

# Ice Jam Flooding

## What is an ice jam and why are they important to Albertans?

Ice jams are accumulations of ice in a river that can lead to flooding. They are a natural part of winter river processes. Ice jams form when the ice blocks the river flow, causing the water level to rise. The downstream end of an ice jam is called the “toe”, and the upstream end of the ice jam is called the “head”.

## Why do ice jams happen?

There are different types of ice jams that happen for different reasons. Ice jams can occur anytime during the winter. Fall freeze-up and spring breakup are the most common times for ice jams to form.

### Freeze-up ice jams

These ice jams occur when an ice cover is forming. When the new ice is not very strong, it collapses and thickens. This can partially block the river channel, forming an ice jam.

### Breakup ice jams

These ice jams occur in the spring and are more common on north-flowing rivers. Snowmelt runoff raises water levels and lifts and breaks the ice cover. The broken ice flows downstream and jams against a solid ice cover.

### Mid-winter breakup ice jams

These ice jams occur when temperatures are very warm, leading to early snowmelt. Winter rainfall can also cause mid-winter breakup ice jams.

## Where do ice jams occur?

Ice jams can form anywhere in Alberta. Ice jams have been documented as far south as the Milk River and as far north as the Hay River.

Some river features make ice jams more likely:

- Tight bends and narrow sections
- Islands or shallow sandbars
- Bridges or other human-made river constrictions
- Confluences with other rivers
- Changes in the river bed slope

The Town of Peace River on the Peace River and Fort McMurray on the Athabasca River are examples of populated areas in Alberta that have a history of more frequent ice jamming and flooding.

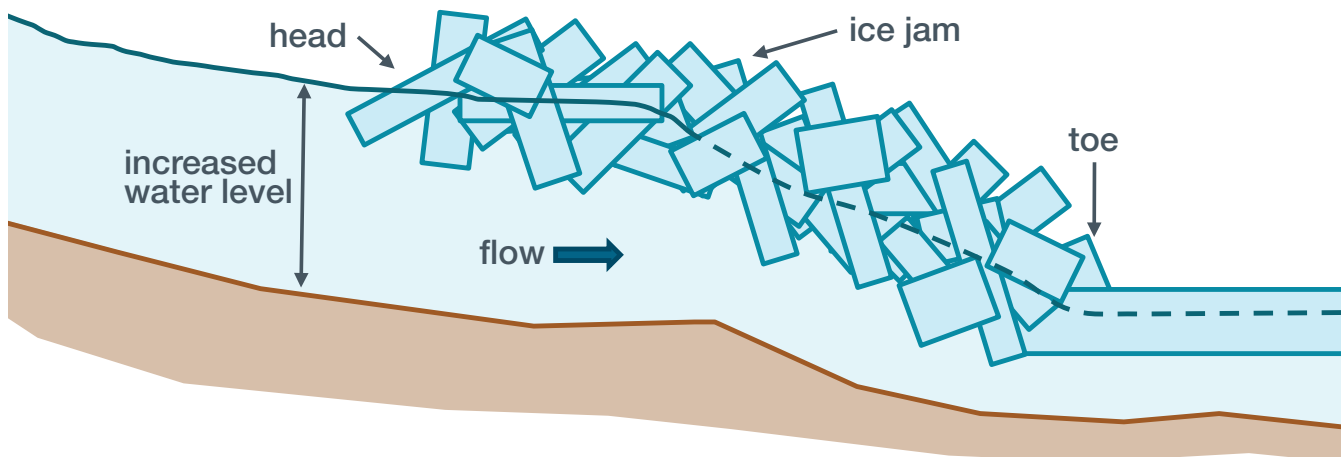


Figure 1: Side view of an ice jam.

## How are ice jam floods different from open water floods?

Ice jam floods are different from open water floods in a few important ways:

### Ice jam floods are more difficult to predict

Open water floods depend mostly on rainfall. Ice jam flooding is harder to predict than open water flooding because it depends on more factors such as:

- How much snow and how fast it melts
- How much water and ice are flowing in the river
- How thick and how strong the ice is
- The shape of the river
- Air temperature

### Ice jam floods can happen very quickly

When ice blocks a river, water levels can rise very fast. During an open water flood, water levels rise over hours or days. During an ice jam, water levels can rise over minutes or hours. Ice jams can also release suddenly, sending fast-flowing water and ice downstream. An ice jam release can cause water levels to decrease quickly near the ice jam but rise downstream. After a release, ice jams can re-form downstream.

### Ice jam floods are often localized

Ice jam floods can occur anywhere on a river. However, ice jam flooding often occurs over a short section of river. Sometimes ice jams occur at a town or at a river gauging station, but not always. An ice jam can only be detected remotely if it forms near a river gauging station. Open water floods often occur over a much longer stretch of river than ice jam floods.

### The effects of ice jam flooding may be different

In addition to the effects of floodwater, the pushing force of ice can damage structures and erode the riverbanks. If an ice jam flood happens during very cold weather, floodwater can freeze in place.

## What do I do if I see an ice jam?

If an ice jam is affecting property, please contact your local authority to report flooding. Whether an ice jam is causing flooding or not, you can submit a photo of the ice jam using the AB Rivers mobile app.

Remember to keep a safe distance from ice jams because water levels can fluctuate very quickly and river banks can be newly eroded and unstable.

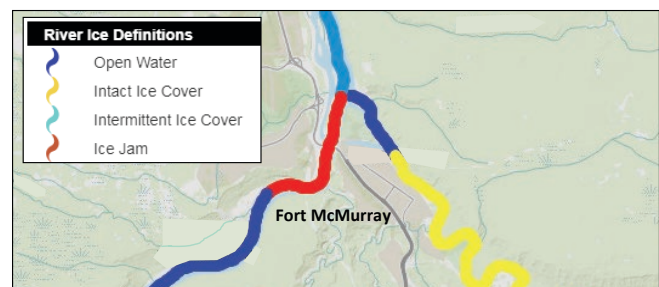
## How does the River Forecast Centre forecast and monitor ice jams?

The River Forecast Centre monitors river and weather conditions across the province of Alberta. The Centre uses a variety of tools to forecast and monitor ice jams and flooding. Water level gauges, ground observations, computer modelling, observation flights, satellite images, remote cameras, weather forecasts, and observations from the public are all used. Staff at the River Forecast Centre maintain awareness of river conditions all year, 24 hours per day. They communicate closely with stakeholder communities.

## What ice information products does the River Forecast Center provide?

Information on river ice conditions in Alberta can be found at [rivers.alberta.ca](http://rivers.alberta.ca) or on the AB Rivers mobile app. This includes:

- Advisories, watches and warnings are issued as river ice conditions warrant
- River ice observation reports for the Peace and Athabasca Rivers (historical archive available)
- River ice cover map, observation photos and other information (historical archive available)
- Forecasters Comments are routinely updated and include relevant location-specific river ice details



**Download the Alberta Rivers app for current information about snow, river flows, lake levels, precipitation, and river ice conditions across the province, plus important advisories sent straight to your cell phone.**