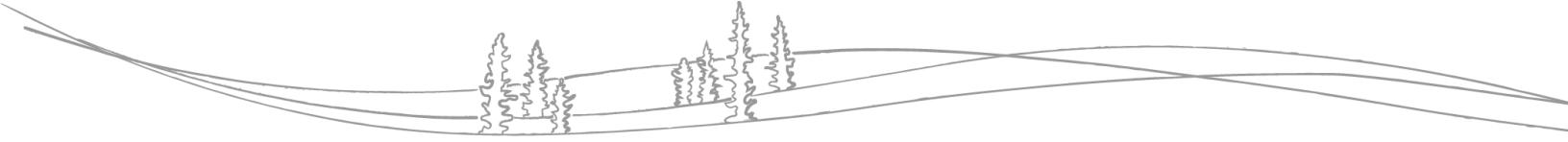




NWT Water Monitoring Bulletin

– April 30, 2024 at 12:00



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:

- On the Liard River, open water sections are growing, and ice has begun moving at the Liard River ferry crossing. Water levels are slowly rising at the mouth of the Liard River and are variable in response to moving ice. Levels are normal for this time of year.
- On the Mackenzie River, open water sections are growing. Some small ice jams have formed and released upstream of the Liard River confluence.
 - Mackenzie River ice remains intact at Fort Simpson.
 - Water levels on the Mackenzie River at Fort Simpson remain lower than normal for this time of year.
- With warmer than normal temperatures forecast at Fort Liard and Fort Simpson for this week, ice is expected to continue to move along the Liard and Mackenzie rivers.

Contents

Current Status:	1
Liard River:	3
Current Status:	3
Hydrometric Data:	4
Liard River at Fort Liard [10ED001]:.....	4
Liard River near the mouth [10ED002]:.....	6
Mackenzie River	8
Current Status:	8
Satellite Data:.....	9
Hydrometric Data:	11
Mackenzie River at Strong Point [10FB006]:	11
Mackenzie River at Fort Simpson [10GC001]:	13
Weather Data:	15
Factors to Watch:	18
Spring Break up on NWT Rivers: Mechanical vs Thermal	18
Technical Note:.....	19

Liard River:

Current Status:

- Snowmelt is nearly complete in the low-lying, non-mountainous part of the Liard River basin.
- Long sections of open water are developing along the Liard River;
 - Ice appears to remain solid on the Liard River at Fort Liard as of this morning
 - The open water section along the riverbank is growing.
 - Ice began moving at the Liard River ferry crossing near Fort Simpson yesterday at 15:00 but has not yet pushed into the Mackenzie River.
- Water levels on the Liard River are rising in response to ice movement and are normal for this time of year.
- Temperatures at Fort Liard and Fort Simpson are expected to be much warmer than normal for the next week;
 - River ice should continue to move in response to warm weather;
 - No significant precipitation is expected over the basin over this time.

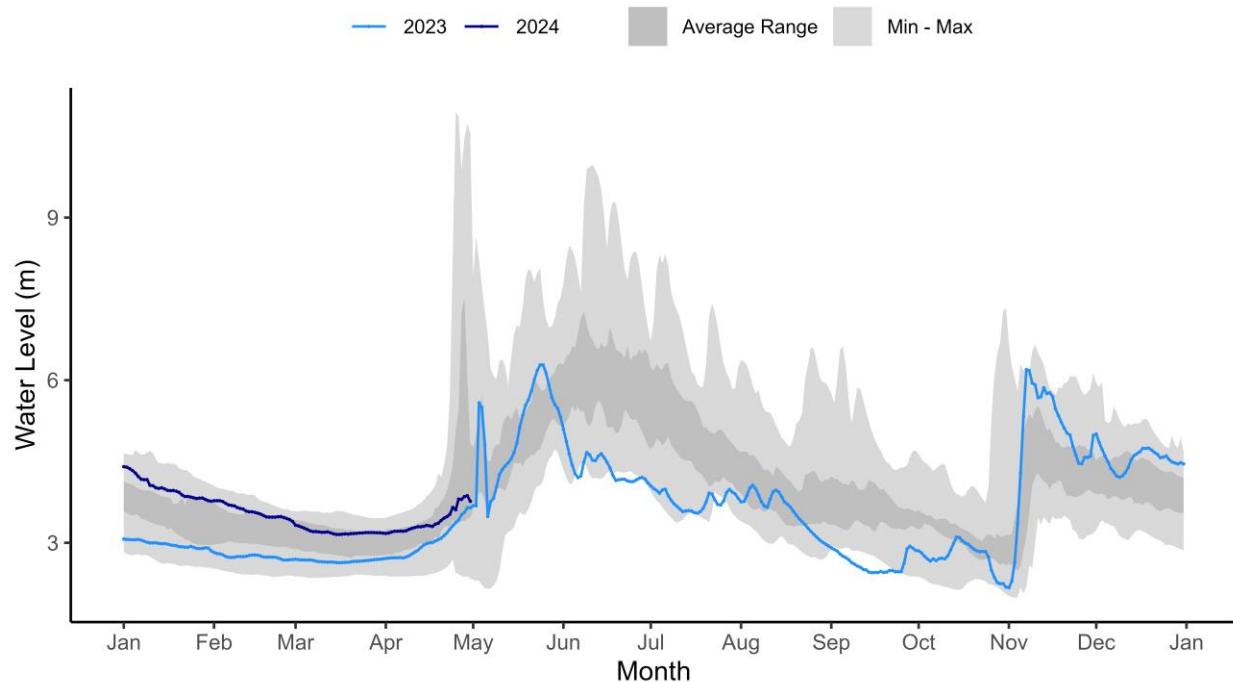


Above – Map of hydrometric stations in the Liard River basin. The station numbers are referenced in the water level plots below.

Hydrometric Data:

Liard River at Fort Liard [10ED001]:

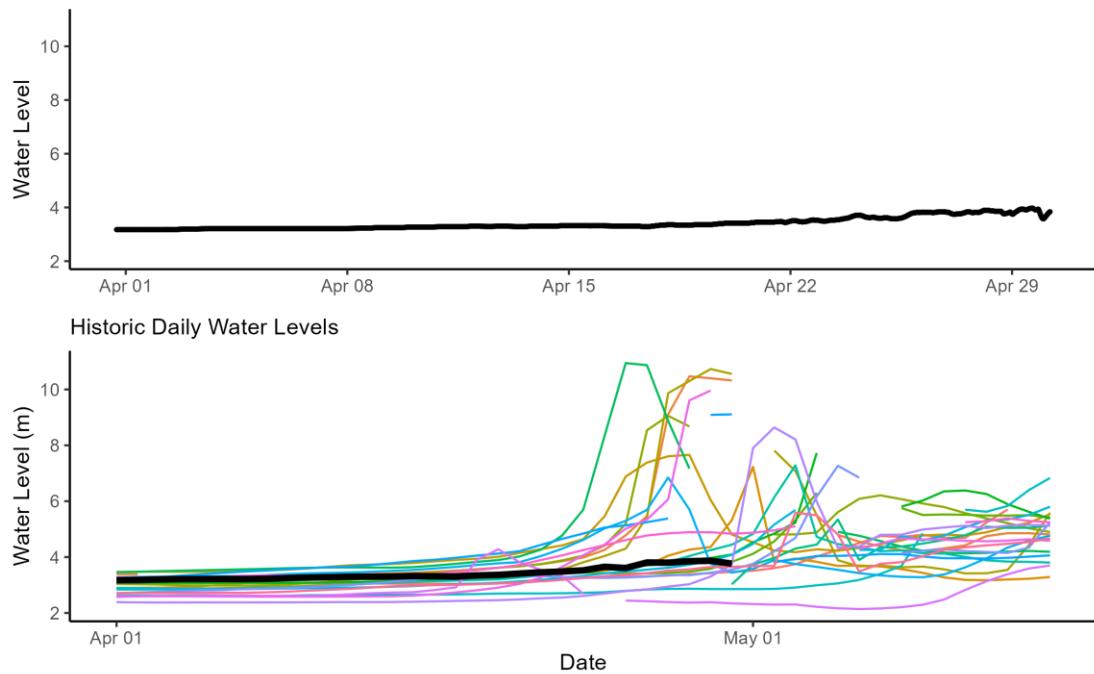
LIARD RIVER AT FORT LIARD (10ED001)



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

LIARD RIVER AT FORT LIARD (10ED001)

2024 Water Levels (5 minute resolution)



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.

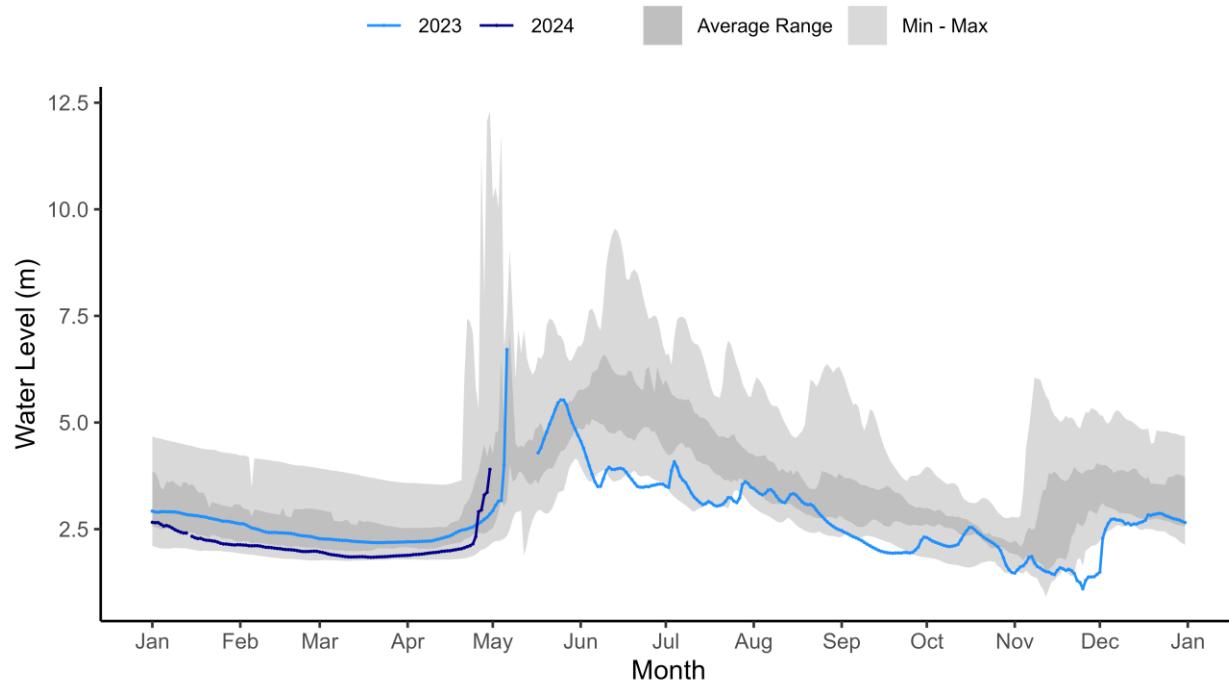
10ED001_FortLiard 2024-04-30 17:01:14 UTC
60.24142, -123.47545 13.3V 14.0°C P



Above – Liard River at Fort Liard hydrometric gauge photo from April 30 at 11:00. Photo courtesy of Water Survey of Canada and GNWT.

Liard River near the mouth [10ED002]:

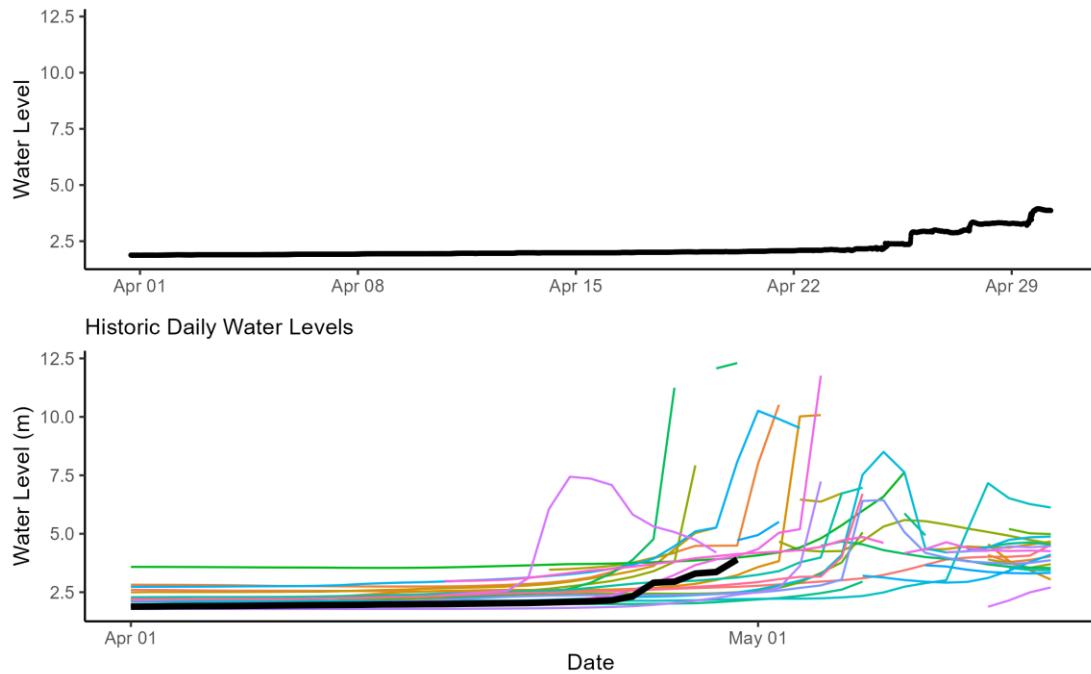
LIARD RIVER NEAR THE MOUTH (10ED002)



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

LIARD RIVER NEAR THE MOUTH (10ED002)

2024 Water Levels (5 minute resolution)



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.

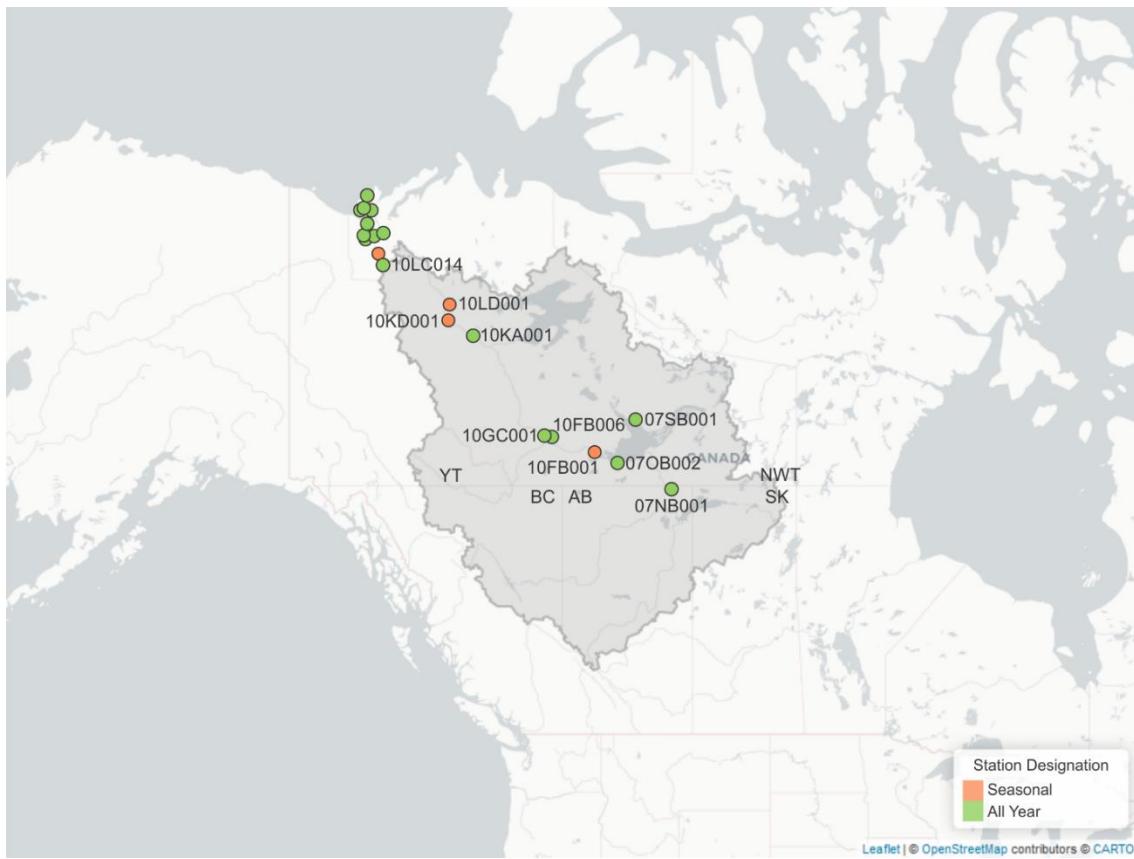


Above – Liard River near the mouth hydrometric gauge photo from April 30 at 08:00. Photo provided by GNWT.

Mackenzie River

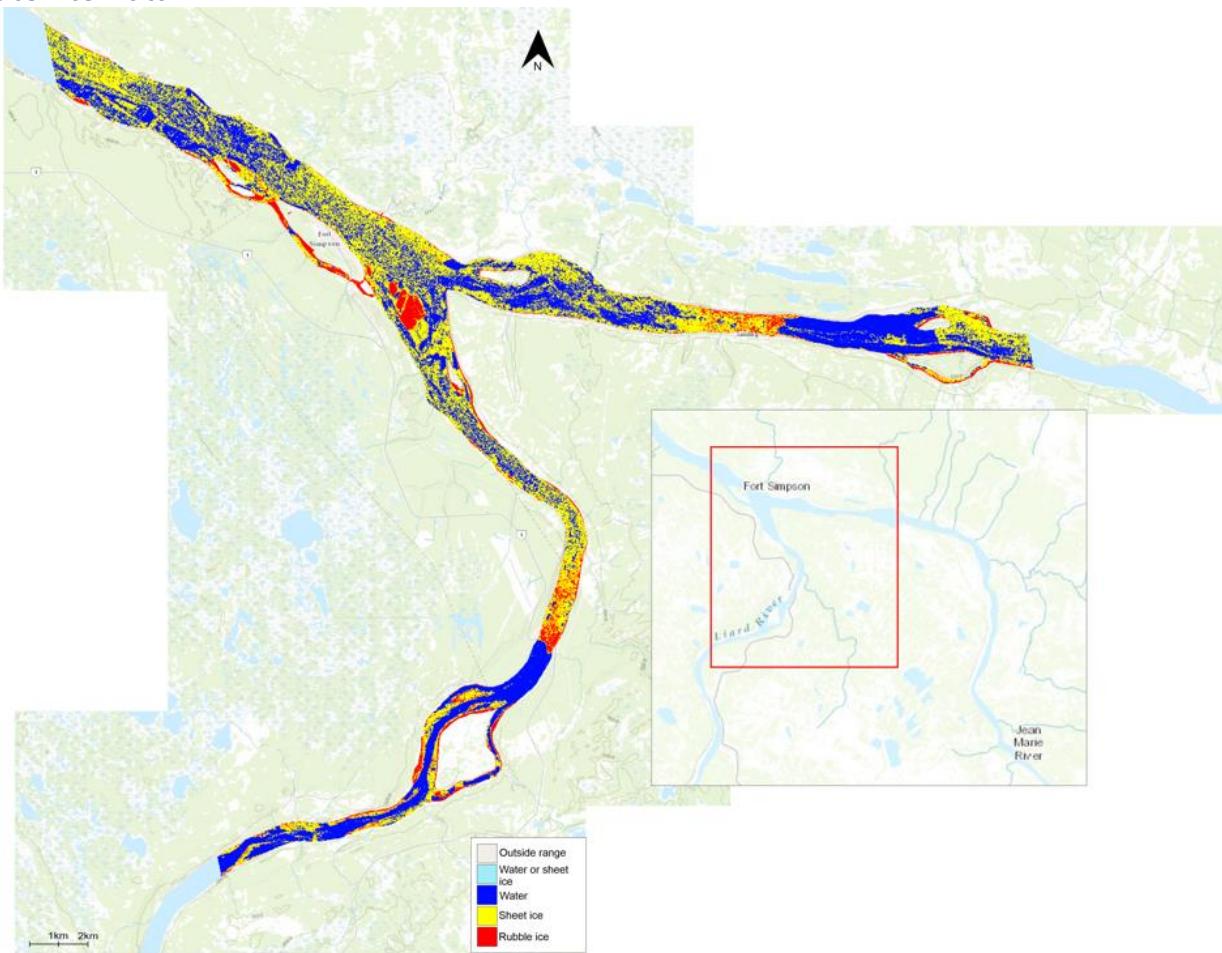
Current Status:

- Open water sections are growing on the Mackenzie River between Jean Marie River and Fort Simpson;
 - Small ice jams have developed and released throughout this reach of the Mackenzie River
 - This is normal for this time of year.
 - Ice has not yet moved on the Mackenzie River at Fort Simpson.
- Water levels continue to rise underneath the ice on the Mackenzie River at Fort Simpson but remain low for this time of year.

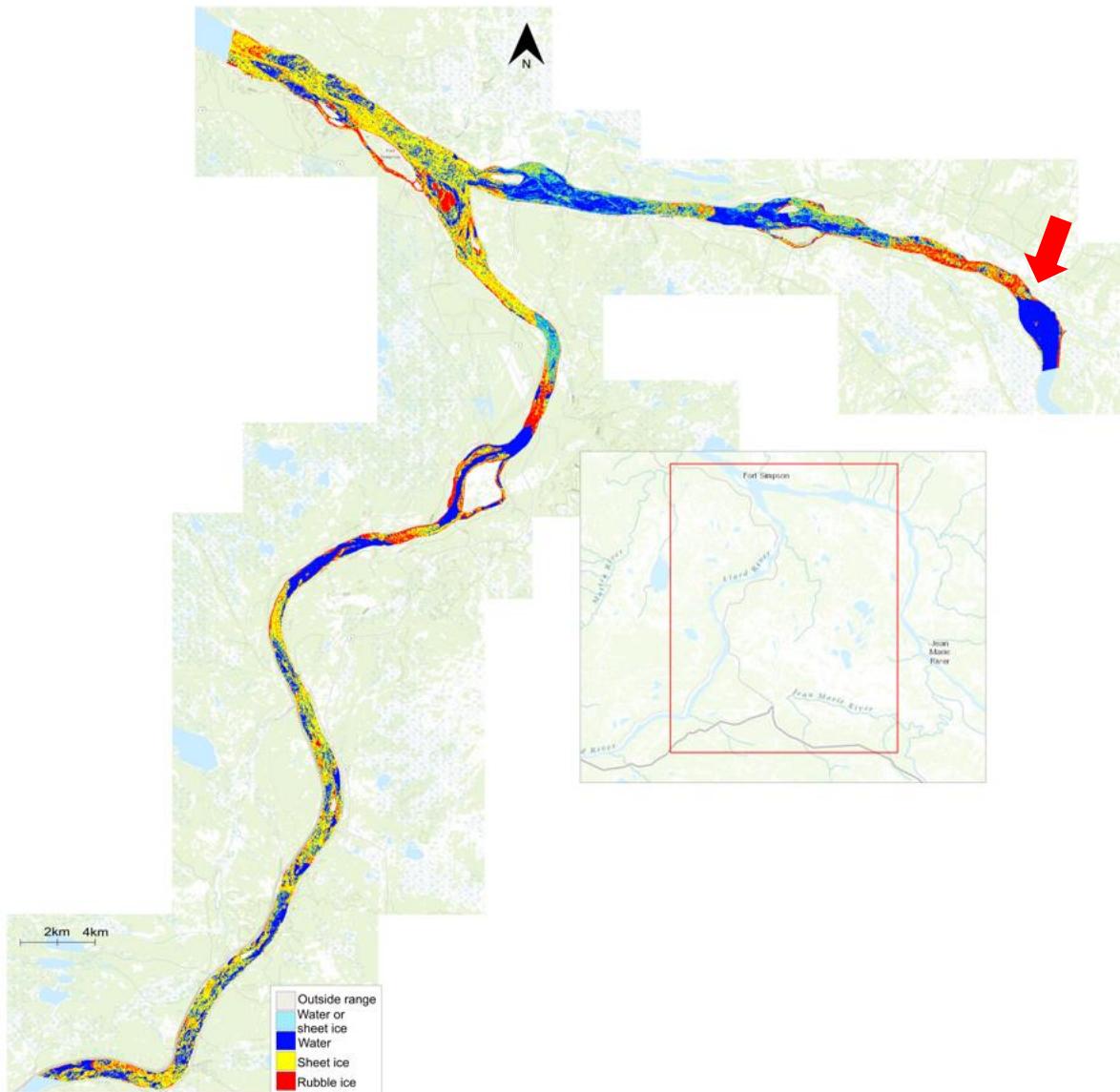


Above – Map of hydrometric stations in the Mackenzie River basin. The station numbers are referenced in the water level plots below.

Satellite Data:



Above – Classified river ice imagery of the confluence of the Liard and Mackenzie rivers as of Apr 29 at 19:37 MDT. The imagery was acquired by the RADARSAT Constellation Mission via the Government Operations Centre. The image shows open water sections, and rubble ice near the Liard River crossing and on the Mackenzie upstream of the confluence. *Note: Ice downstream of the confluence is intact (see gauge photo at Fort Simpson), blue sections are likely misclassified due to water overlaying the ice surface.*

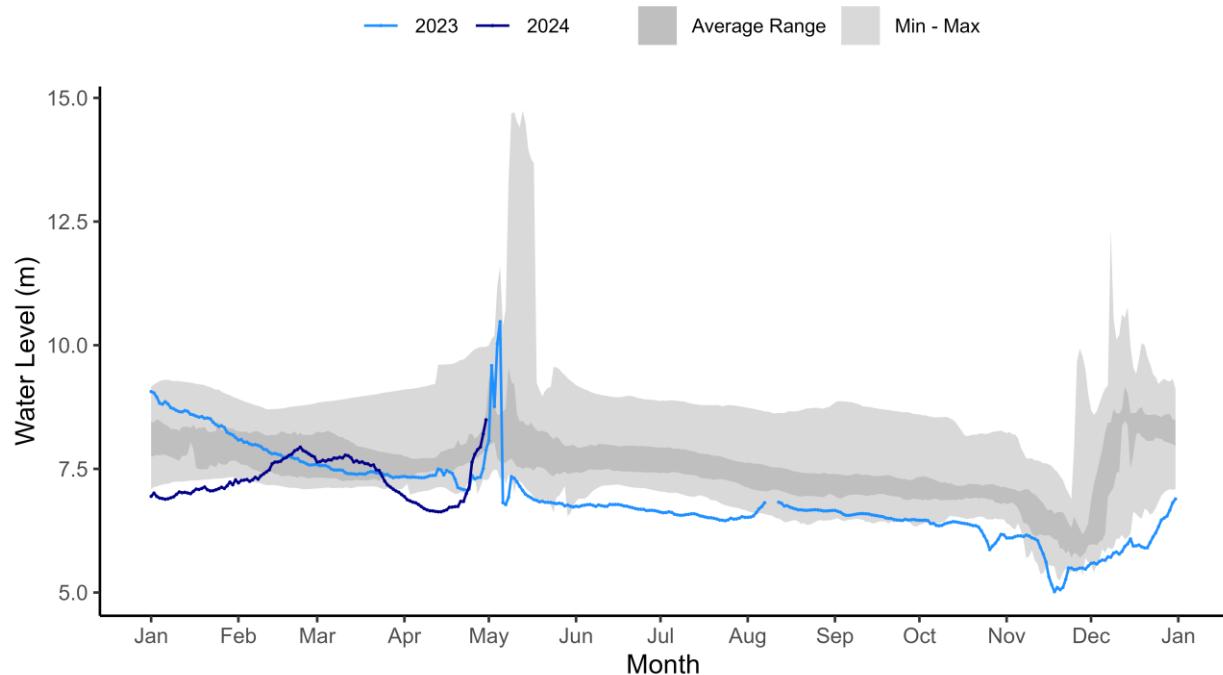


Above – Classified river ice imagery of the confluence of the Liard and Mackenzie rivers as of Apr 29 at 08:37 MDT. The imagery was acquired by the RADARSAT Constellation Mission via the Government Operations Centre. The image shows open water sections, intact ice downstream of the confluence, and a small ice jam forming on the Mackenzie upstream of the confluence (see red arrow). Note: *Ice downstream of the confluence is intact (see gauge photo at Fort Simpson), blue sections are likely misclassified due to water overlaying the ice surface.*

Hydrometric Data:

Mackenzie River at Strong Point [10FB006]:

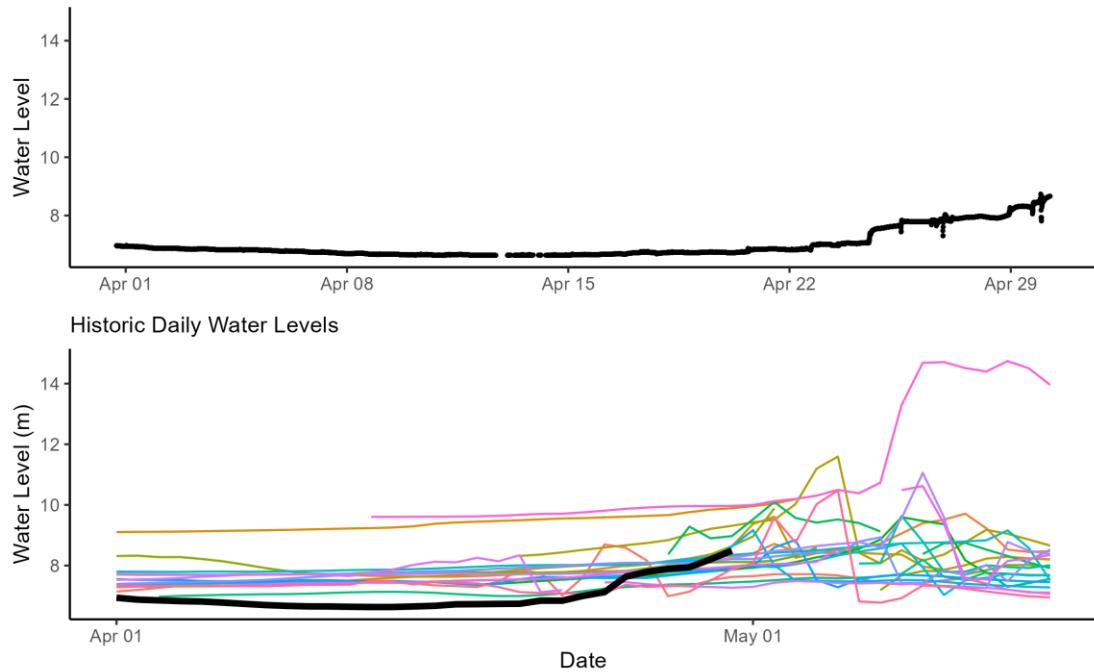
MACKENZIE RIVER AT STRONG POINT (10FB006)



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

MACKENZIE RIVER AT STRONG POINT (10FB006)

2024 Water Levels (5 minute resolution)



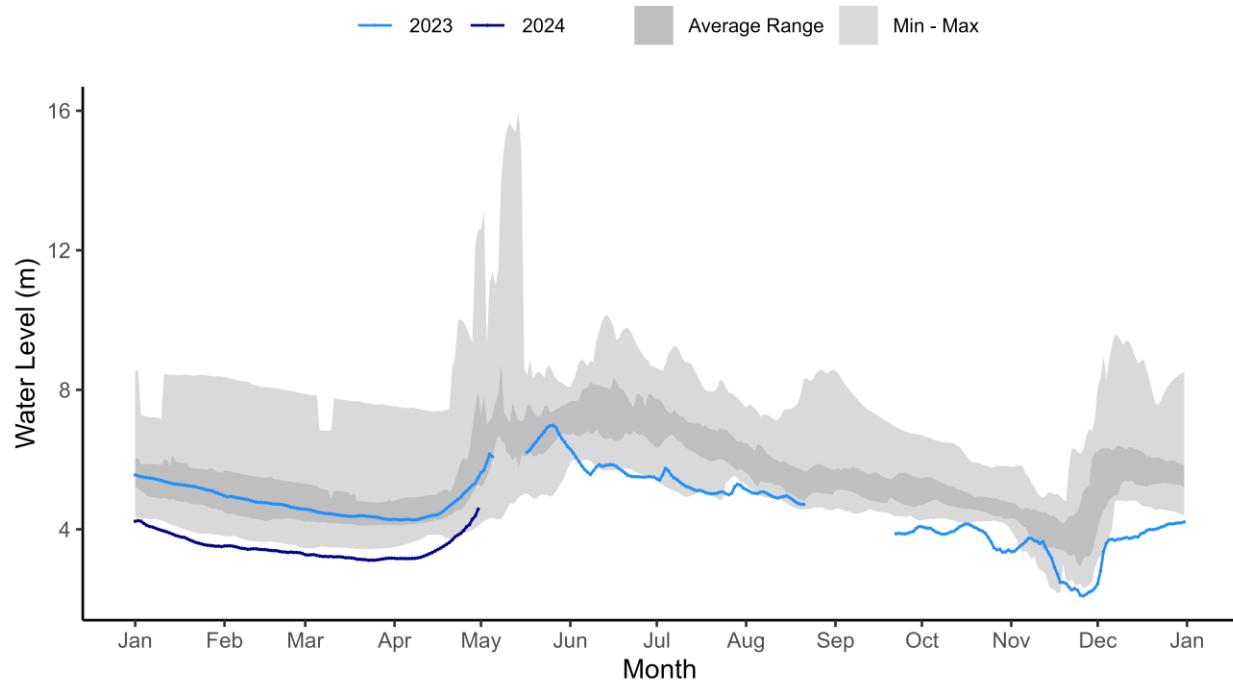
Above – The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.

10FB006_MackStrongPoint 2024-04-30 17:01:14 UTC
61.81648, -120.79189 12.7V 10.0°C P

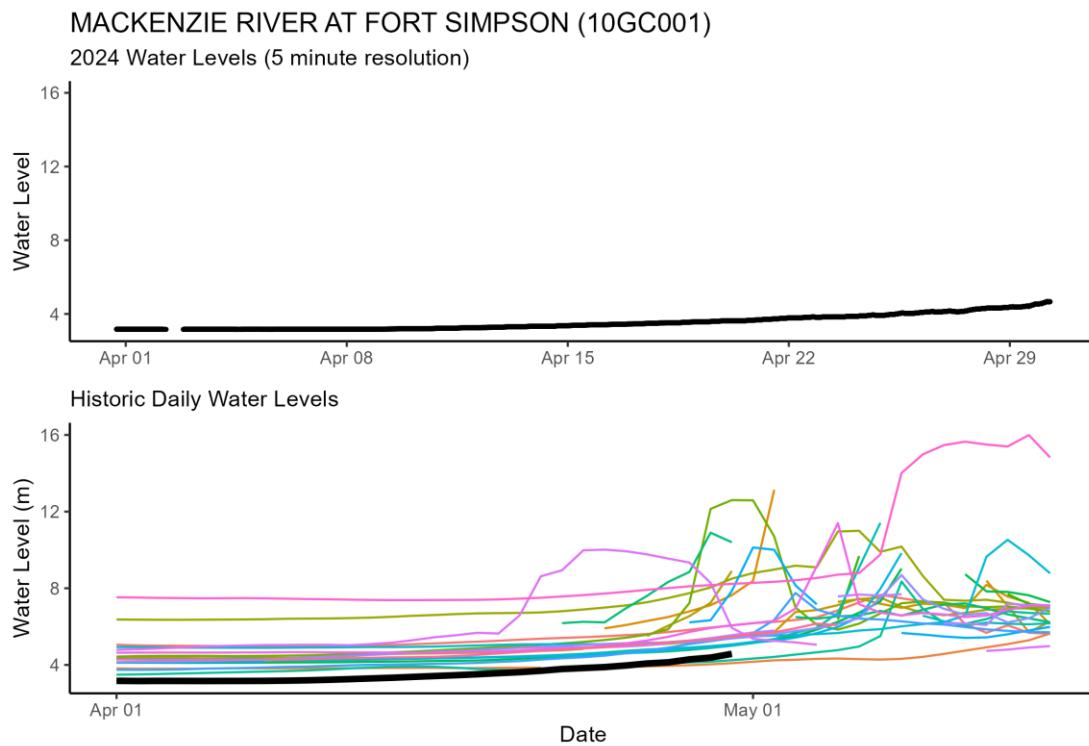


Above – Mackenzie River at Strong Point hydrometric gauge photo from April 30 at 11:00. Photo courtesy of Water Survey of Canada and GNWT.

Mackenzie River at Fort Simpson [10GC001]:
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.

10GC001_MackSimpson 2024-04-30 17:01:14 UTC
61.86804, -121.35842 14.4V 115°C P

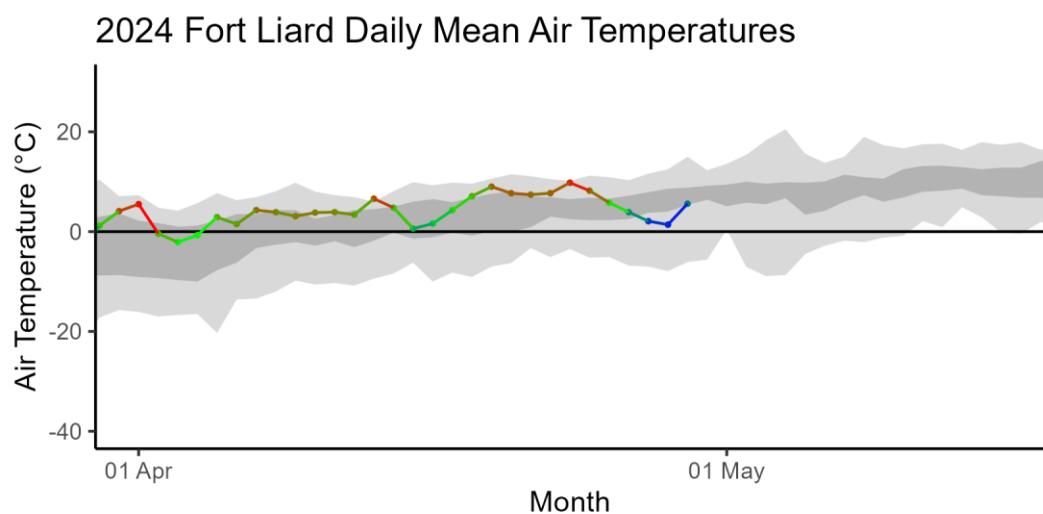
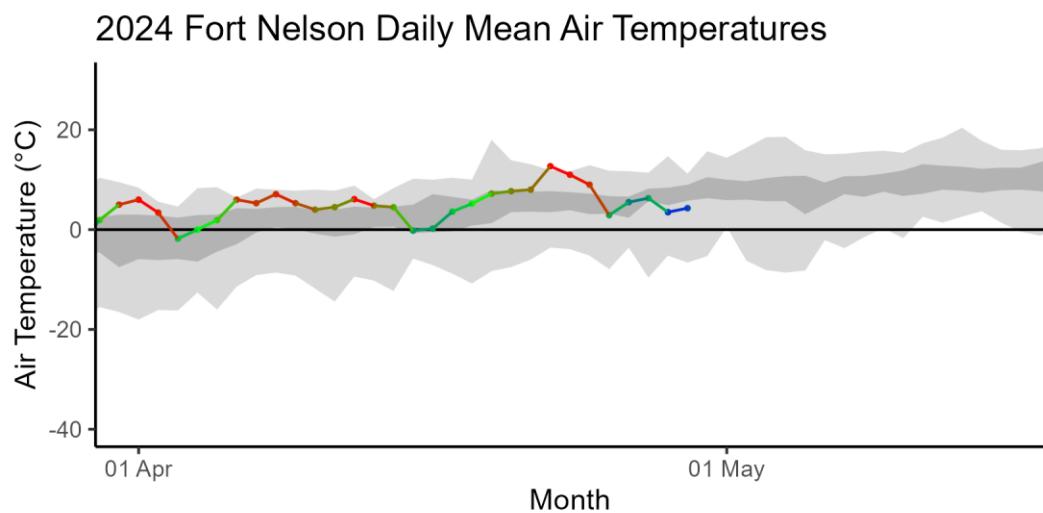


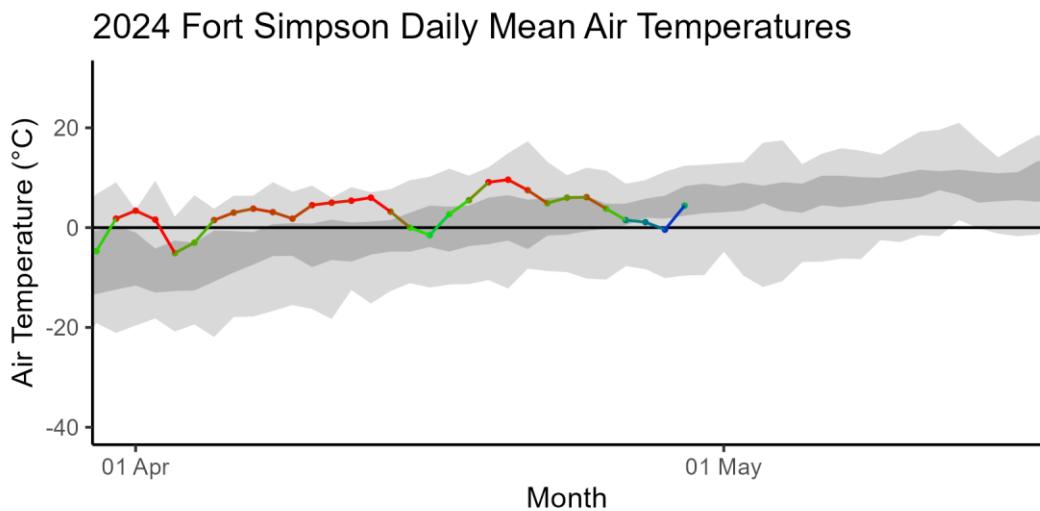
Above – Mackenzie River at Fort Simpson hydrometric gauge photo from April 30 at 11:00. Photo provided by GNWT.

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 week. No significant precipitation is forecast for the Dehcho region over the week.





Fort Nelson seven-day weather forecast:

Tue 30 Apr	Wed 1 May	Thu 2 May	Fri 3 May	Sat 4 May	Sun 5 May	Mon 6 May
 14°C	 16°C	 17°C	 17°C	 17°C	 19°C	 18°C
Sunny	Mainly sunny	Sunny	Sunny	Sunny	A mix of sun and cloud	A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 -1°C	 3°C	 5°C	 3°C	 4°C	 5°C	
Clear	Clear	Clear	Clear	Clear	Cloudy periods	

Fort Liard seven-day weather forecast:

Tue 30 Apr	Wed 1 May	Thu 2 May	Fri 3 May	Sat 4 May	Sun 5 May	Mon 6 May
 16°C	 17°C	 18°C	 20°C	 20°C	 18°C	 18°C
Sunny	A mix of sun and cloud	Sunny	Sunny	Sunny	A mix of sun and cloud	A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 1°C	 1°C	 2°C	 3°C	 4°C	 4°C	
Partly cloudy	Clear	Clear	Clear	Cloudy periods	Cloudy periods	

Fort Simpson seven-day weather forecast:

Tue 30 Apr	Wed 1 May	Thu 2 May	Fri 3 May	Sat 4 May	Sun 5 May	Mon 6 May
 13°C	 15°C	 15°C	 19°C	 19°C	 21°C	 21°C
Mainly sunny	Mainly sunny	A mix of sun and cloud	Sunny	Sunny	Sunny	A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 1°C	 2°C	 4°C	 5°C	 6°C	 7°C	
A few clouds	Clear	Clear	Clear	Clear	Cloudy periods	

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.