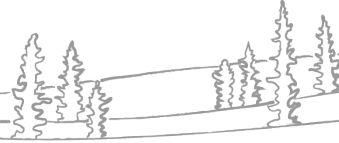




NWT Water Monitoring Bulletin

– May 16, 2023 at 14:00



NWT break up reports will be published routinely as break up unfolds. These reports will focus on regions with active snowmelt and ice break up. The geographic focus of the report will shift as conditions change. Additional information about basin conditions can be found in the ECC Snow Survey Bulletin and Spring Water Outlook, [available here](#). If you have any photos or information about break up in your community, feel free to reach out to us: nwtwaters@gov.nt.ca.

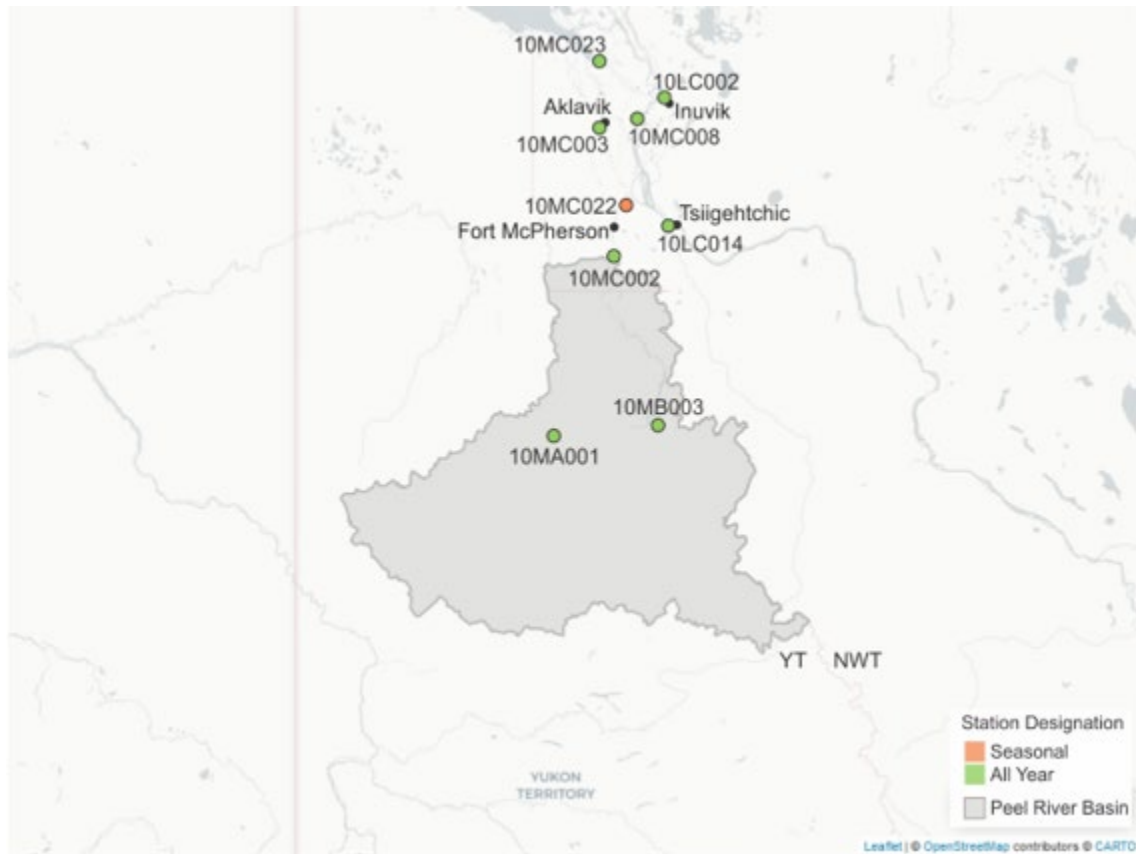
Current Status:

- The water level on the Peel River rose rapidly yesterday;
 - Cabin owners along the Peel River and residents of Fort McPherson should be aware of the continued potential for high water and flooding;
 - The water level sensor and the camera at the hydrometric gauge on the Peel River have been impacted by ice and are not transmitting data or photographs;
 - Flooding of cabins on the banks of the Peel River has been reported;
 - There are reports that water levels may have dropped slightly overnight;
 - Satellite imagery from yesterday afternoon (14:00) showed open some open sections where the Peel River drains into the Mackenzie River Delta;
 - Subsequent water level rises on the Peel River will be dependent on how Peel and Mackenzie River ice packs into the Delta and where backwater is routed;
 - Temperatures in Fort McPherson today are forecast to be cooler than the past few days, but still warmer than normal;
 - Temperatures will rise again tomorrow, followed by rain forecast on Thursday;
 - This will bring additional snowmelt water from higher elevations down to the river and could continue to raise water levels if the ice jams prevent drainage into the Delta.
- Ice on the Mackenzie River has moved past Fort Good Hope;
 - Water levels on the Mackenzie River at Fort Good Hope have been slowly receding and the flood risk for the community has been greatly diminished;
- Ice on the Mackenzie River at Tsiigehtchic has pushed in from upstream;
- Ice conditions have impacted many hydrometric gauges in the Beaufort Delta and little real-time information is currently available.

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Beaufort Delta and Peel River:



Hydrometric Data:

Mackenzie River at Arctic Red River [10LC014]:

Note: The hydrometric gauge has been impacted by ice and is not producing data at this location.



Above – Mackenzie River at Arctic Red River hydrometric gauge photo from May 16 at 10:00. Photo courtesy of Water Survey of Canada and GNWT.

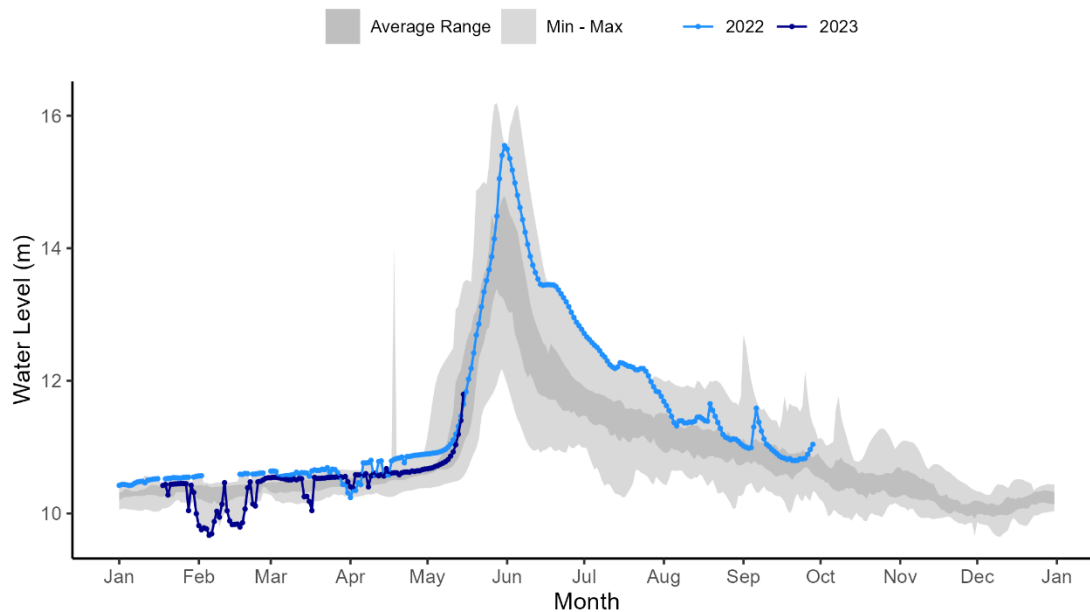
Peel River above Fort McPherson [10MC002]

Note: The hydrometric gauge and the camera have been impacted by ice and are not producing data at this location.

Arctic Red River near the mouth [10LA001]

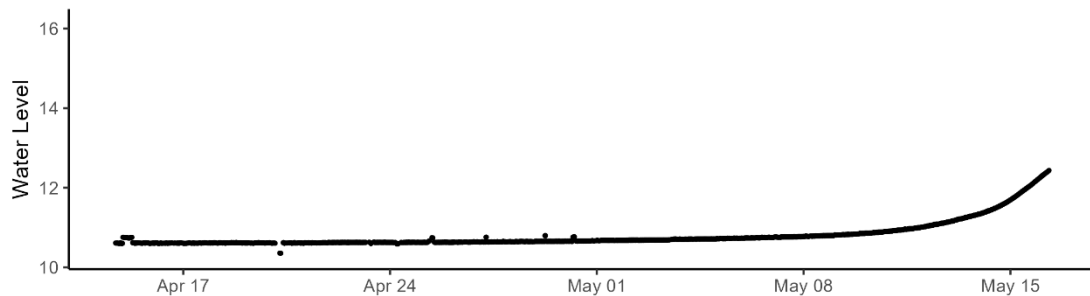
Note: The hydrometric gauge has been impacted by ice and is not producing data at this location.

Mackenzie River (Peel Channel) above Aklavik [10MC003]:
MACKENZIE RIVER (PEEL CHANNEL) ABOVE AKLAVIK (10MC003)

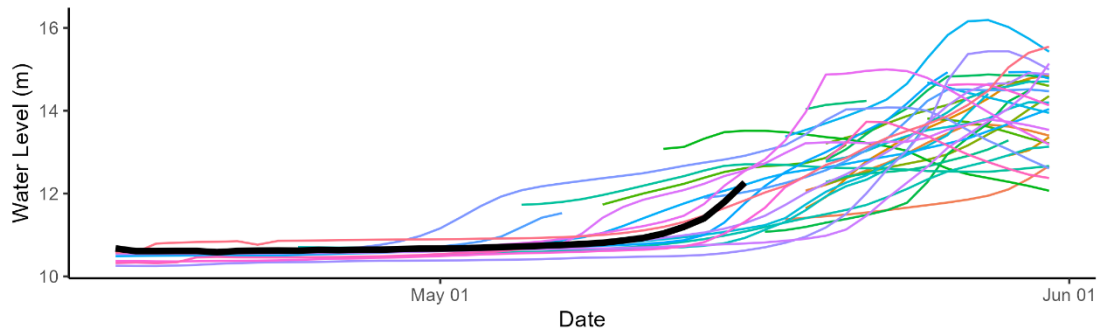


Above – Water level data for the Mackenzie River above Aklavik. Daily average levels for this year and the previous year are shown here.

MACKENZIE RIVER (PEEL CHANNEL) ABOVE AKLAVIK (10MC003)
2023 Water Levels (5 minute resolution)



Historic Daily Water Levels

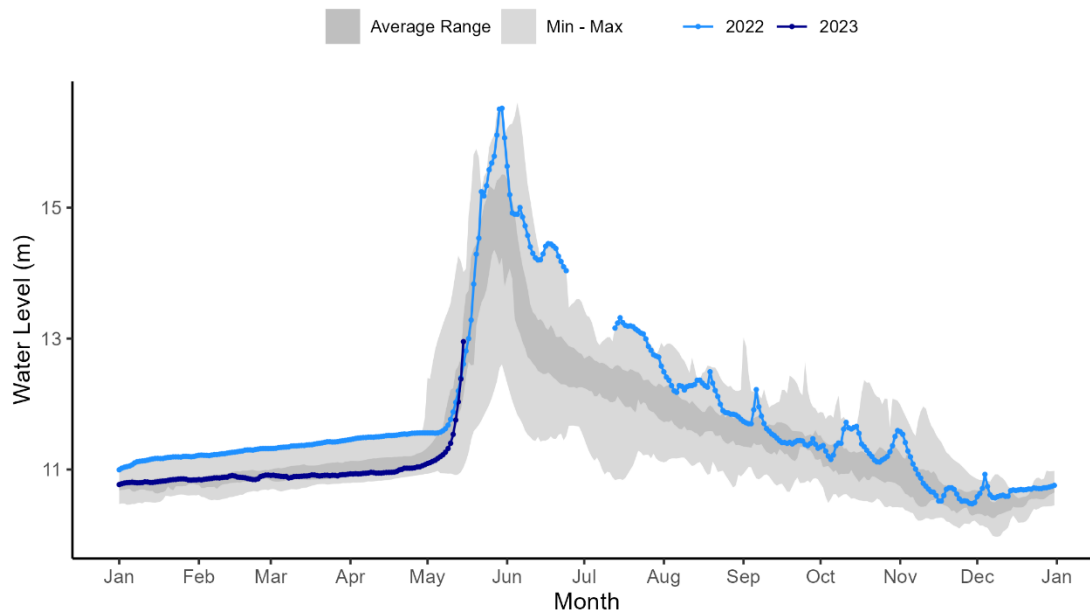


Above: The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.



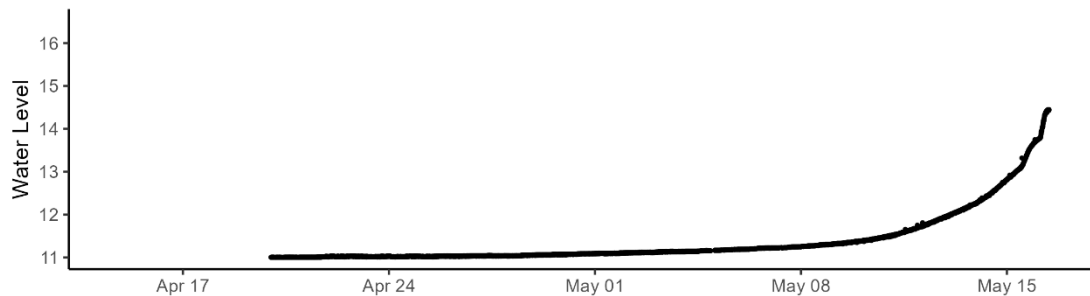
Above – Mackenzie River above Aklavik hydrometric gauge photo from May 16 at 10:00. Photo courtesy of Water Survey of Canada and GNWT.

Mackenzie River (Middle Channel) below Raymond Channel [10MC008]:
MACKENZIE RIVER (MIDDLE CHANNEL) BELOW RAYMOND CHANNEL (10MC

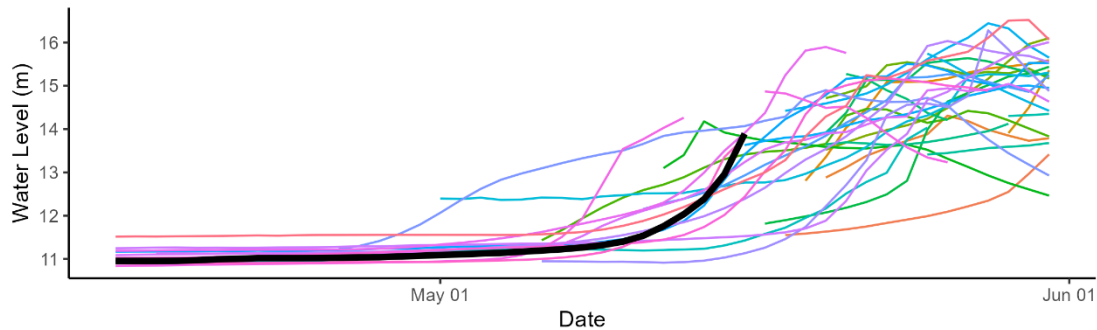


Above – Water level data for the Mackenzie River below Raymond Channel. Daily average levels for this year and the previous year are shown here.

MACKENZIE RIVER (MIDDLE CHANNEL) BELOW RAYMOND CHANNEL (10MC008);
2023 Water Levels (5 minute resolution)



Historic Daily Water Levels



Above: The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.



Above – Mackenzie River below Raymond Channel hydrometric gauge photo from May 15 at 13:00. Photo courtesy of Water Survey of Canada and GNWT.

Weather Data:

Current status and forecast:

Temperatures in the Sahtu and Beaufort Delta have been well above seasonal for the past week. Cloud cover at Fort McPherson and Inuvik will lower temperatures today, but they will still be above seasonal. Clear skies and warmer temperatures are set to return tomorrow. The combination of sun and warm temperatures will continue to melt snow and deliver runoff from higher elevations in the Peel River basin. Warm temperatures should continue to melt ice as break up progresses northward into the Mackenzie River Delta.

Background information and context:

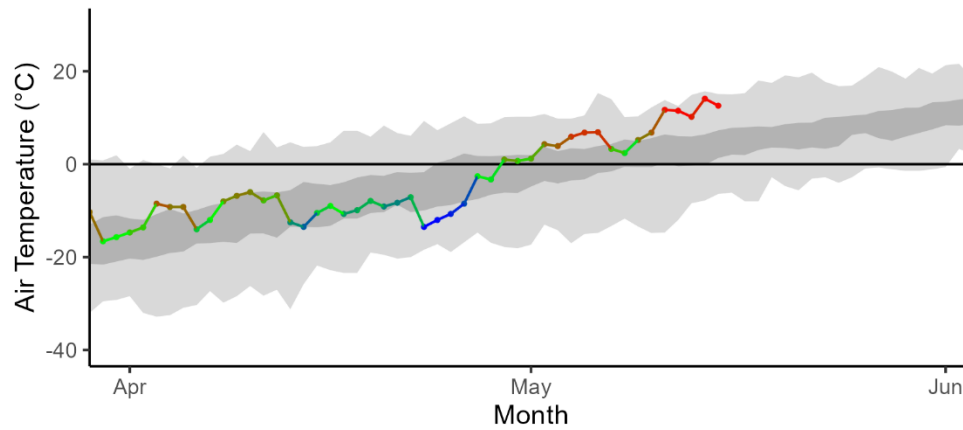
Weather information informs how snow and ice will melt and provides information about how this spring is unfolding relative to previous springs. Warmer than normal conditions early in the spring allow for additional energy to melt the snowpack and soften river ice. Rain-on-snow events can cause rapid melt of snowpacks and facilitate quick delivery of snowmelt water to rivers. Locations included here cover basin areas that feed into NWT rivers that are currently undergoing break up.

There are two sets of figures below. The first set of figures shows daily temperatures relative to normal for select locations in the NWT. The dark grey bands represent the average range of temperatures, while the light grey bands represent historic minimum and maximum daily mean temperatures. The second set of figures present a seven-day weather forecast, provided by Environment and Climate Change Canada.

2023 spring temperatures to-date:

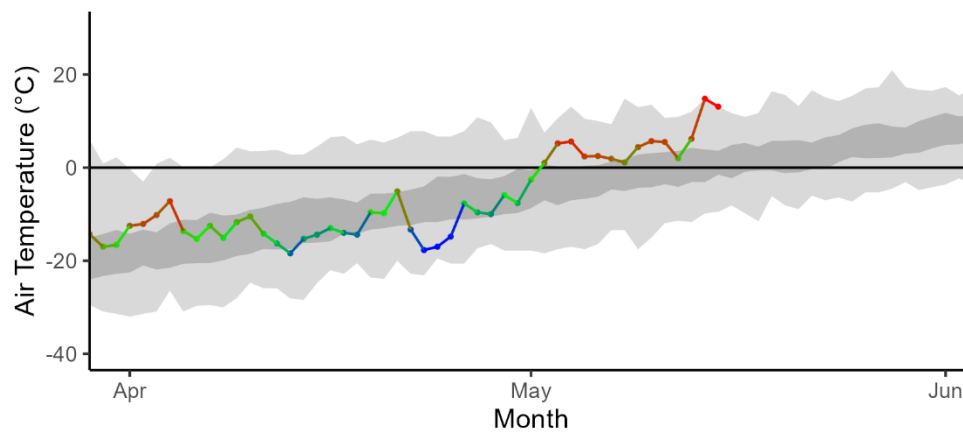
Fort Good Hope:

2023 Fort Good Hope Mean Daily Air Temperatures



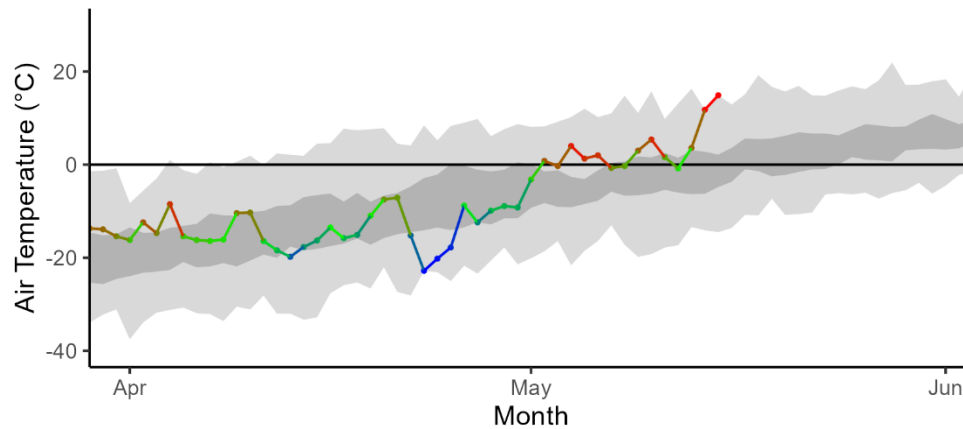
Fort McPherson:

2023 Fort McPherson Mean Daily Air Temperatures
















Inuvik:

2023 Inuvik Mean Daily Air Temperatures
















Seven-day weather forecast:














Fort Good Hope:

Tue 16 May	Wed 17 May	Thu 18 May	Fri 19 May	Sat 20 May	Sun 21 May	Mon 22 May
 21°C Sunny	 21°C Sunny	 19°C Sunny	 13°C Sunny	 20°C Sunny	 14°C A mix of sun and cloud	 14°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 8°C Clear	 5°C Clear	 -1°C Clear	 5°C Clear	 5°C Clear	 4°C Cloudy periods	

Fort McPherson:

Tue 16 May	Wed 17 May	Thu 18 May	Fri 19 May	Sat 20 May	Sun 21 May	Mon 22 May
 8°C A mix of sun and cloud	 17°C Sunny	 8°C A mix of sun and cloud	 12°C Sunny	 16°C Sunny	 12°C A mix of sun and cloud	 12°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 -1°C Clearing	 -1°C Clear	 -2°C Clear	 5°C Clear	 3°C Cloudy periods	 3°C Cloudy periods	

Inuvik:

Tue 16 May	Wed 17 May	Thu 18 May	Fri 19 May	Sat 20 May	Sun 21 May	Mon 22 May
 7°C Mainly cloudy	 9°C Mainly sunny	 3°C 60% Chance of flurries	 7°C Sunny	 16°C Sunny	 16°C A mix of sun and cloud	 16°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 3°C Clearing	 -1°C Clear	 -2°C Cloudy periods	 2°C Clear	 1°C Cloudy periods	 1°C Cloudy periods	

Factors to Watch:

It is important to note that much of the water contributing to flooding of NWT communities originates from outside of the NWT, which is why we also rely on information from the Yukon, British Columbia, Alberta and Saskatchewan.

The potential and severity of flooding will depend in large part on the weather over the upcoming weeks and how this interacts with existing ice conditions, water levels and snow pack amounts.

The primary factors that influence water levels in the spring are:

- Ice jams (can result in out-of-bank flows, even if there are below normal flows)
- Rate of melt of ice and snow:
 - Gradual vs quick melt
 - Rain on snow or ice events (rain brings a lot of energy to help melt happen more quickly)
- Current water levels
- How wet the ground was in the fall
- Snowpack

Spring Break up on NWT Rivers: Mechanical vs Thermal

In any given year, spring flooding can occur in a number of NWT communities, including Hay River, Jean Marie River, Fort Simpson, Fort Liard, Nahanni Butte, Tulita, Fort Good Hope, Fort McPherson and Aklavik. Spring flooding is caused by ice jam-induced flooding and can occur irrespective of existing water levels. However, if existing water levels are high, the impact of an ice jam flood can be much worse.

Ice jams typically form when on north-flowing rivers, where warm weather and snowmelt cause ice to break up on the southern reaches of a river. As this ice flows north (downstream), it meets a more solid ice cover. When this happens, the pieces of floating ice jam on the solid ice and can form a dam, which causes water levels to rise rapidly. This is called a **mechanical break up**, whereby the ice downstream is broken up by the force of ice moving into it.

If there is warm and sunny weather throughout early spring, the ice will thermally erode and weaken. This provides less of a resisting force for ice and water moving down the river and will have less of a chance of causing water levels to rise. This is called a **thermal break up**.

The causes of mechanical and thermal break ups are usually dependent on the weather during early spring. Warm weather, sunshine, and rain on snow events are usually a good way to bring extra energy into the system to help melt the ice. Warm temperatures in the upstream part of a basin could also cause a rapid snowmelt and move water to the river very quickly. This could lead to ice-jam conditions downstream if the ice has not yet received enough energy to degrade. Another important factor is the thickness of the ice. Thicker ice takes longer to melt and can increase the chances of ice jams. If an ice jam occurs, the location of the ice jam is also very important. Each river reach has different locations that are prone to ice jams. The location of the ice jam can be an

important factor as to whether or not a community floods. Furthermore, ice will jam and then move again at multiple locations along a river as break up progresses downstream. The timing and location of each jam can also influence if a community will flood.

Technical Note:

- The figures in this report plot water levels. The values on the y-axis are (in most cases) relative to an arbitrary datum. This means that the values on each gauge can be compared to different years but should not be used to compare water levels from one location to the next.

For example, the Hay River near the border gauge (07OB008) records a level of about 288 m. The Hay River near Hay River gauge (07OB001) usually records a level of about 4 m. This **does not mean** that the water level at the Hay River at the border site is 284 m higher than the water level at the Hay River near Hay River site.