Government of
Northwest Territories

NWT Water Monitoring Bulletin – May 2nd, 2024 at 13:00

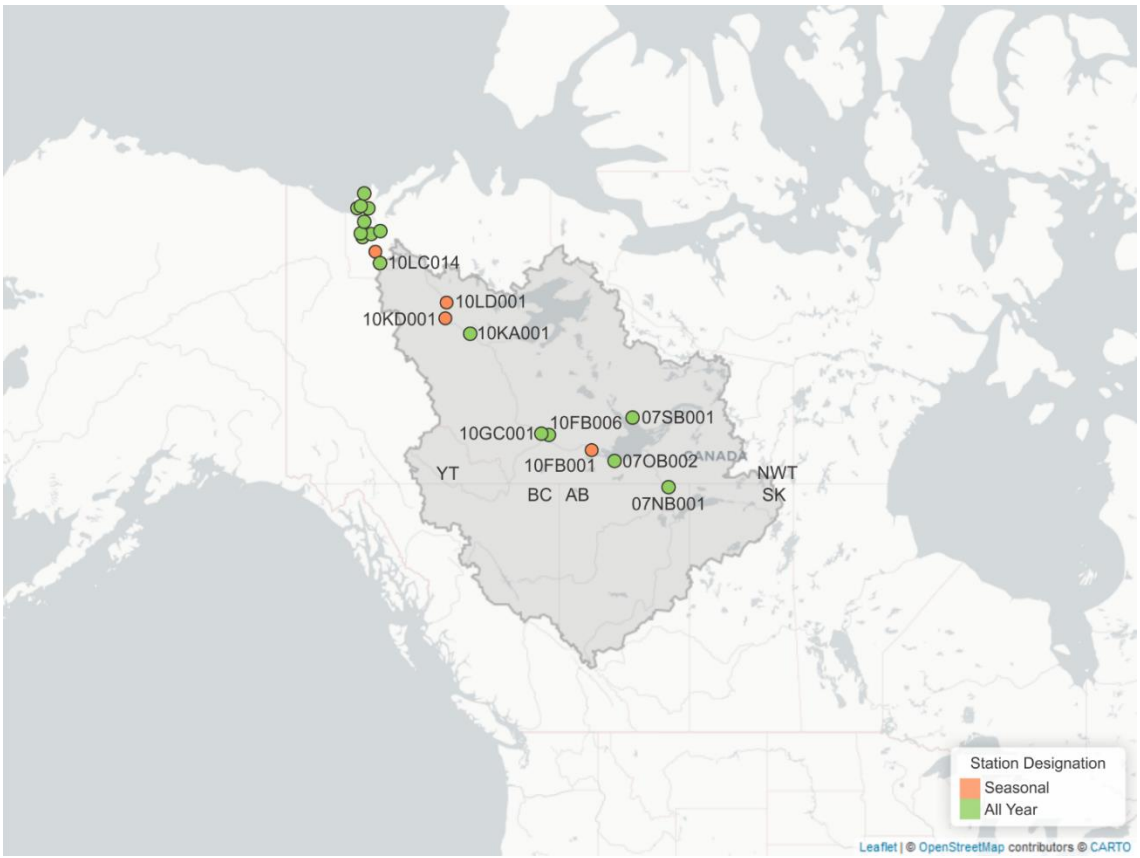
NWT break up reports will be published routinely as break up unfolds. These reports will focus on regions with active snowmelt and ice break up. The geographic focus of the report will shift as conditions change. Additional information about basin conditions can be found in the ECC Snow Survey Bulletin 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:

- Ice began moving on the Mackenzie River at Fort Simpson on the evening of April 30th;
    - So far, ice appears to be clearing well through Fort Simpson with no concerns;
    - Open water extends to about 35 km downstream of Fort Simpson, where an ice jam has formed.
- As of yesterday, ice was still holding on the Liard River between the ferry crossing and the confluence (see image below).
    - Ice started to move on the Liard River at Fort Liard yesterday.
- Water levels on the Mackenzie River at Fort Simpson remain low for this time of year.
- Water levels on the Liard River at Fort Liard rose by about 3 m in response to ice movement yesterday afternoon but have been slowly subsiding since then.
    - This rise is well within the normal range for breakup.
- Water levels on the Mackenzie River at Norman Wells are slowly rising underneath the ice and are lower than normal for this time of year.
- Warmer than normal temperatures are forecast for the next week throughout the Dehcho and in the southern Sahtu.

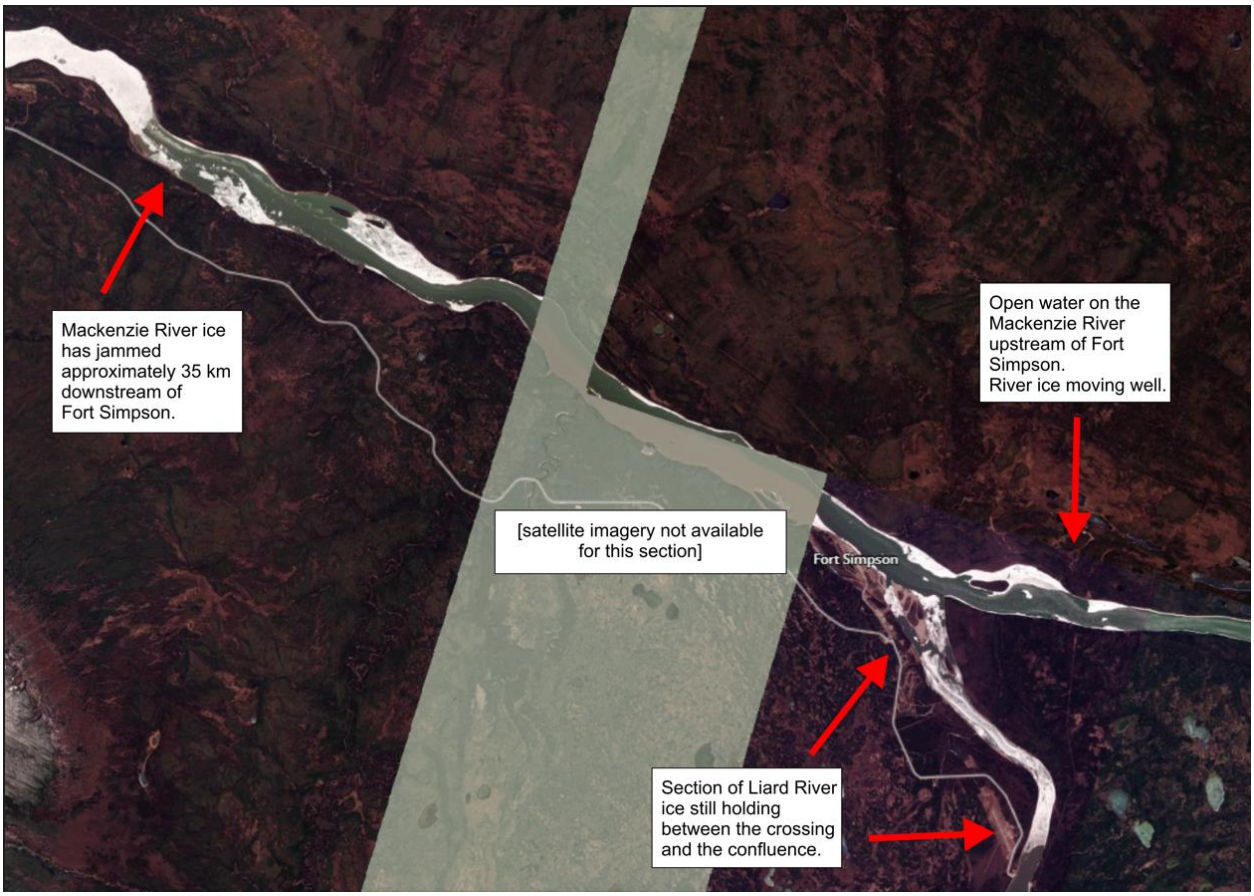
Contents

Hydrometric station map:



Above – Map of hydrometric stations in the Mackenzie River basin. The station numbers are referenced in the water level plots below.

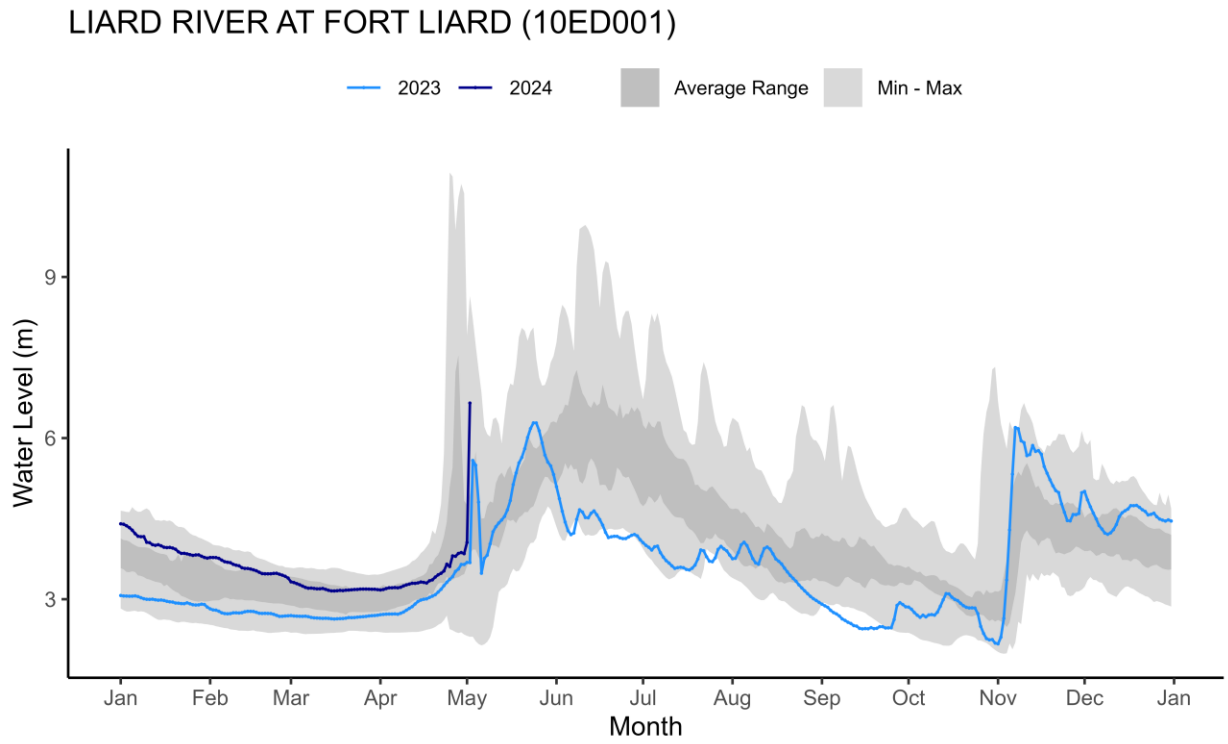
Optical imagery:



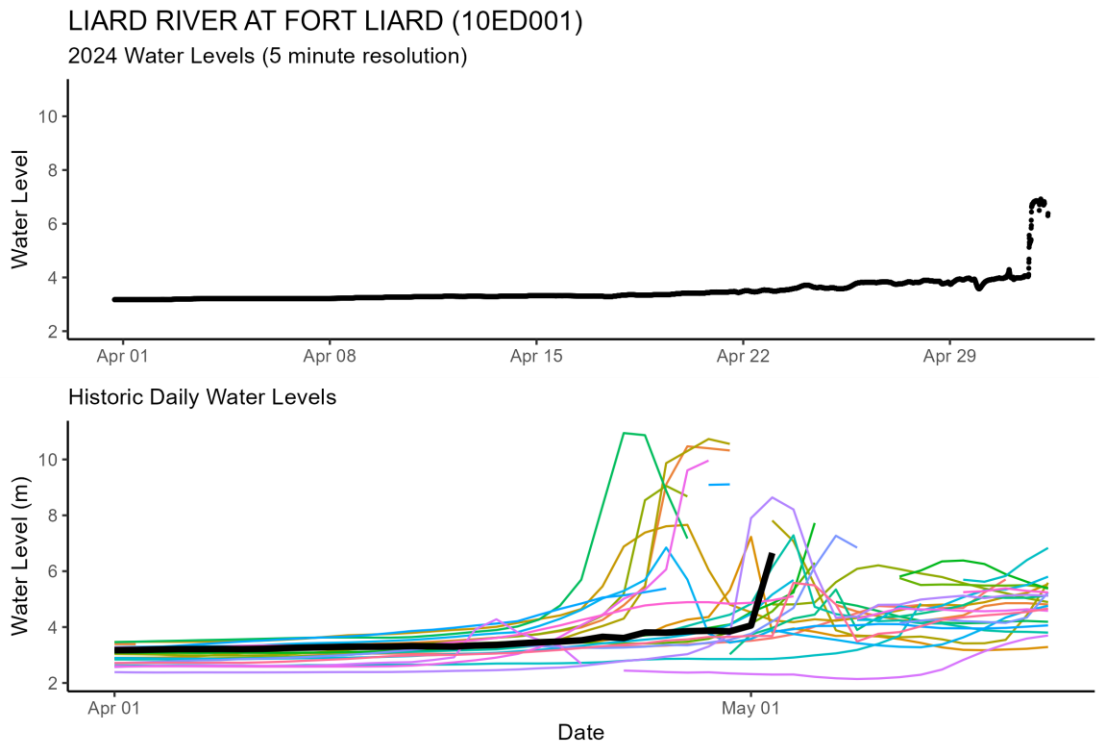
Above – Satellite imagery of the confluence of the Liard and Mackenzie rivers at Fort Simpson. The image was acquired on May 1st at 13:30 MDT and is provided by Planet Labs. The image shows that Mackenzie River ice has moved through the confluence and that Liard River ice is still holding.

Hydrometric Data:

Liard River at Fort Liard [10ED001]:



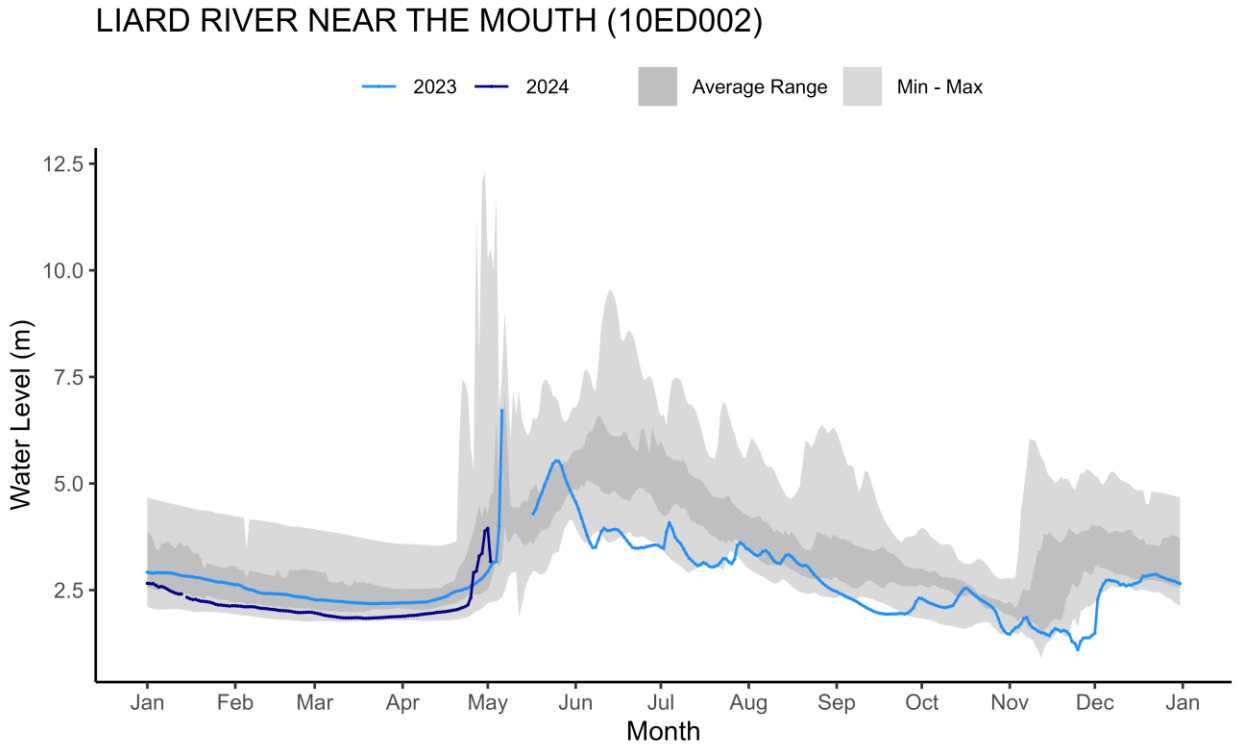
Above – Water level data for the Liard River at Fort Liard. Data for the previous year are also shown here.



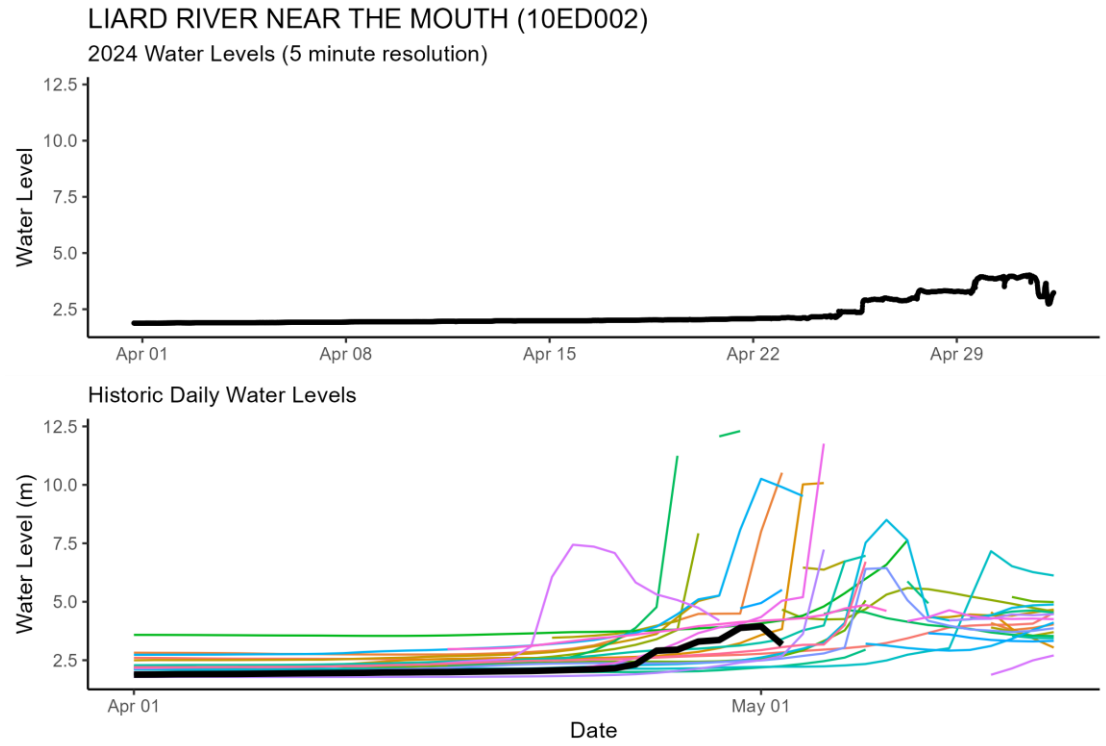
Above - The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.

Above – Liard River at Fort Liard hydrometric gauge photo from May 2nd at 12:00. Photo courtesy of Water Survey of Canada and GNWT. Ice is now moving on the Liard River at Fort Liard.

Liard River near the mouth [10ED002]:



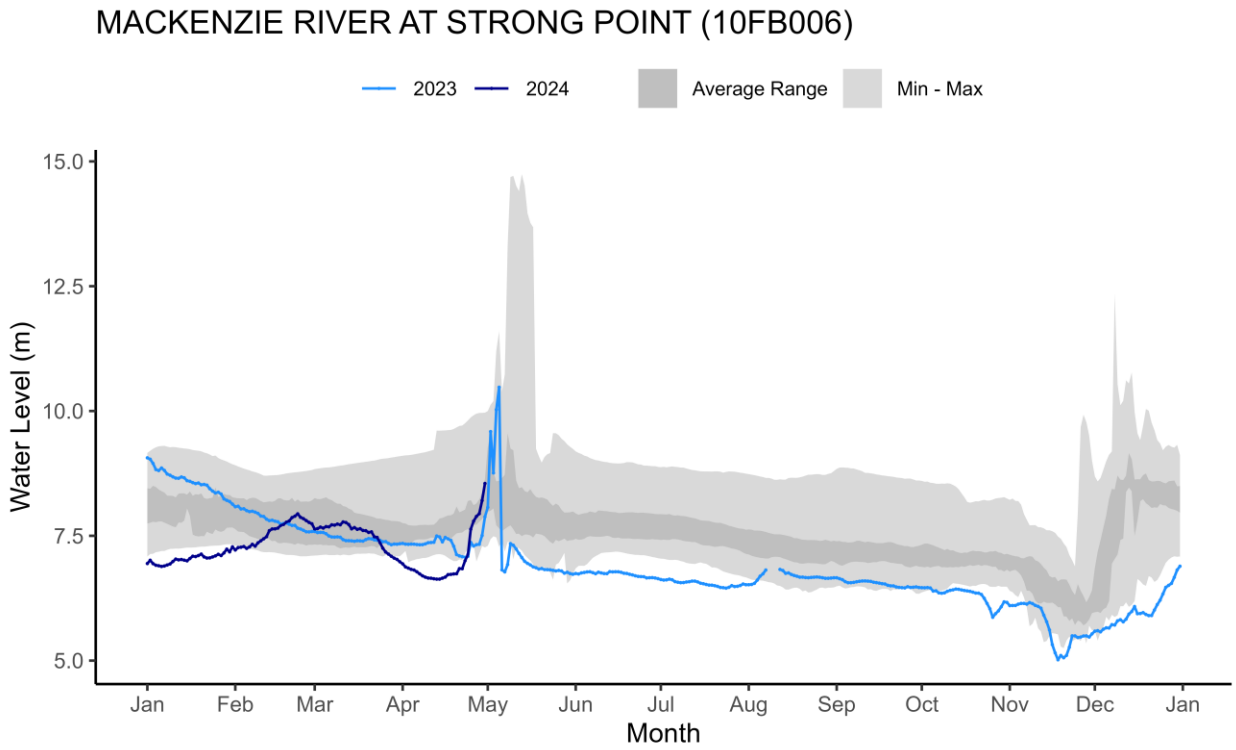
Above – Water level data for the Liard River near the mouth. Data for the previous year are also shown here.



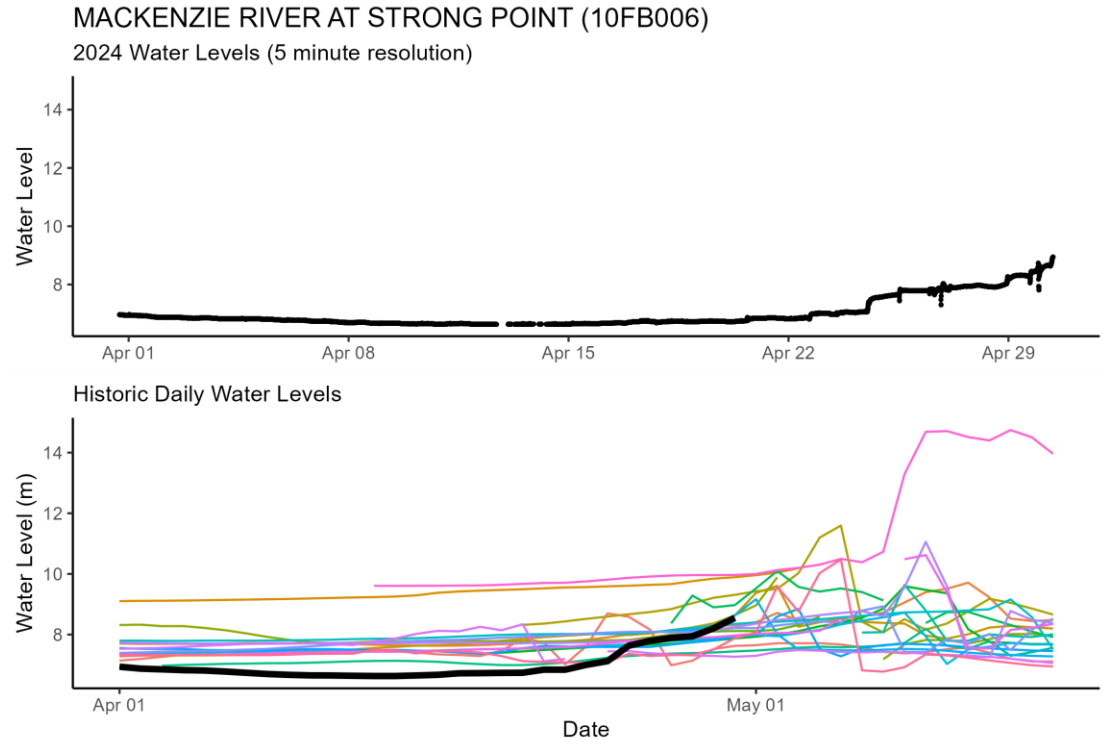
Above - The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.

Above – Liard River near the mouth hydrometric gauge photo from May 2nd at 09:00. Photo provided by GNWT.

Mackenzie River at Strong Point [10FB006]:



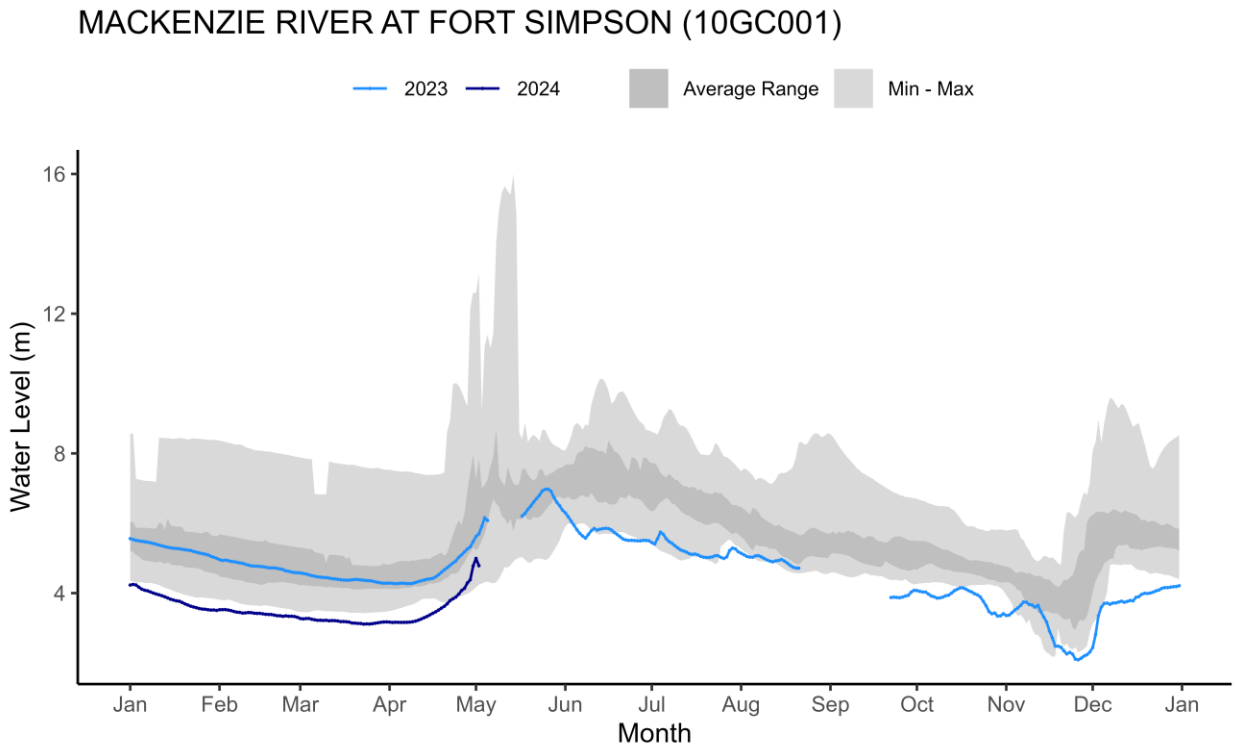
Above – Water level data for the Mackenzie River at Strong Point. Daily average levels for the previous year are also shown here.



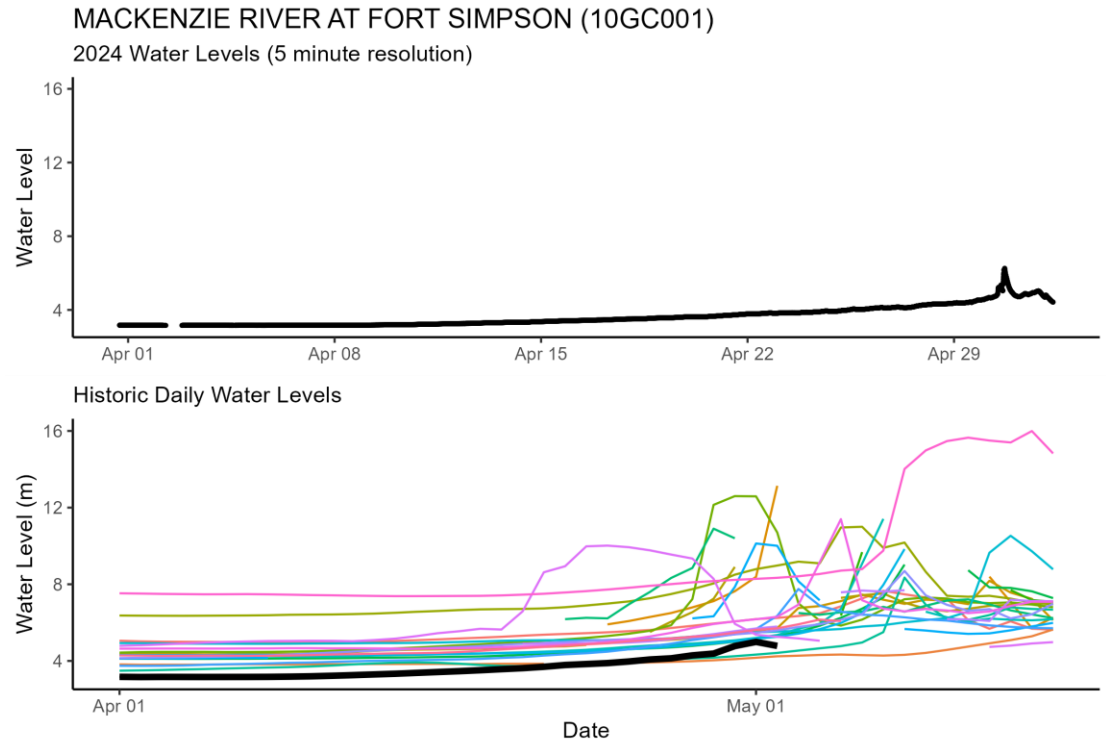
Above – The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.

Above – Mackenzie River at Strong Point hydrometric gauge photo from May 2nd at 12:00. Photo courtesy of Water Survey of Canada and GNWT.

Mackenzie River at Fort Simpson [10GC001]:



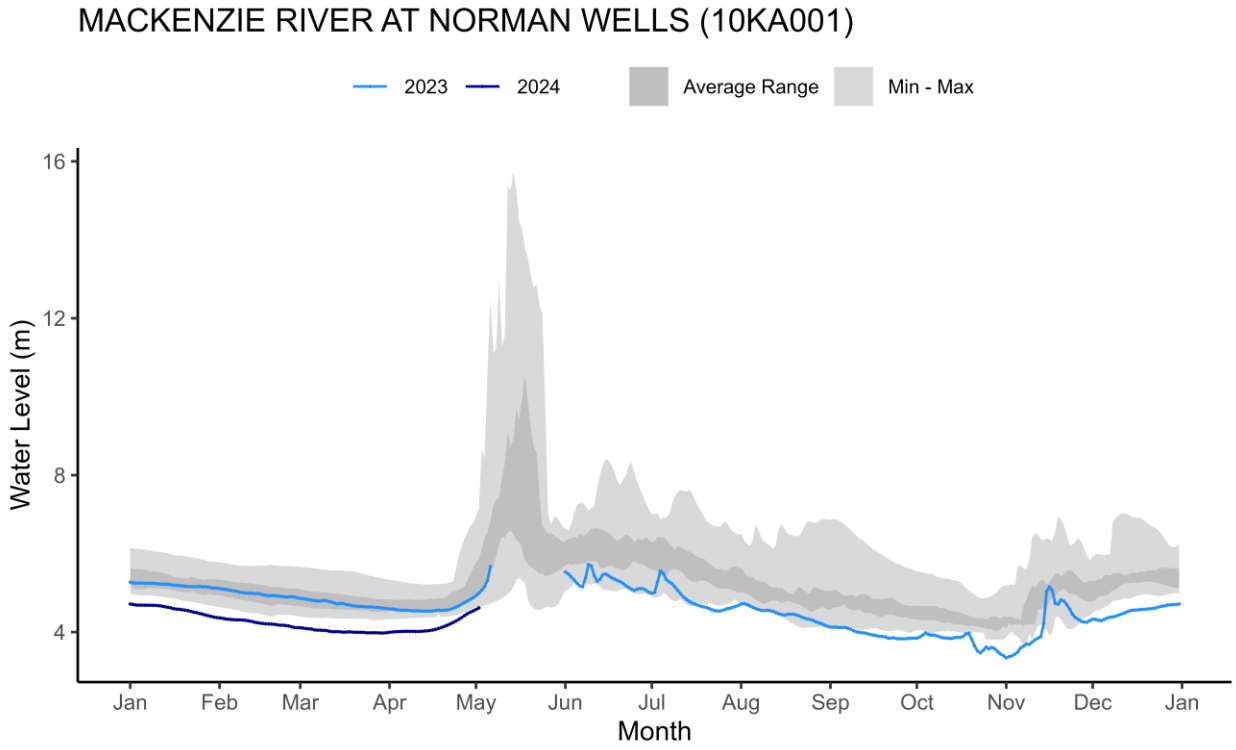
Above – Water level data for the Mackenzie River at Fort Simpson. Data for the previous year are also shown here.



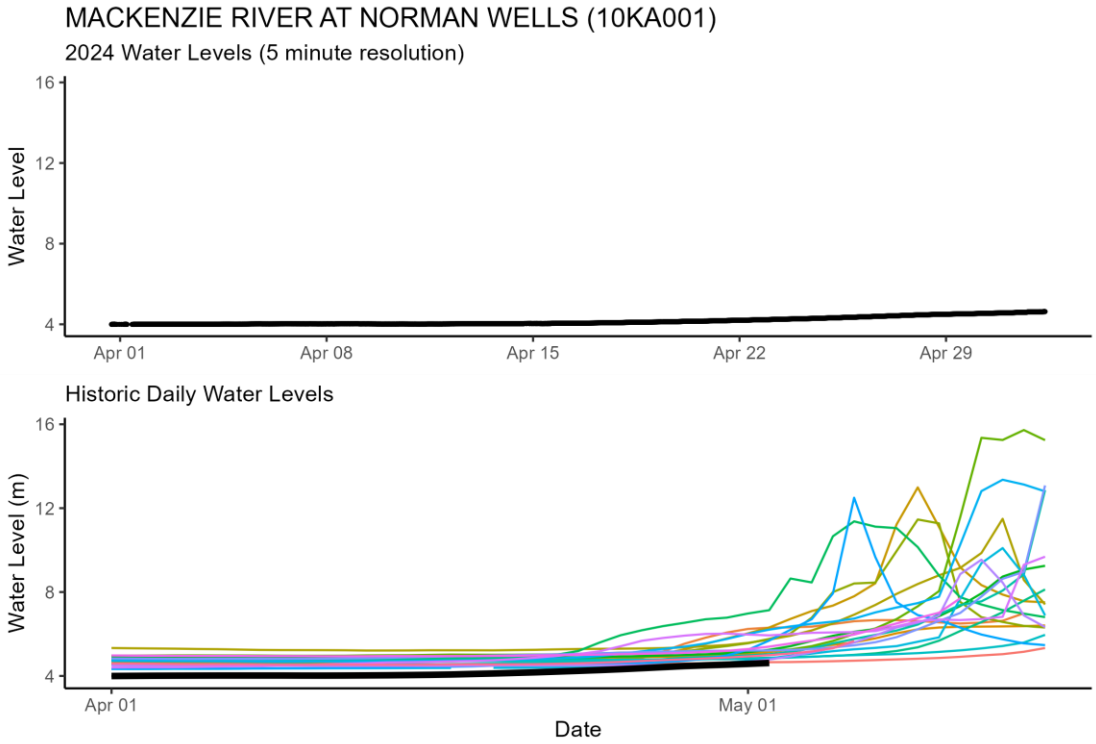
Above - The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.

Above – Mackenzie River at Fort Simpson hydrometric gauge photo from May 2nd at 12:00. Photo provided by GNWT.

Mackenzie River at Norman Wells [10KA001]:



Above – Water level data for the Mackenzie River at Norman Wells. Data for the previous year are also shown here.



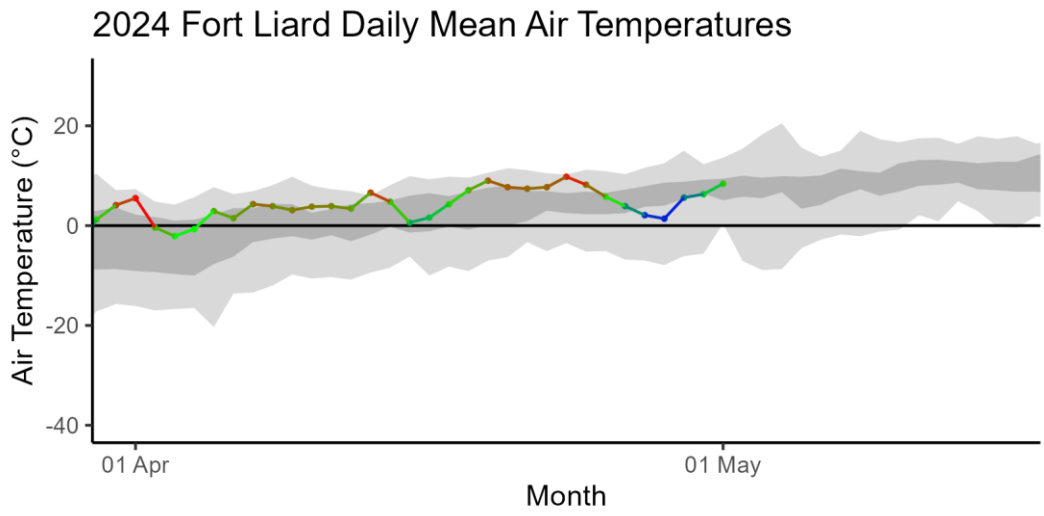
Above – The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.

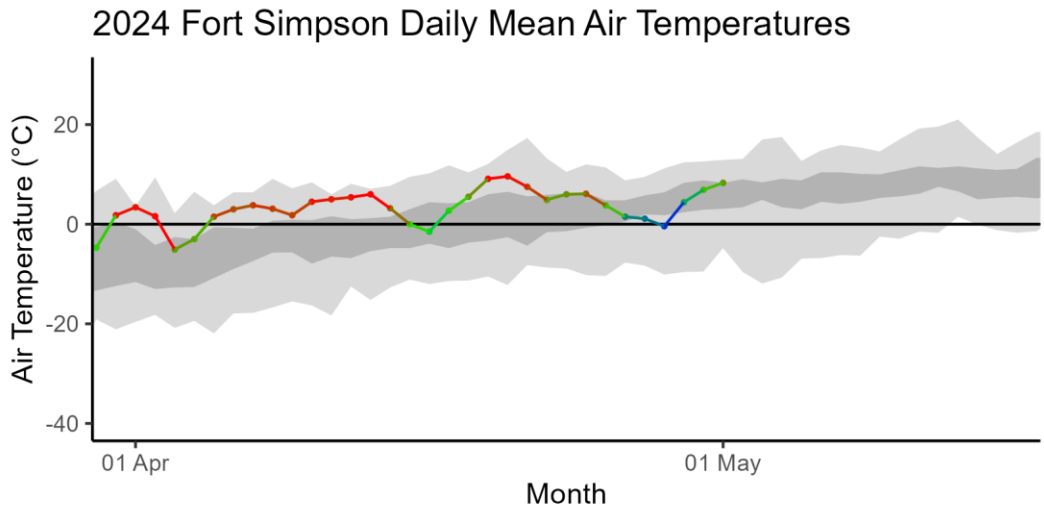
Above – Mackenzie River at Norman Wells hydrometric gauge photo from May 2nd at 8:00. Photo courtesy of Water Survey of Canada and GNWT.

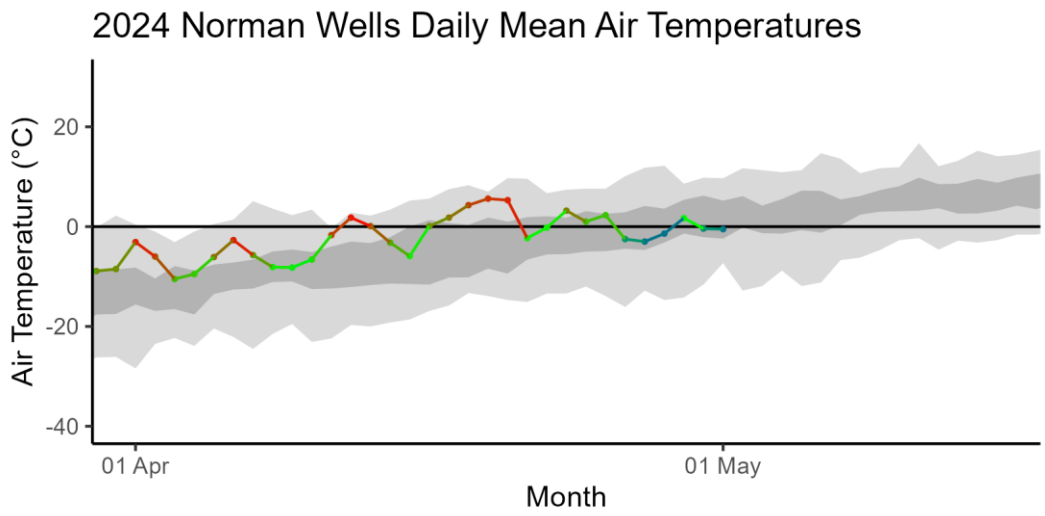
Weather Data:

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. The first set of figures show how temperatures have been relative to average (dark grey band) this spring, while the second set shows Environment and Climate Change Canada (ECCC) weather forecast data for the next seven days.

The Dehcho region is forecast to see temperatures that are warmer than normal over the next week. No significant precipitation is forecast for the Dehcho region over this period.






2024 Norman Wells Daily Mean Air Temperatures
Air Temperature (°C)
20
0
-20
-40
01 Apr
01 May
Month

Fort Liard seven-day weather forecast:

Thu 2 May	Fri 3 May	Sat 4 May	Sun 5 May	Mon 6 May	Tue 7 May	Wed 8 May
18°C A mix of sun and cloud	19°C A mix of sun and cloud	21°C Sunny	21°C Sunny	22°C A mix of sun and cloud	16°C Cloudy	16°C A mix of sun and cloud
Tonight	**Night**	**Night**	**Night**	**Night**	**Night**	
5°C Partly cloudy	3°C Clear	4°C Clear	6°C Clear	4°C 30% Chance of showers	2°C Cloudy	

Fort Simpson seven-day weather forecast:

Thu 2 May	Fri 3 May	Sat 4 May	Sun 5 May	Mon 6 May	Tue 7 May	Wed 8 May
15°C A mix of sun and cloud	17°C Mainly sunny	19°C Sunny	20°C Sunny	23°C Sunny	19°C A mix of sun and cloud	18°C A mix of sun and cloud
Tonight	**Night**	**Night**	**Night**	**Night**	**Night**	
0°C Partly cloudy	3°C Clear	5°C Clear	8°C Clear	5°C Cloudy periods	4°C Cloudy periods	

Norman Wells seven-day weather forecast:

Thu 2 May	Fri 3 May	Sat 4 May	Sun 5 May	Mon 6 May	Tue 7 May	Wed 8 May
0°C 60% Chance of flurries	8°C A mix of sun and cloud	16°C A mix of sun and cloud	16°C Sunny	16°C Sunny	14°C A mix of sun and cloud	14°C A mix of sun and cloud
Tonight	**Night**	**Night**	**Night**	**Night**	**Night**	
-4°C Partly cloudy	-1°C Clear	-1°C Cloudy periods	3°C Clear	2°C Cloudy periods	2°C 60% Chance of showers	

Factors to Watch:

It is important to note that much of the water contributing to NWT rivers 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 snowpack 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, 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 occur 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, hits the ground, or gets stuck in a river bend. When this happens, the pieces of floating ice jam 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 may 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 behind an ice jam. 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.