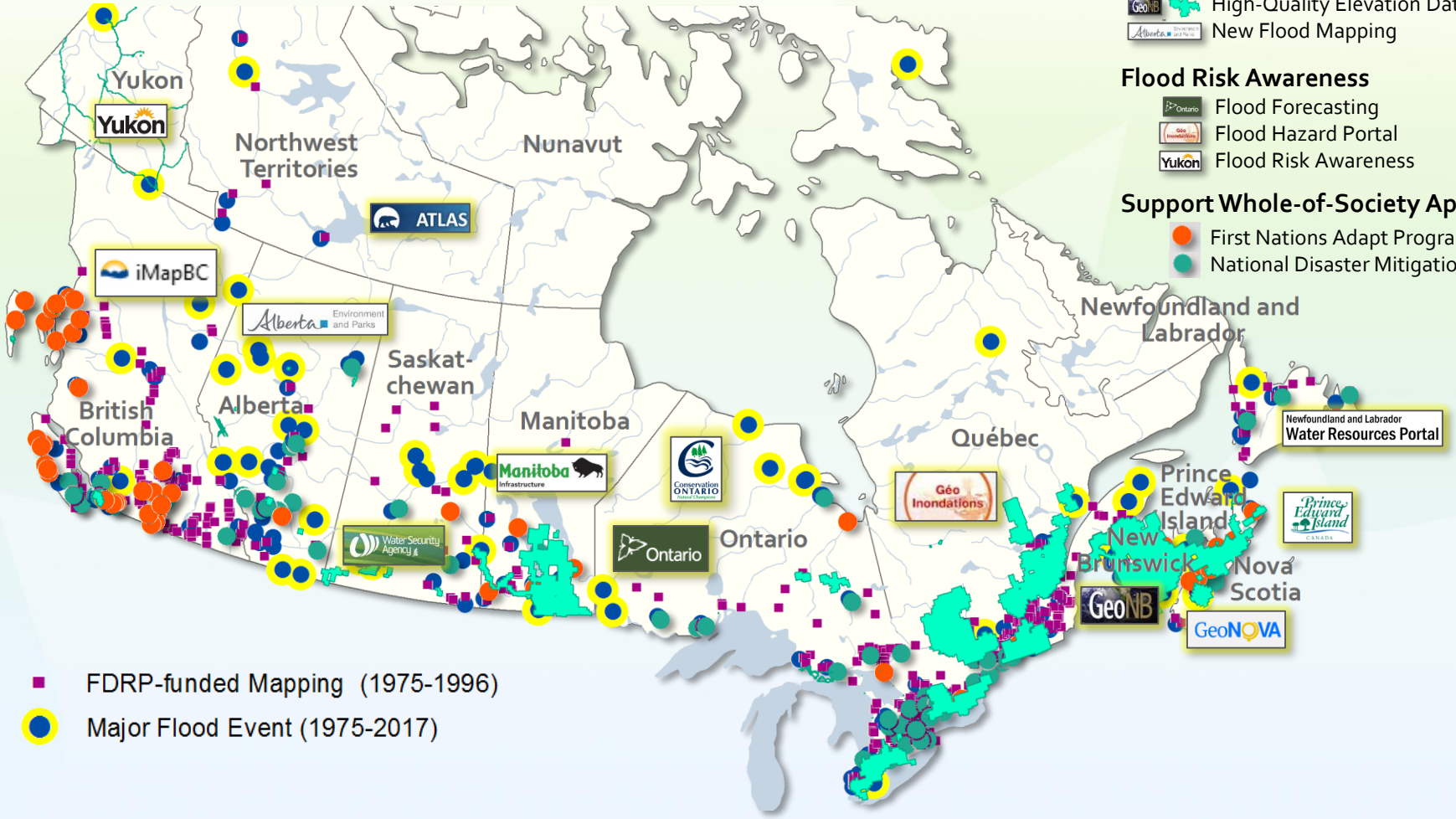
Federal Flood Mapping Guidelines Series Document	Status
Federal Flood Mapping Framework v 2.0	Published
Flood Hazard Identification and Priority Setting	*In Progress*
Federal Hydrologic and Hydraulic Procedures for Flood Hazard Delineation v 1.0	Nearly Complete
Federal Airborne LiDAR Data Acquisition Guideline v 2.0	Published
Case Studies on Climate Change in Floodplain Mapping volume 1	Published
Federal Geomatics Guidelines for Flood Mapping v 1.0	Nearly Complete
Flood Risk Assessment v 1.0	*In Progress*
Risk-Based Land Use Guide v 2.0	*In Progress*
Bibliography of Best Practices and References for Flood Mitigation	Published

FDRP Maps on FGP



Environmental Scan

Recent Flood Mapping Achievements



Long-Term Vision for Flood Mapping

Authoritative flood risk and flood hazard information should be available, communicated effectively, developed with strong partnerships and collaboration from all stakeholders, and of sufficient quality to support effective decision-making at all levels.

- Effective
- Authoritative
- Communication
- Partnerships
- Interoperable

Flood Risk Information Tool

- Designed for general public to raise awareness of flood risk:
  - Search by postal code or address
  - Each property will be assigned a risk score
    - Supplied with general information to reduce risk

-Links to local government for flood hazard maps

PROPOSED ONLINE FLOOD INFORMATION SITES

FRIT – Flood Risk Information Tool

- to increase public awareness of their flood risk

ER2 – Rapid Risk Evaluator

- deterministic and probabilistic scenario modelling, designed for emergency response community

ER^2 – Rapid Risk Evaluation

Web application for risk assessment of natural hazards

Heather McGrath

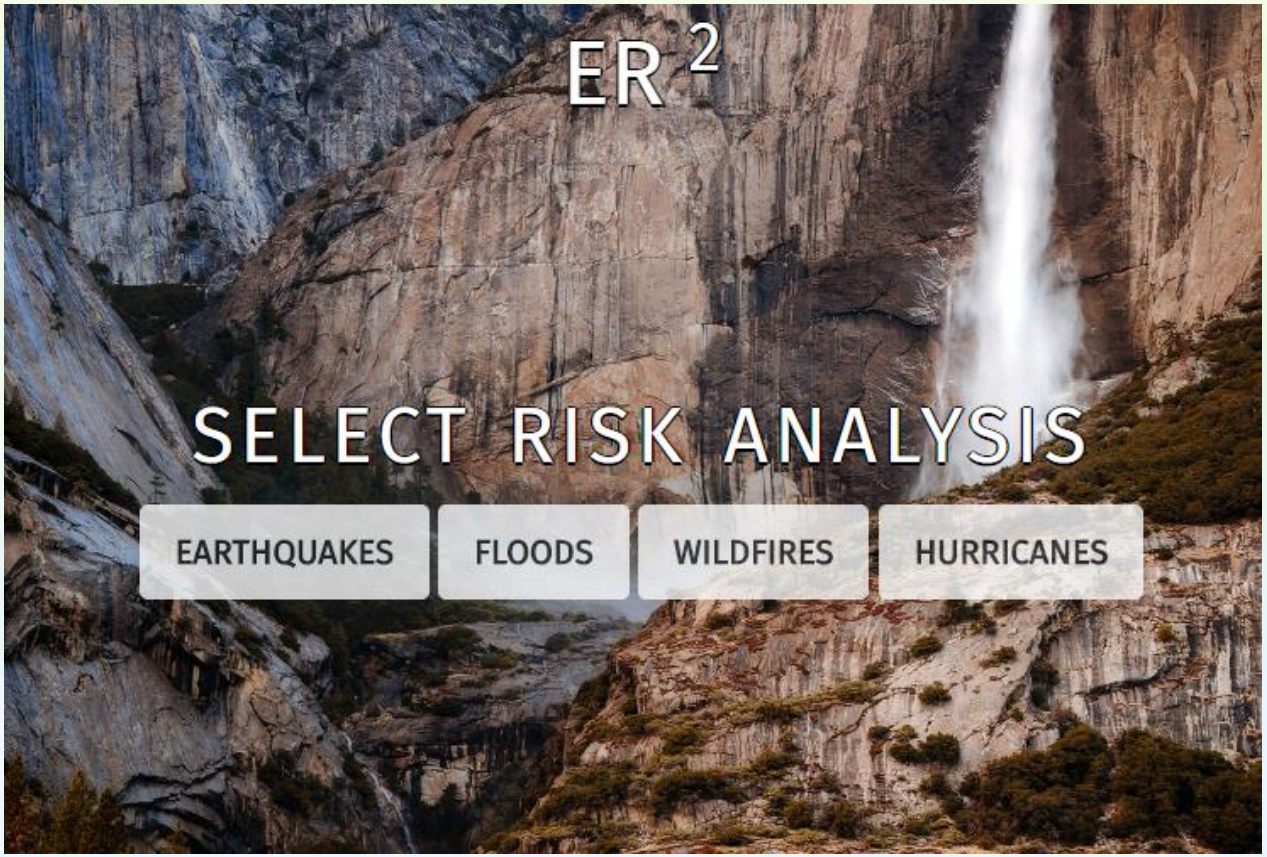
Objectives of ER2

Web-based application for natural hazard risk assessment :

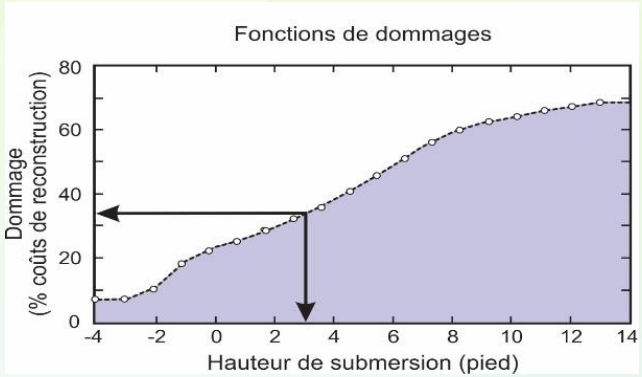
- multiple hazards (hub for floods, earthquakes, hurricanes…..)
- out-of-the-box capacity across Canada
- user-friendly (push-of-the-button)
- intended for use by the non-expert public safety community

Natural Hazards of ER2

- Current Modules:
  - Earthquake
  - Flooding
- Future:
  - Forest Fires
  - Hurricanes
  - …

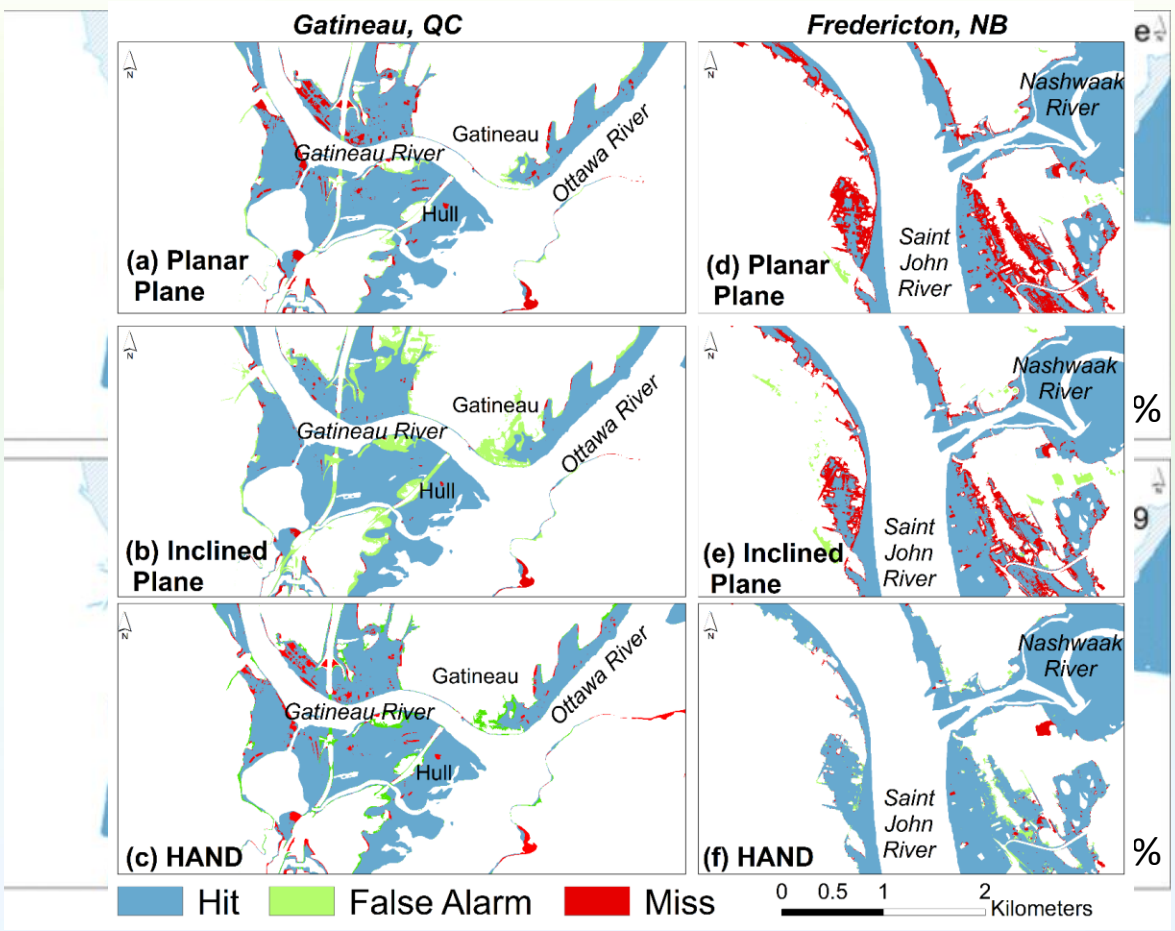


Hazard x Inventory x Vulnerability → Negative Consequences



Simple Complexity Flood Models

- Tested 3 simple inundation models
  - Planar, Inclined Plane and HAND
- 2 sites
- Compare results to
- historic floods



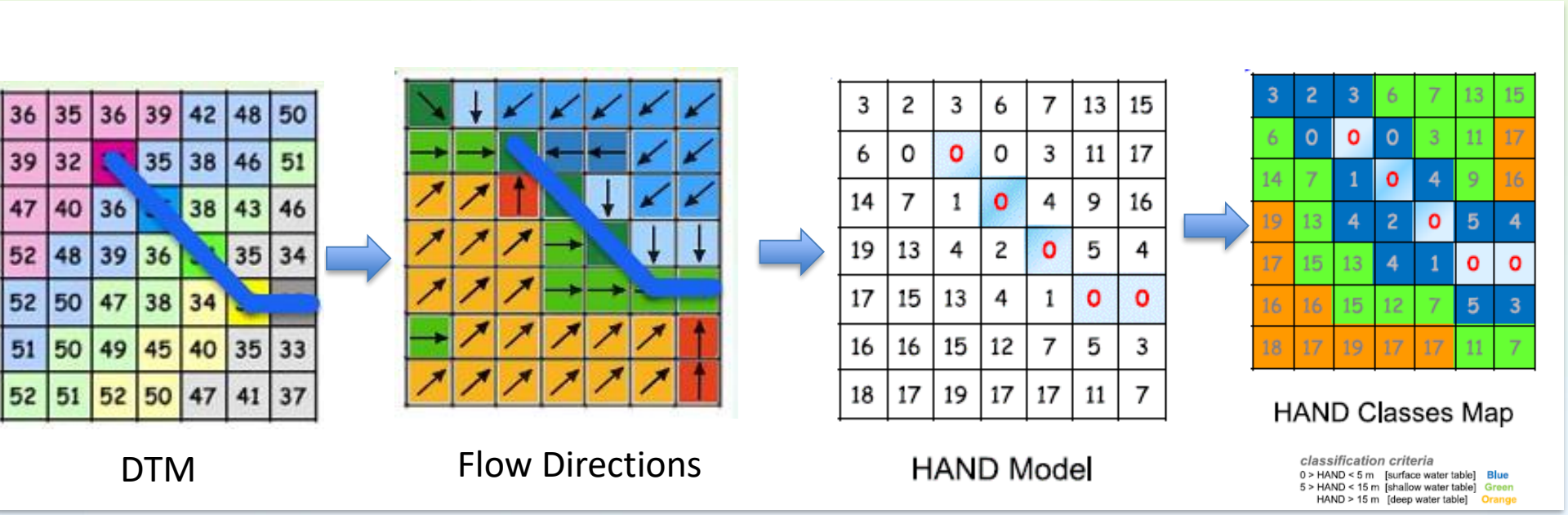
McGrath, Heather, Jean-François Bourgon, Jean-Samuel Proulx-Bourque, Miroslav Nastev, and Ahmad Abo El Ezz. "A comparison of simplified conceptual models for rapid web-based flood inundation mapping." Natural Hazards (2018): 1-16.

Height Above Nearest Drainage (HAND)

- Digital Terrain Model and River Network are the only required inputs for HAND model
- Rapid simulation, suitable for online web-mapping

Partner:

Canada Centre for Mapping and Earth Observation

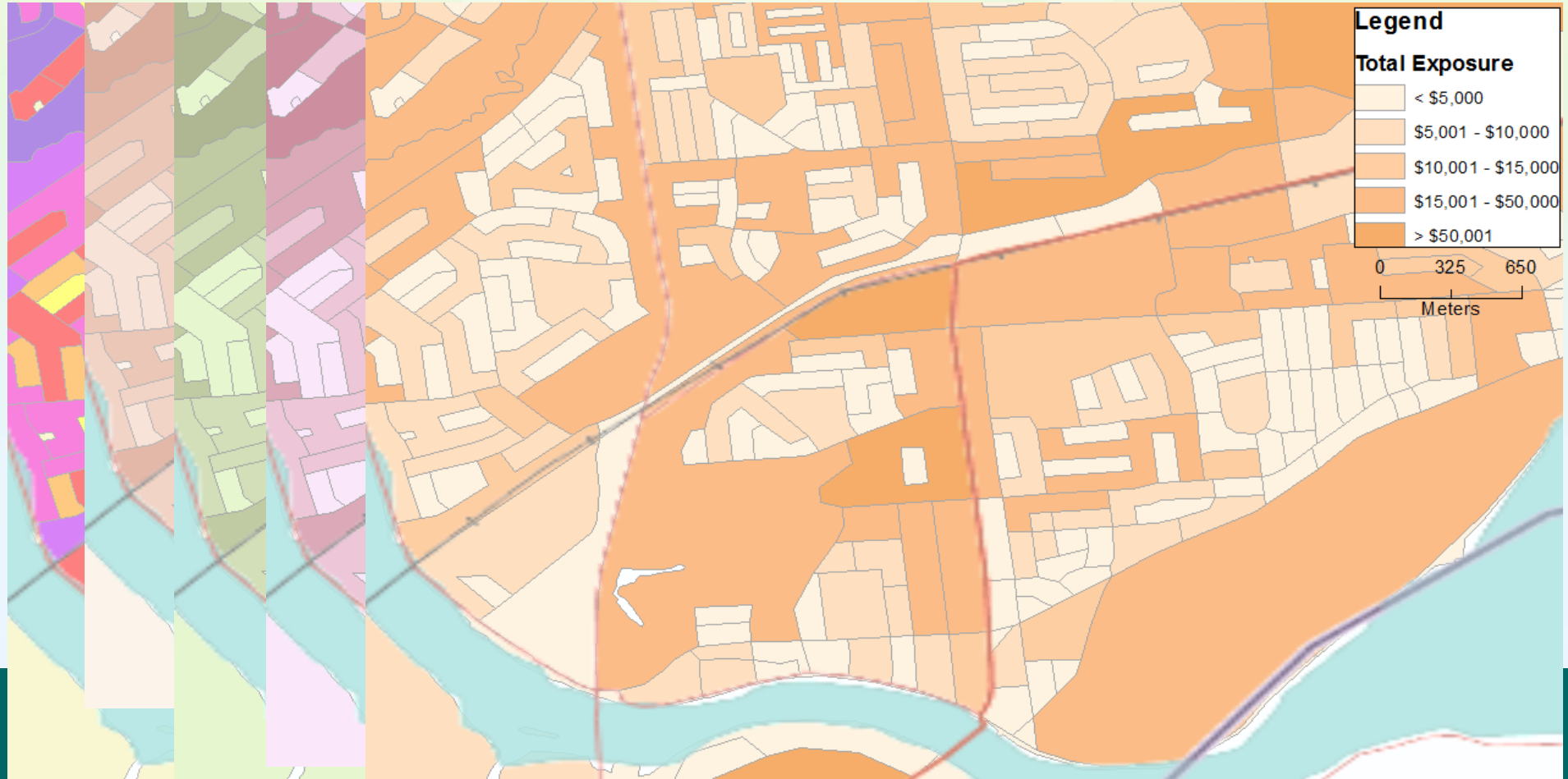


DTM | Flow Directions | HAND Model

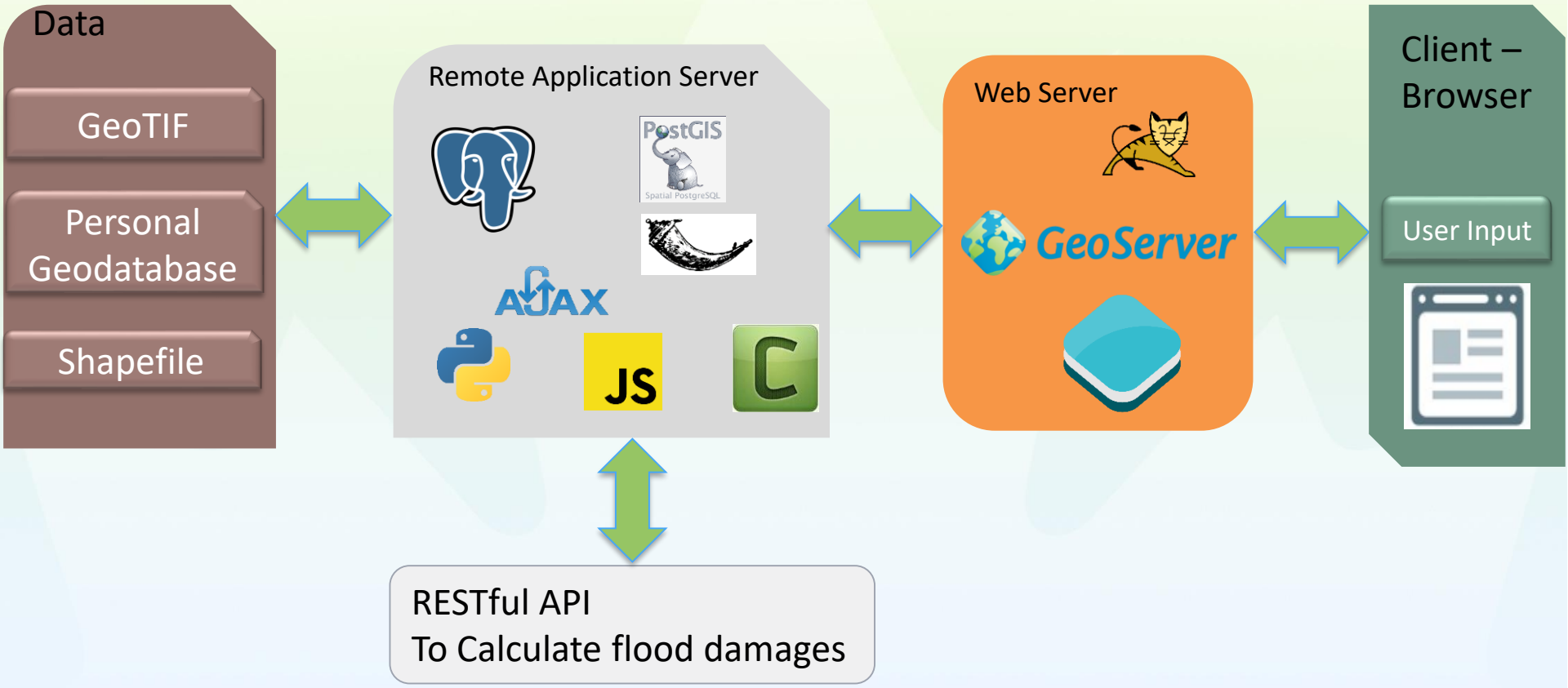
Figures: Nobre, A. D., Cuartas, L. A., Hodnett, M., Rennó, C. D., Rodrigues, G., Silveira, A., & Saleska, S. (2011). Height Above the Nearest Drainage–a hydrologically relevant new terrain model. *Journal of Hydrology*, *404*(1), 13-29. https://www.sciencedirect.com/science/article/pii/S002216411002599

Inventory

- Population and Residential Buildings
- Commercial and Industrial Buildings

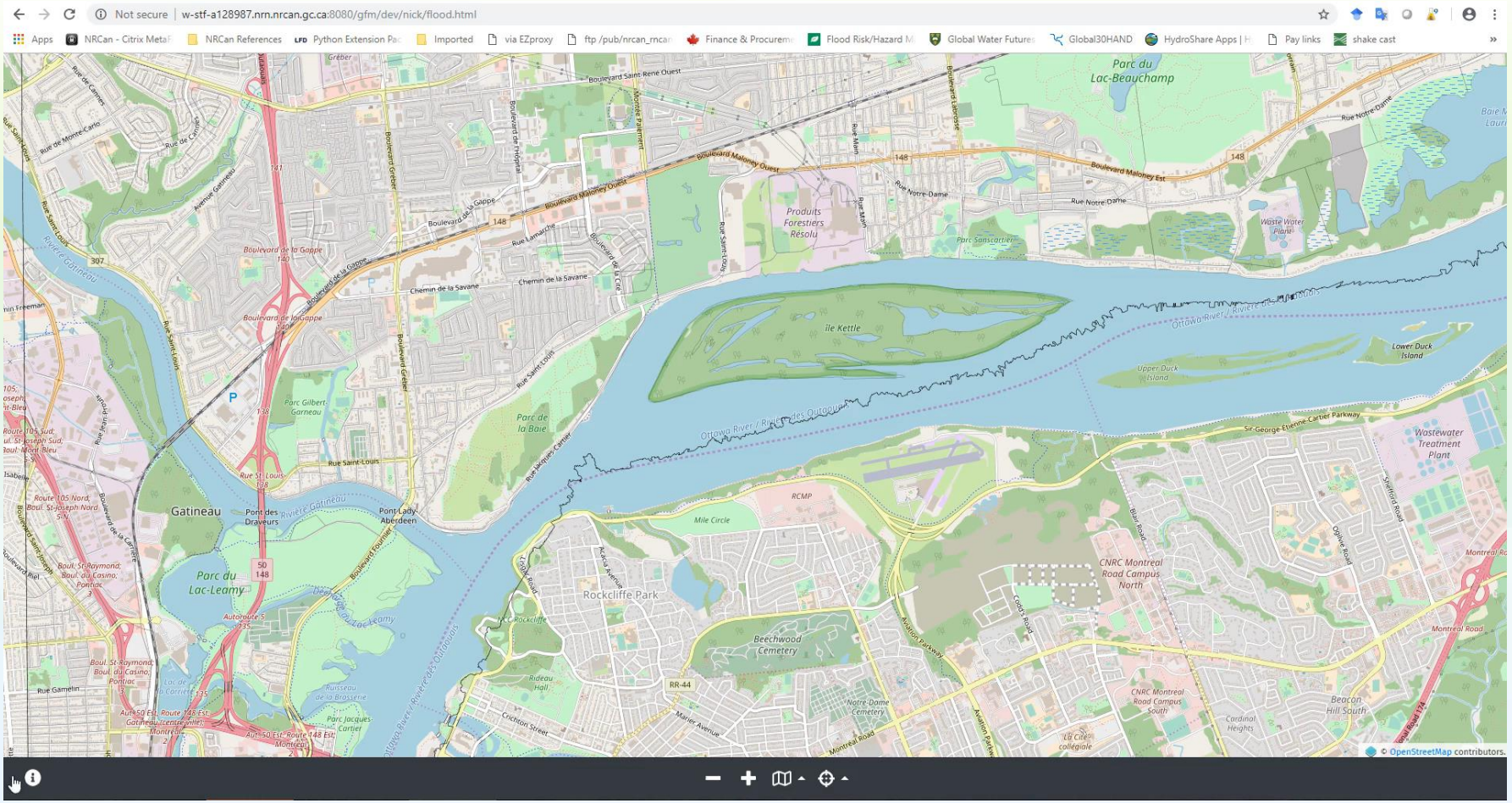


Application Overview



Results

- Flooded Census Dissemination Blocks
  - Calculated layers
    - Economic losses
    - Social losses (affected and displaced population)
    - Transmission system interruptions
    - Number of buildings flooded
    - Block Vulnerability Index
- Calculations are performed, results are saved in the database and new WFS layers are added to the map


Not secure | w-stf-a128987.nrn.nrcan.gc.ca:8080/gfm/dev/nick/flood.html
Gatineau
Rockcliffe Park
Parc du Lac-Beauchamp
Parc du Lac-Leamy
Ottawa River / Rivière des Outaouais
Rivière Gatineau
Île Kettle
Lower Duck Island
Upper Duck Island
Wastewater Treatment Plant
CNRC Montreal Road Campus North
CNRC Montreal Road Campus South
Beechwood Cemetery
Notre-Dame Cemetery
Mile Circle
RCMP
Pont des Draveurs
Pont Lady Aberdeen
Parc Gilbert-Garneau
Parc de la Baie
Produits Forestiers Résolu
Waste Water Plant
Parc Sanscartier
Beacon Hill South
Cardinal Heights
La Cité collégiale
Rideau Hall
Parc Jacques Cartier
Boulevard Saint-René Ouest
Boulevard Maloney Ouest
Boulevard Maloney Est
Boulevard de la Gappe
Boulevard Greber
Boulevard Fournier
Rue Saint-Louis
Rue Notre-Dame
Chemin de la Savane
Sir-George-Étienne-Cartier Parkway
Montreal Road
Aviation Parkway
Autoroute 5
RR-44
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