Government of
Northwest Territories

NWT Water Monitoring Bulletin – May 18, 2024 at 17:00

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:

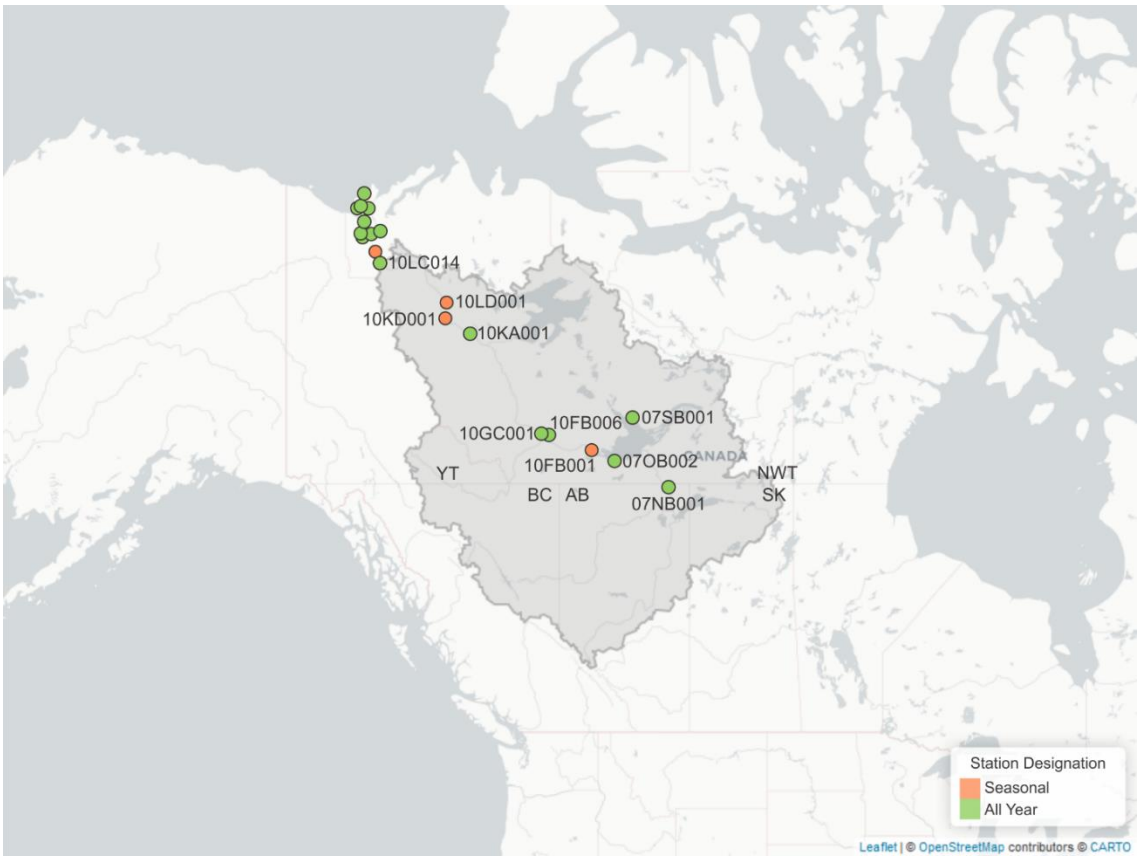
- Break up is progressing along the Mackenzie River.
  - The ice front has moved downstream of Norman Wells;
  - There are intermittent stretches of open water and sheet ice on the Mackenzie River between Norman Wells and Tsiigehtchic.
- Water levels on the Mackenzie River upstream of the ice front remain very low.
- On the Peel River, water levels are rising, and ice is beginning to move upstream of Fort McPherson.
  - Snow and ice melt have substantially increased as a result of temperatures well above zero degrees over the previous two days.
  - Out of bank flows and potential flooding are possible this weekend around Fort McPherson if a strong ice jam forms downstream of the community.
  - Imagery indicates that ice jams are beginning to form above the community;
  - ECC will continue to monitor ice conditions through radar and optical satellite imagery.
- Temperatures for the next three days are forecast to be well above zero in the Sahtu (warmer than average).
- In the Peel River basin and Beaufort Delta, daytime highs are forecast to be just above zero with lows near zero.

Contents

Mackenzie River:

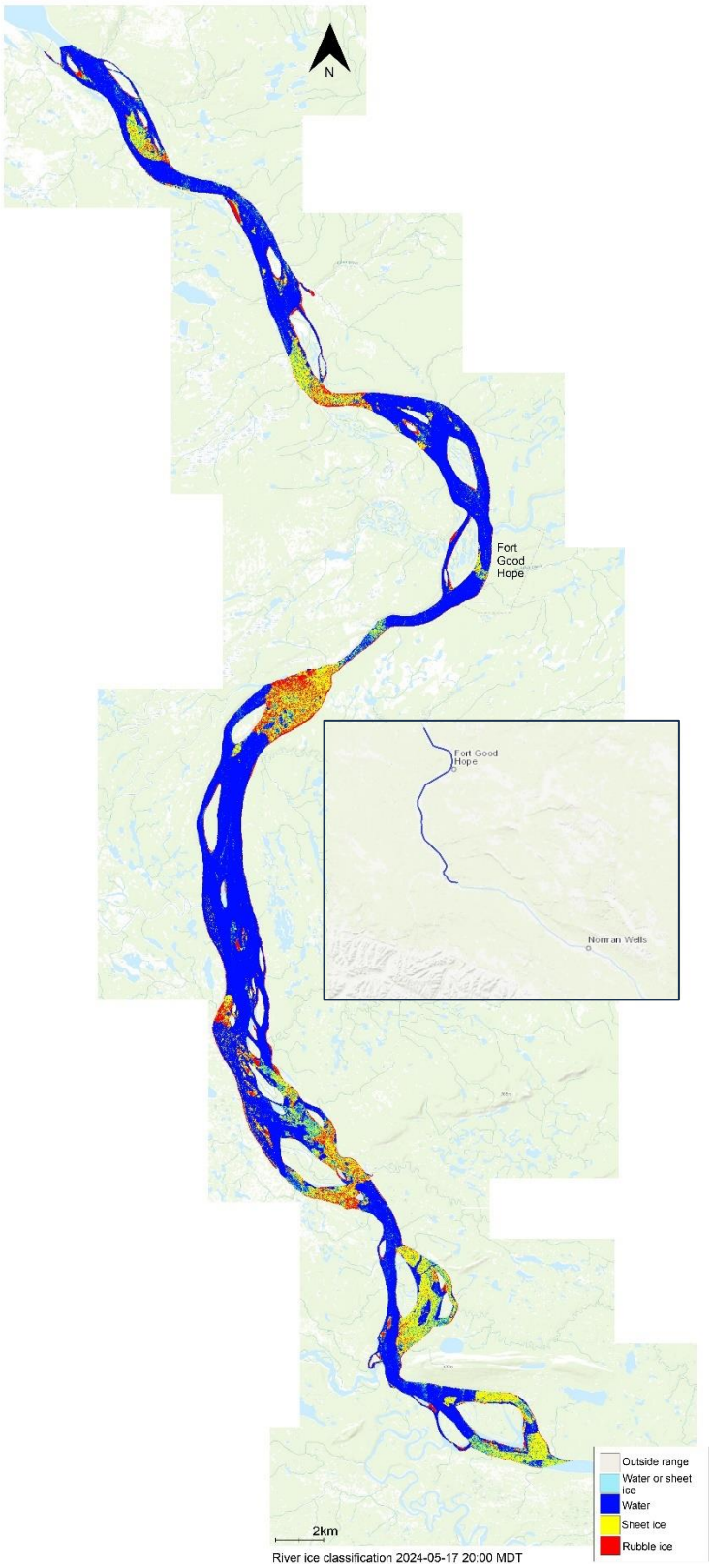
Current Status:

- Break up is progressing along the Mackenzie River.
    - The ice front has moved past Norman Wells;
    - Ice in this region has started to move, with no ice jams of concern;
    - There are large open water sections and sheet ice in between Fort Good Hope and Tsiigehtchic.



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

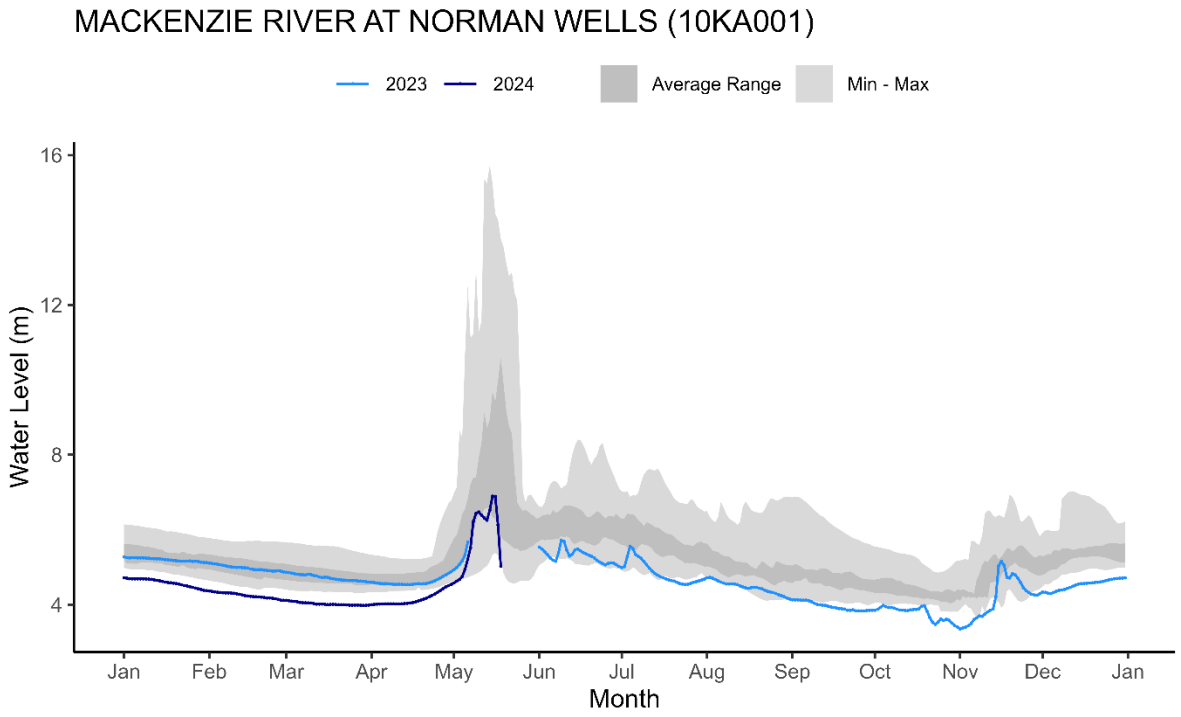
Imagery:



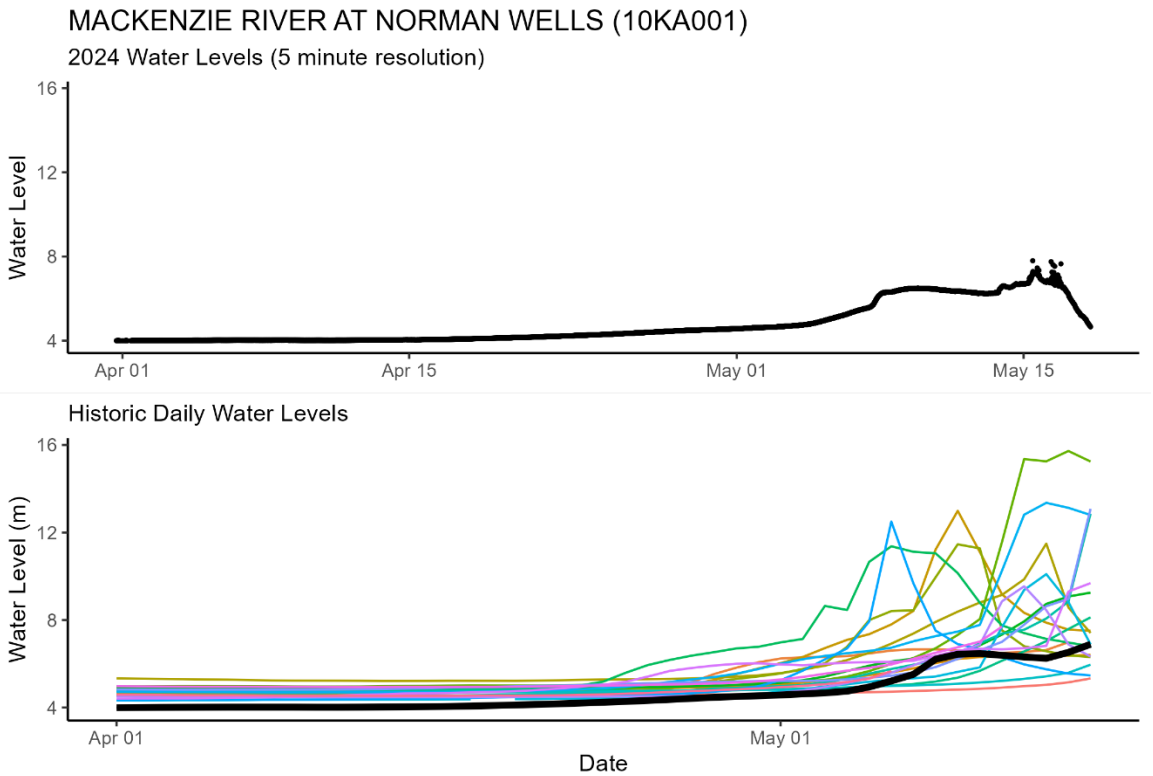
Above – River ice classification of the Mackenzie River near Fort Good Hope. The image was acquired on May 17th at 20:00 MDT. This image shows open water sections and an ice jam upstream of Fort Good Hope.

Hydrometric Data:

Mackenzie River at Norman Wells [10KA001]:



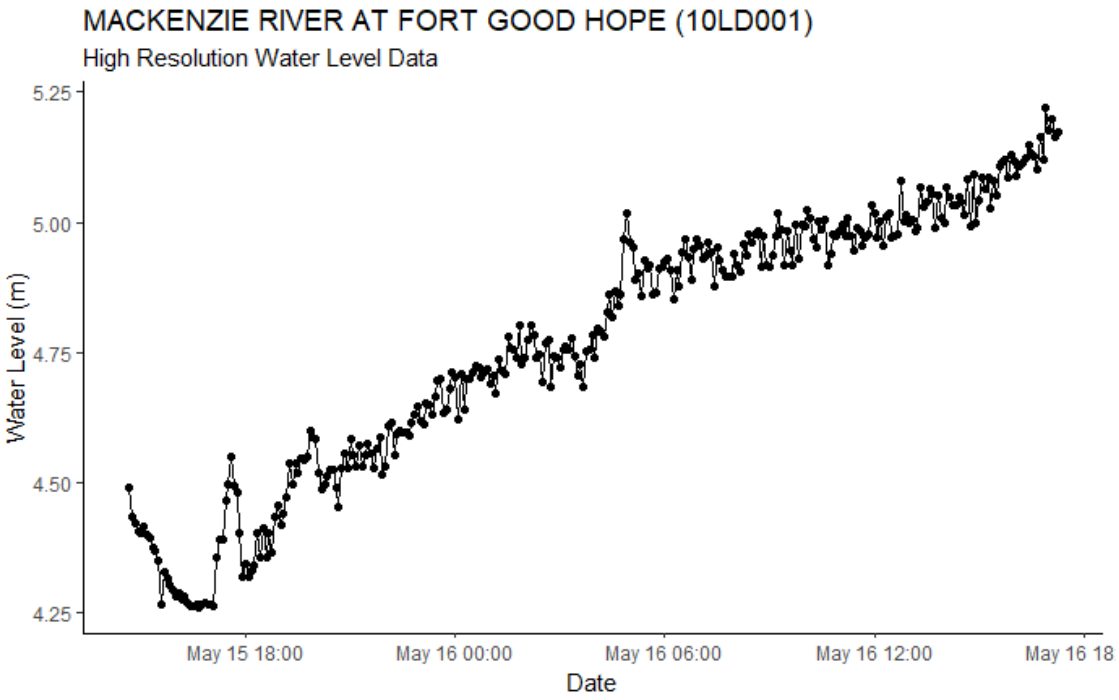
Above – Water level data for the Mackenzie River at Norman Wells. Data for the previous year are also shown here.



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 18th at 14:00. Photo courtesy of Water Survey of Canada and GNWT.

Mackenzie River at Fort Good Hope [10LD001]:



Above – This graph presents real time water level data at 5-minute resolution.

Above – Mackenzie River at Fort Good Hope hydrometric gauge photo from May 18th at 14:00. Photo provided by GNWT.

Mackenzie River at Arctic Red River [10LC014]:

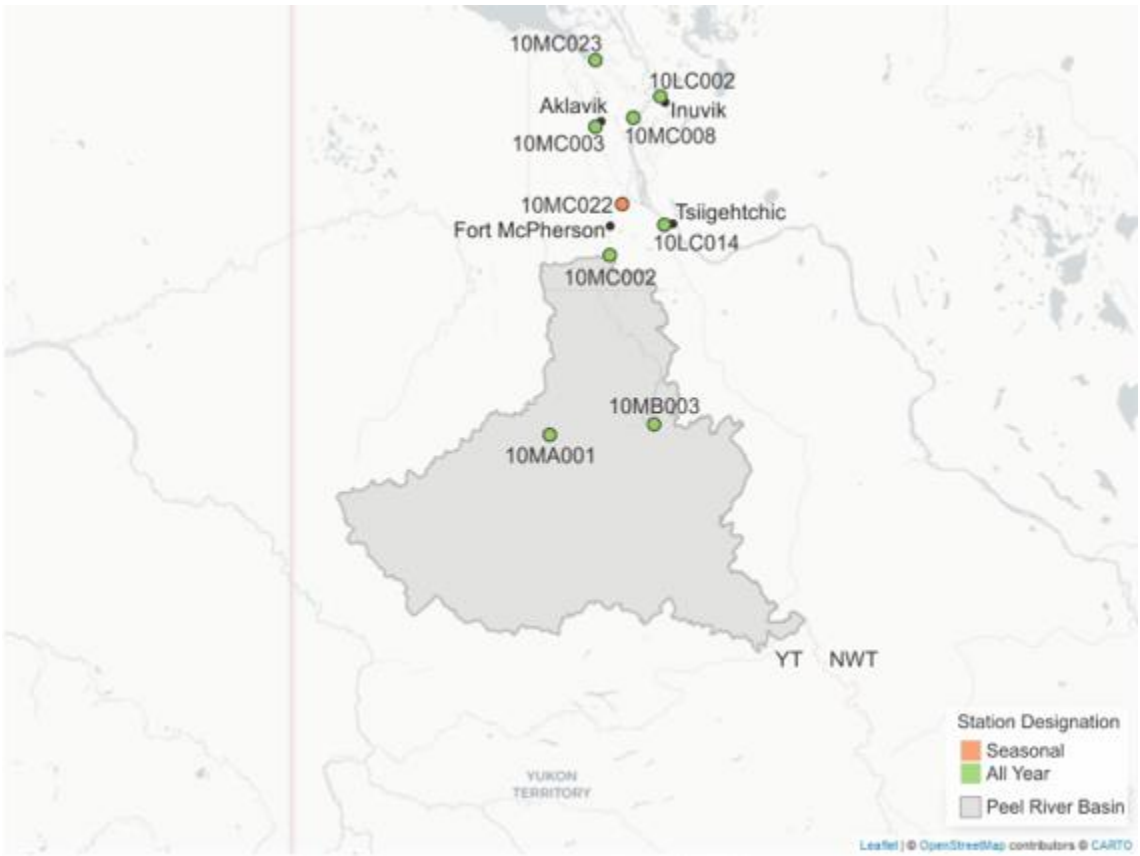
Note: Water level data are not currently being transmitted from this station.

Above – Mackenzie River at Arctic Red River hydrometric gauge photo from May 18th at 12:00. Photo courtesy of Water Survey of Canada and GNWT.

Beaufort Delta and Peel River:

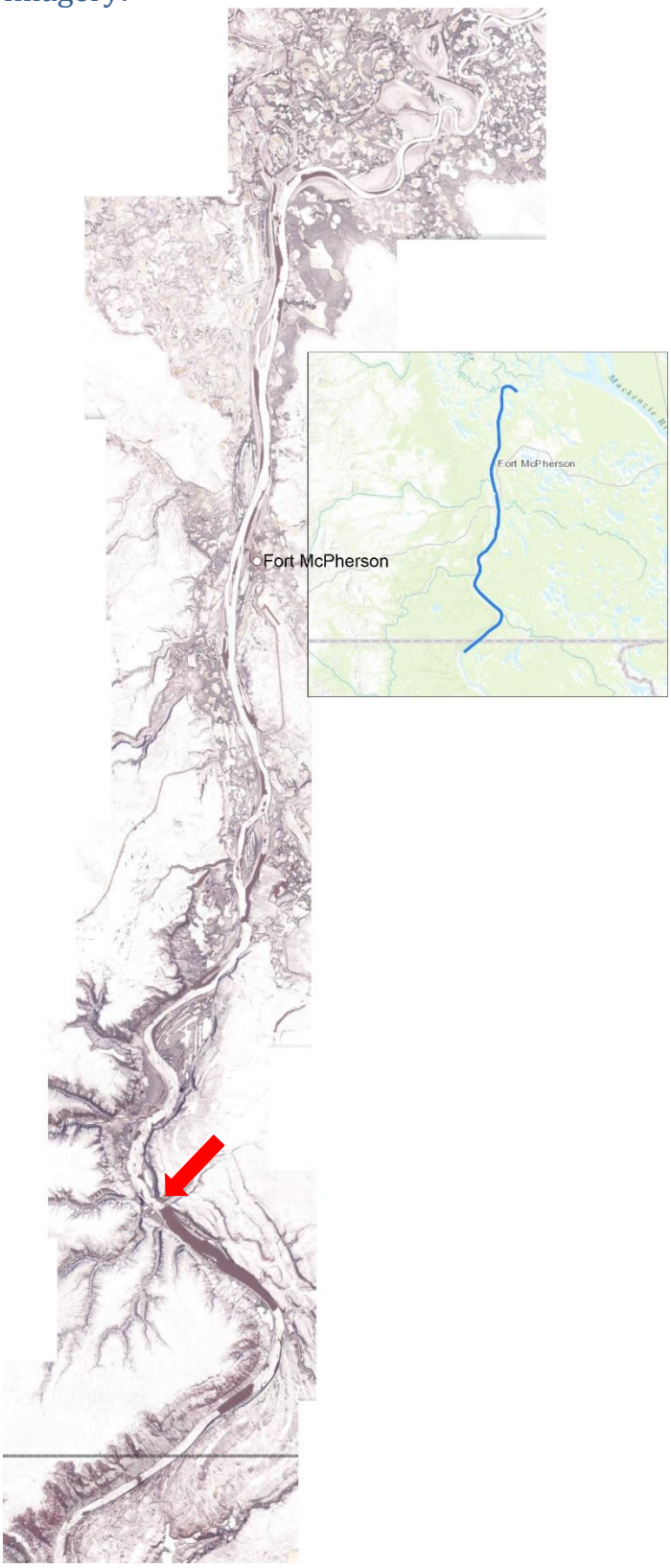
Current Status:

- Water levels are rising on the Peel River above Fort McPherson.
    - Photos from the hydrometric gauge indicate that ice is moving on the Peel River.
    - Water level data are not currently being transmitted at the gauge, but water level rise is inferred from photographs that are being transmitted every hour.
    - Snow and ice melt increased over the last two days due to warmer than normal temperatures.
    - Water levels on the Peel River in the area around Fort McPherson over the coming days will depend in part on whether or not strong ice jams form on the river.
    - The winter snowpack was much greater than normal in the Peel River basin this year.

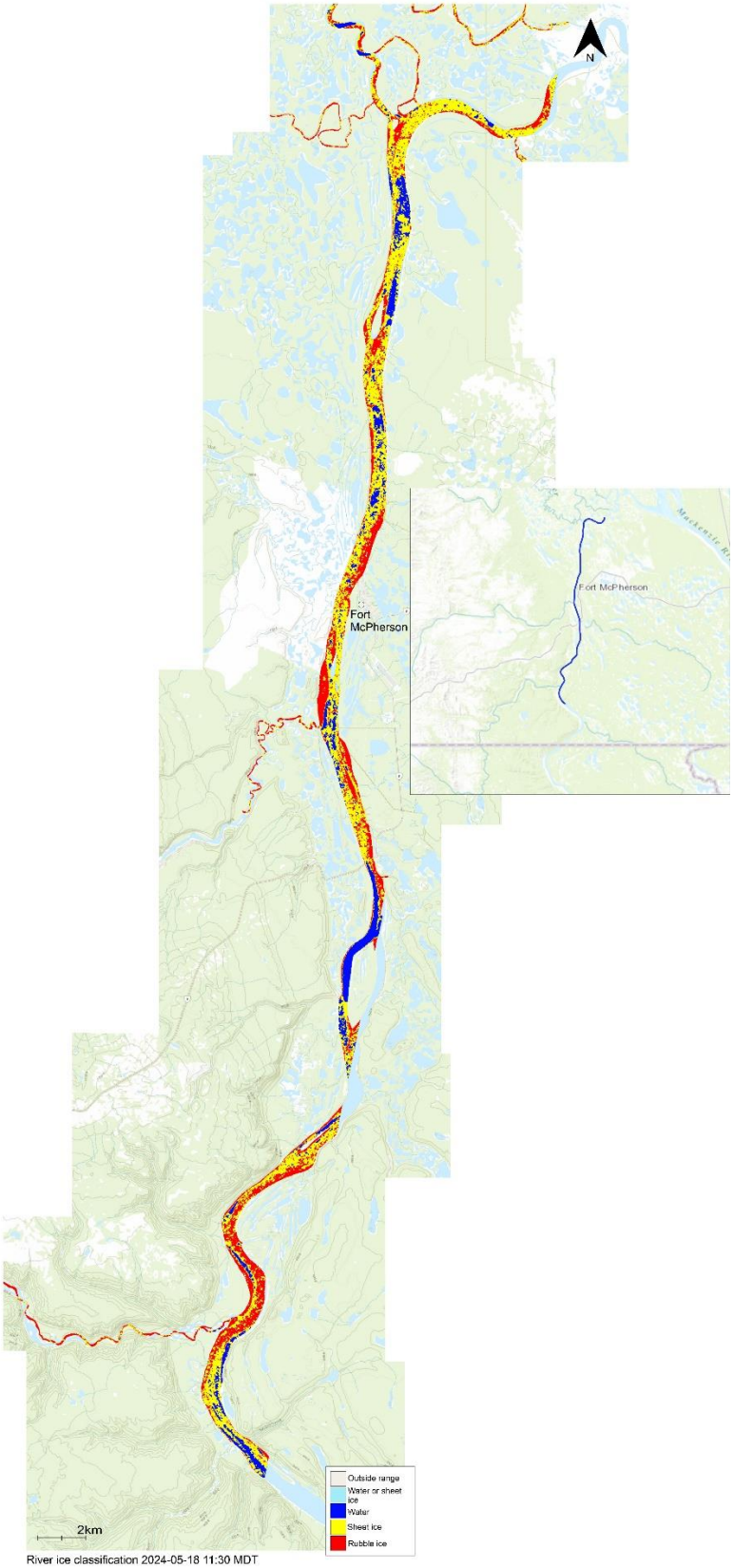


Above – Map of hydrometric stations in the Peel River basin. The station numbers are referenced in the water level plots below.

Imagery:



Above – Planet imagery of the Peel River near Fort McPherson. The image was acquired on May 17th. The image shows an ice jam forming approximately 30 km upstream of Fort McPherson (see red arrow).



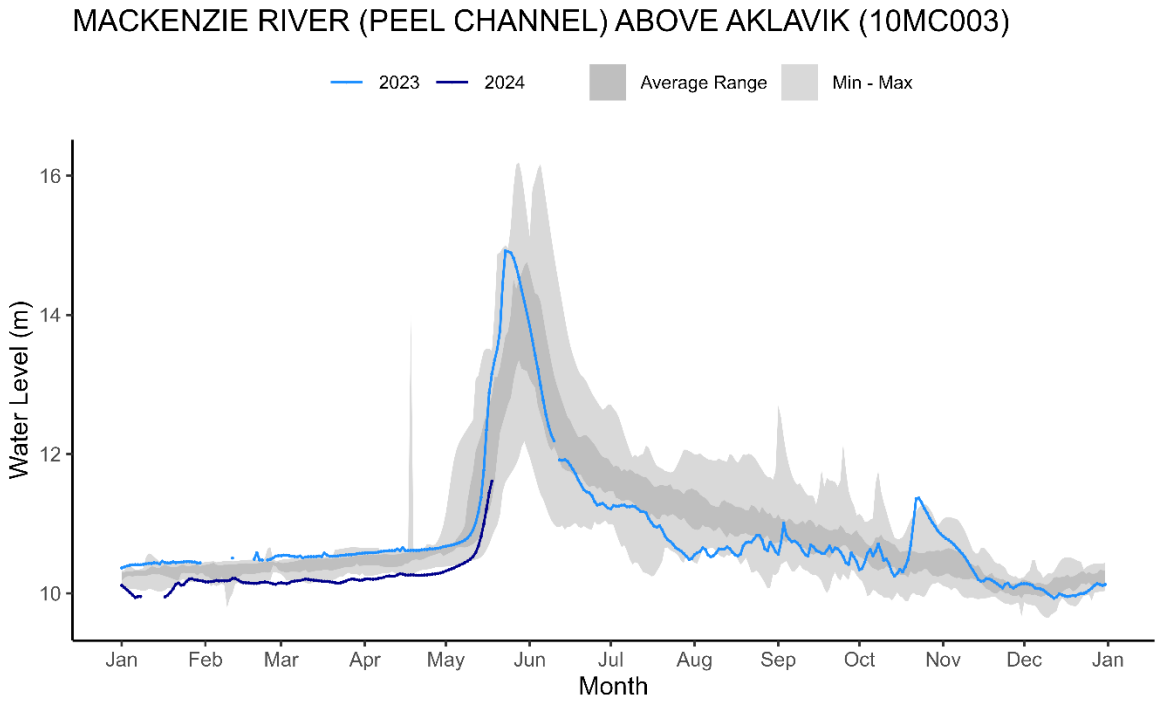
Above – River ice classification of the Peel River near Fort McPherson. The image was acquired on May 18th at 11:30 MDT. This image shows both open water sections and sheet ice along the river.

Hydrometric Data:
Peel River above Fort McPherson [10MC002]

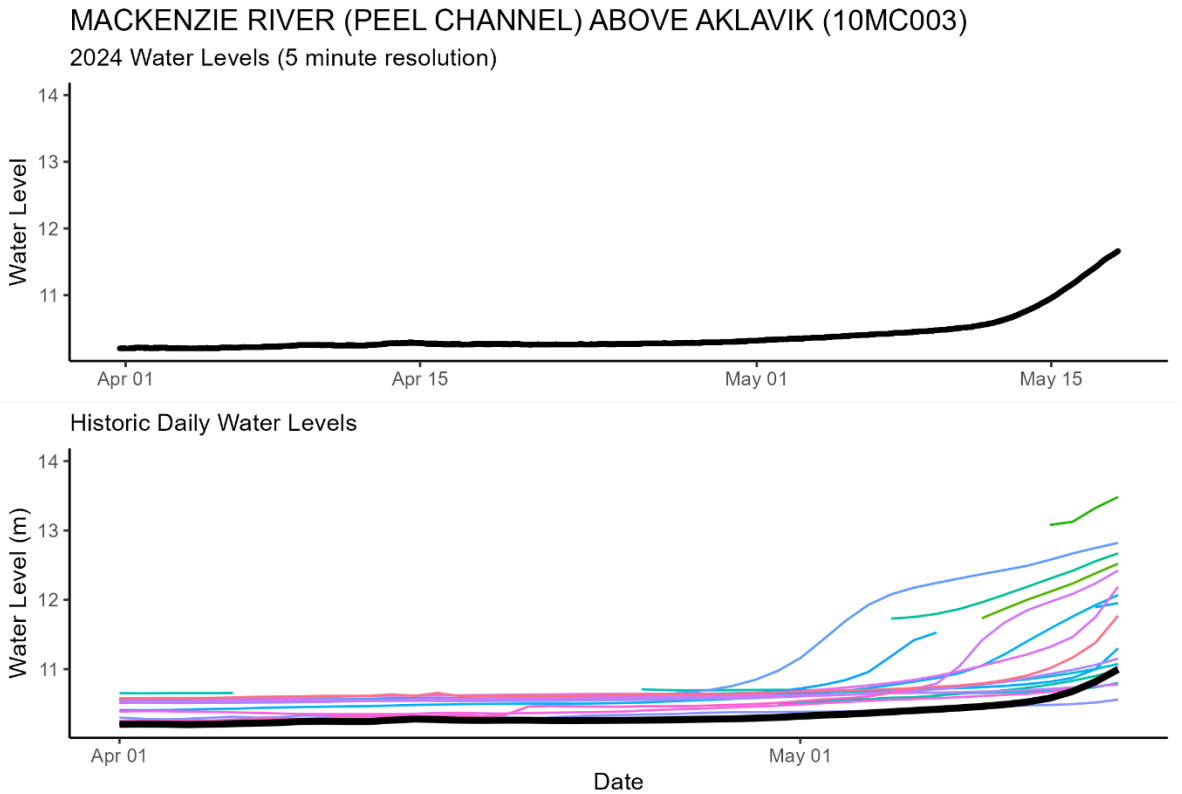
Note: Water level data are not currently being transmitted from this station. Photos from the hydrometric gauge indicate that water levels are rising quickly.

Above – Peel River above Fort McPherson hydrometric gauge photo from May 18th at 15:00. Photo courtesy of Water Survey of Canada and GNWT.

Mackenzie River (Peel Channel) above Aklavik [10MC003]:



Above – Water level data for the Mackenzie River (Peel Channel) above Aklavik. 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 (Peel Channel) above Aklavik hydrometric gauge photo from May 18 at 12:00. Photo courtesy of Water Survey of Canada and GNWT.

Weather Data:

Current status and forecast:

The Sahtu region is forecast to see temperatures that are warmer than normal for the rest of the weekend. Daytime highs are expected to be between 15°C and 20°C on Sunday, while nighttime lows will be between 5°C and 10°C. These temperatures should facilitate rapid melting of the residual snowpack.

The Inuvialuit-Gwich'in region is forecast to see temperatures that are approximately average for the rest of this weekend. Daytime high temperatures will be above freezing, while nighttime lows will hover around freezing. These temperatures should help to reduce the rate of snowmelt after warmer than average temperatures Thursday-Friday of this past week.

Some light precipitation (5-10 mm) is forecast for the Sahtu region this weekend.

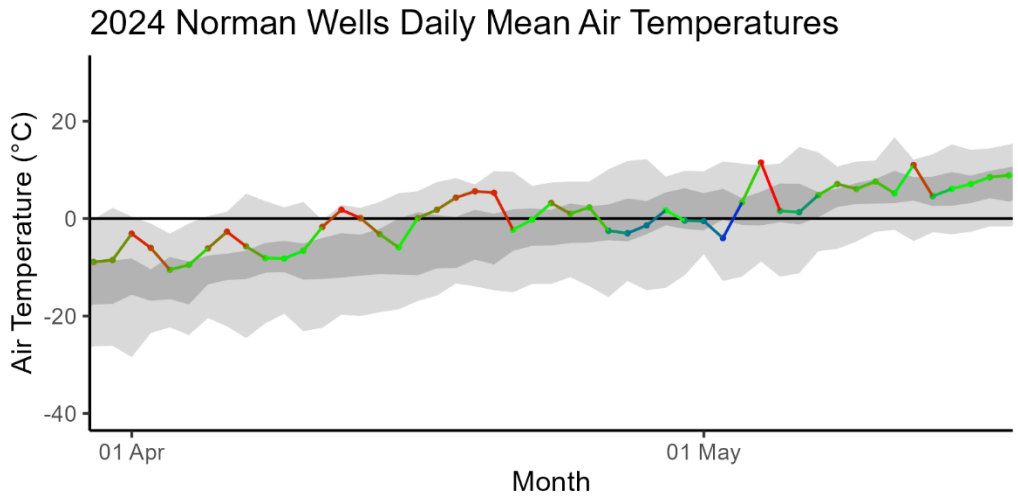
Background information and context:

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.

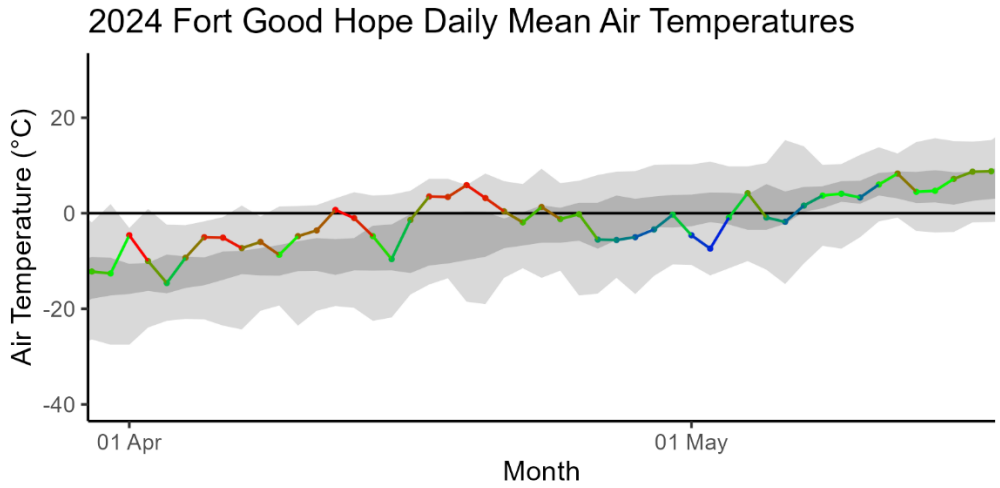
There are two sets of figures below. The first set of figures shows daily temperatures relative to normal for select locations in the NWT. The dark grey bands represent the average range of temperatures, while the light grey bands represent historic minimum and maximum daily mean temperatures. The second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

2024 spring temperatures to-date:

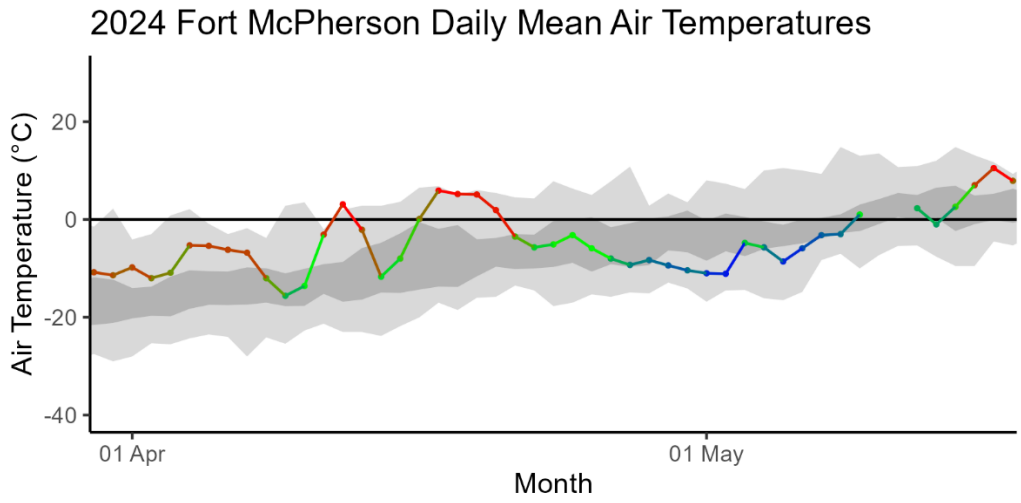
Norman Wells:



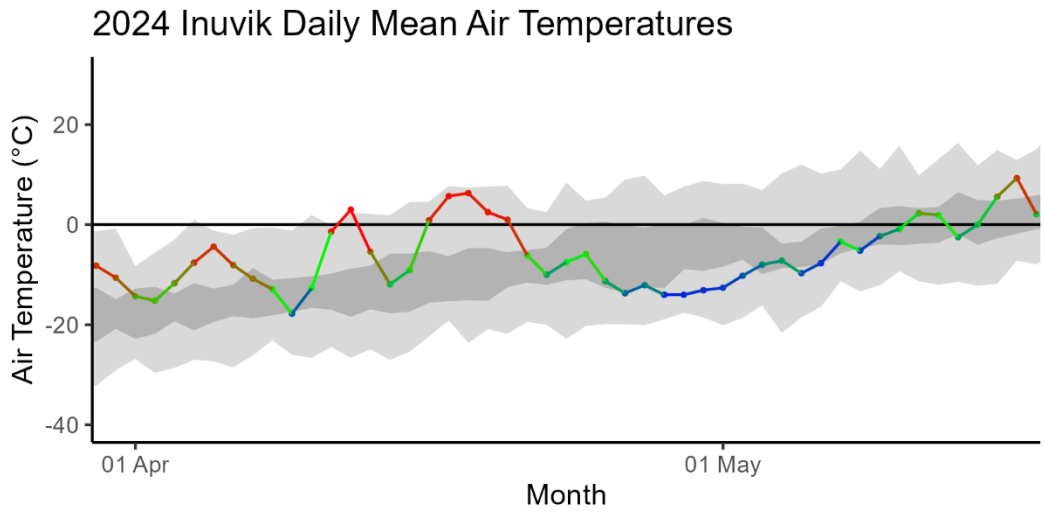
Fort Good Hope:



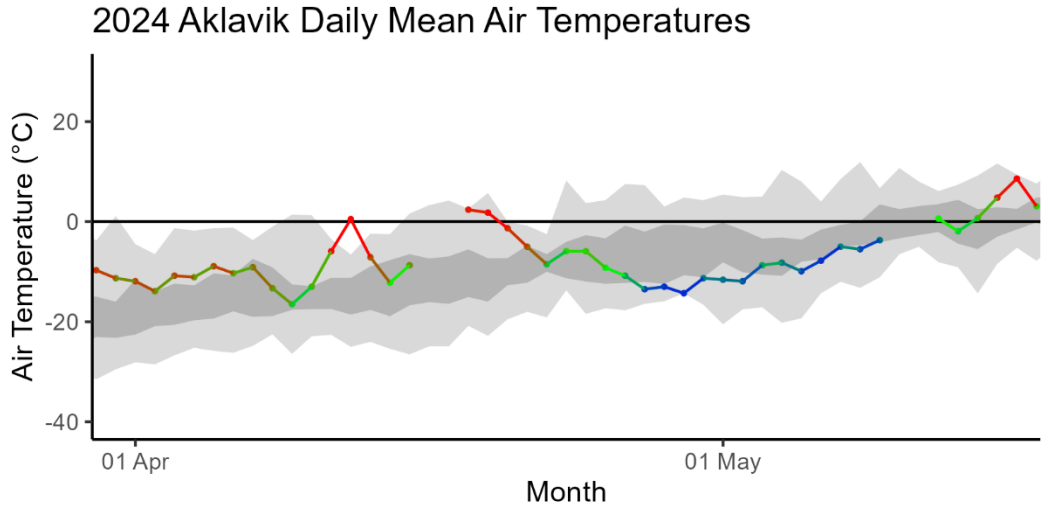
Fort McPherson:



Inuvik:



Aklavik:



Seven-day weather forecast:

Norman Wells:

Sat 18 May	Sun 19 May	Mon 20 May	Tue 21 May	Wed 22 May	Thu 23 May	Fri 24 May
13°C	19°C	14°C	15°C	20°C	19°C	17°C
A mix of sun and cloud	30% Chance of showers	Cloudy	Sunny	Sunny	A mix of sun and cloud	A mix of sun and cloud
Tonight	**Night**	**Night**	**Night**	**Night**	**Night**	
5°C	7°C	4°C	6°C	7°C	6°C	
30% Chance of showers	Clear	Periods of rain	Clear	Clear	Cloudy periods	

Fort Good Hope:

Sat 18 May	Sun 19 May	Mon 20 May	Tue 21 May	Wed 22 May	Thu 23 May	Fri 24 May
14°C	18°C	11°C	15°C	21°C	12°C	11°C
30% Chance of showers	A mix of sun and cloud	Cloudy	A mix of sun and cloud	Sunny	A mix of sun and cloud	A mix of sun and cloud
Tonight	**Night**	**Night**	**Night**	**Night**	**Night**	
6°C	4°C	2°C	7°C	4°C	3°C	
Partly cloudy	Clear	Rain	Clear	Cloudy periods	Cloudy periods	

Fort McPherson:

Sat 18 May	Sun 19 May	Mon 20 May	Tue 21 May	Wed 22 May	Thu 23 May	Fri 24 May
1°C	3°C	5°C	7°C	9°C	8°C	8°C
Cloudy	Mainly cloudy	Cloudy	A mix of sun and cloud	A mix of sun and cloud	A mix of sun and cloud	A mix of sun and cloud
Tonight	**Night**	**Night**	**Night**	**Night**	**Night**	
-2°C	1°C	-1°C	1°C	1°C	0°C	
Mainly cloudy	Periods of snow or rain	Cloudy	Clear	Cloudy periods	Cloudy periods	

Inuvik:

Sat 18 May	Sun 19 May	Mon 20 May	Tue 21 May	Wed 22 May	Thu 23 May	Fri 24 May
 0°C Cloudy	 3°C A mix of sun and cloud	 2°C Cloudy	 4°C Cloudy	 8°C Sunny	 9°C A mix of sun and cloud	 11°C A mix of sun and cloud
Tonight	**Night**	**Night**	**Night**	**Night**	**Night**	
 0°C Cloudy	 1°C 60% Chance of showers	 0°C Cloudy	 3°C Clear	 0°C A mix of sun and cloud	 -1°C A mix of sun and cloud	

Aklavik:

Sat 18 May	Sun 19 May	Mon 20 May	Tue 21 May	Wed 22 May	Thu 23 May	Fri 24 May
 0°C Cloudy	 4°C Clearing	 3°C Cloudy	 5°C A mix of sun and cloud	 6°C A mix of sun and cloud	 6°C A mix of sun and cloud	 6°C A mix of sun and cloud
Tonight	**Night**	**Night**	**Night**	**Night**	**Night**	
 0°C Mainly cloudy	 1°C Rain	 0°C Cloudy	 2°C Clear	 -1°C A mix of sun and cloud	 -1°C A mix of sun and cloud	

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.