



# Major Flooding around Lakes and Rivers

When lakes and rivers overflow their banks, homes, roads, and communities can be flooded. This major flooding can have big impacts infrastructure in communities and the safety of people who live there. Major flooding could get worse with climate change. How can communities prepare?

## What causes major flooding?

Major flooding from waterbodies like lakes and rivers happens when there is more water flowing into the system than there is flowing out. This extra water can overflow the banks of the lake or river and flood the surrounding land. Large amounts of rain, runoff from snow and ice melt, or a blockage in the system (like an ice jam) can all cause major flooding. In coastal communities, storm surges can also lead to major flooding. Storm surges happen when windy conditions push ocean water past the shoreline and onto the land.



*Low-lying Kashechewan First Nation often floods in the spring because of melting upstream on the Albany River. Photo from Albany FB group*

## How will climate change impact major flooding?

Across Ontario, climate change is likely to make major flooding events occur more often. With climate change, Ontario is expecting more rain and snow, with heavy rain events (50-150 millimetres of rain falling in 24 hours) predicted to happen more often. Less snow on the ground and warmer spring temperatures could mean a quicker spring melt, which can also overflow lakes and rivers. An increase in storm severity could make storm surges more likely to happen, increasing the risk of flooding in coastal communities.

## What are people noticing?

Many First Nation communities have been established near lakes and rivers. Lakes and rivers provide drinking water, food, and transportation corridors but building near water can make communities vulnerable to major flooding events. Already, flooding is a problem for some First Nations communities. On the James Bay coast, Kashechewan First Nation is evacuated on an almost yearly basis because of the threat of flooding. In other communities, lake levels have gone up higher than in the past.



*The threat of flooding in Kashechewan has recently led to yearly evacuations of community members. Photo from*

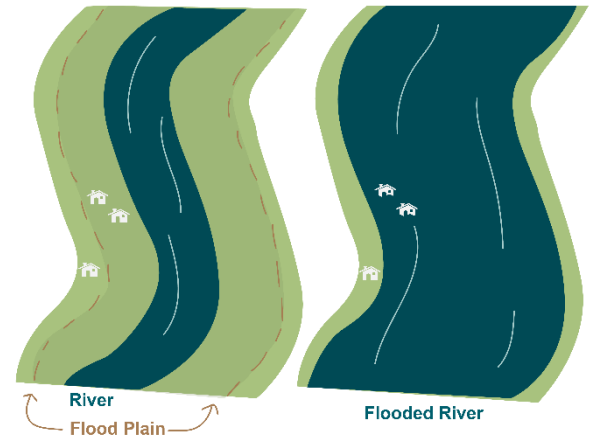
<https://nationalpost.com/news/canada/we-cannot-continue-to-live-this-way-flood-risk-forces-kashechewan-evacuation-for-fourth-year-in-a-row>



## How can we prepare?

### ***Avoid building on flood plains***

A flood plain is an area of low-lying ground next to a lake, river, or other waterway. These areas are susceptible to flooding and should be avoided when planning new development, including housing and roads. Since many remote communities do not have flood plain maps or water level records, traditional knowledge about high water levels and past floods are a valuable tool for future planning. In some cases, communities may want to relocate infrastructure that has already been built to higher ground



### ***Monitoring and forecasting***

Monitoring for the conditions that can lead to flooding (like weather, water levels, etc.) can help communities be prepared for potential flood events. Communities can take ownership of their own monitoring with systems like NetAtmo, weather stations with online software for recording local weather. Provincial and federal programs also collect data related to flooding and flood prediction, including real-time monitoring of water levels and water flow, and a flood forecasting and warning program.

Traditional knowledge, together with measurements of past climate, can also help to build a better understanding of flooding trends in remote areas. Communities that experience regular flooding may want to partner with consultants to create a flood forecasting model for their area to look at the conditions that have caused flooding in the past to predict conditions that are likely to result in a flood in the future. Flood forecasting models can potentially give communities advanced warning of a flood event, allowing time for emergency measures such as evacuations.



Water level monitoring stations.  
<https://wateroffice.ec.gc.ca/>



Flood forecast mapping in Ontario.  
<https://www.gisapplication.lrc.gov.on.ca/webapps/flood/>

### ***Emergency Planning***

An emergency plan can lower the risk to people and infrastructure in the event of a flood. A community plan could include measures for community protection (like sandbags), a list of vulnerable residents, evacuation plans, and/or a refuge center. Communities can also encourage households to be ready for emergencies by providing information, like a packing list for evacuation or a list of supplies that might be useful.

### ***Structures for water level regulation***

Structures like dams, dikes and berms are sometimes used for flood control in areas where floods have happened in the past. Other structures like ice booms, and ice retention structures, are used to prevent ice jams, which can be a cause of major flooding.

Climate change could make major flooding events more common in Ontario because of faster snow melt and heavy rain in the spring. People and communities should prepare by building above past high-water levels, monitoring water levels and rain events, listening for flood warnings and creating an emergency plan.