Government of
Northwest Territories

NWT Water Monitoring Bulletin – May 15, 2024 at 16:00

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:

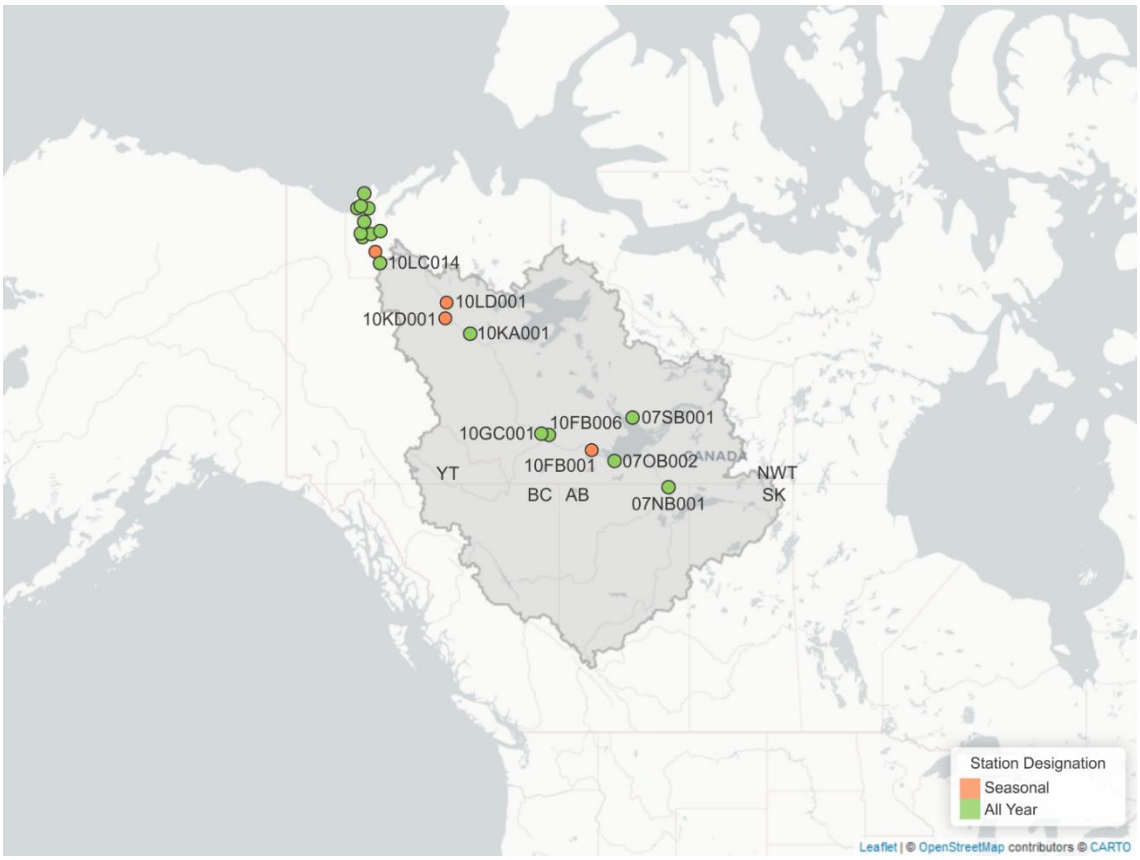
- Break up is progressing along the Mackenzie River.
  - The ice front is currently just upstream of Norman Wells;
  - There are intermittent stretches of open water and sheet ice on the Mackenzie River between Norman Wells and Fort Good Hope.
- Water levels under ice on the Mackenzie River at Norman Wells continue to rise at a rate that is normal for this time of year.
  - Water levels on the Mackenzie River upstream of the ice front remain extremely low.
- On the Peel River, water levels are beginning to rise underneath the ice.
  - Snow melt and ice degradation have progressed slowly as mean daily temperatures have been close to 0°C.
- Temperatures for the next three days are forecast to be warmer than normal in the Sahtu, and close to seasonal for the Peel River basin and the Beaufort Delta.

Contents

Mackenzie River:

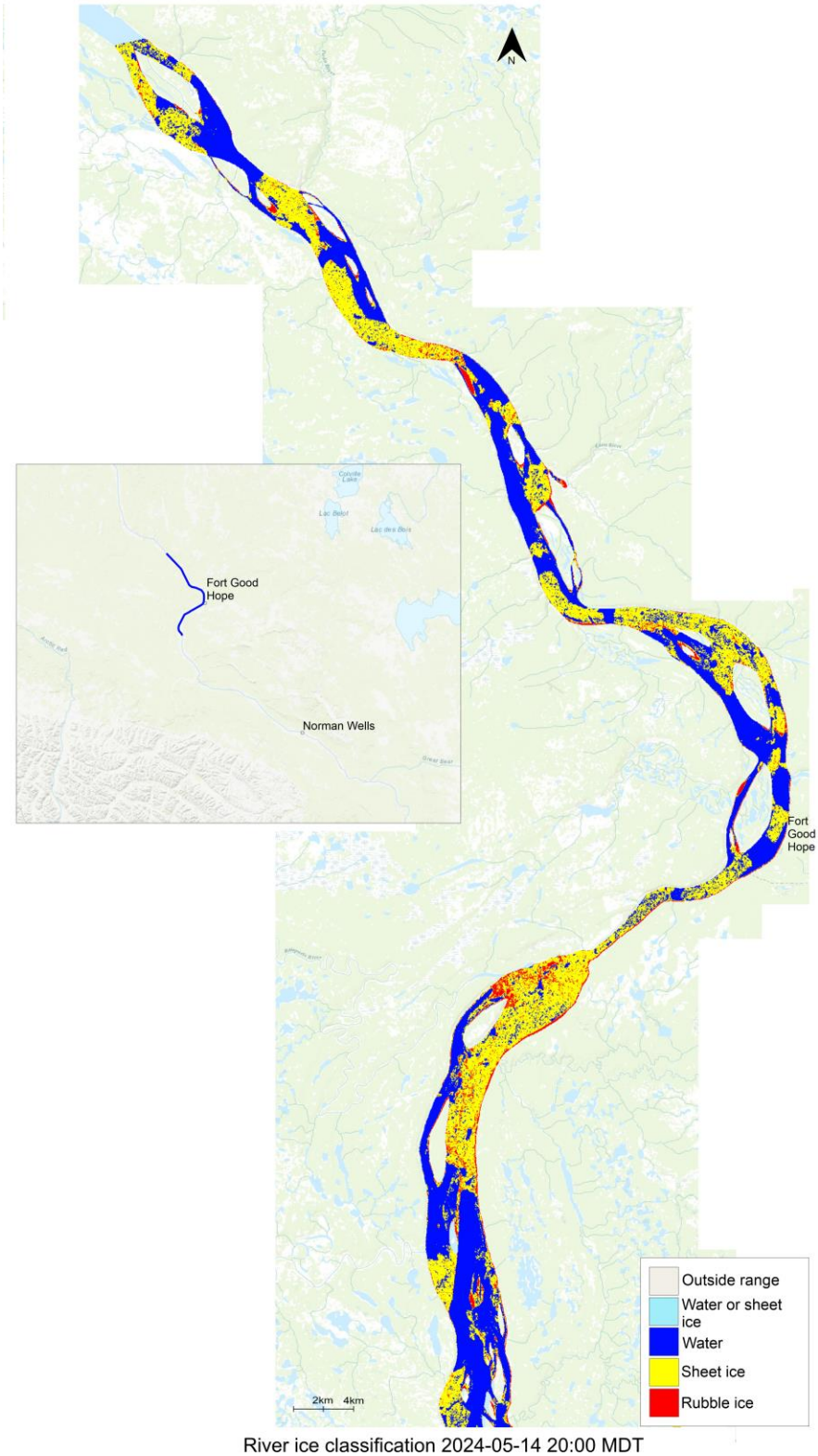
Current Status:

- Water levels are rising underneath the ice on the Mackenzie River at Norman Wells, as is normal for this time of year.
    - 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 Norman Wells and Fort Good Hope (see imagery below).



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

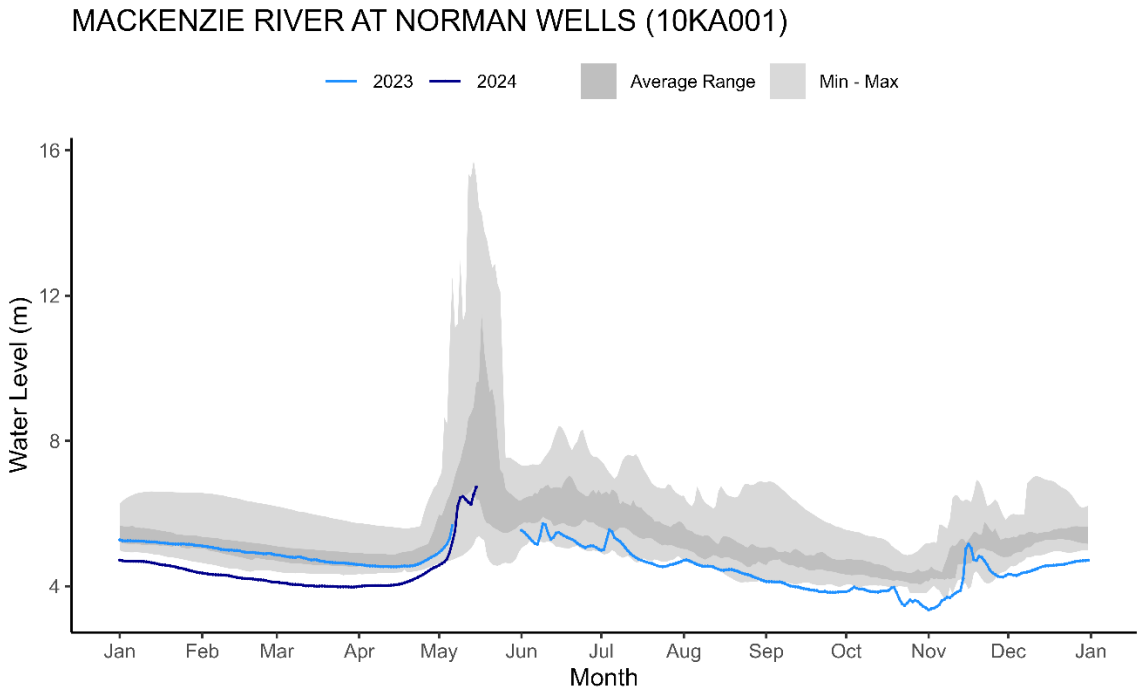
Satellite Imagery:



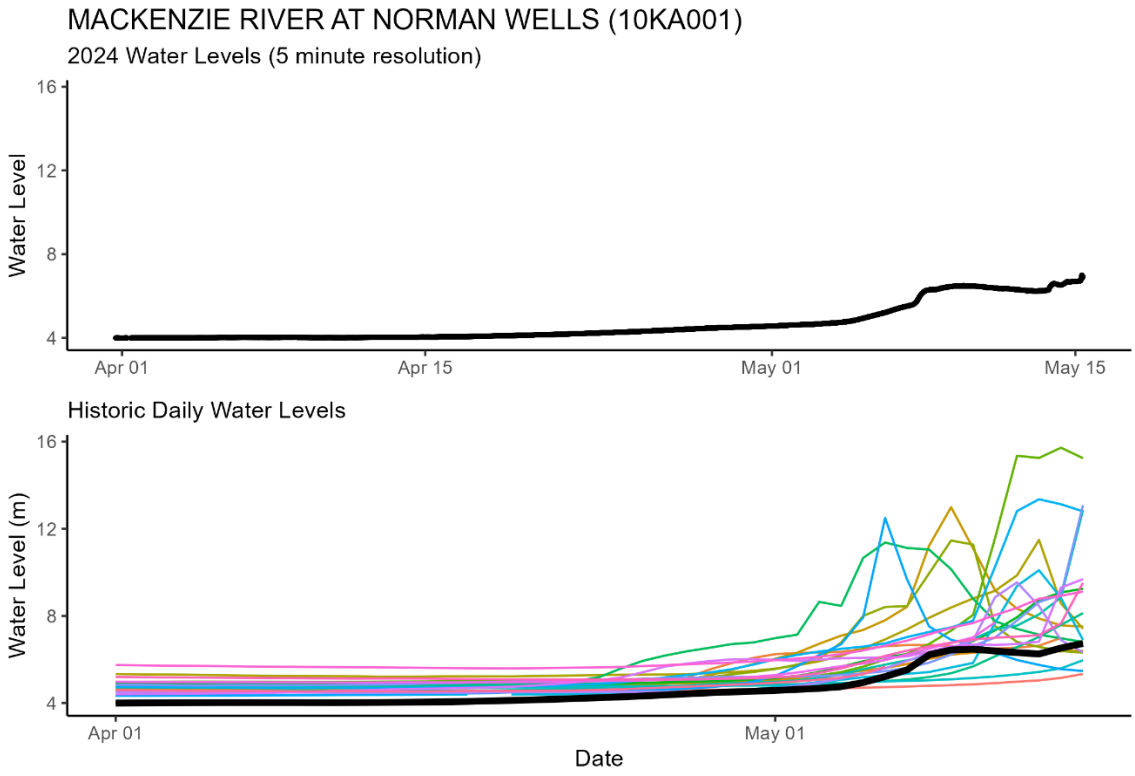
Above – River ice classification imagery of the Mackenzie River near Fort Good Hope. The image was acquired on May 14th at 20:00 MDT. The image shows open water sections and sheet along the river.

Hydrometric Data:

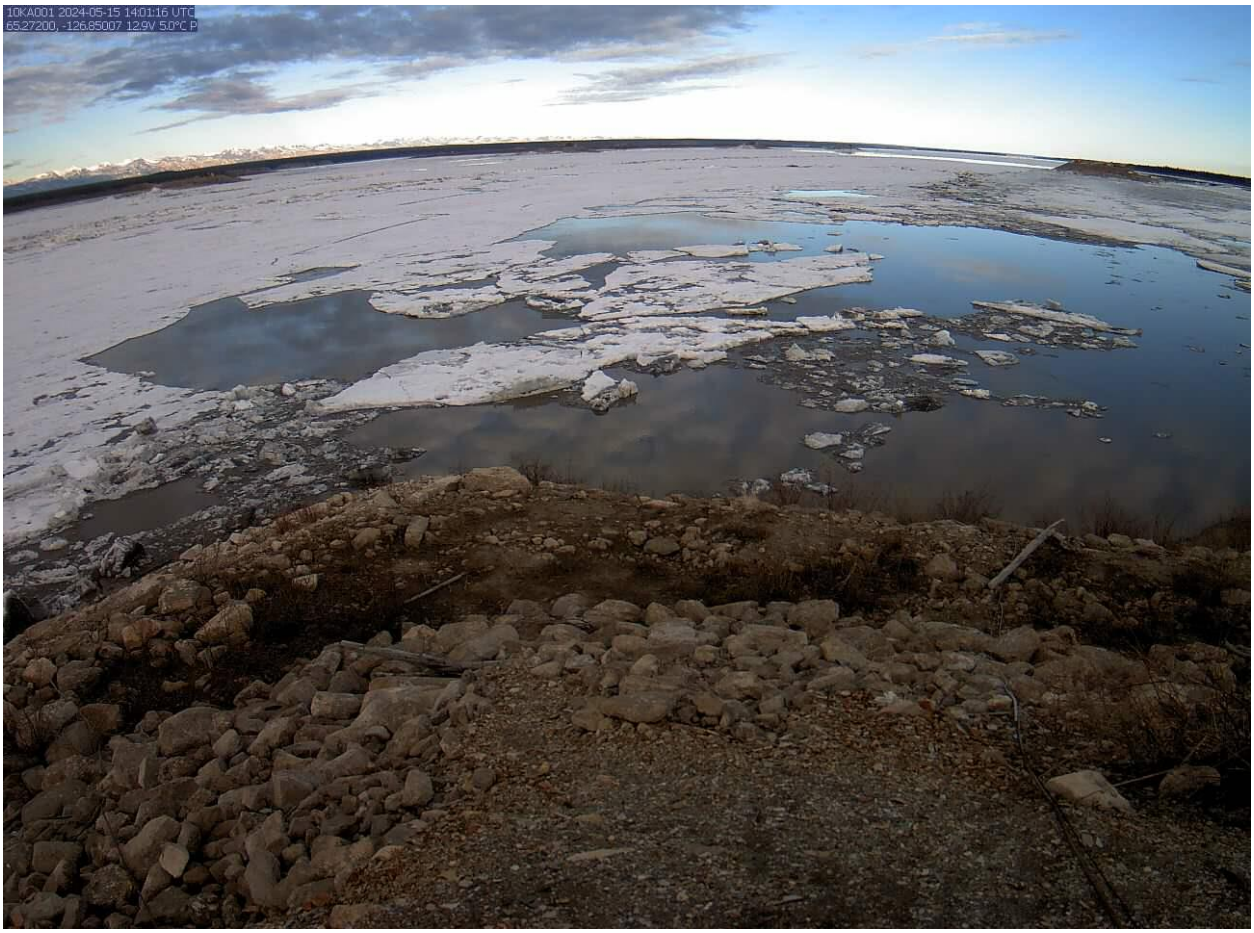
Mackenzie River at Norman Wells [10KA001]:



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.

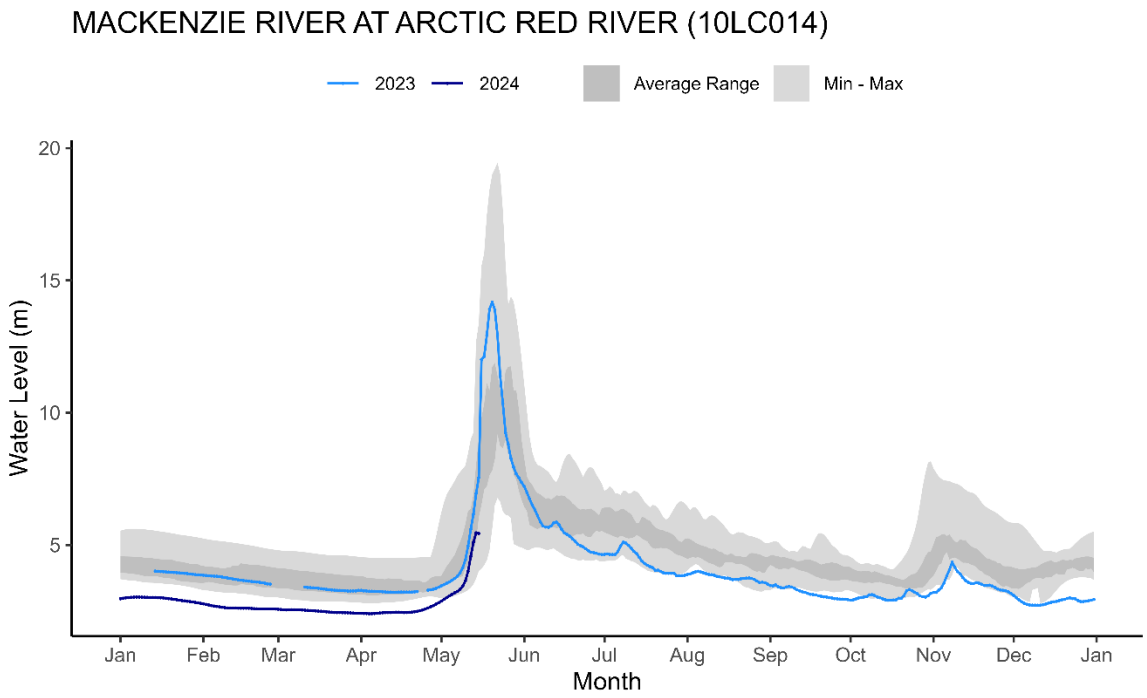


Above – Mackenzie River at Norman Wells hydrometric gauge photo from May 15th at 08:00. Photo courtesy of Water Survey of Canada and GNWT.

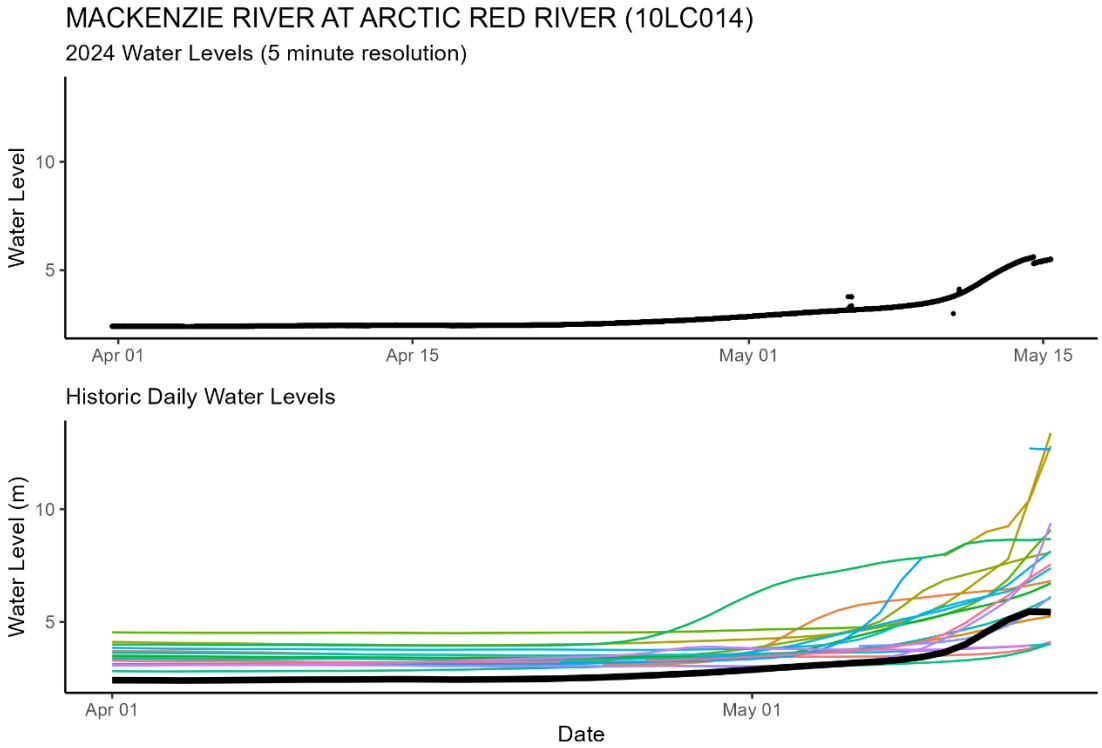
Mackenzie River at Fort Good Hope [10LD001]:

Above – Mackenzie River at Fort Good Hope hydrometric gauge photo from May 15th at 14:00. Photo provided by GNWT.

Mackenzie River at Arctic Red River [10LC014]:



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



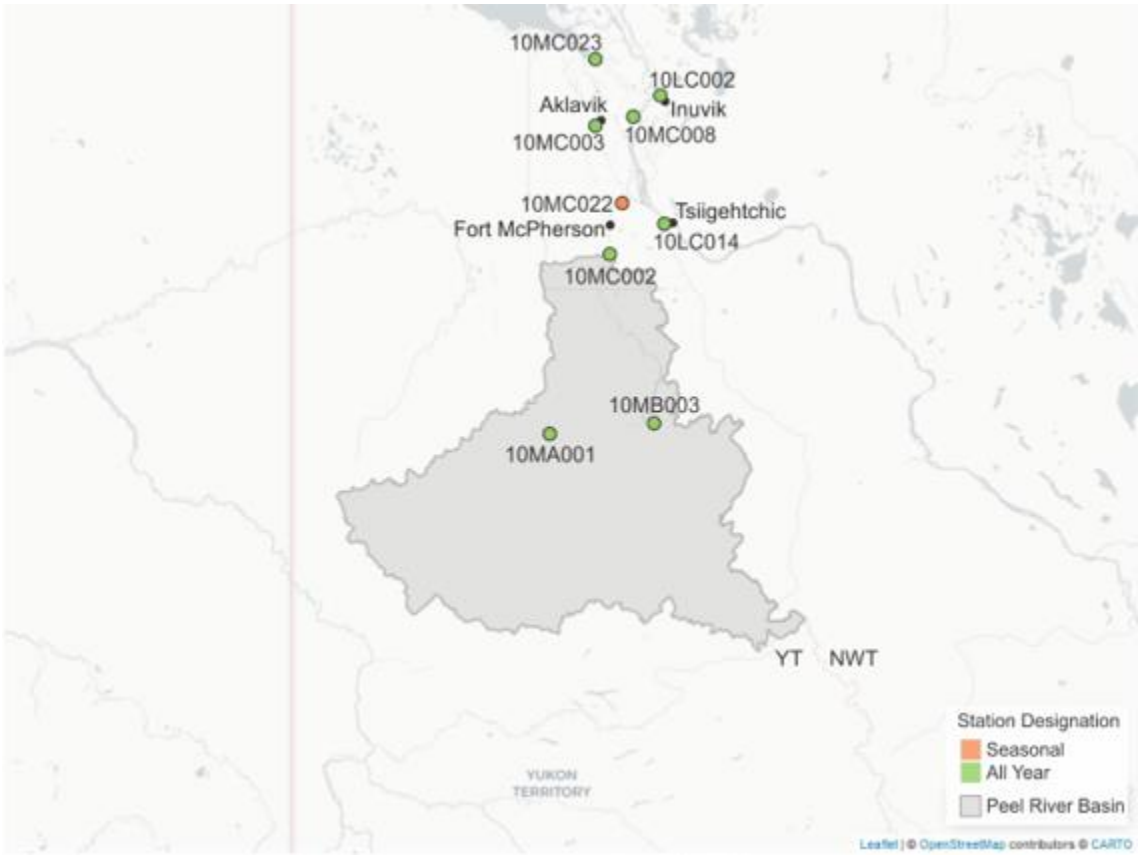
Above – The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.

Above – Mackenzie River at Arctic Red River hydrometric gauge photo from May 15th at 12:00. Photo courtesy of Water Survey of Canada and GNWT.

Beaufort Delta and Peel River:

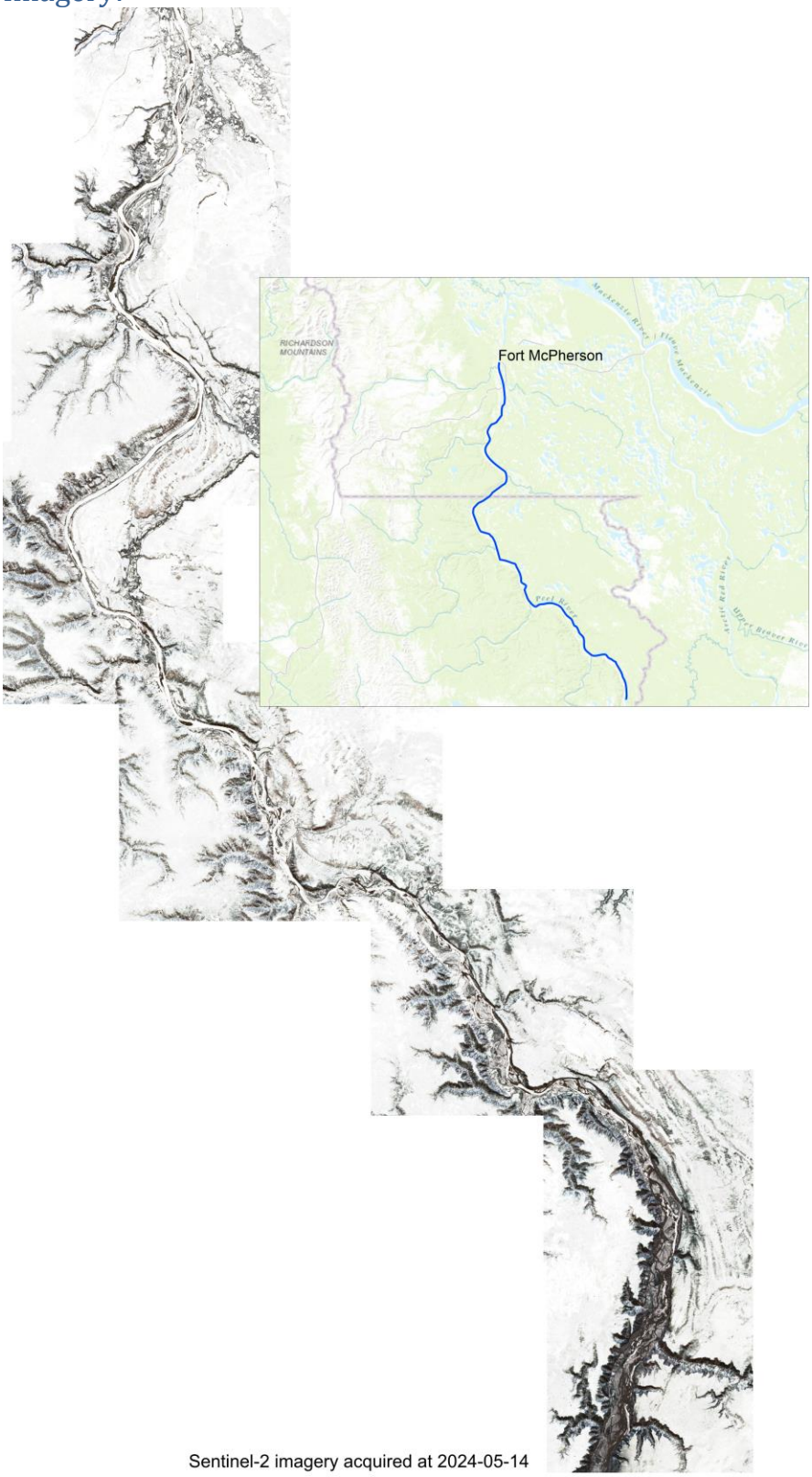
Current Status:

- Water levels are beginning to rise underneath the ice near Fort McPherson.
    - The winter snowpack was much greater than normal in the Peel River basin this year.
    - As a result, higher than normal flows and water levels are possible during break up.
    - The actual water level at break up will depend on how quickly the snow melts and if and where ice jams form along the Peel River.
    - Ice is degrading on the Peel River upstream of the YK-NWT border (see imagery below).
    - Average temperatures are forecast for this week and weekend and should result in a slower rise in levels when compared to this time last year.



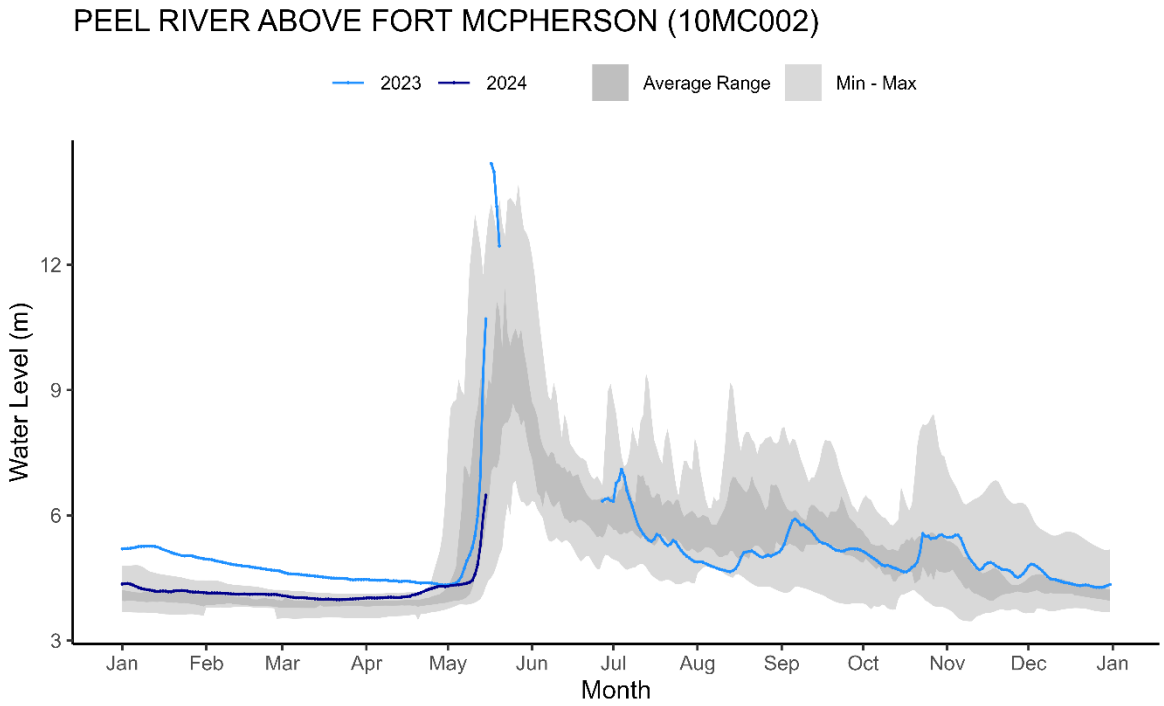
Above – Map of hydrometric stations in the Peel River basin. The station numbers are referenced in the water level plots below.

Imagery:

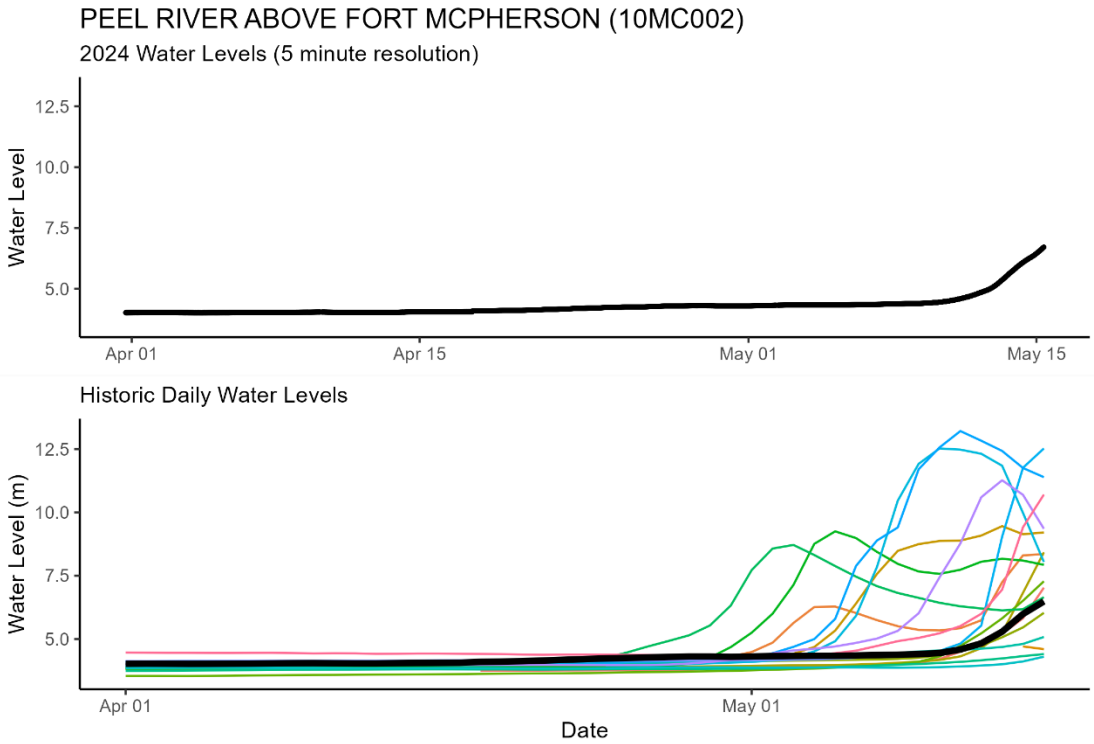


Above – Sentinel-2 imagery of the Peel River upstream of Fort McPherson. The image was acquired on May 14th.

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



Above – Water level data for Peel River above Fort McPherson. Data for the previous year are also shown here.

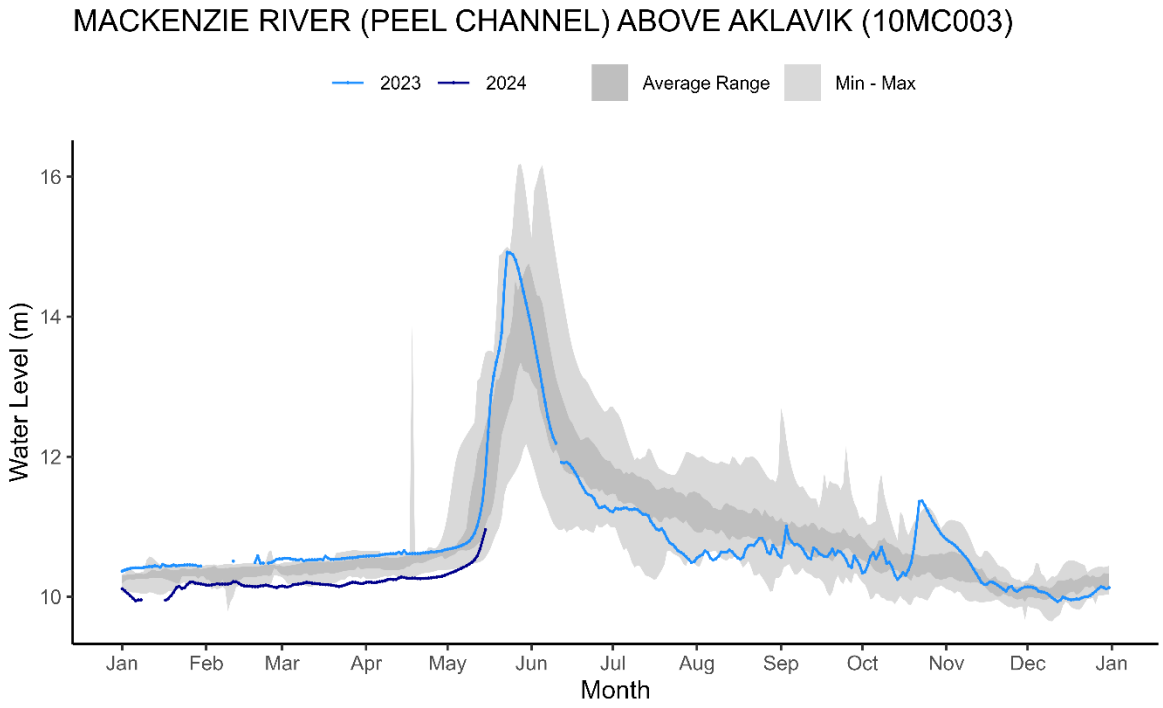


Above – The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.

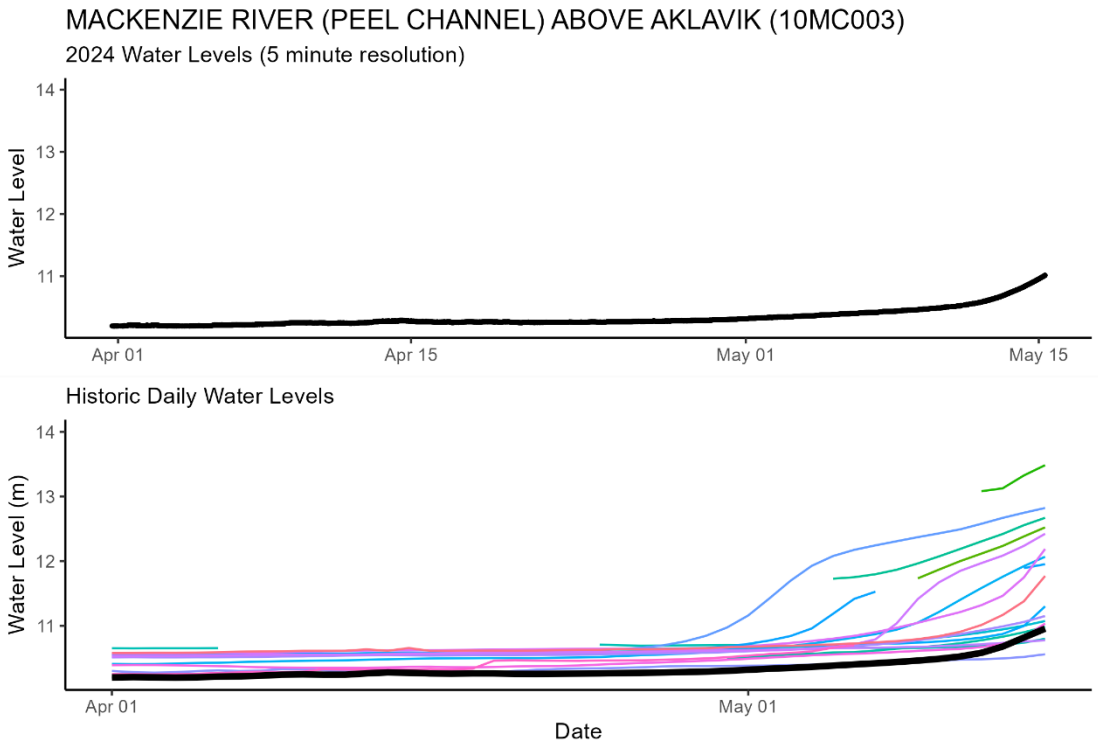
Above – Peel River above Fort McPherson hydrometric gauge photo from May 15th at 14:00. Photo courtesy of Water Survey of Canada and GNWT.

.

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 15 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 week and weekend. Daytime highs are expected to be in the mid-teens, while nighttime lows will be above freezing. 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 week and weekend. Daytime high temperatures will range from 3°C to 8°C, while nighttime lows will hover around freezing. These temperatures should help to moderate snowmelt across the region.

No significant precipitation is forecast for either region.

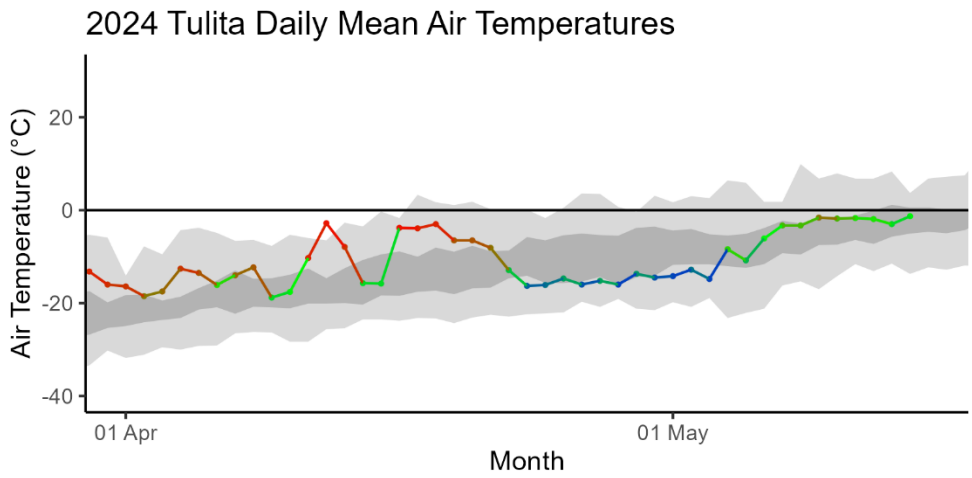
Background information and context:

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.

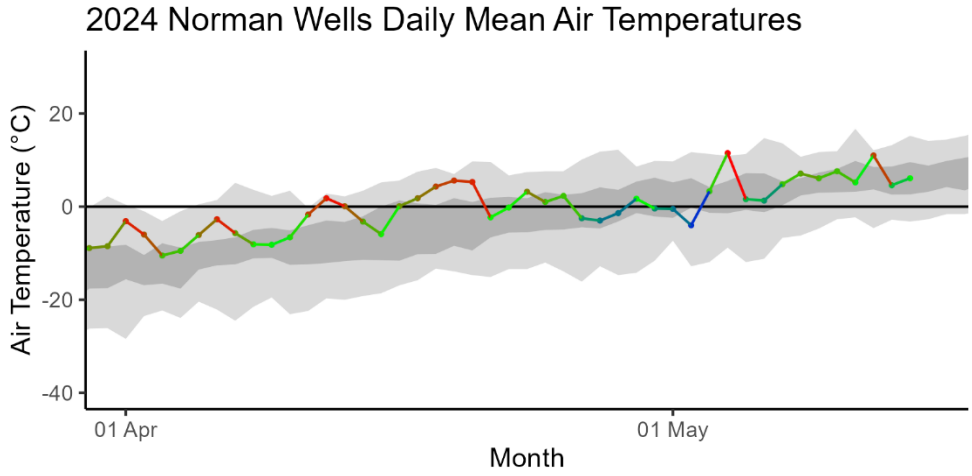
There are two sets of figures below. The first set of figures shows daily temperatures relative to normal for select locations in the NWT. The dark grey bands represent the average range of temperatures, while the light grey bands represent historic minimum and maximum daily mean temperatures. The second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

2024 spring temperatures to-date:

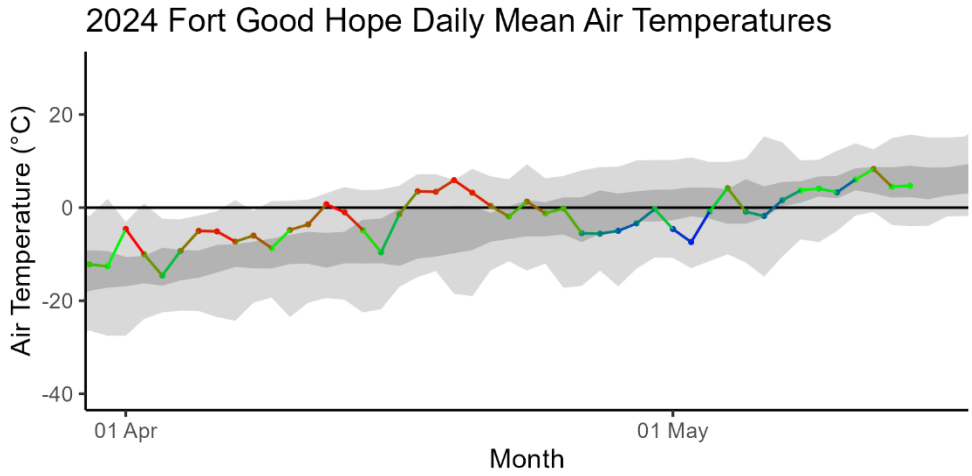
Tulita:



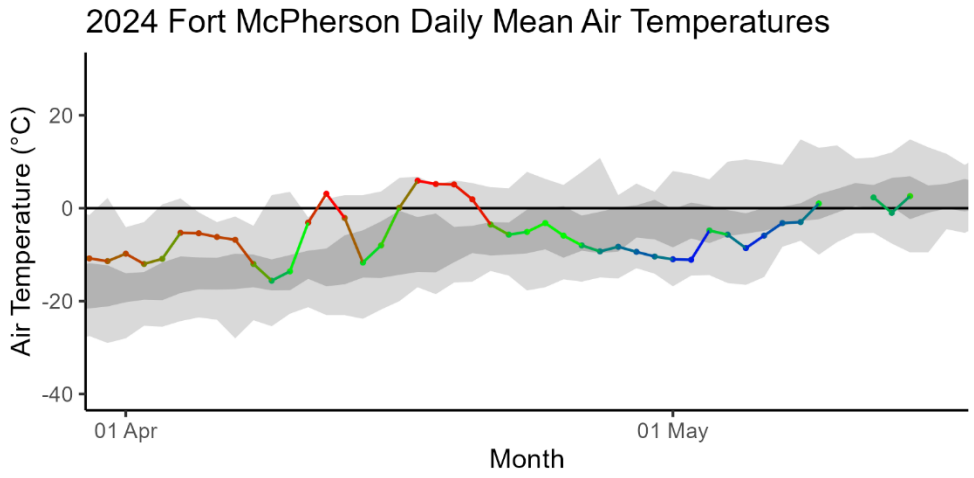
Norman Wells:



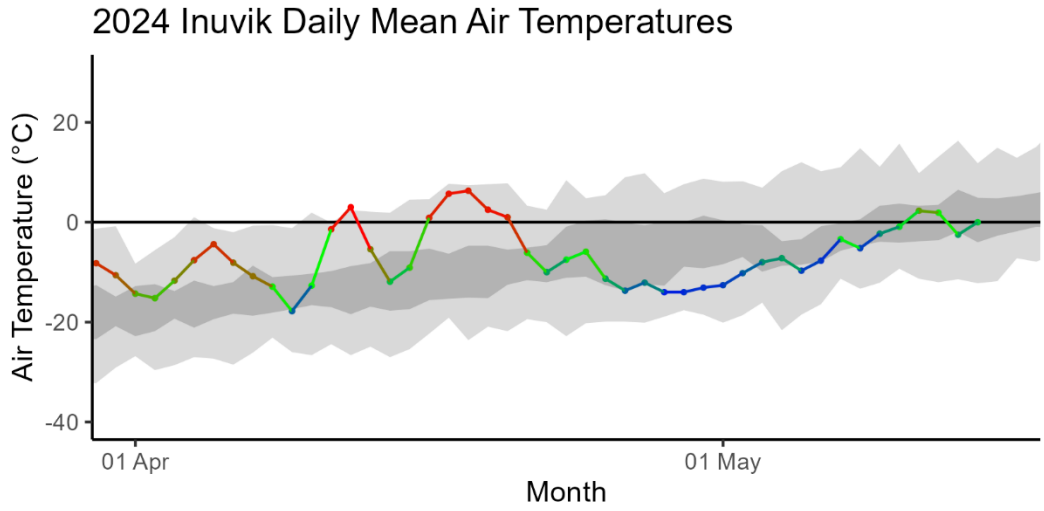
Fort Good Hope:



Fort McPherson:



Inuvik:



Seven-day weather forecast:

Tulita:

Wed 15 May	Thu 16 May	Fri 17 May	Sat 18 May	Sun 19 May	Mon 20 May	Tue 21 May
14°C	16°C	16°C	14°C	16°C	15°C	16°C
A mix of sun and cloud	Increasing cloudiness	A mix of sun and cloud	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**	
3°C	5°C	4°C	2°C	3°C	4°C	
Partly cloudy	Cloudy	Cloudy periods	Cloudy periods	Cloudy periods	Cloudy periods	

Norman Wells:

Wed 15 May	Thu 16 May	Fri 17 May	Sat 18 May	Sun 19 May	Mon 20 May	Tue 21 May
14°C	16°C	16°C	14°C	16°C	15°C	16°C
A mix of sun and cloud	Increasing cloudiness	A mix of sun and cloud	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**	
3°C	5°C	4°C	2°C	3°C	4°C	
Partly cloudy	Cloudy	Cloudy periods	Cloudy periods	Cloudy periods	Cloudy periods	

Fort Good Hope:

Wed 15 May	Thu 16 May	Fri 17 May	Sat 18 May	Sun 19 May	Mon 20 May	Tue 21 May
15°C	16°C	15°C	14°C	17°C	9°C	10°C
Mainly sunny	A mix of sun and cloud	A mix of sun and cloud	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**	
3°C	1°C	2°C	4°C	0°C	2°C	
Partly cloudy	Clear	Cloudy periods	Cloudy periods	Cloudy periods	Cloudy periods	

Fort McPherson:

Wed 15 May	Thu 16 May	Fri 17 May	Sat 18 May	Sun 19 May	Mon 20 May	Tue 21 May
 7°C	 6°C	 4°C	 3°C	 4°C	 6°C	 7°C
Sunny	Mainly sunny	Sunny	Cloudy	A mix of sun and cloud	A mix of sun and cloud	A mix of sun and cloud
Tonight	**Night**	**Night**	**Night**	**Night**	**Night**	
 3°C	 1°C	 1°C	 0°C	 -3°C	 -1°C	
A few clouds	Clear	Cloudy	Cloudy	Cloudy periods	Cloudy periods	

Inuvik:

Wed 15 May	Thu 16 May	Fri 17 May	Sat 18 May	Sun 19 May	Mon 20 May	Tue 21 May
 4°C	 5°C	 4°C	 3°C	 4°C	 8°C	 8°C
A mix of sun and cloud	Mainly sunny	A mix of sun and cloud	Cloudy	Sunny	A mix of sun and cloud	A mix of sun and cloud
Tonight	**Night**	**Night**	**Night**	**Night**	**Night**	
 2°C	 0°C	 1°C	 1°C	 -4°C	 -3°C	
A few clouds	Clear	Cloudy periods	Cloudy	Cloudy periods	Cloudy periods	

Aklavik:

Wed 15 May	Thu 16 May	Fri 17 May	Sat 18 May	Sun 19 May	Mon 20 May	Tue 21 May
 9°C	 6°C	 3°C	 3°C	 4°C	 3°C	 5°C
A mix of sun and cloud	Mainly sunny	A mix of sun and cloud	Cloudy	A mix of sun and cloud	A mix of sun and cloud	A mix of sun and cloud
Tonight	**Night**	**Night**	**Night**	**Night**	**Night**	
 1°C	 2°C	 1°C	 1°C	 -5°C	 -3°C	
A few clouds	Clear	Cloudy	Cloudy	Cloudy periods	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.