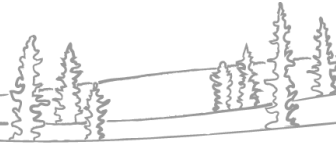




NWT Water Monitoring Bulletin

– May 20, 2023 at 14:00



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.

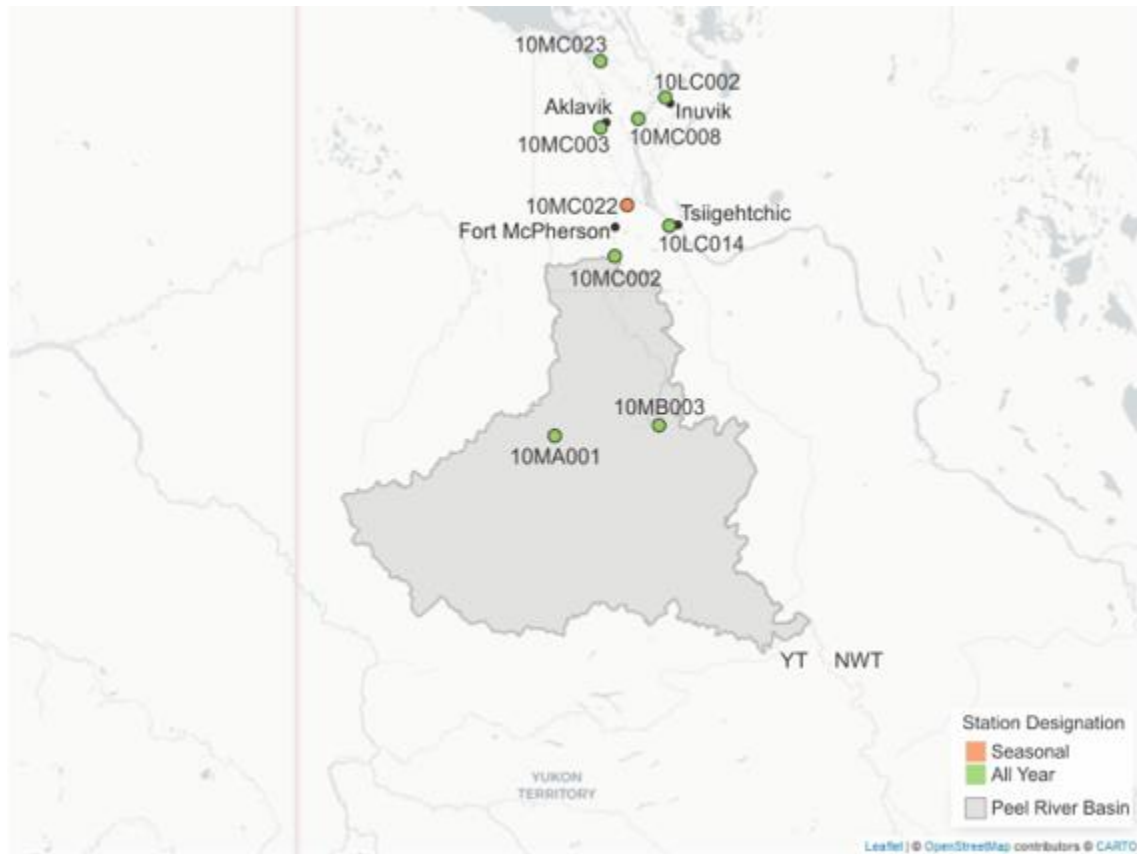
Current Status:

- The local state-of-emergency in Fort McPherson remains in place in response to restricted access to fresh water and the airport;
- The water level on the Peel River at Fort McPherson has receded by approximately 2.0 m over the past 72 hours;
- Water levels on the Mackenzie River at Tsiigehtchic remain stable as the build up of ice just downstream remains in place;
 - Ice from the main stem of the Mackenzie River has packed into the Delta near Point Separation and at the confluence of the Peel River;
- There are reports that ice started moving in Aklavik around 12:00 (noon) today;
 - Residents of Aklavik should remain vigilant as water levels can change rapidly as ice moves through channels in the Delta;
 - Prior to ice movement, the water level at Aklavik had been rising quickly under ice, but was still within the normal range for this stage of break up;
 - The water level in Aklavik will be dependent on how ice and water clear through the Delta over the coming days;
 - Mackenzie River ice is packed into the upper Mackenzie Delta near Point Separation and the mouth of the Peel River;
 - This ice is being held by solid sheet ice in the main channel.

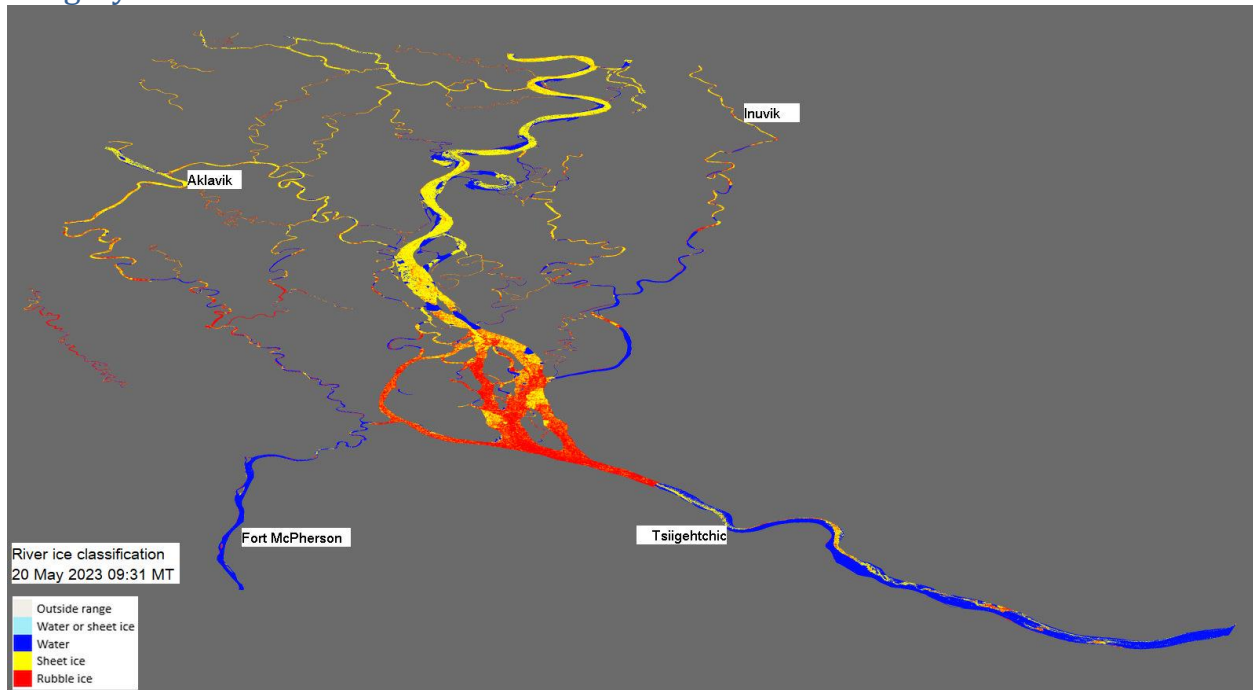
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Beaufort Delta and Peel River:



Imagery:



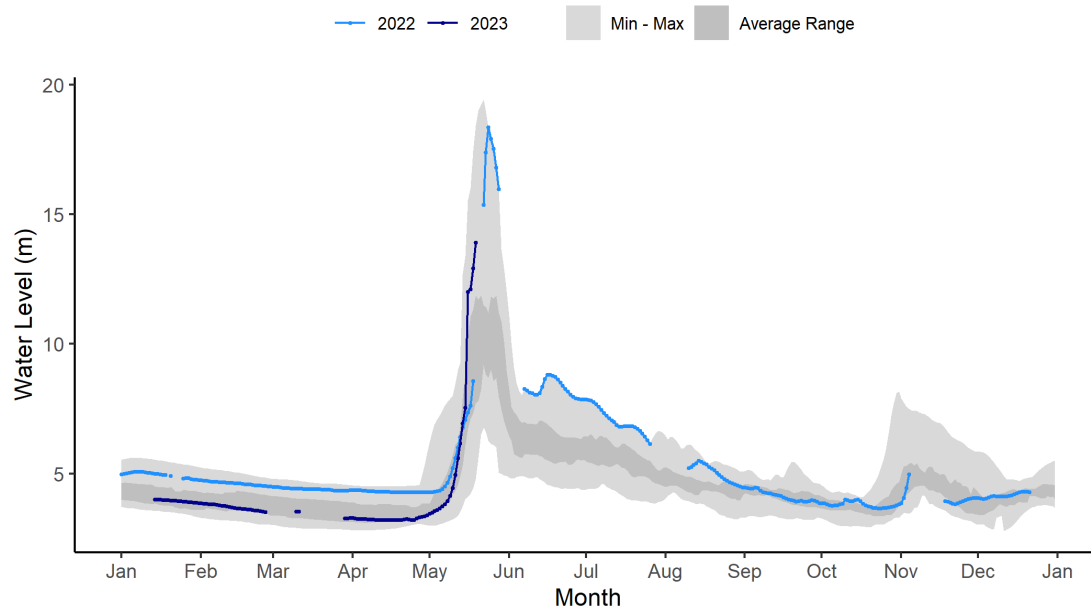
Above – Classified river ice image of the Peel and Mackenzie rivers and the Mackenzie River Delta. The image was acquired this morning at 09:31 and is courtesy of the federal government’s Government Operations Centre. The river ice classification was completed using the IceBC algorithm. Technical difficulties prevented the loading of a basemap underneath, but community names are shown here for reference.

The image shows an ice jam on the Peel River has cleared down the Peel Channel. The Mackenzie River Delta remains jammed (red areas on map) from just upstream of Point Separation through the main channel. The Peel Channel is open almost halfway to Aklavik.

Hydrometric Data:

Mackenzie River at Arctic Red River [10LC014]:

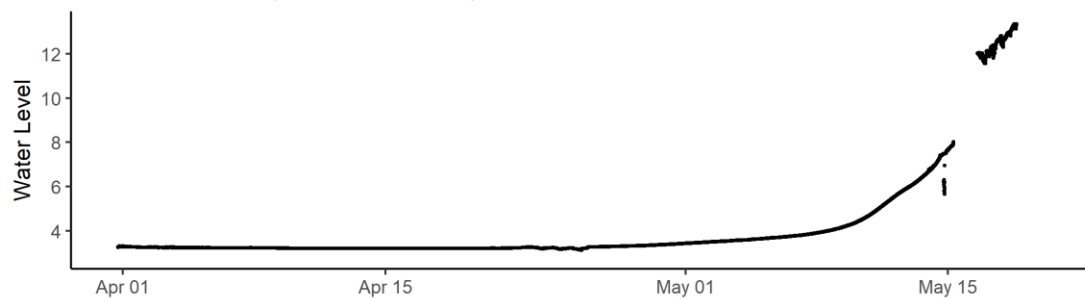
MACKENZIE RIVER AT ARCTIC RED RIVER (10LC014)



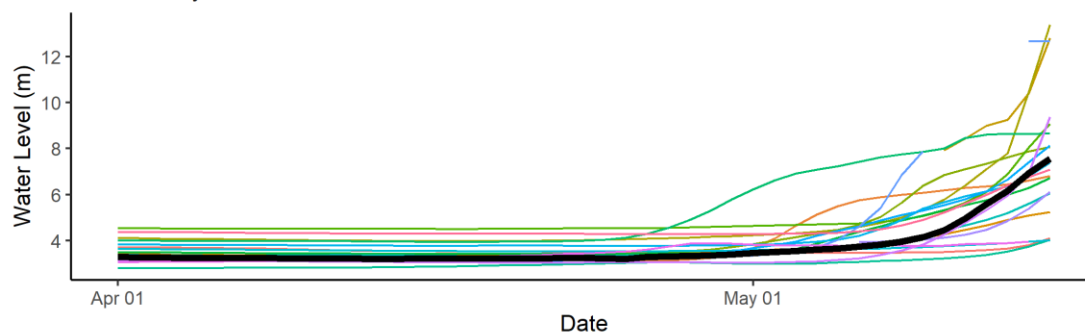
Above – Water level data for the Mackenzie River at Arctic Red River. Daily average levels for this year and the previous year are shown here.

MACKENZIE RIVER AT ARCTIC RED RIVER (10LC014)

2023 Water Levels (5 minute resolution)



Historic Daily Water Levels



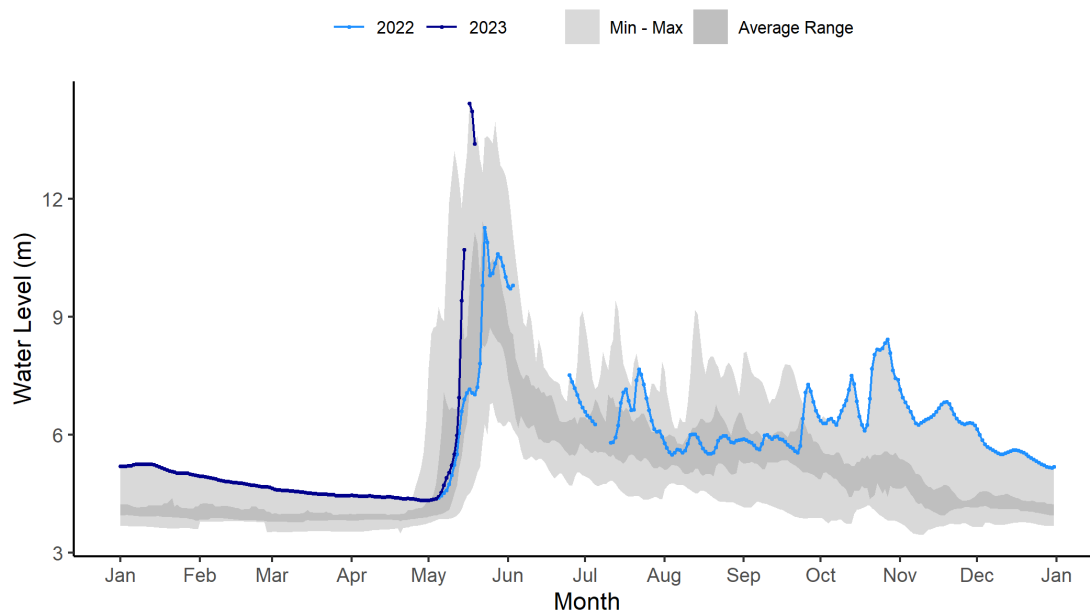
Above: The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.



Above – Mackenzie River at Arctic Red River hydrometric gauge photo from May 20 at 13:00. Photo courtesy of Water Survey of Canada and GNWT.

Peel River above Fort McPherson [10MC002]

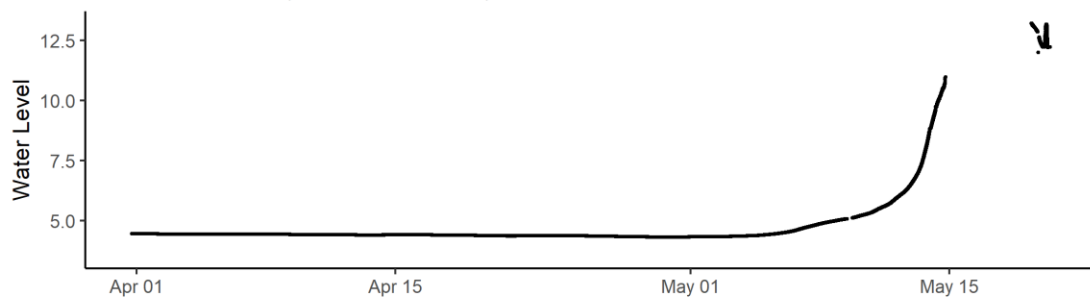
PEEL RIVER ABOVE FORT MCPHERSON (10MC002)



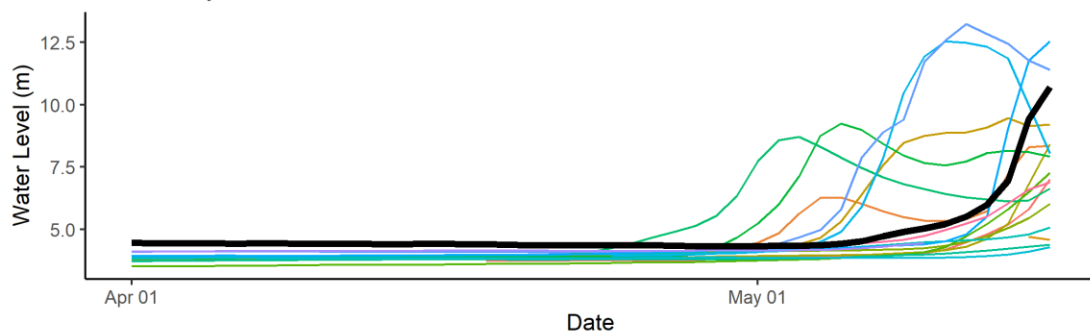
Above – Provisional water level data for the Peel River above Fort McPherson. Daily average levels for this year and the previous year are shown here.

PEEL RIVER ABOVE FORT MCPHERSON (10MC002)

2023 Water Levels (5 minute resolution)

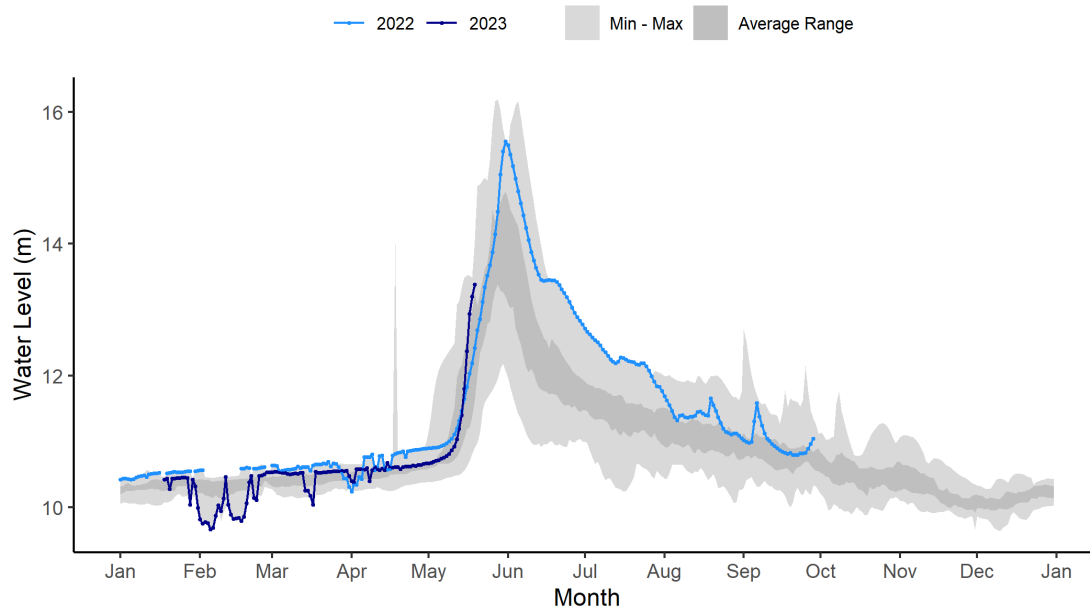


Historic Daily Water Levels



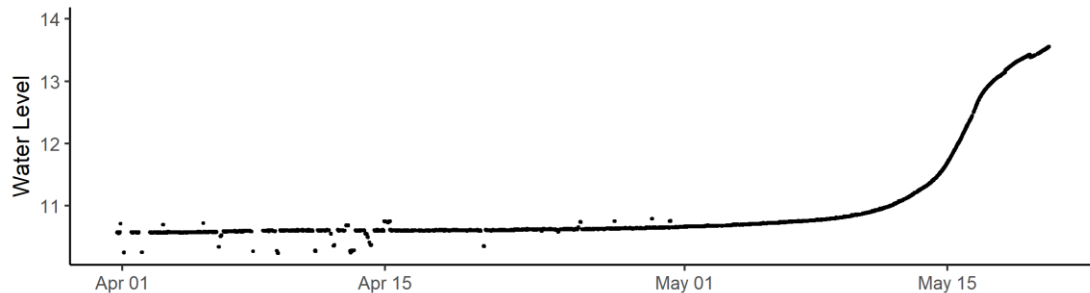
Above: The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.

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

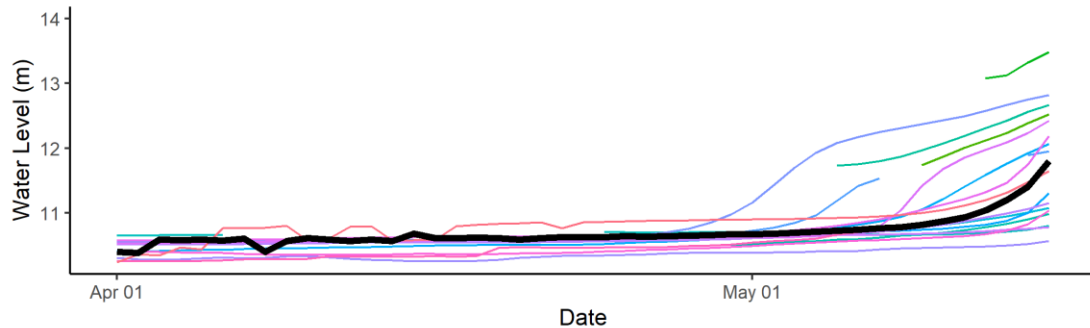


Above – Water level data for the Mackenzie River (Peel Channel) above Aklavik. Daily average levels for this year and the previous year are shown here.

MACKENZIE RIVER (PEEL CHANNEL) ABOVE AKLAVIK (10MC003)
2023 Water Levels (5 minute resolution)

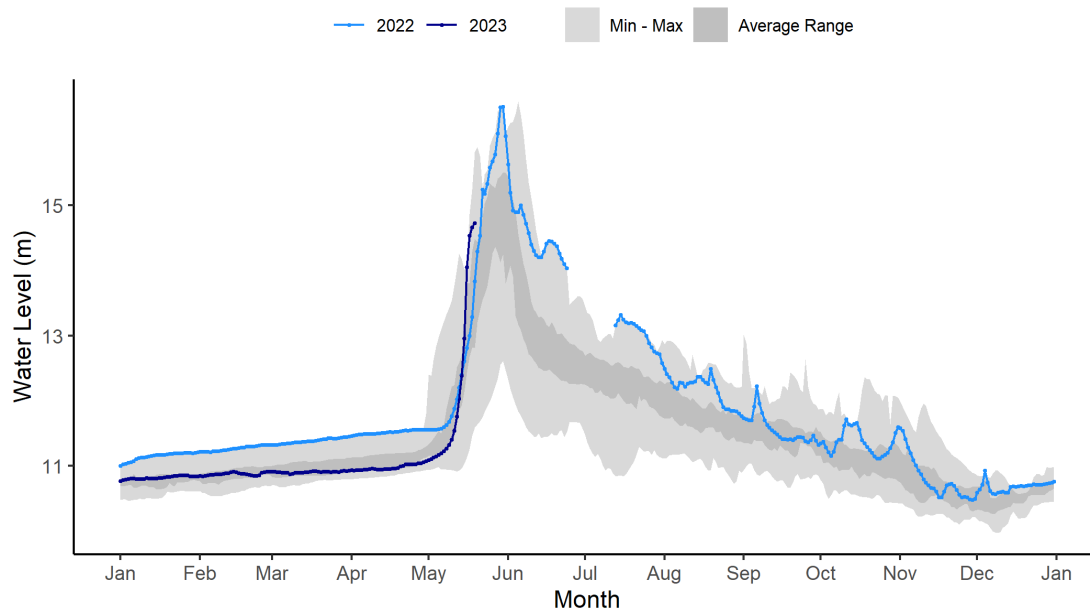


Historic Daily Water Levels



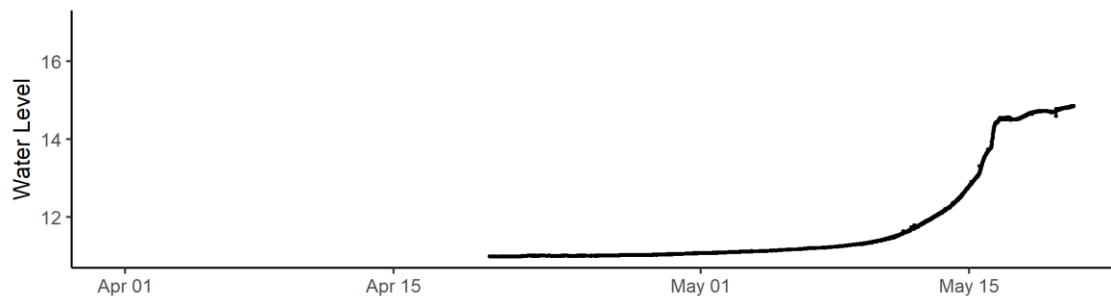
Above: The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.

Mackenzie River (Middle Channel) below Raymond Channel [10MC008]:
MACKENZIE RIVER (MIDDLE CHANNEL) BELOW RAYMOND CHANNEL (10M0

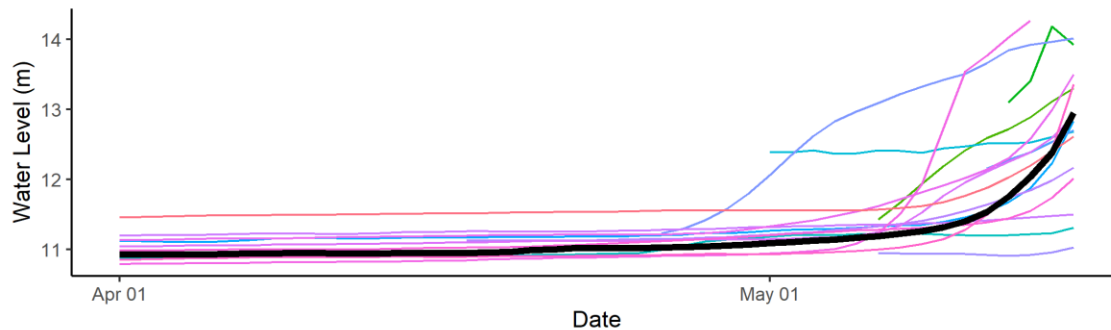


Above – Water level data for the Mackenzie River (Middle Channel) below Raymond Channel. Daily average levels for this year and the previous year are shown here.

MACKENZIE RIVER (MIDDLE CHANNEL) BELOW RAYMOND CHANNEL (10MC008)
2023 Water Levels (5 minute resolution)



Historic Daily Water Levels

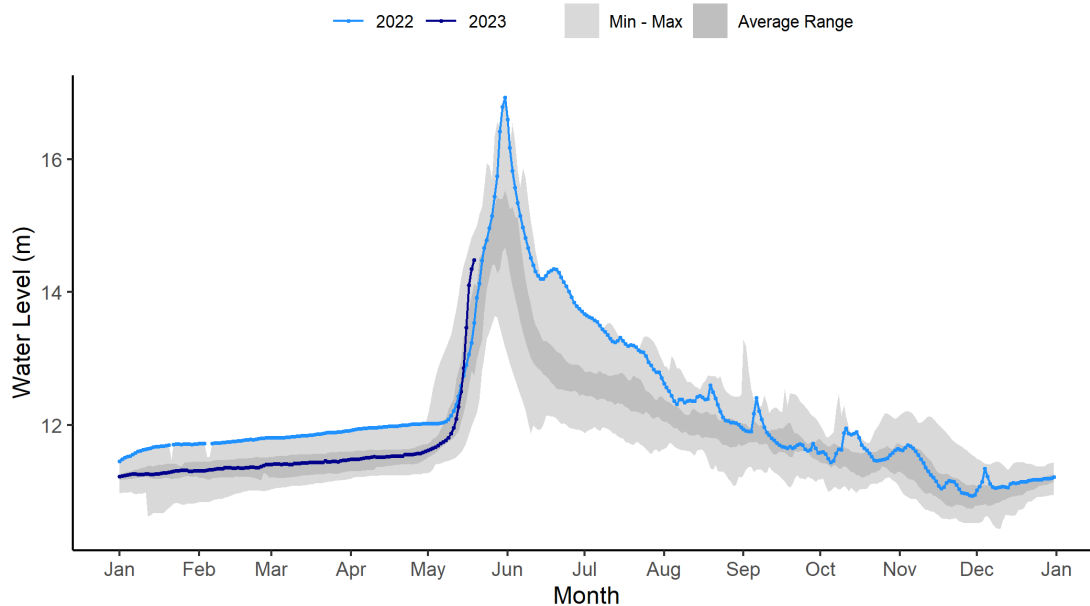


Above: The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.



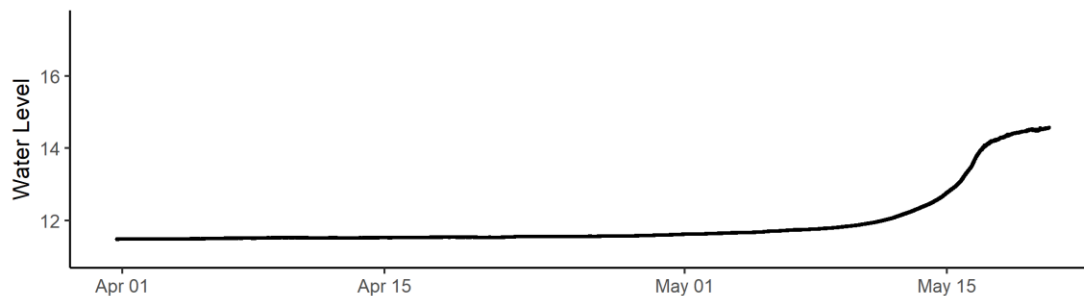
Above – Mackenzie River (Middle Channel) below Raymond Channel hydrometric gauge photo from May 20 at 12:00. Photo courtesy of Water Survey of Canada and GNWT.

Mackenzie River (East Channel) at Inuvik [10LC002]:
MACKENZIE RIVER (EAST CHANNEL) AT INUVIK (10LC002)

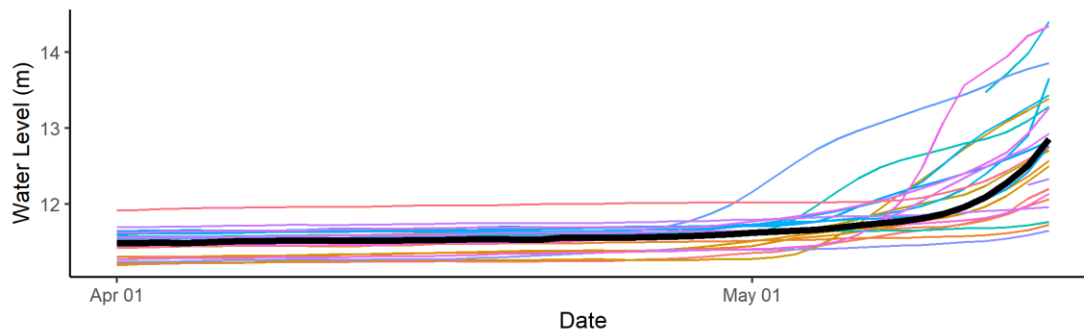


Above – Water level data for the Mackenzie River (East Channel) at Inuvik. Daily average levels for this year and the previous year are shown here.

MACKENZIE RIVER (EAST CHANNEL) AT INUVIK (10LC002)
2023 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.

Weather Data:

Current status and forecast:














Weather in the Beaufort Delta is expected to be above seasonal for the next three days, with a chance of rain/flurries later today.

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.

Seven-day weather forecast:














Fort McPherson:

Sat 20 May	Sun 21 May	Mon 22 May	Tue 23 May	Wed 24 May	Thu 25 May	Fri 26 May
 17°C Increasing cloudiness	 14°C Clearing	 23°C Sunny	 11°C 60% Chance of showers	 11°C Cloudy	 12°C A mix of sun and cloud	 14°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 2°C 30% Chance of rain showers or flurries	 7°C Clear	 7°C Clear	 1°C Cloudy	 2°C Cloudy periods	 4°C Cloudy periods	

Inuvik:

Sat 20 May	Sun 21 May	Mon 22 May	Tue 23 May	Wed 24 May	Thu 25 May	Fri 26 May
 15°C Increasing cloudiness	 10°C 30% Chance of flurries	 20°C Sunny	 8°C 60% Chance of showers	 12°C A mix of sun and cloud	 18°C A mix of sun and cloud	 20°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 0°C 30% Chance of rain showers or flurries	 7°C Clear	 7°C Clear	 1°C Cloudy	 1°C A mix of sun and cloud	 3°C A mix of sun and cloud	

Aklavik:

Sat 20 May	Sun 21 May	Mon 22 May	Tue 23 May	Wed 24 May	Thu 25 May	Fri 26 May
 14°C Increasing cloudiness	 11°C Clearing	 20°C Sunny	 6°C 60% Chance of showers	 10°C Cloudy	 10°C A mix of sun and cloud	 12°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 2°C 30% Chance of rain showers or flurries	 10°C Clear	 5°C Clear	 1°C Cloudy	 0°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.