



Natural Resources
Canada

Ressources naturelles
Canada



Federal Floodplain Mapping Activities

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of Canada

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du Canada

Canada 

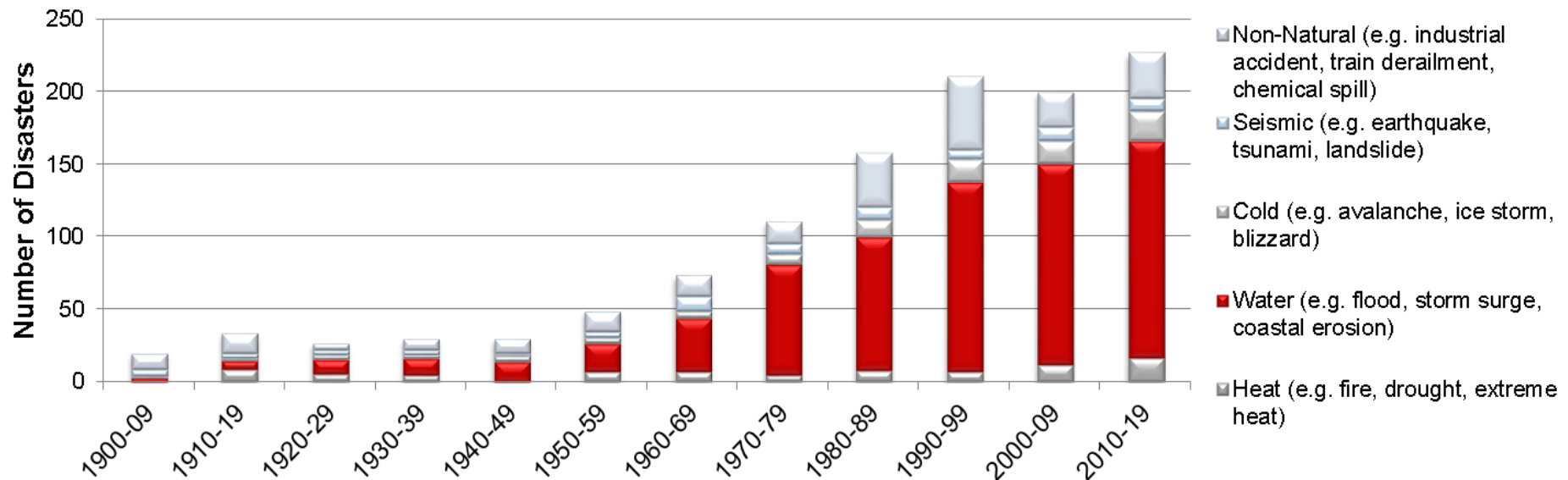
Overview

- 1. Floodplain Mapping in Canada**
- 2. Federal Floodplain Mapping Framework**
- 3. Federal Floodplain Mapping Guidelines Series**
- 4. Guideline Development Activities**
- 5. Research Projects**
- 6. National Risk Profile**



Disaster Trend in Canada

The Government of Canada's financial liabilities for the federally administered Disaster Financial Assistance Arrangements (DFAA) is estimated to be \$1.8 billion over the next five years



Flooding in Canada



Flooding, and other water based events, are the most frequent and costly disasters in Canada



Disaster Mitigation in Canada

Disaster mitigation is most cost-effective means of managing disaster risks - Provides on average 4:1 return-on-investment

Canada has begun to shift its approach to managing disaster risks. Initiative to reduce impacts of natural disasters by focusing investments on significant, recurring flood risks and costs

- National Disaster Mitigation Program (NDMP)
- consulting with the insurance industry to advance the development of a national approach to residential flood insurance
- developing national flood mapping guidelines
- undertaking research and analysis activities to address flood-related disasters in Canada

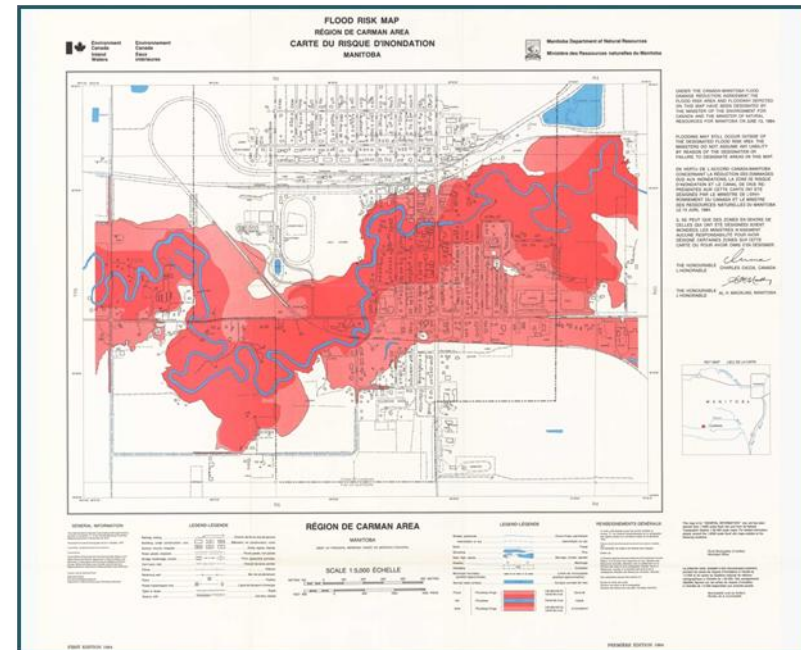


Importance of Floodplain Maps

- Promote information on flood hazards to promote awareness
- Enable community preparedness and disaster mitigation planning
- Empower citizens and property owners
- Inform emergency management practices
- General public awareness
- Land use planning

Basis for 'designation'

Support flood insurance



Types of Floodplain Maps

Flood Hazard Maps: Engineering maps that show extent of regulatory flood. Used for regulatory planning purposes.

Inundation Maps: Show extent of floodwater coverage during floods of different magnitudes. Aid emergency management plans.

Flood Risk Maps: Show flood extents along with socio-economic values, such as property vulnerability levels. Identify consequences to communities.

Flood Awareness Maps: Poster-style communication maps that inform public about flooding (e.g. history, vulnerability, resources, etc.).

High degree of flexibility in mapping practices.

Names for different types of maps applied differently in different jurisdictions.



History of Floodplain Mapping

Early Programs

- Various programs to build small- and large-scale structural mitigation works

Flood Damage Reduction Program (FDRP)

- 1976-1997
- Preventative and non-structural measures (e.g. floodplain mapping).
- Cost-shared F/P/T agreements



General Overview

Developed in response to recommendations from Office of the Auditor General, private industry and Insurance Bureau of Canada

Federal Flood Mapping Committee (FMC)

Technical Working Group (TWG)

- Key stakeholders and experts - Climate Change, Risk Assessment, Geospatial Management and Mapping, Hydrology and Hydraulics
- Ongoing feedback
- Engagement through workshops, teleconferences and an online forum



Federal Flood Mapping Committee (FMC)

Natural Resources Canada:

- Provide technical advice
- Manage flood risk geospatial data
- Geospatial standards and geospatial platform
- Floodplain mapping guidelines
- Perform geospatial and research projects to advance floodplain mapping

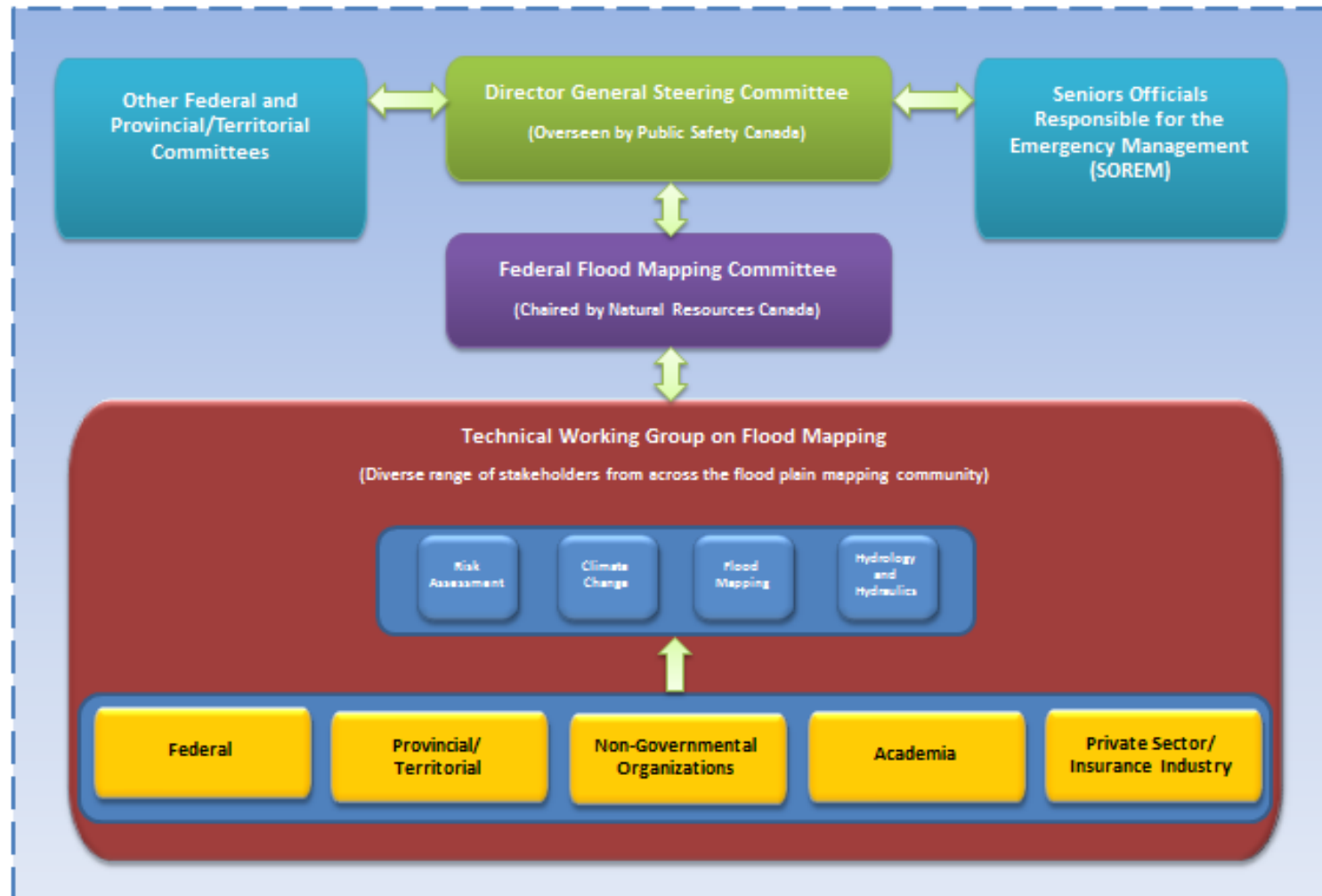
Public Safety Canada:

- Establishing National Risk Profile
- Programs for Disaster Mitigation
- Main Sponsor of the Guidelines

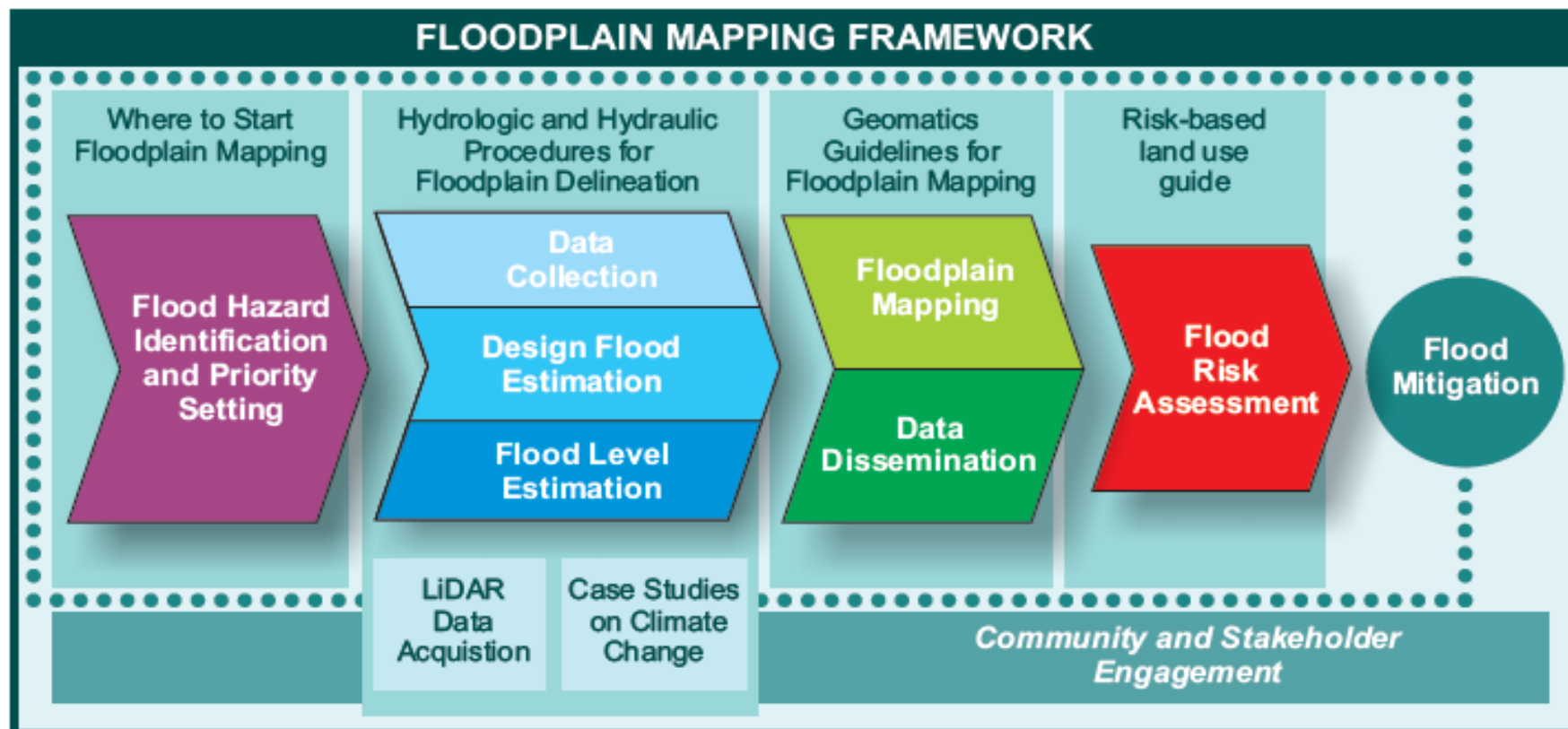
Other departments provide input/guidance as needed



Stakeholders



Federal Floodplain Mapping Framework



Vision

Develop comprehensive understanding of hazard exposure in order to increase resilience of Canadian communities.

Develop common principles and guidelines for floodplain mapping.

Establish inclusive process to provide consistent and usable body of information.

Establish consistent flood hazard information collection and mapping practices across Canada.



Principles

- **Local**
- **Accessible**
- **Collaborative**
- **Interoperable**
- **Adaptable**
- **Evergreen**
- **Voluntary**



Objectives of the Guidelines

Recognize provincial/territorial roles and responsibilities for flood mitigation

Provide basis for further specification by provinces & territories

Inclusive and take regional considerations into account

Encourage sharing and dissemination of flood hazard information

Serve all floodplain mapping practitioners and stakeholders

Not *standards* – recommended common practices



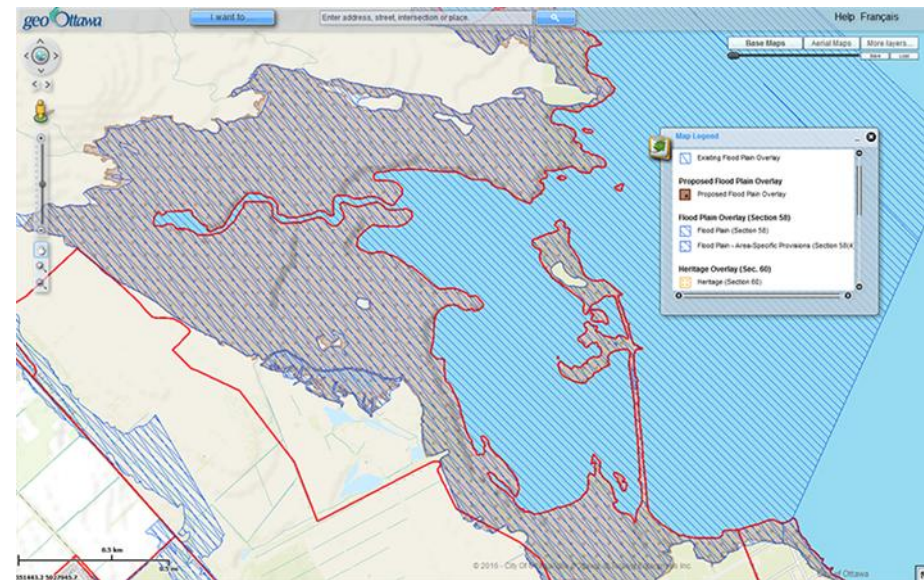
Federal Floodplain Mapping Guidelines Series

- **Federal Floodplain Mapping Framework (March 2017)**
- Flood Hazard Identification and Priority Setting (to be developed)
- Federal Hydrologic and Hydraulic Procedures for Floodplain Delineation (Spring 2017)
- Federal Airborne LiDAR Data Acquisition Guideline (Spring 2017)
- Case Studies on Climate Change in Floodplain Mapping (to be developed)
- Federal Geomatics Guidelines for Floodplain Mapping (Spring 2017)
- Flood Risk Assessment (to be developed)
- Risk-based land-use guide: Safe use of land based on hazard risk assessment (2015)
- Bibliography of Best Practices and References for Flood Mitigation (Spring 2017)



The Federal Floodplain Mapping Guidelines Series

will strengthen the resilience of Canadian communities to overland flooding – Canada's costliest hazard – by promoting a common approach to floodplain mapping across the country



Development Activities

Identify gaps and requirements

Further work and studies in support of *Guidelines Series* development

- Floodplain mapping processes
- Case studies: climate change in floodplain mapping
- Flood vulnerability functions (stage damage curves)
- 2D modelling
- Coastal and large lake frequency analysis
- Flood frequency analysis
- Review storm surge and wave run-up heights models
- Ice conditions for floodplain delineation



Research Projects

- Water Level and Wetland Mapping
- Urban Flood Risk and Vulnerability Mapping
- Mapping Water Budget and Flood Potential
- Unmanned Aerial Vehicles (UAV) to Quantify Snow Depth Changes for Flood Risk Mapping
- Expert System for Risk Mitigation and Response
- Flood Inundation Frequency Mapping in Floodplains
- Enhance Mobile Volunteer Geographic Information (VGI) Application for Natural Disaster Related EO Product Validation
- Hydrographic Data Models Canada and US



National Risk Profile for Canada

The overall objective of this initiative is to design and pilot a sustainable approach for national risk assessment, and will include the fusion of:

- top- down risk assessment methods (national scenario-based planning; capability assessment; and critical infrastructure interdependence);



- bottom-up municipal level assessments (submitted under the National Disaster Mitigation Program and local hazard mapping and modelling initiatives).



National Risk Profile Development

- **Stakeholder Engagement**
 - The Federal family
 - Provinces and Territories
 - Other stakeholders
 - e.g., Indigenous Groups, Industry Groups, Non-Governmental Organizations (NGOs), Tri-services and communities
- **Risk Assessment Methodologies**
 - All Hazards Risk Assessment (AHRA)
 - Risk Assessment Tools
 - Floodplain Mapping Guidelines
- **Leveraging Best Practices**
 - Drawing from best practices and lessons learned from completed profiles by international counterparts (e.g. United Kingdom Profile)



Thank You

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Natural Resources Canada

