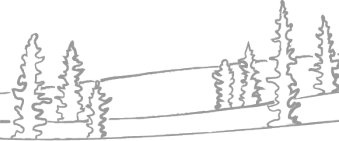




NWT Water Monitoring Bulletin

– May 17, 2022: 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 ENR 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:

- Water levels are receding in Sambaa K'e after flooding from the Island River on the weekend;
 - Some ponded water remains in low-lying areas of the community;
- Ice is moving along the Mackenzie River through the Sahtu;
- Ice broke and is moving well through the Ramparts, past Fort Good Hope as of this morning;
- Water levels have receded on the Mackenzie River at Tulita and Norman Wells following ice movement;
- Water levels under ice are increasing in the Mackenzie River Delta, as is normal for this time of year;
- Water levels on the Peel River near Fort McPherson are increasing at a normal rate for this time of year.

Contents

Current Status:	1
Hay River:	3
Current Status:	3
Hydrometric Data:	4
Hay River near Meander River (Alberta) [07OB003]:	4
Hay River near the border [07OB008]:	5
Hay River near Hay River [07OB001]:	6
Dehcho Region.....	7
Current Status:	7
Imagery:	7
Mackenzie River	8
Current Status:	8
Hydrometric Data:	9
Mackenzie River at Norman Wells [10KA001]:	9
Mackenzie River at Fort Good Hope [10LD001]:	11
Mackenzie River at Arctic Red River [10LC014]:	12
Peel River and Beaufort Delta	14
Current Status:	14
Peel River at Fort McPherson [10MC002]:	15
Mackenzie River (Peel Channel) at Aklavik [10MC003]:	17
Mackenzie River (Middle Channel) below Raymond Channel [10MC008]:	18
Mackenzie River (East Channel) at Inuvik [10LC002]:	19
Mackenzie River (Napoiak Channel) above Shallow Bay [10MC023]:	20
Weather Data:	21
Factors to Watch:	23
Spring Break up on NWT Rivers: Mechanical vs Thermal	23

Hay River:

Current Status:

- Provisional water levels at the Hay River near Hay River gauge (just upstream of town) dropped by 5 m since the peak on the morning of May 12;
- While the gauge on the main stem of the Hay River at the border continues to slowly increase as residual snowmelt water moves through the basin and to the river, the gauge further south on the Hay River near Meander River has levelled off;
- As Hay River has reached open water status and the risk of more break-up related flooding has passed, there will no longer be daily analyses in this report in order to focus efforts downstream where flood risk still remains. Conditions will continue to be monitored by ENR. If you wish to follow real-time, visit: https://wateroffice.ec.gc.ca/report/real_time_e.html?stn=07OB001



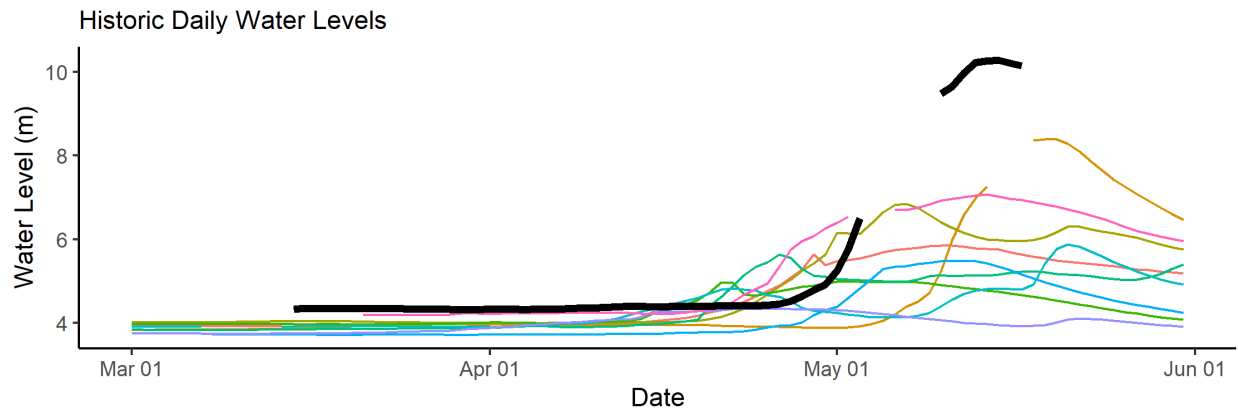
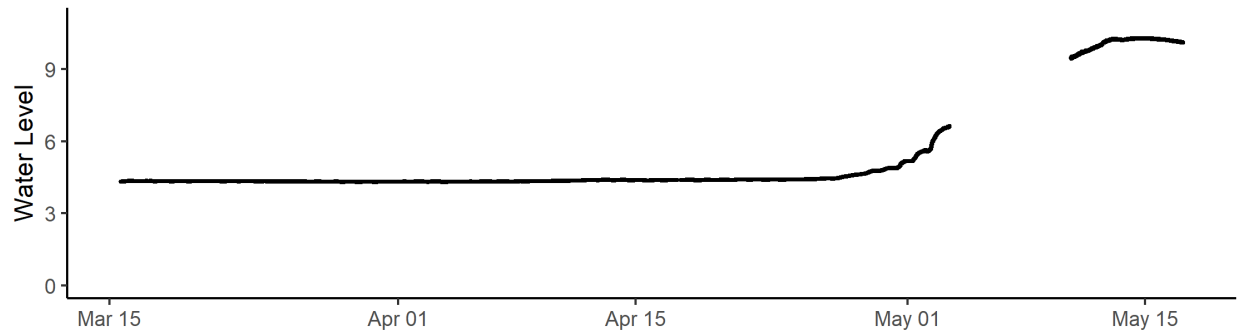
Above – Map of hydrometric stations in the Hay River basin. The station numbers are referenced in the water level plots below.

Hydrometric Data:

Hay River near Meander River (Alberta) [070B003]:

HAY RIVER NEAR MEANDER RIVER (070B003)

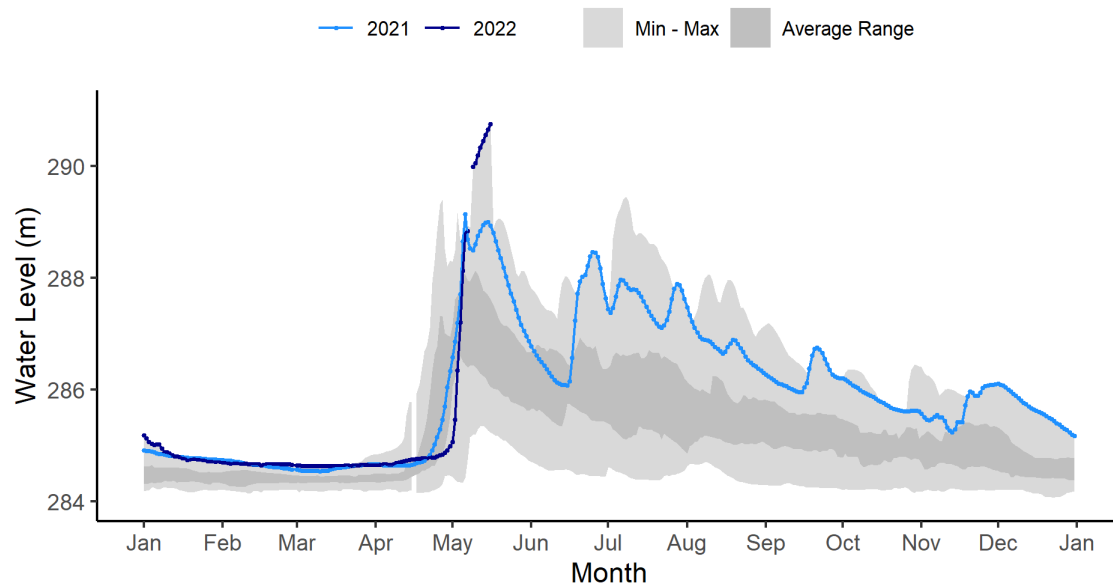
2022 Water Levels (5 minute resolution)



Above – Water level data on the Hay River near Meander River, AB.

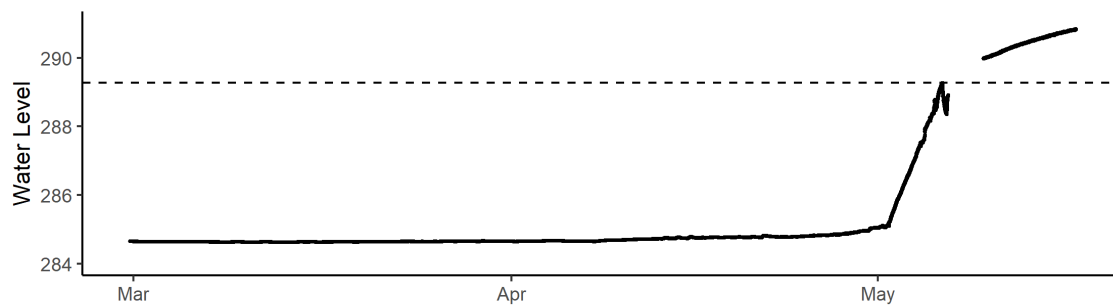
Hay River near the border [07OB008]:

HAY RIVER NEAR ALTA/NWT BOUNDARY (07OB008)

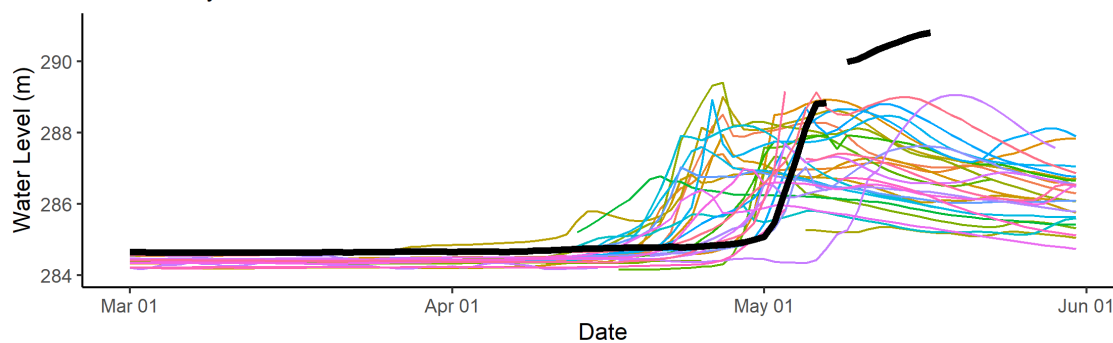


HAY RIVER NEAR ALTA/NWT BOUNDARY (07OB008)

2022 Water Levels (5 minute resolution)

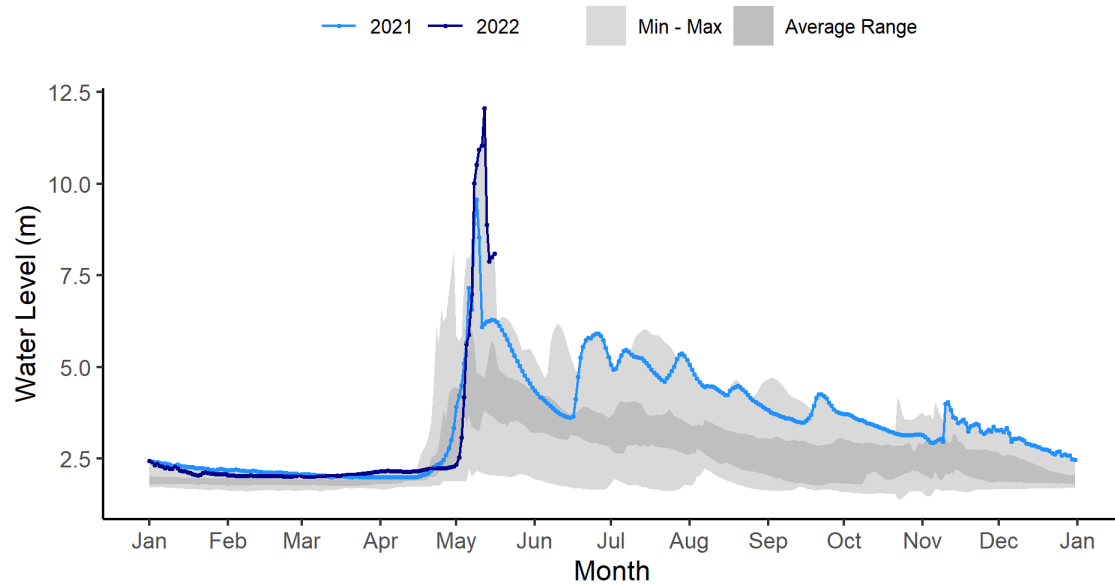


Historic Daily Water Levels

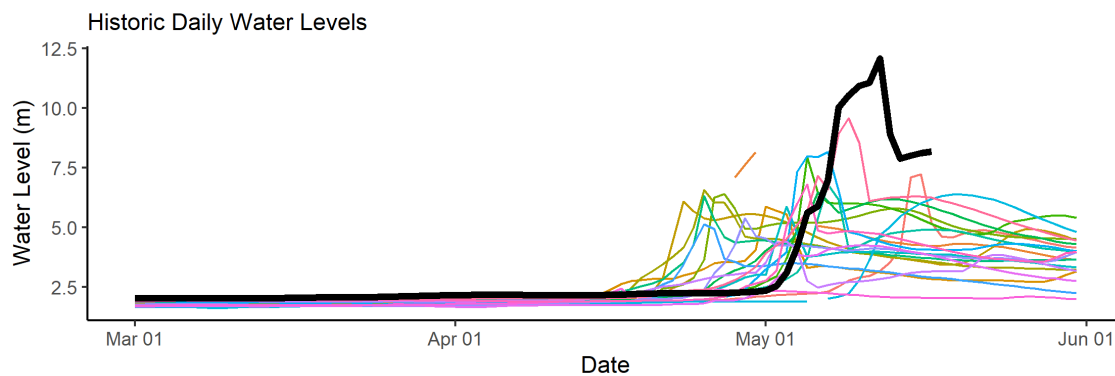
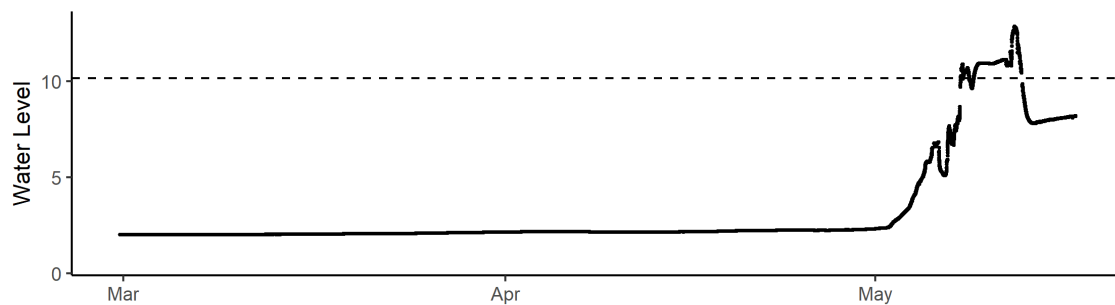


Above - The middle graph in this figure presents real time water level data at 5-minute resolution with the dashed line representing the peak water level from last year (2021). The lower graph shows daily average levels relative to the previous 20 years.

Hay River near Hay River [07OB001]:
HAY RIVER NEAR HAY RIVER (07OB001)



HAY RIVER NEAR HAY RIVER (07OB001)
2022 Water Levels (5 minute resolution)



Above - The middle graph in this figure presents real time water level data at 5-minute resolution with the dashed line representing the peak water level from last year (2021). The lower graph shows daily average levels relative to the previous 20 years.

Dehcho Region

Current Status:

- Localized flooding occurred in Sambaa K'e on May 14 and May 15;
 - Ponded water remains in some areas and is slowly draining;
 - Ice on the Island River jammed at the mouth (inlet to Trout Lake) and led to backwater breaching the river bank and flowing into the community.

Imagery:

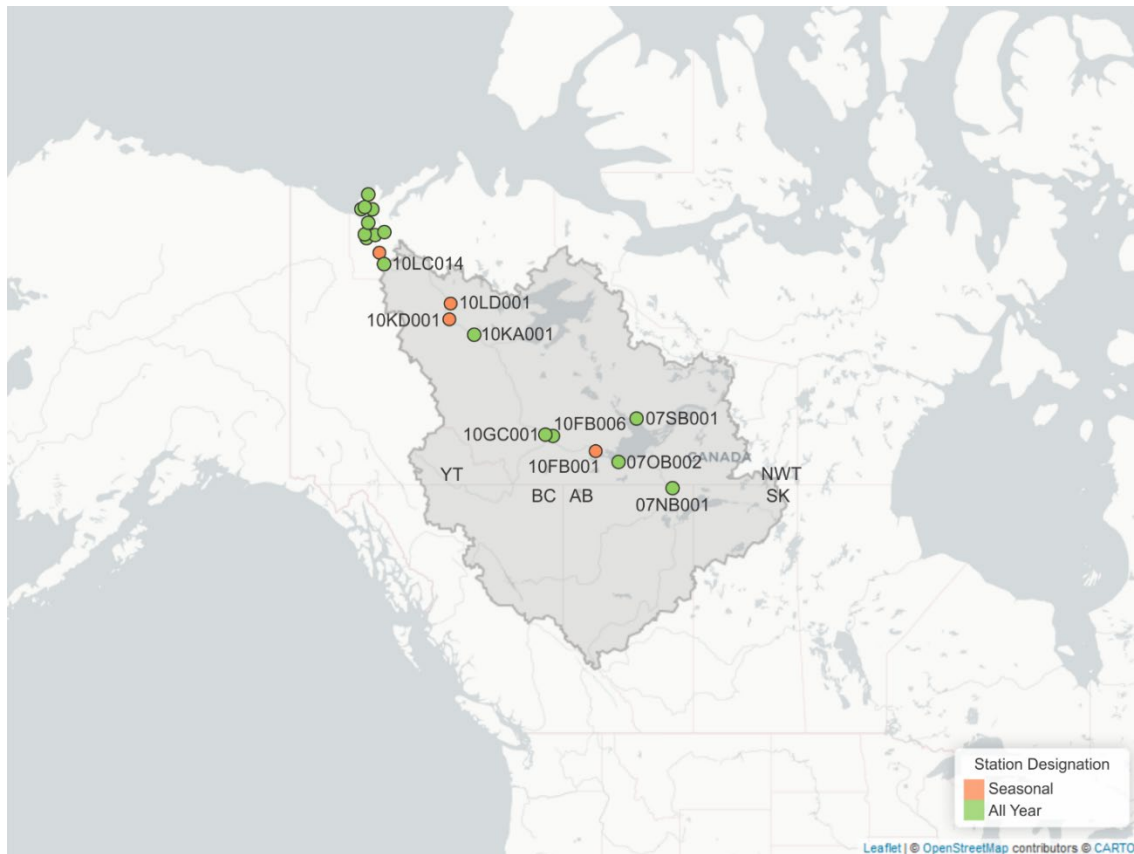


Above – Image taken at 13:00 MDT on May 16th over the community of Sambaa K'e, looking south. The Island River can be seen draining into Trout Lake. Note that the large channel at the north end of the fork (channel at the bottom of the image) was jammed with ice during the flood event, forcing backwater through the south channel. Image courtesy of the GNWT.

Mackenzie River

Current Status:

- Break up is progressing along the Mackenzie River, with ice moving along the river through the Sahtu;
- The main push of ice has now moved past Tulita, Norman Wells and the Ramparts;
 - Water levels at Tulita have receded;
 - Water levels at Norman Wells have receded;
- Ice is currently moving downstream at Fort Good Hope (as of 11:00).

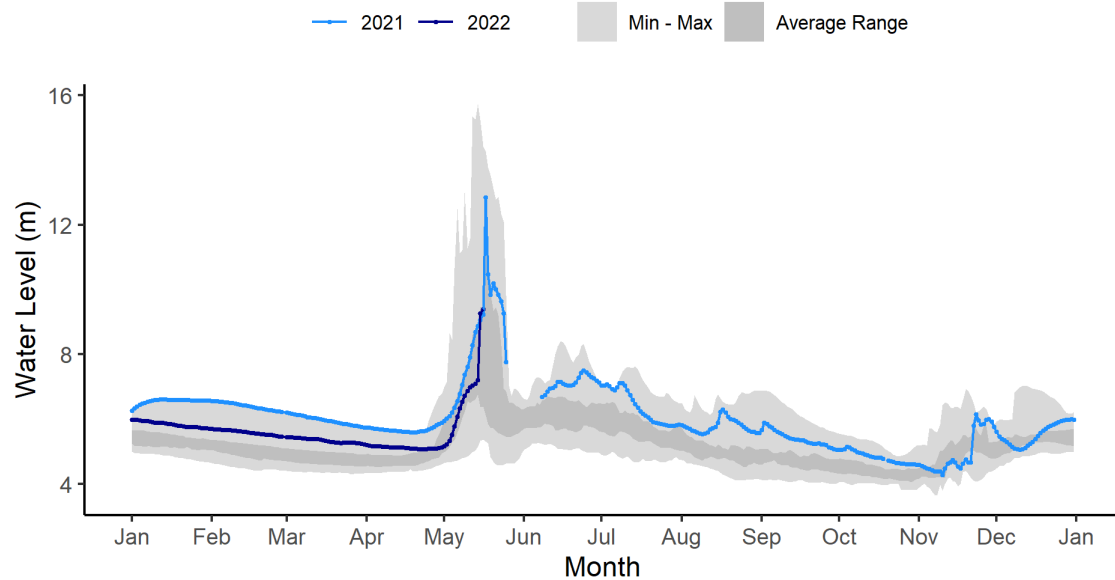


Above – Map of hydrometric stations in the Dehcho (Mackenzie River) basin. The station numbers are referenced in the water level plots below.

Hydrometric Data:

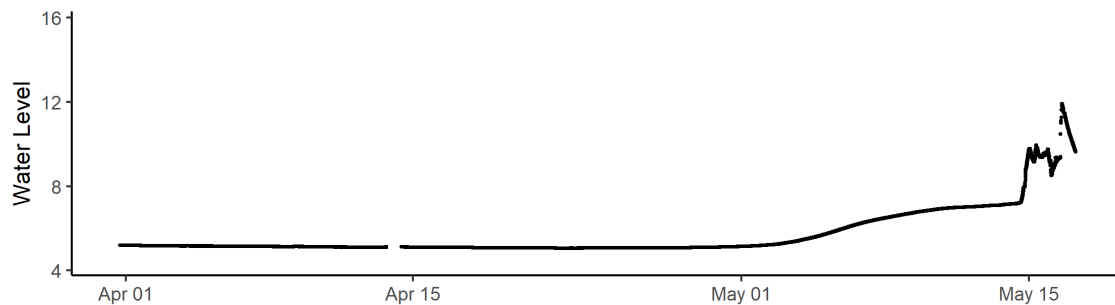
Mackenzie River at Norman Wells [10KA001]:

MACKENZIE RIVER AT NORMAN WELLS (10KA001)

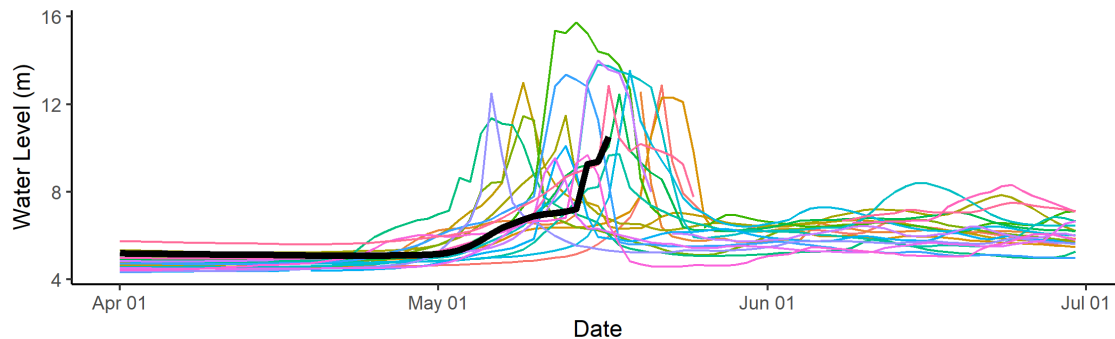


MACKENZIE RIVER AT NORMAN WELLS (10KA001)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels



Above – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Unsteady water levels are an indication of ice movement. Water levels remain within typical levels for break up.



Above – Mackenzie River at Norman Wells hydrometric gauge photo from May 17 at 11:00. Photo courtesy of Water Survey of Canada and GNWT.

Mackenzie River at Fort Good Hope [10LD001]:

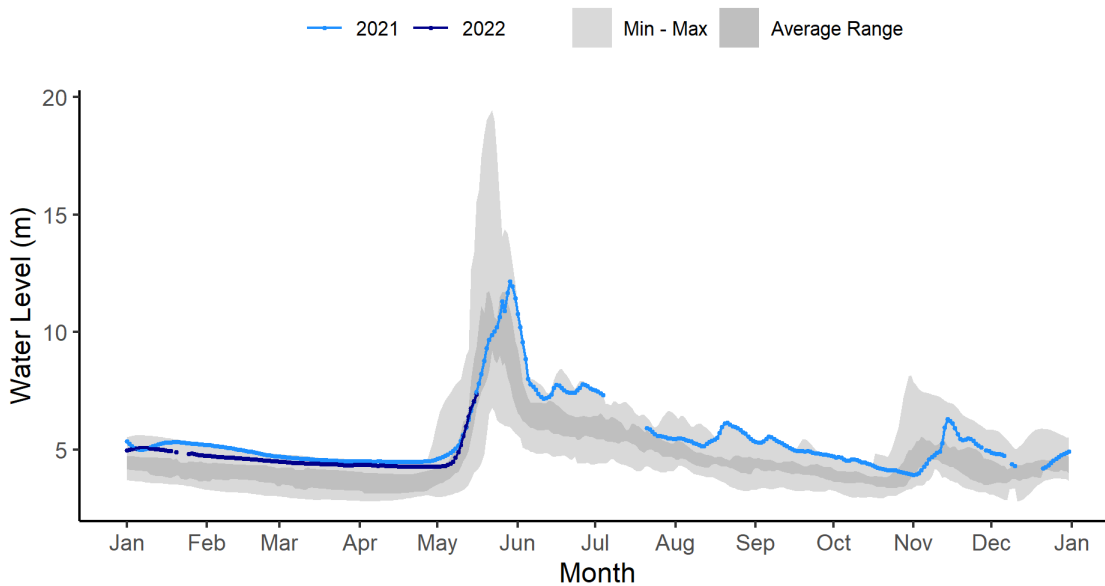
10LD001, 2022-05-17 18:01:15 UTC
66.25150, -128.64580 12.3V 10.5°C P



Above – Mackenzie River at Fort Good Hope hydrometric gauge photo from May 17 at 12:00. Photo courtesy of Water Survey of Canada and GNWT.

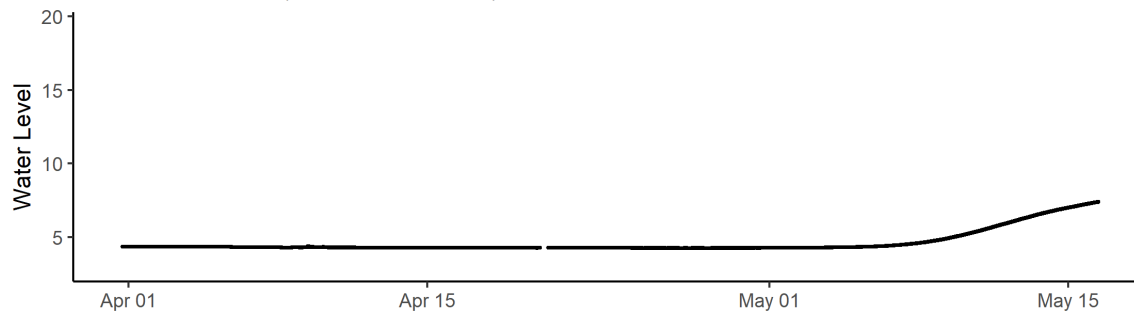
Mackenzie River at Arctic Red River [10LC014]:

MACKENZIE RIVER AT ARCTIC RED RIVER (10LC014)

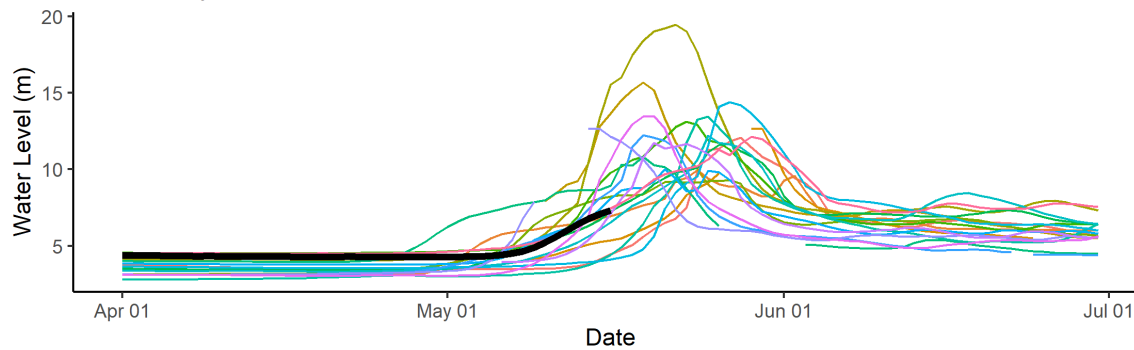


MACKENZIE RIVER AT ARCTIC RED RIVER (10LC014)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels



Above – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels on the Mackenzie River at Arctic Red River have slowly begun to rise, with the timing being approximately average to previous years.

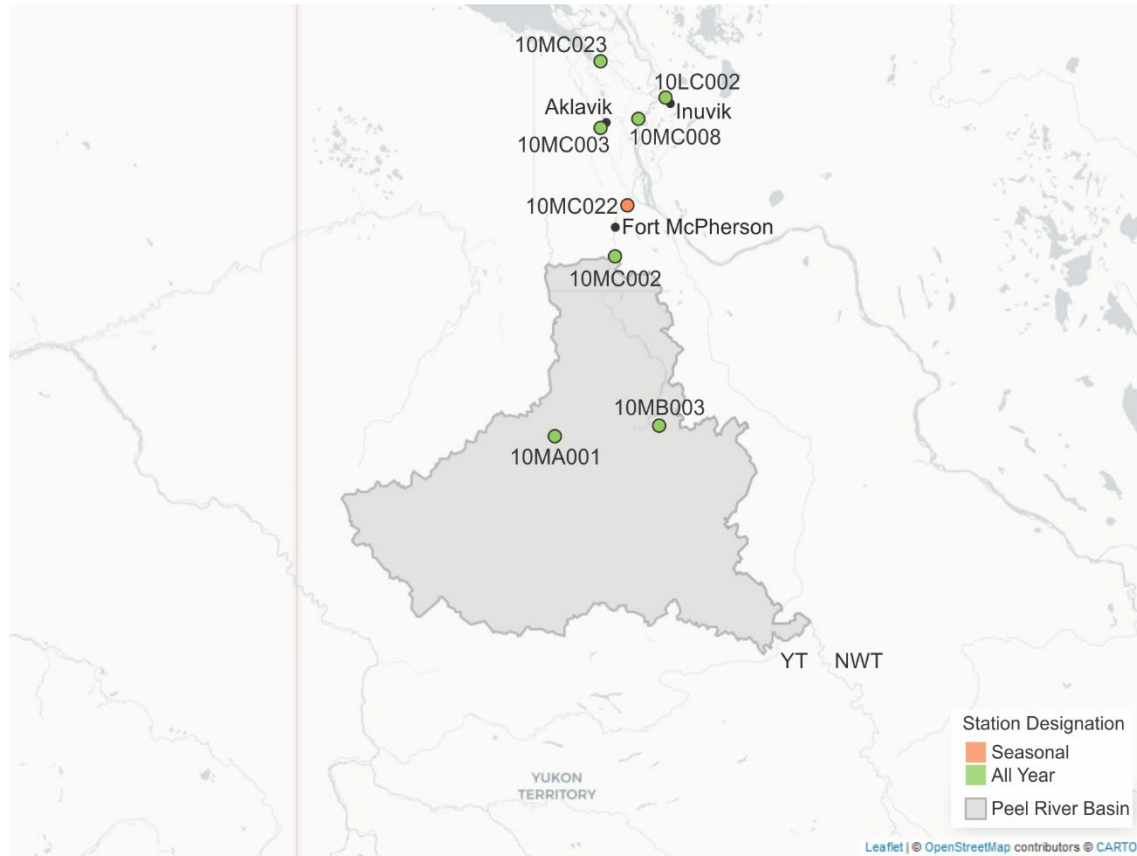


Above – Mackenzie River at Arctic Red River hydrometric gauge photo from May 17 at 10:00. Photo courtesy of Water Survey of Canada and GNWT.

Peel River and Beaufort Delta

Current Status:

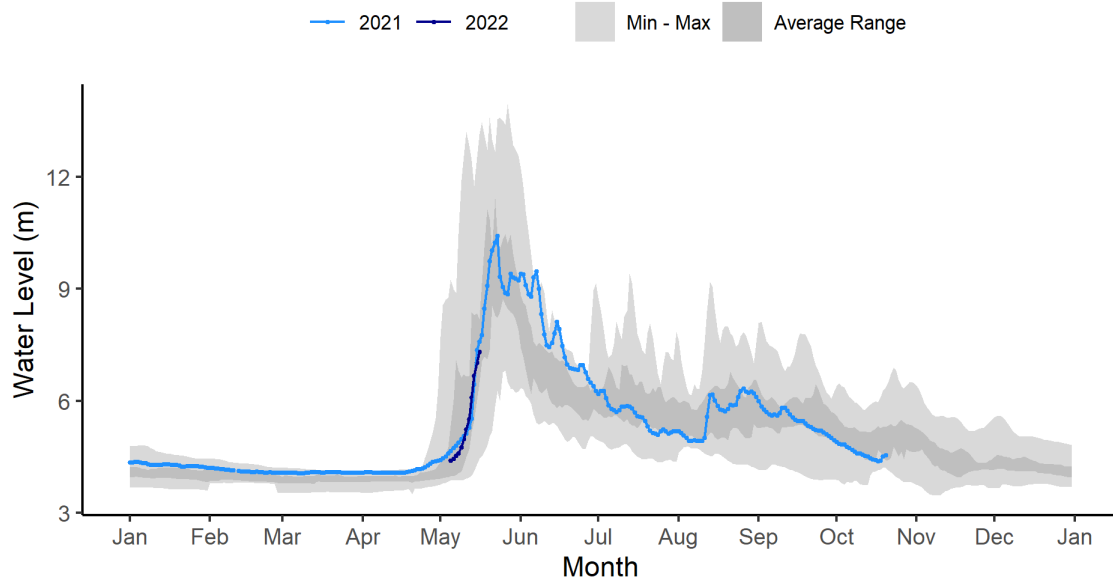
- Water levels are beginning to increase on the Peel River, as is usual for this time of year;
- Ice has not yet moved on the Mackenzie River near Tsiigehtchic;
- Water levels in the Mackenzie Delta continue to rise;
 - Water levels were much higher than average over winter, but lower than last year.



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

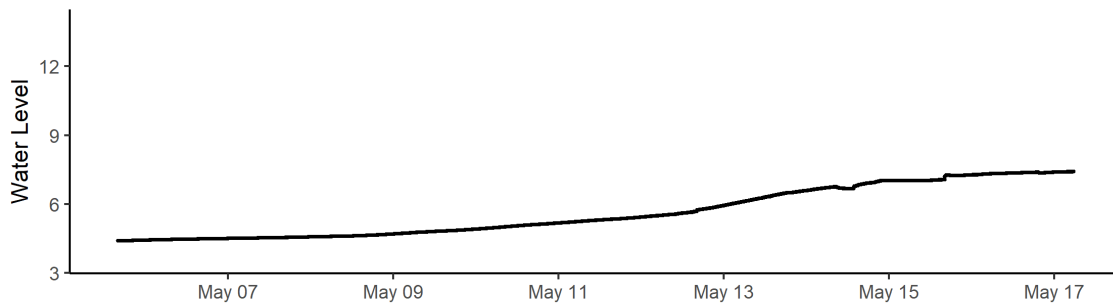
Peel River at Fort McPherson [10MC002]:

PEEL RIVER ABOVE FORT MCPHERSON (10MC002)

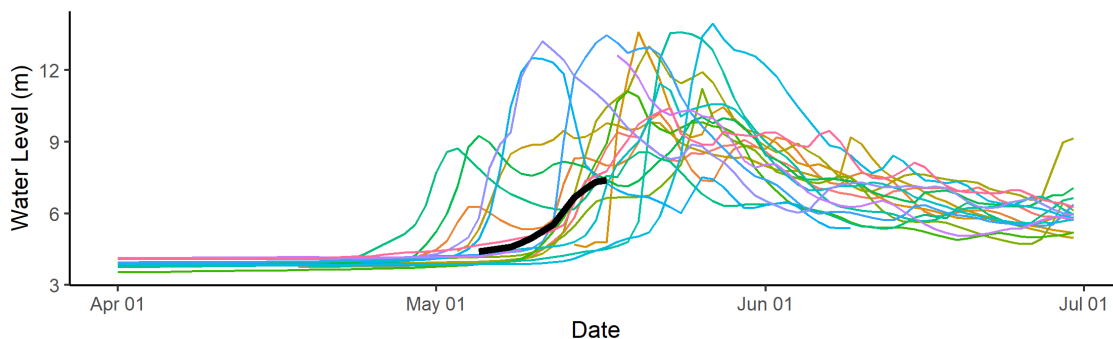


PEEL RIVER ABOVE FORT MCPHERSON (10MC002)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels



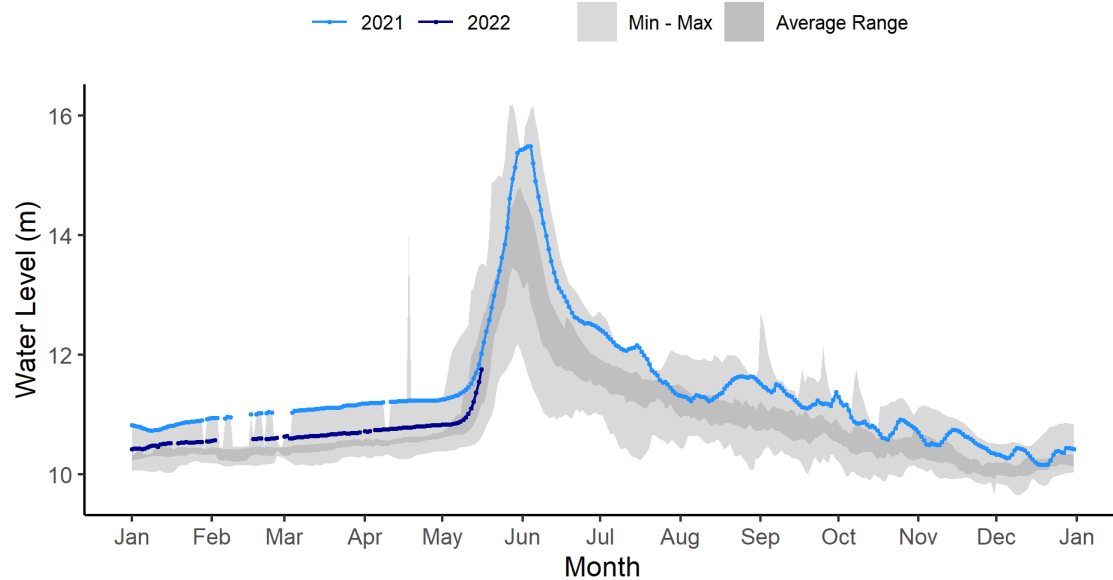
Above – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels on the Peel River at Fort McPherson have slowly begun to rise, with the timing being approximately average to previous years. There were reports of ice movement on the Peel River near Fort McPherson as of yesterday morning.



Above – Peel River at Fort McPherson hydrometric gauge photo from May 17 at 12:00. Photo courtesy of Water Survey of Canada and GNWT.

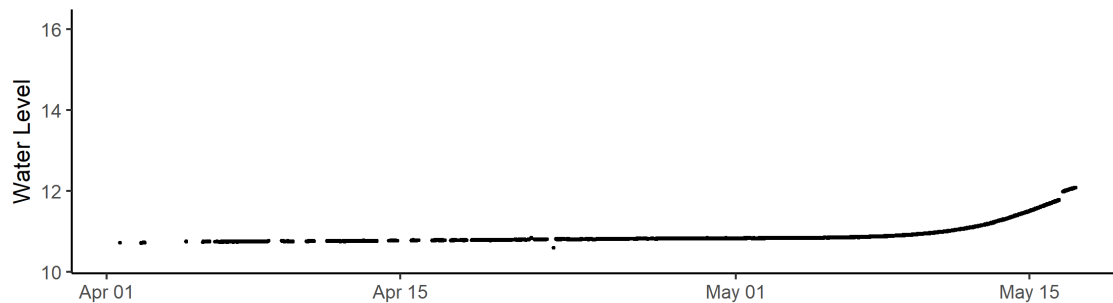
Mackenzie River (Peel Channel) at Aklavik [10MC003]:

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

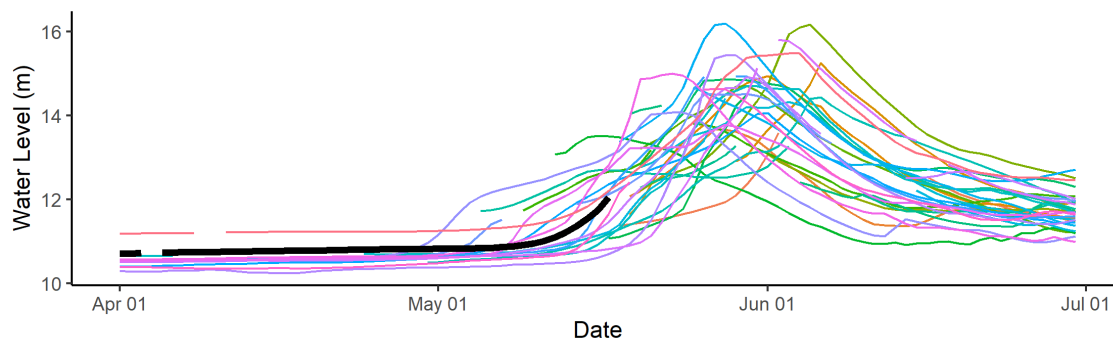


MACKENZIE RIVER (PEEL CHANNEL) ABOVE AKLAVIK (10MC003)

2022 Water Levels (5 minute resolution)

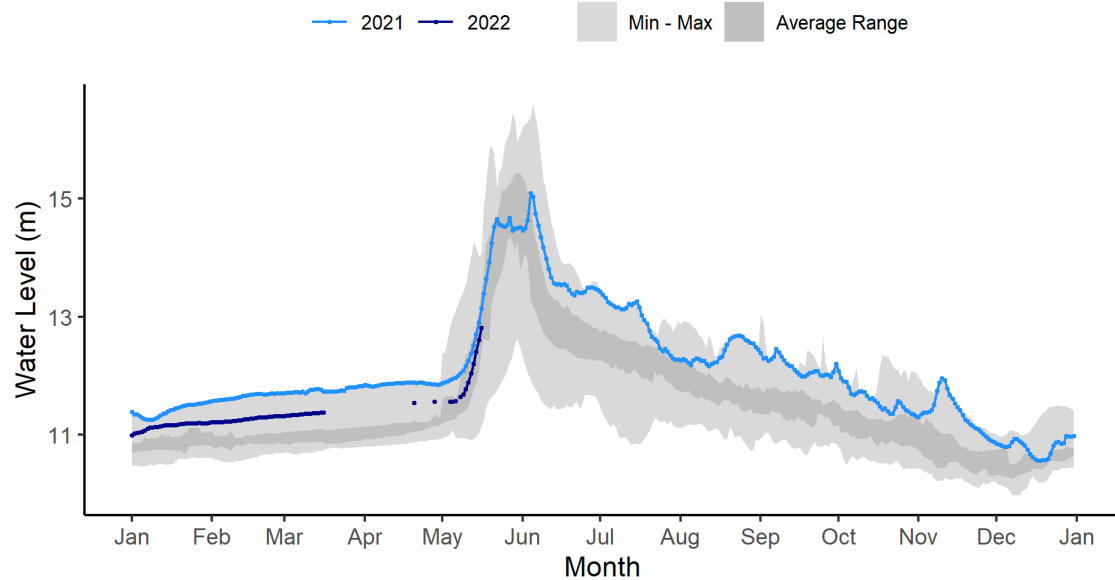


Historic Daily Water Levels

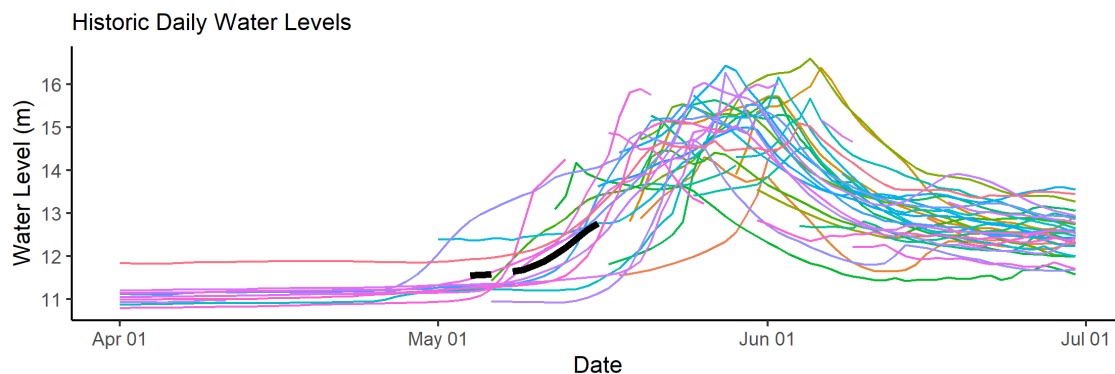
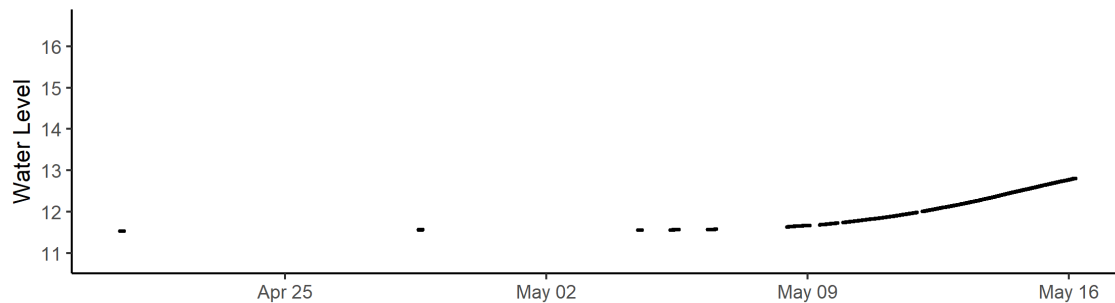


Above – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels in the Mackenzie Delta are rising as is normal for this time of year.

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



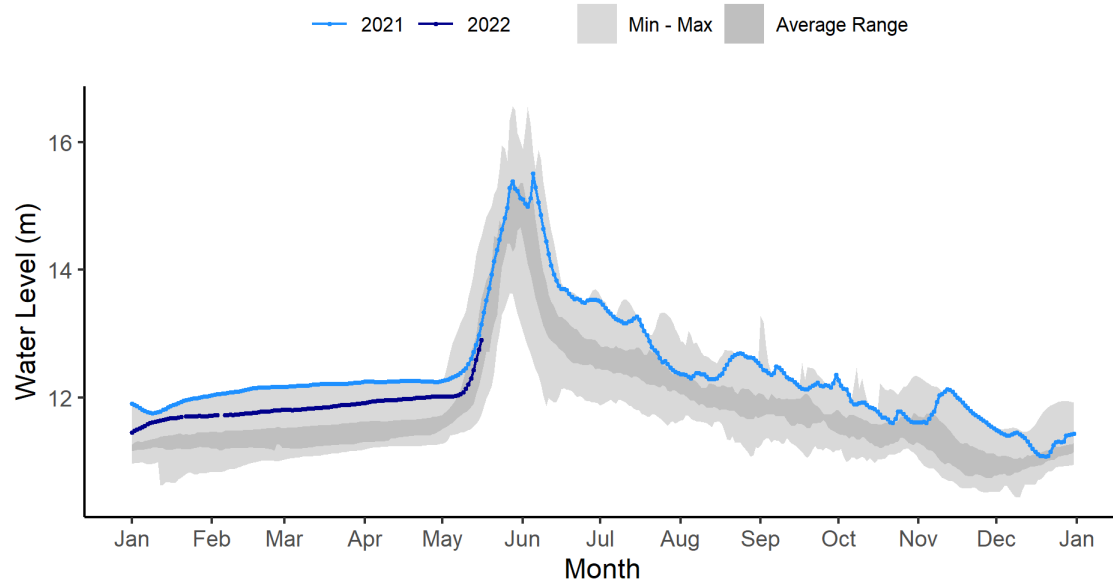
MACKENZIE RIVER (MIDDLE CHANNEL) BELOW RAYMOND CHANNEL (10MC008)
2022 Water Levels (5 minute resolution)



Above – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels in the Mackenzie Delta are rising as is normal for this time of year.

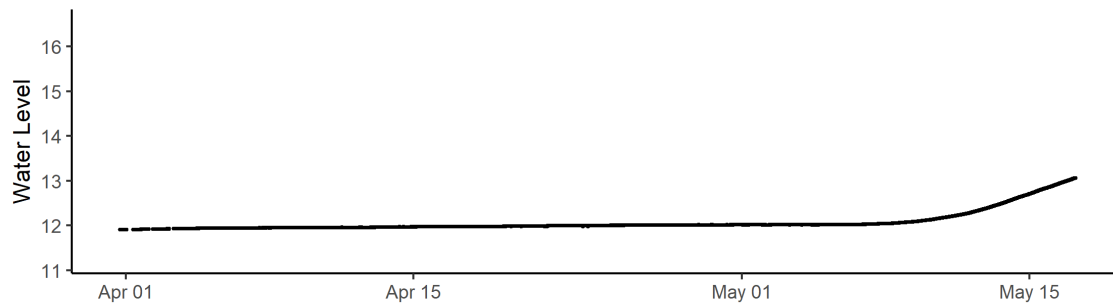
Mackenzie River (East Channel) at Inuvik [10LC002]:

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

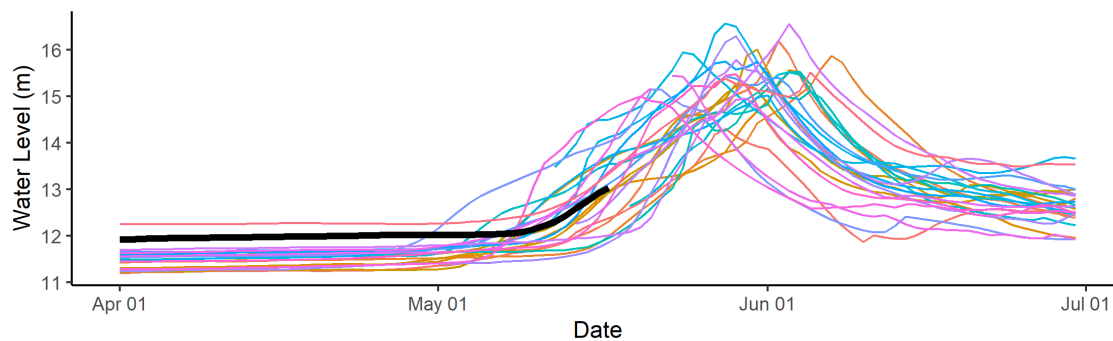


MACKENZIE RIVER (EAST CHANNEL) AT INUVIK (10LC002)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels

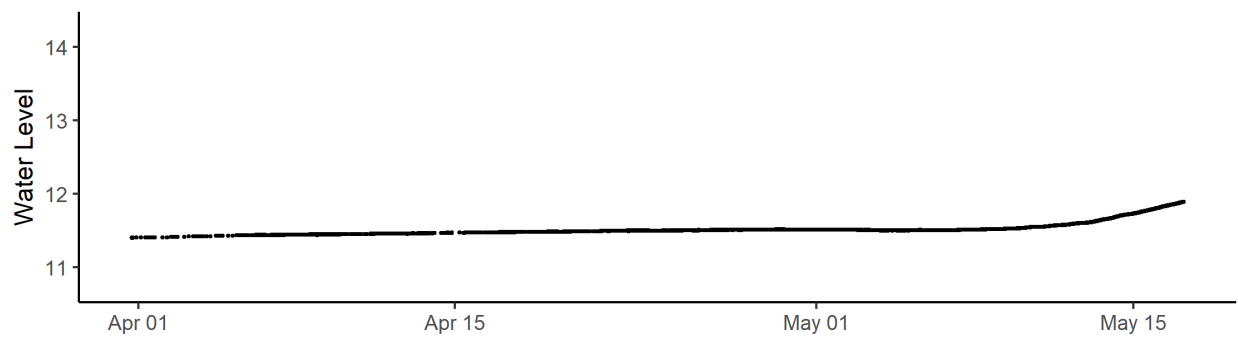


Above – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels in the Mackenzie Delta are rising as is normal for this time of year.

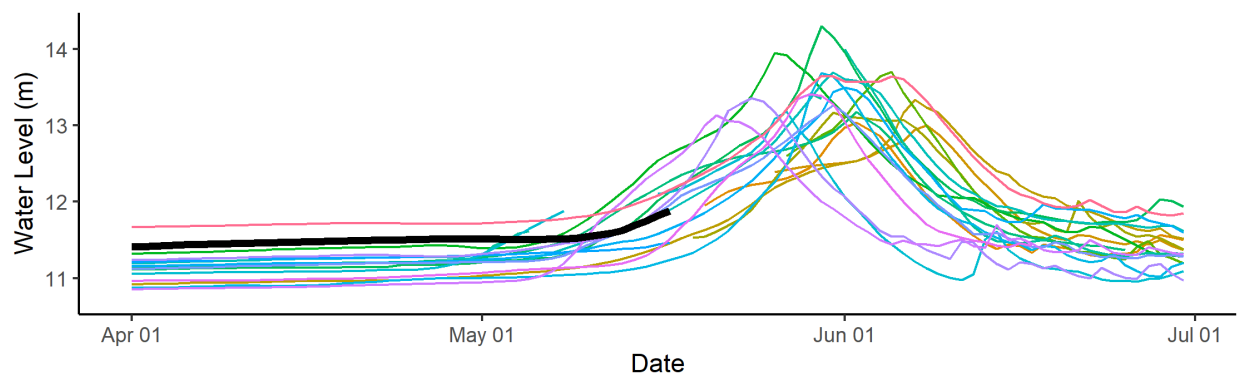
Mackenzie River (Napoia Channel) above Shallow Bay [10MC023]:

MACKENZIE RIVER (NAPOIAK CHANNEL) ABOVE SHALLOW BAY (10MC023)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels

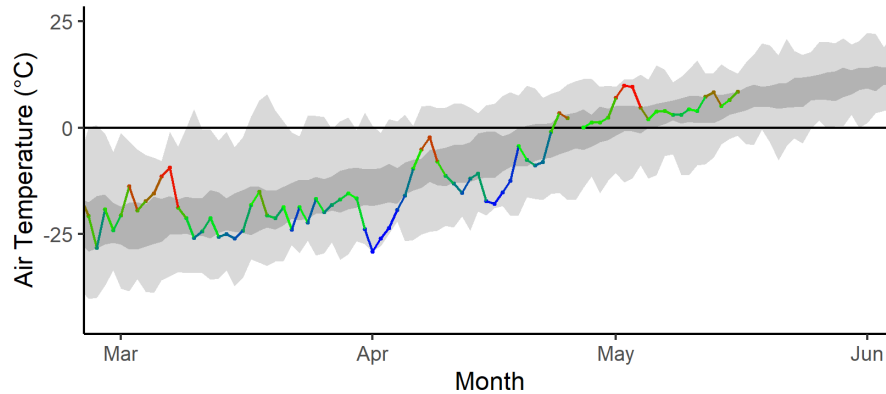


Above – The top graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels in the Mackenzie Delta are rising as is normal for this time of year.

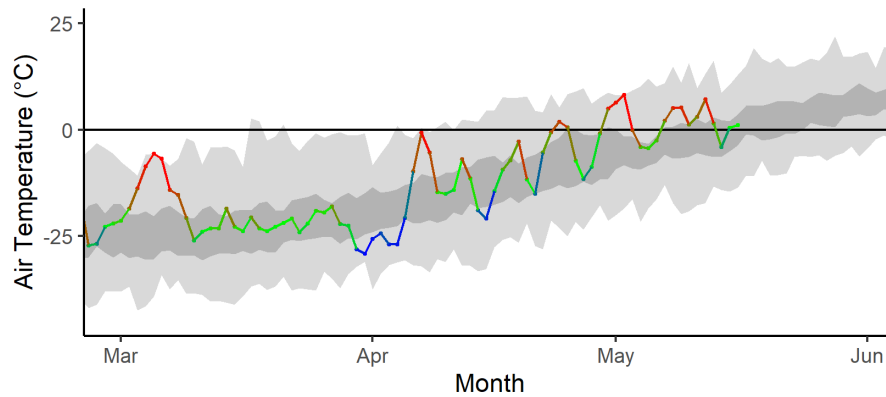
Weather Data:

Weather information informs how snow and ice will melt and provides information about how this spring is unfolding relative to previous springs. Locations included here cover basin areas that feed into NWT rivers that are currently undergoing break up. The first set of plots show how temperatures have been relative to average (dark grey band) this spring, while the second set is Environment and Climate Change Canada (ECCC) weather forecast data for the next seven days.

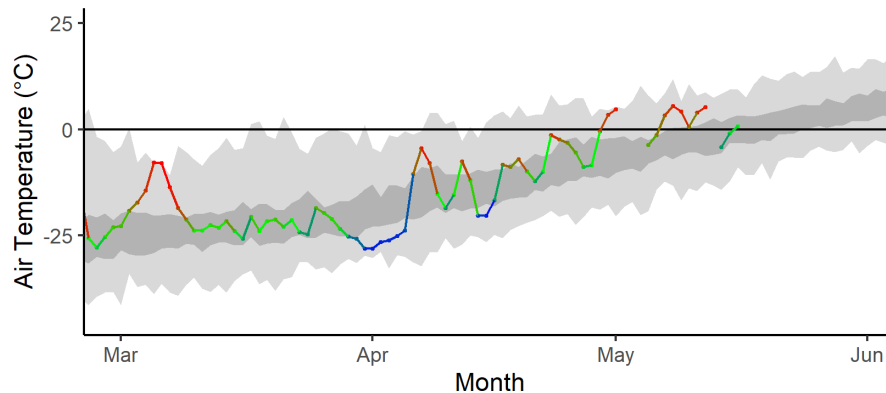
2022 Norman Wells Mean Daily Air Temperatures
















2022 Inuvik Mean Daily Air Temperatures
















2022 Aklavik Mean Daily Air Temperatures



Norman Wells seven-day weather forecast:

▼ Forecast							Hourly Forecast	Air Quality	Alerts	Jet Stream
Tue 17 May	Wed 18 May	Thu 19 May	Fri 20 May	Sat 21 May	Sun 22 May	Mon 23 May				
 17°C A mix of sun and cloud	 12°C 30% Chance of showers	 15°C Cloudy	 15°C Cloudy	 12°C Periods of rain	 10°C A mix of sun and cloud	 9°C A mix of sun and cloud				
Tonight	Night	Night	Night	Night	Night					
 6°C Partly cloudy	 5°C 30% Chance of showers	 6°C Cloudy	 6°C 60% Chance of showers	 2°C Cloudy periods	 1°C Cloudy periods					

Inuvik seven-day weather forecast:

▼ Forecast							Hourly Forecast	Air Quality	Alerts	Jet Stream
Tue 17 May	Wed 18 May	Thu 19 May	Fri 20 May	Sat 21 May	Sun 22 May	Mon 23 May				
 1°C 60% Chance of flurries	 3°C 30% Chance of flurries	 7°C Cloudy	 12°C A mix of sun and cloud	 5°C 60% Chance of flurries or rain showers	 3°C A mix of sun and cloud	 4°C A mix of sun and cloud				
Tonight	Night	Night	Night	Night	Night					
 0°C 60% Chance of flurries	 0°C Cloudy	 -1°C Cloudy periods	 0°C 60% Chance of showers	 -7°C Cloudy periods	 -7°C Cloudy periods					














Aklavik seven-day weather forecast:

▼Forecast

[Hourly Forecast](#)

[Alerts](#)

[Jet Stream](#)

Tue 17 May	Wed 18 May	Thu 19 May	Fri 20 May	Sat 21 May	Sun 22 May	Mon 23 May
 0°C 60% Chance of flurries	 2°C Cloudy	 5°C A mix of sun and cloud	 11°C A mix of sun and cloud	 6°C 60% Chance of flurries or rain showers	 0°C A mix of sun and cloud	 1°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 -2°C 60% Chance of flurries	 -1°C Cloudy periods	 0°C Cloudy periods	 1°C 60% Chance of showers	 -6°C Cloudy periods	 -7°C Cloudy periods	

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.