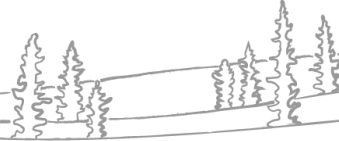




NWT Water Monitoring Bulletin

– May 21st, 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.

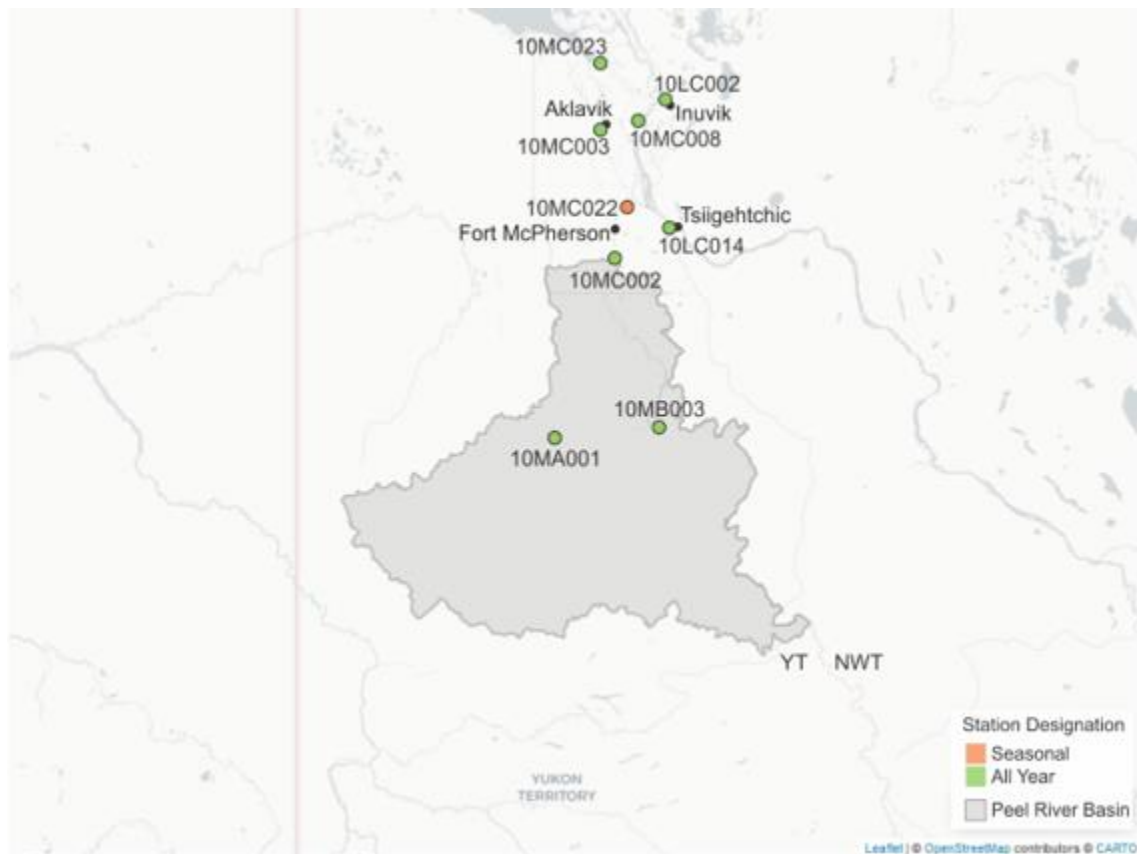
Current Status:

- Break up continues to progress down the Mackenzie River.
 - The ice front has now moved downstream of Fort Good Hope;
 - There are intermittent stretches of open water and sheet ice on the Mackenzie River between Fort Good Hope and Tsiigehtchic.
 - Water levels are rising underneath the ice downstream of Tsiigehtchic.
- Water levels on the Mackenzie River upstream of the ice front remain very low.
- Water levels under the ice on the Mackenzie River at Aklavik have risen by about 2 m over the last week but are lower than average for this time of year.
- On the Peel River, water levels are holding relatively constant since the weekend.
 - An ice jam formed on the Peel River downstream of Fort McPherson over the weekend.
 - The head of the ice jam is approximately 15 km downstream of Fort McPherson.
 - The location of the ice jam is further from Fort McPherson than last year when flooding occurred around the community.
 - Out of bank flows are possible over the next couple of days if significant snowmelt occurs while the ice jam continues to hold.
 - ECC will continue to monitor ice conditions through radar and optical satellite imagery.
 - Temperatures in Fort McPherson are expected to be well above 0°C and warmer than normal over the next two days.
- In the Beaufort Delta region, temperatures this week are forecast to be approximately average with daytime highs above zero and lows near zero.

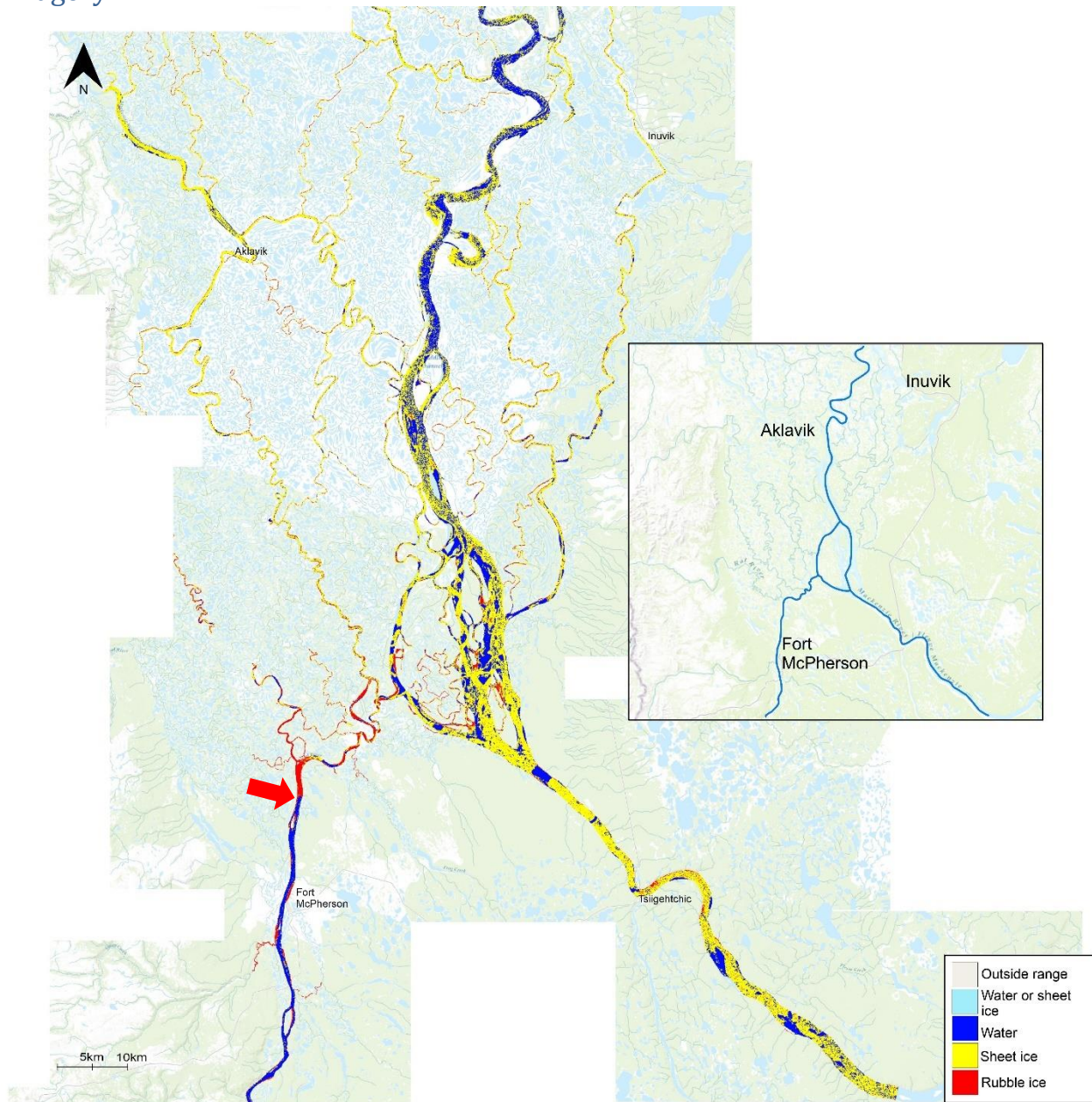
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Beaufort Delta and Peel River:



Imagery:



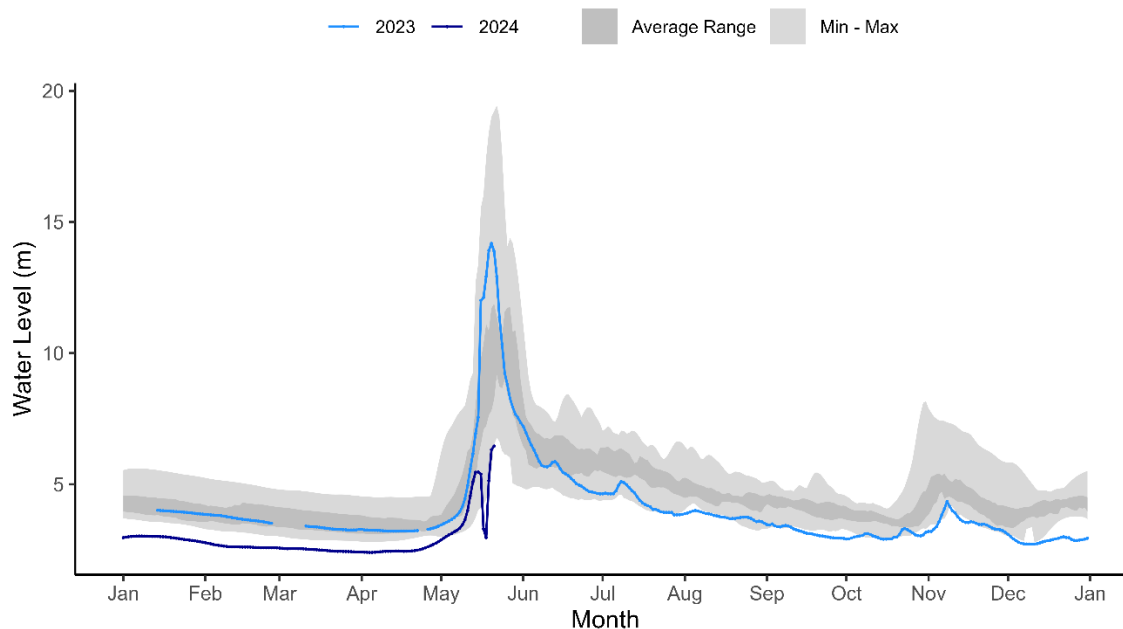
Above – Classified river ice image of the Peel and Mackenzie rivers and the Mackenzie River Delta. The image was acquired this morning at 11:30 MDT and is courtesy of the federal government’s Government Operations Centre. The river ice classification was completed using the IceBC algorithm.

The image shows an ice jam on the Peel River downstream of Fort McPherson (see red arrow, pointing to the head of the jam). The Mackenzie River Delta has sections of open water and sheet ice. Note that some blue sections downstream of the east channel confluence are likely mistakenly identified as water rather than water overlying intact sheet ice.

Hydrometric Data:

Mackenzie River at Arctic Red River [10LC014]:

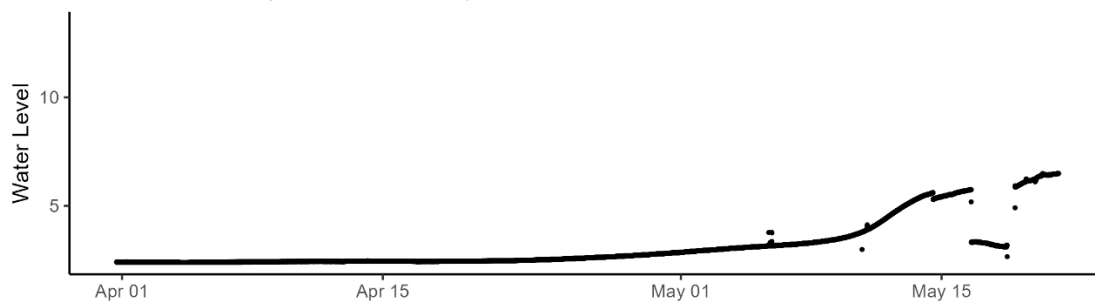
MACKENZIE RIVER AT ARCTIC RED RIVER (10LC014)



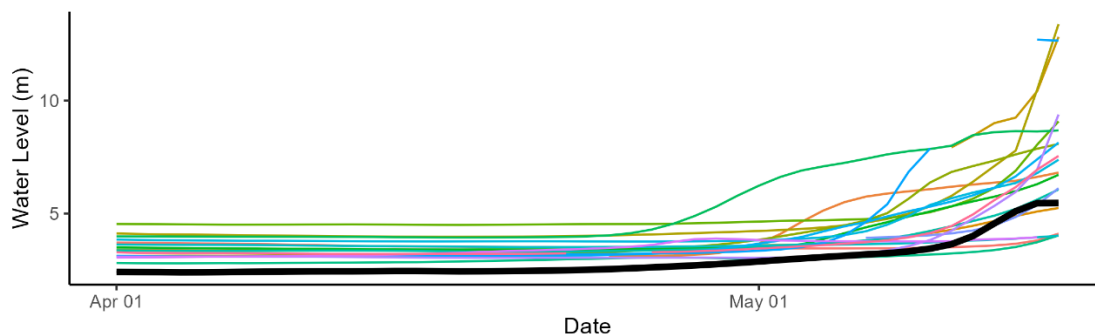
Above – Water level data for the Mackenzie River at Arctic Red River. Daily average levels for this year and the previous year are shown here.

MACKENZIE RIVER AT ARCTIC RED RIVER (10LC014)

2024 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 at Arctic Red River hydrometric gauge photo from May 21st at 12:00. Photo courtesy of Water Survey of Canada and GNWT.

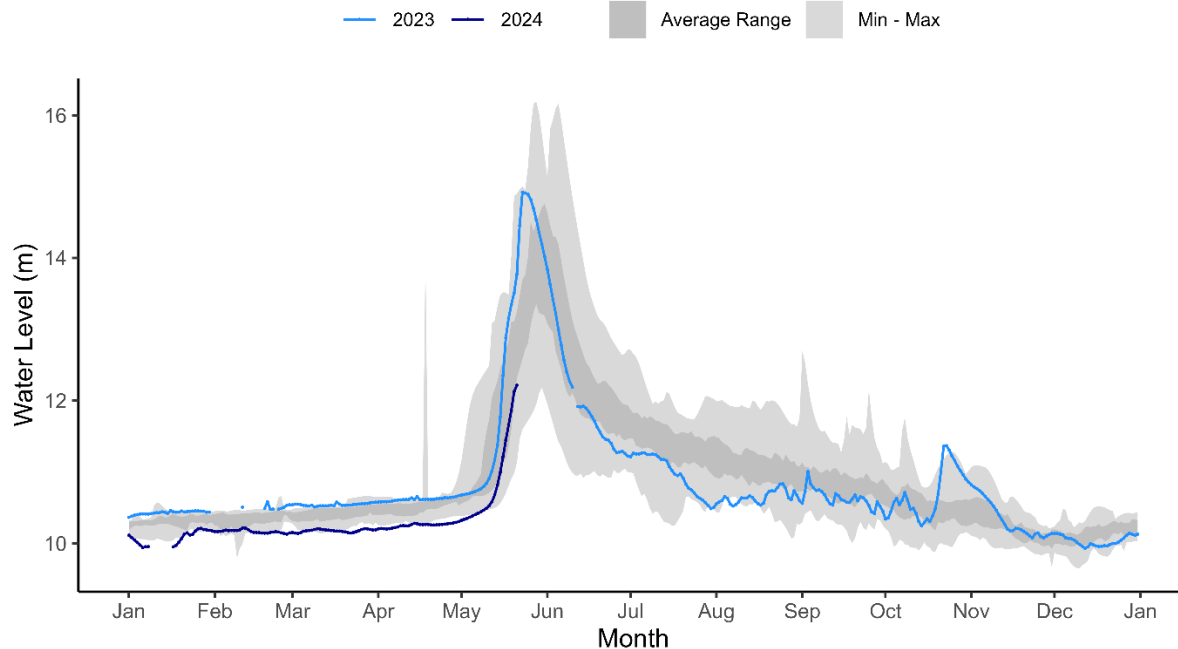
Peel River above Fort McPherson [10MC002]

Note: Water level data are not currently being transmitted from this station. Photos from the hydrometric gauge indicate that water levels have been holding relatively steady since yesterday (May 20th).



Above – Peel River above Fort McPherson hydrometric gauge photo from May 21st at midnight. Photo courtesy of Water Survey of Canada and GNWT.

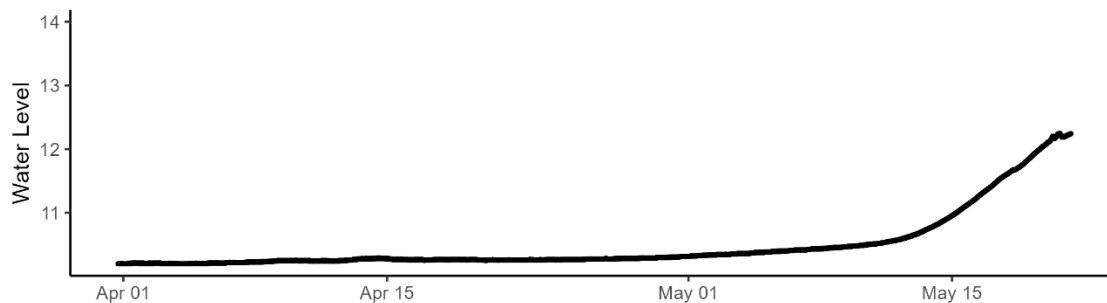
Mackenzie River (Peel Channel) above Aklavik [10MC003]:
MACKENZIE RIVER (PEEL CHANNEL) ABOVE AKLAVIK (10MC003)



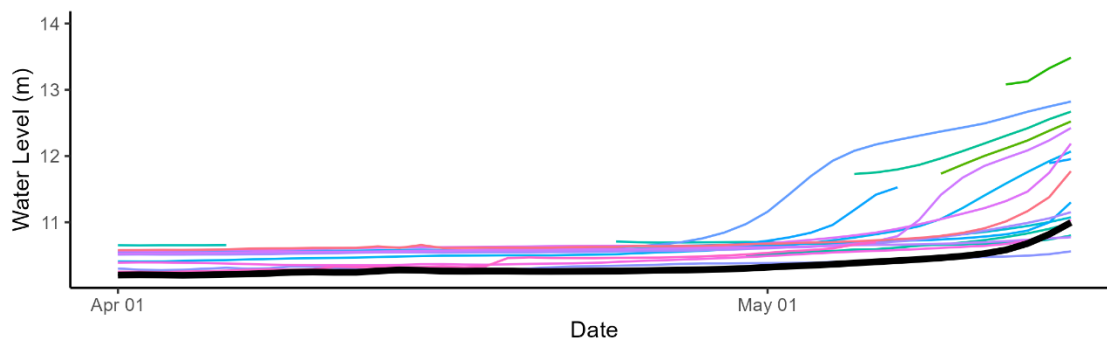
Above – Water level data for the Mackenzie River (Peel Channel) above Aklavik. Daily average levels for this year and the previous year are shown here.

MACKENZIE RIVER (PEEL CHANNEL) ABOVE AKLAVIK (10MC003)

2024 Water Levels (5 minute resolution)



Historic Daily Water Levels

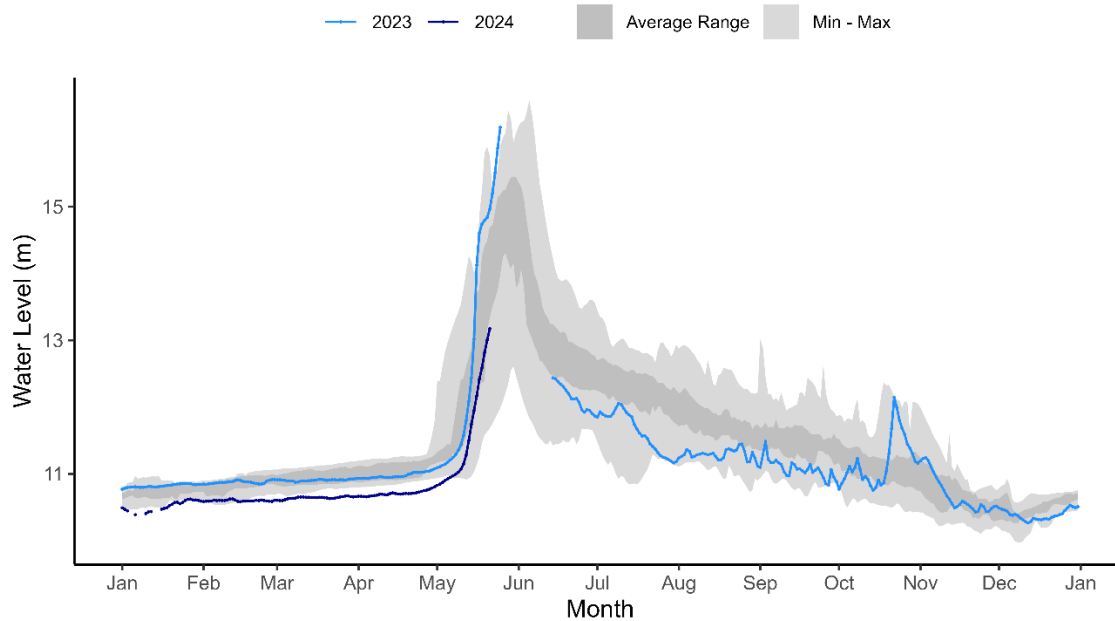


Above: The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.



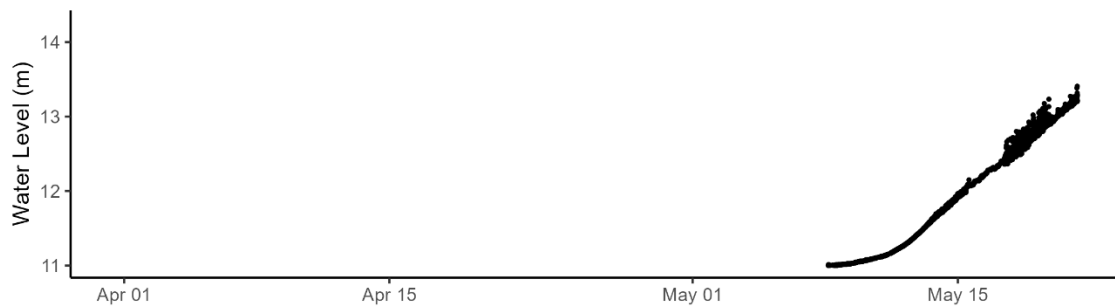
Above – Mackenzie River (Peel Channel) above Aklavik hydrometric gauge photo from May 20th at 12:00. Photo courtesy of Water Survey of Canada and GNWT.

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

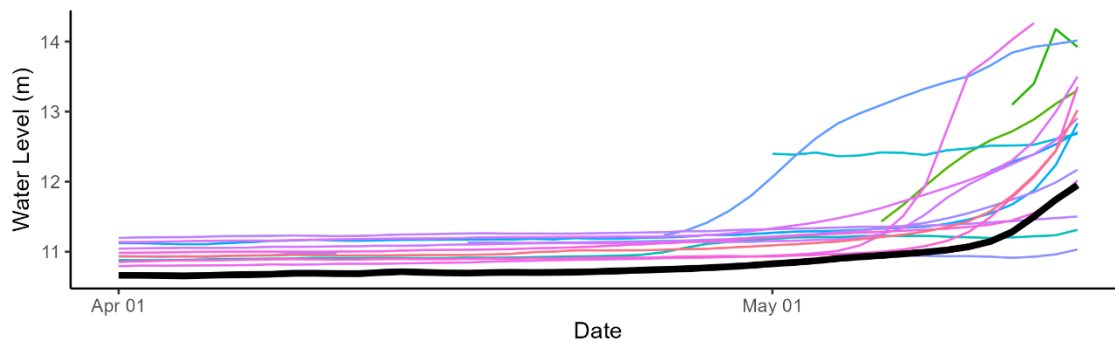


Above – Water level data for the Mackenzie River (Middle Channel) below Raymond Channel. Daily average levels for this year and the previous year are shown here.

MACKENZIE RIVER BELOW RAYMOND CHANNEL (10MC008)
2024 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 (Middle Channel) below Raymond Channel hydrometric gauge photo from May 21st at 12:00. Photo courtesy of Water Survey of Canada and GNWT.

Weather Data:

Current status and forecast:

The Peel River basin is forecast to see temperatures that are above average over the next two days, and approximately average for the rest of the week. The Beaufort-Delta region is forecast to see temperatures that are approximately average for the week. Daytime high temperatures will be well above freezing. Nighttime lows will hover around freezing for the next couple days and should drop to below freezing for the weekend.

Some precipitation (15-20 mm) is forecast for the Peel River basin and Beaufort-Delta region later this week (Saturday-Sunday).

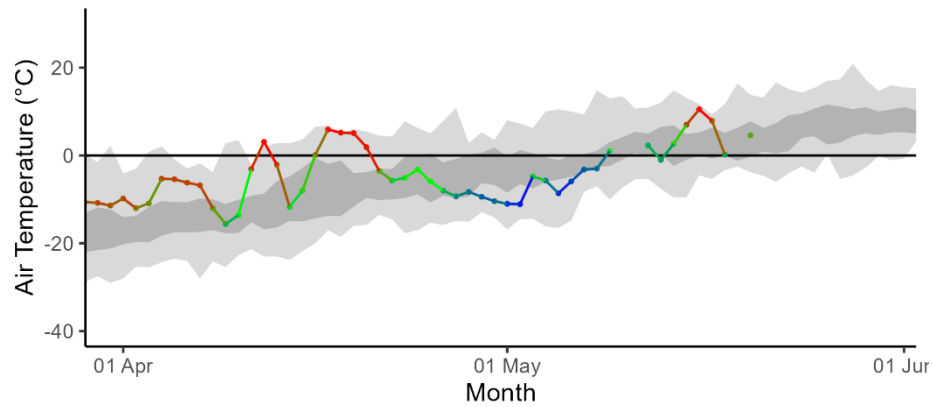
Background information and context:

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.

2024 spring temperatures to-date:

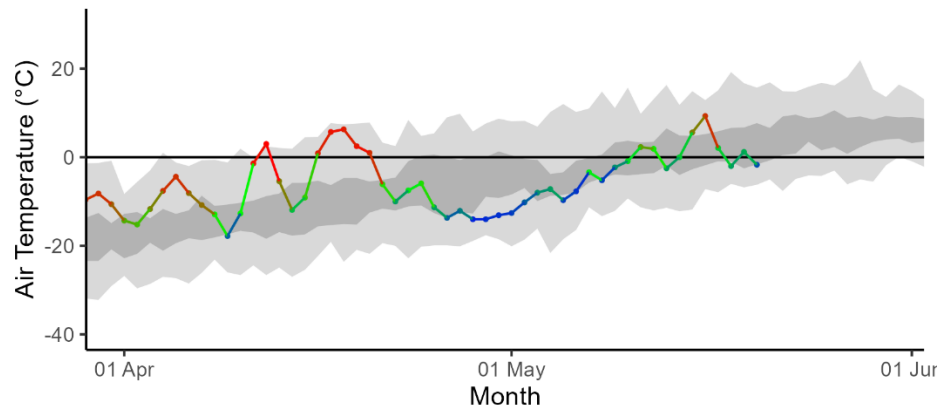
Fort McPherson:

2024 Fort McPherson Daily Mean Air Temperatures



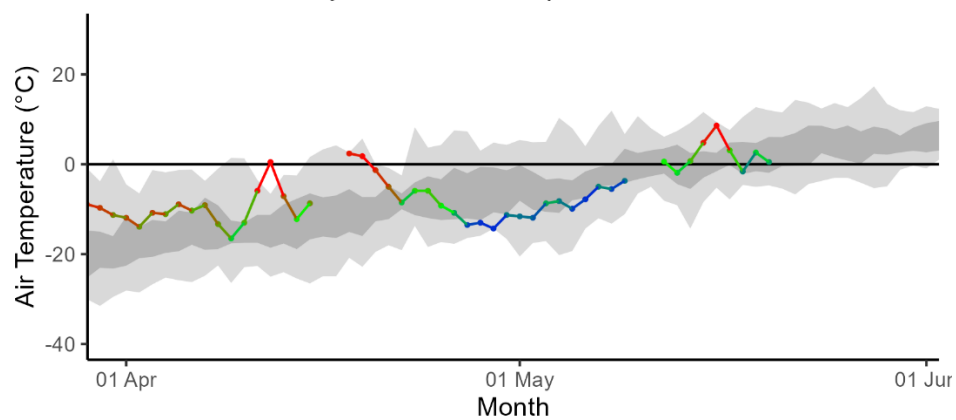
Inuvik:

2024 Inuvik Daily Mean Air Temperatures
















Aklavik:

2024 Aklavik Daily Mean Air Temperatures
















Seven-day weather forecast:














Fort McPherson:

Tue 21 May	Wed 22 May	Thu 23 May	Fri 24 May	Sat 25 May	Sun 26 May	Mon 27 May
 12°C Mainly sunny	 9°C Mainly sunny	 6°C Cloudy	 3°C 30% Chance of showers	 4°C Periods of snow	 6°C A mix of sun and cloud	 8°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 0°C Clear	 2°C Cloudy	 1°C 40% Chance of showers	 -1°C 60% Chance of flurries	 -1°C Cloudy periods	 -1°C Cloudy periods	

Inuvik:

Tue 21 May	Wed 22 May	Thu 23 May	Fri 24 May	Sat 25 May	Sun 26 May	Mon 27 May
 7°C A mix of sun and cloud	 7°C Sunny	 4°C Cloudy	 1°C Cloudy	 3°C 40% Chance of flurries	 5°C A mix of sun and cloud	 9°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 3°C Clear	 0°C A mix of sun and cloud	 1°C Cloudy	 -1°C Cloudy	 -6°C A mix of sun and cloud	 -4°C A mix of sun and cloud	

Aklavik:

Tue 21 May	Wed 22 May	Thu 23 May	Fri 24 May	Sat 25 May	Sun 26 May	Mon 27 May
 5°C A mix of sun and cloud	 6°C Sunny	 4°C Cloudy	 2°C Cloudy	 3°C 40% Chance of flurries	 3°C A mix of sun and cloud	 6°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 2°C A few clouds	 3°C A mix of sun and cloud	 1°C Cloudy	 -1°C Cloudy	 -3°C A mix of sun and cloud	 -3°C A mix of sun and cloud	

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.