

Flood Risk Mapping in Newfoundland & Labrador

Flooding in Newfoundland & Labrador

Flooding is part of the natural environmental process and it is essential for a healthy ecosystem; however, flooding is also a cause of human hardship and economic loss.

Most flooding in the Province is caused by:

- heavy rainfalls,
- rain-on-snow events,
- ice jams in rivers, and
- high tide with storm surges.

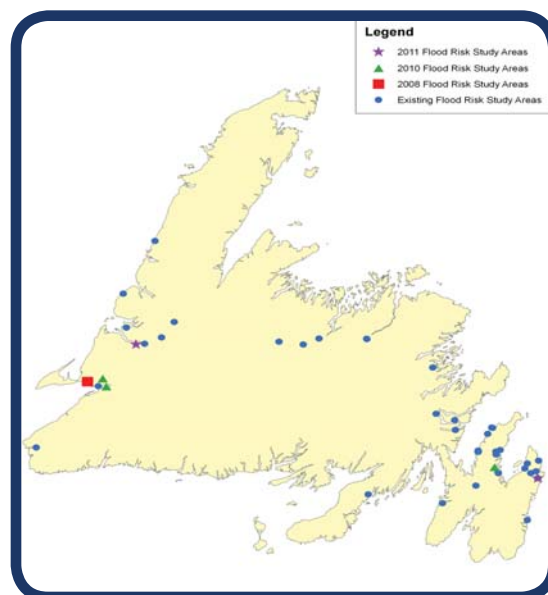
Floods are one of the most common natural hazards in the Province of Newfoundland and Labrador (NL), and are often the most costly.

The processes and conditions that result in floods are often predictable and usually occur in the same areas, known as floodplains.

Flood Plain Management

The best and most cost effective method of minimizing the impact of floods is proper management and planning of the known flood plains. Flood plain management usually involves the adoption of land use regulations that limit human exposure to areas prone to flooding events.

The Province's *Policy for Flood Plain Management*, administered through the *Water Resources Act, 2002*, regulates development in designated flood plains. In 2010, climate change flood plains were added to the policy.



Communities with flood risk mapping

Flood Risk Mapping

Flood risk maps are based on flood events associated with the 1:20 and 1:100 annual exceedance probability (AEP). The 1:20 and 1:100 AEP corresponds to the 5% and 1% risk of flooding in any one year.

Since their creation, the maps have been incorporated into a wide range of applications, by provincial and municipal governments, including:

- Design of infrastructure,
- Environmental assessments,
- Land-use development,
- Municipal plans,
- Various regulations, and
- Water resource analyses.

Climate change

Since 2009, flood risk mapping studies have incorporated climate change projections by adding climate change flood plains for the 1:20 and 1:100 AEP. This is important for:

- Climate change adaptation
- Public safety and information,
- Municipal and development planning,
- Setting of structural design criteria, and
- Flood response.

Climate change flood risk mapping assists in regulating new developments in flood-prone areas, minimizing flood damage to properties and the environment, and restricting activities that could degrade water resources.

A New Template for Climate Change Flood Risk Mapping

During the 1980s and 1990s, flood risk mapping studies were undertaken for 37 areas. The studies are complex in nature and followed a prescribed template. The template had four components:

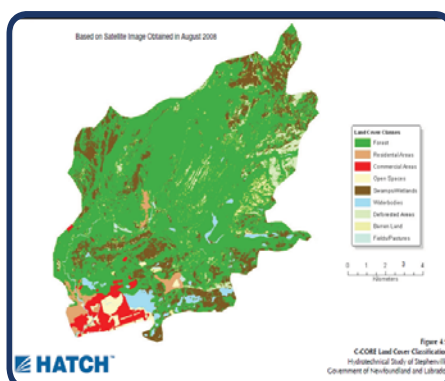
- (1) Hydrology (determining flood flows),
- (2) Hydraulics (water surface profiles for the 1:20 and 1:100 AEP flood events),
- (3) Topographic mapping (delineated flood levels on the flood plain), and
- (4) Public information (interpretive information on the flood hazard).

Since 2009, the template for the flood risk mapping studies has been updated to include:

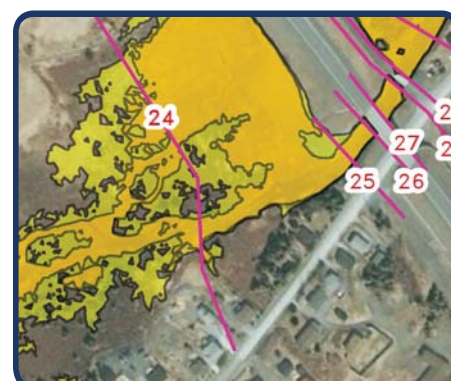
- Climate change flood risk mapping,
- Inundation mapping (indicating the depth of flooding),
- Non-proprietary models (Arc-Hydro, HEC-HMS, and HEC-RAS),
- LiDAR (for accurate digital-elevation models and collection of aerial photography), and
- Land-cover analysis using high-resolution satellite imagery.

Return Period	10 Years			
	Hist	2020s	2050s	2080s
Newfoundland and Labrador	Precip. (mm)	Precip. (mm)	Precip. (mm)	Precip. (mm)
Gander CGCM2	59.4	65.8	65.5	62.1
Gander HadCM3	59.4	61.7	70.7	81.3
St Johns CGCM2	75.9	113.2	118.5	107.2
St. Johns HadCM3	75.9	103.5	139.1	110.8

Environment Canada
climate change projections



Land cover analysis using
high-resolution satellite imagery



Flood risk mapping overlaid on
high-resolution satellite imagery

Public Information

The Province's flood risk mapping studies are publicly available, accessible through the *NL Water Resources Portal*, online at: maps.gov.nl.ca/water.

The studies and maps are also available online at: www.env.gov.nl.ca/env/waterres/flooding/frm.



NL Water Resources Portal

For the community

The process for a flood risk mapping study to be undertaken for a community is as follows:

- (1) The study area must have a history of flooding impacting development,
- (2) The community makes a written request for a new (or updated) study to the Department,
- (3) The Department reviews the request,
- (4) Approved requests are added to a priority list, and
- (5) With an approved budget, communities are contacted, prior to the commencement of the study, for input.

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Online: www.env.gov.nl.ca/env