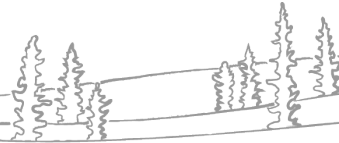




# NWT Water Monitoring Bulletin

## – May 18, 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](mailto:nwtwaters@gov.nt.ca).

### Current Status:

- Ice continues to move along the Mackenzie River through the Sahtu;
- Water levels under ice continue to increase 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;
- Radar imagery of ice conditions in the lower Mackenzie River around Tsiigehtchic, the Mackenzie Delta, and a stretch of the Peel River around Fort McPherson indicate there has been little movement as of May 17 09:30.

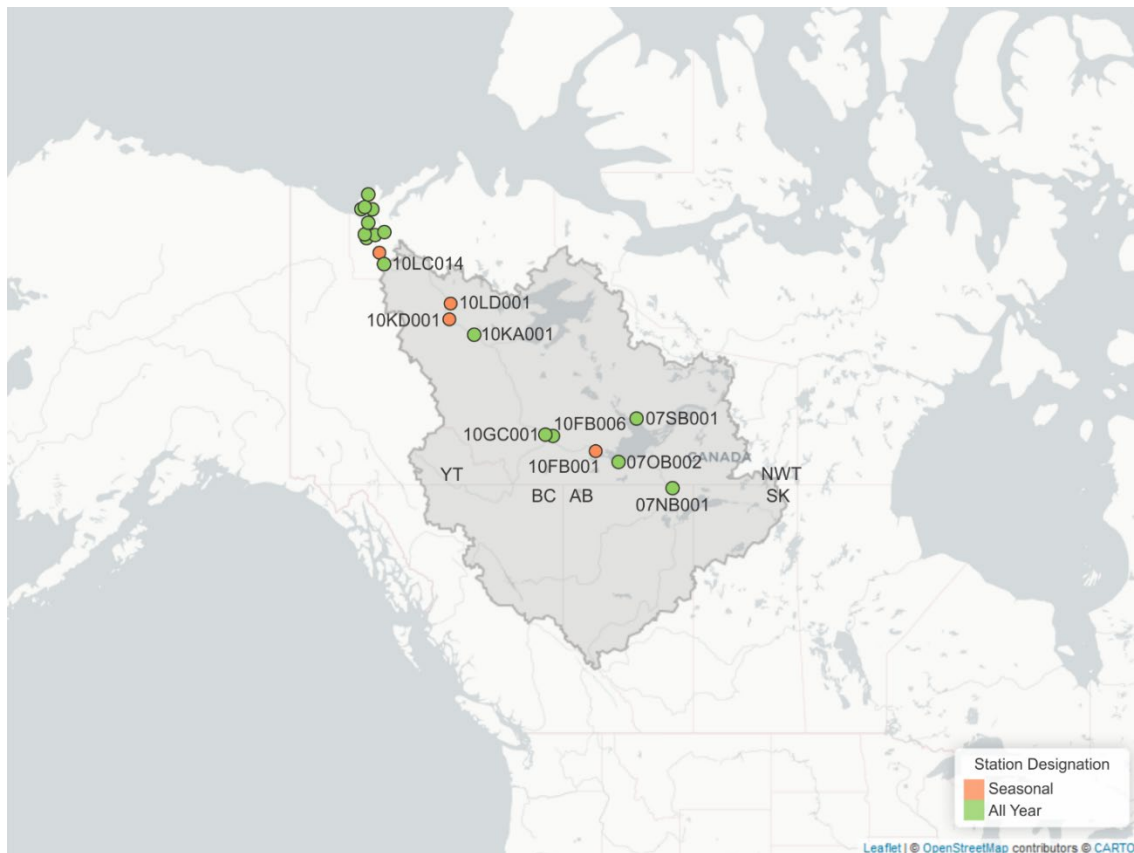
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## Mackenzie River

### 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;
  - Water levels at Fort Good Hope remain steady, based on photo from 07:00;
- As of 07:00, ice was moving downstream at Fort Good Hope.

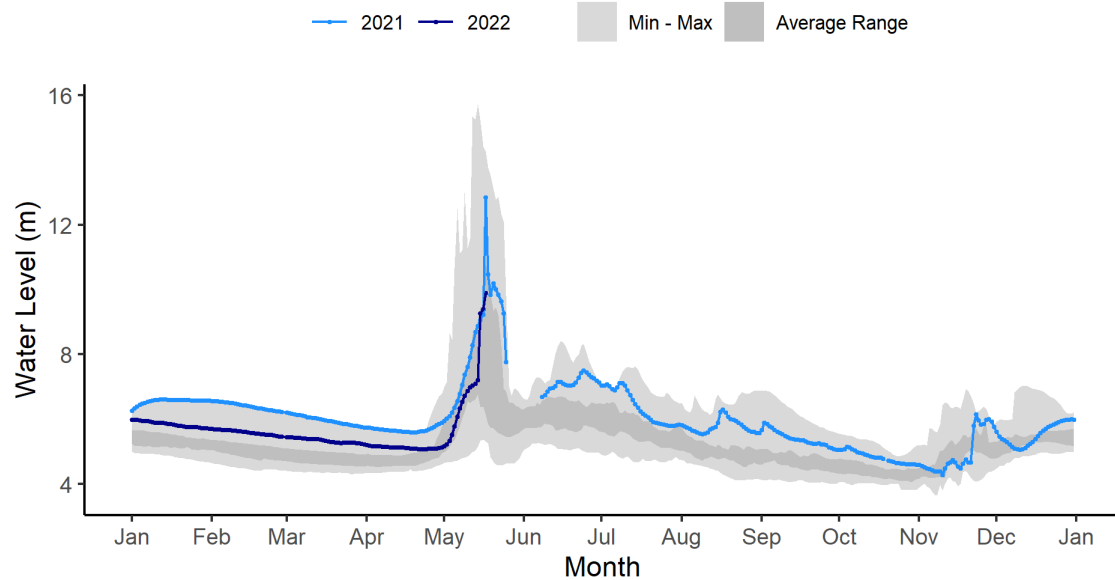


*Above* – Map of hydrometric stations in the Dehcho (Mackenzie River) basin. The station numbers are referenced in the water level plots below.

## Hydrometric Data:

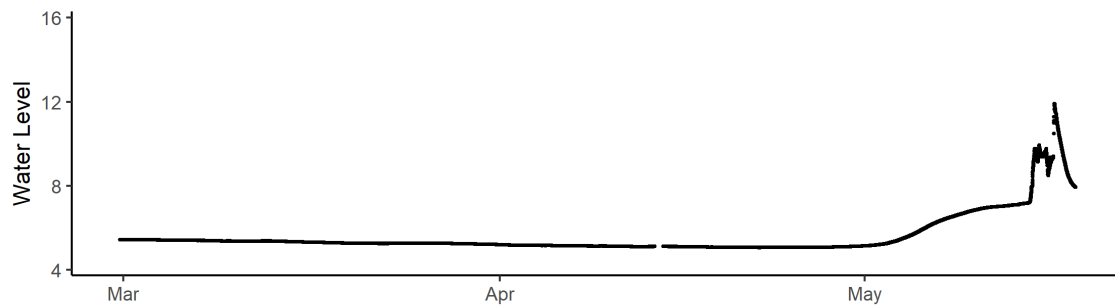
Mackenzie River at Norman Wells [10KA001]:

### MACKENZIE RIVER AT NORMAN WELLS (10KA001)

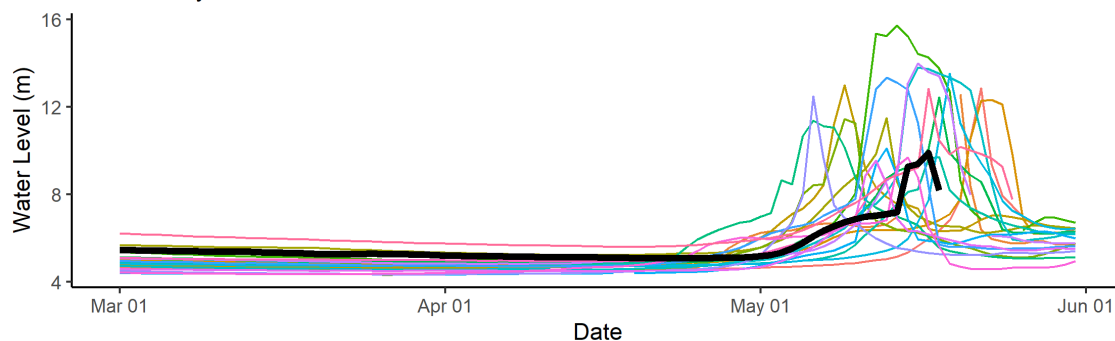


### MACKENZIE RIVER AT NORMAN WELLS (10KA001)

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. Water levels are receding after reaching their ice-induced peak.

# Mackenzie River at Fort Good Hope [10LD001]:

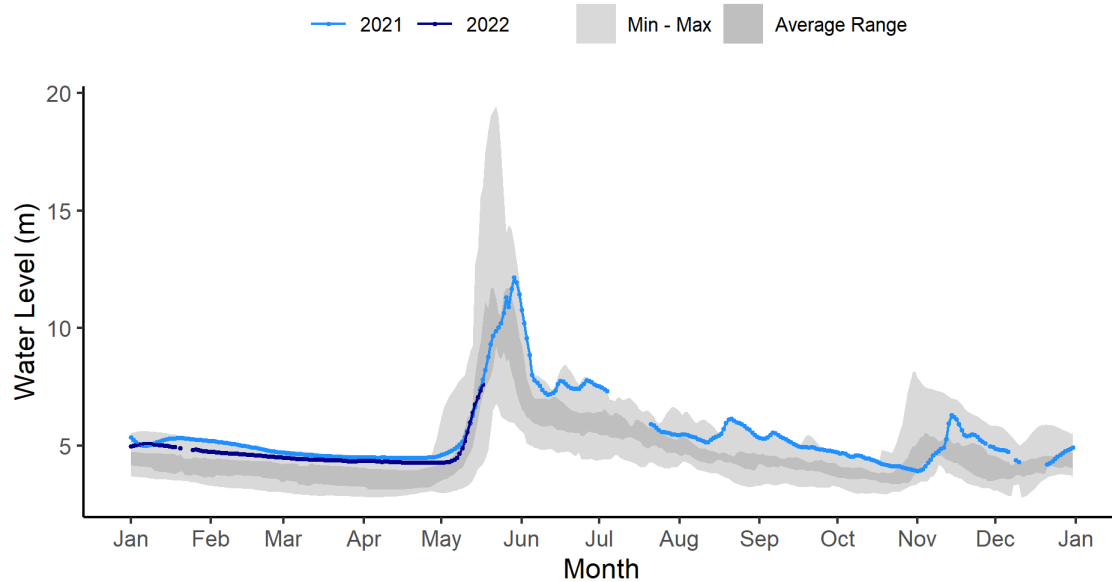
10LD001, 2022-05-18 13:01:14 UTC  
66.25151, -128.64980 12.3V 25°C P



*Above* – Mackenzie River at Fort Good Hope hydrometric gauge photo from May 18 at 07:00. Photo courtesy of Water Survey of Canada and GNWT.

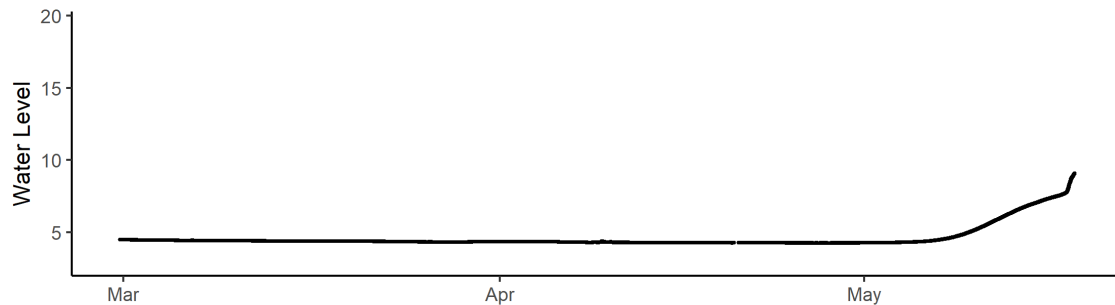
Mackenzie River at Arctic Red River [10LC014]:

## MACKENZIE RIVER AT ARCTIC RED RIVER (10LC014)

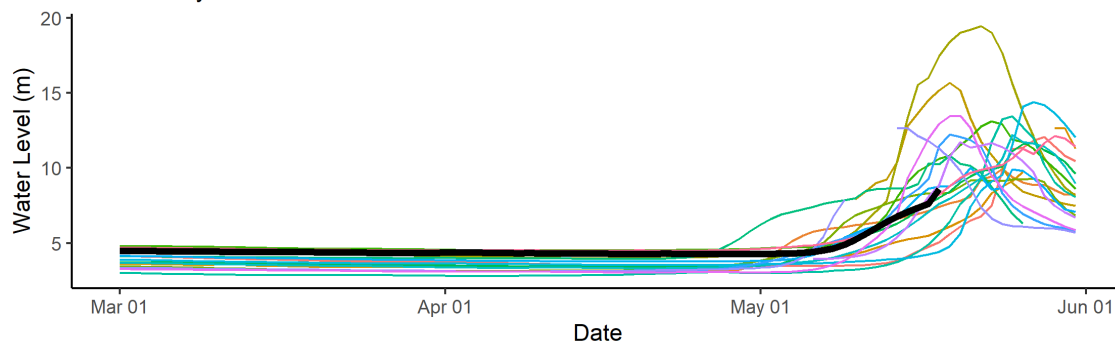


## MACKENZIE RIVER AT ARCTIC RED RIVER (10LC014)

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 are rising as flow rates under the ice increase. The rate of rise is normal for this time of year.



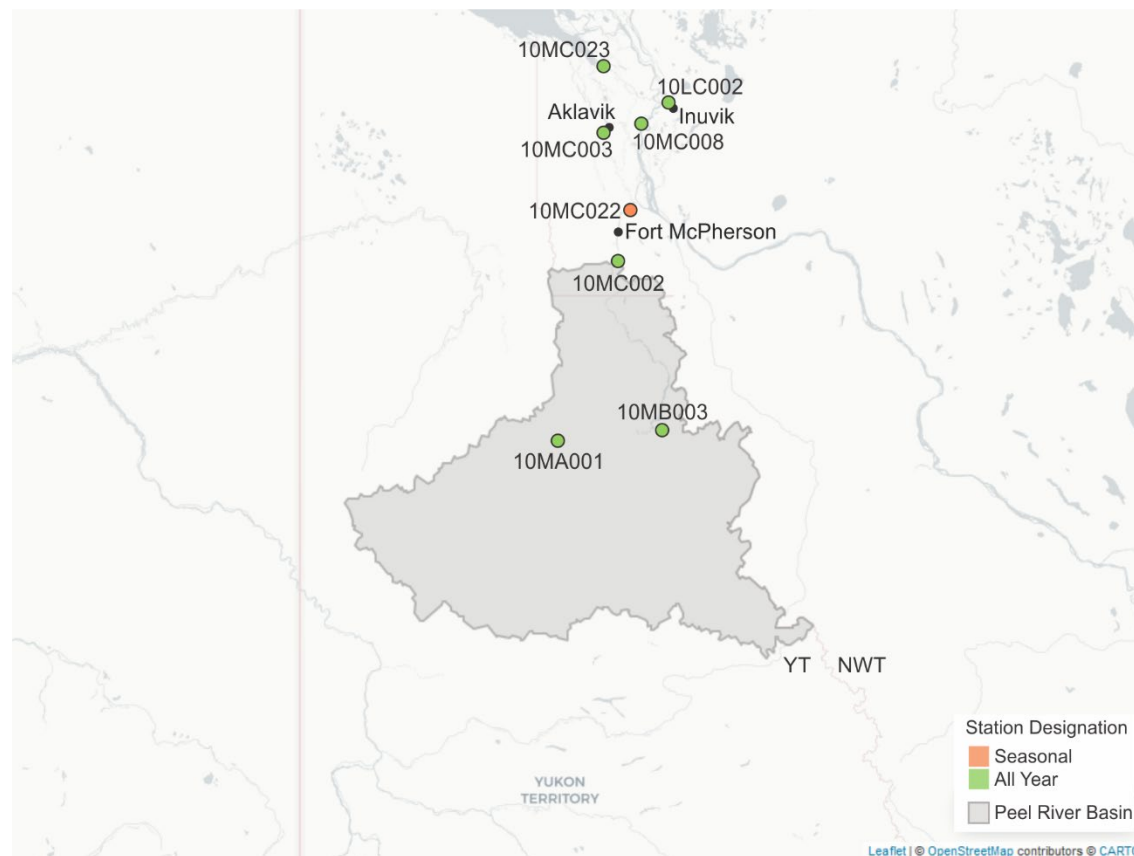
*Above* – Mackenzie River at Arctic Red River hydrometric gauge photo from May 17 at 22:00. Photo courtesy of Water Survey of Canada and GNWT.



## Peel River and Beaufort Delta

### Current Status:

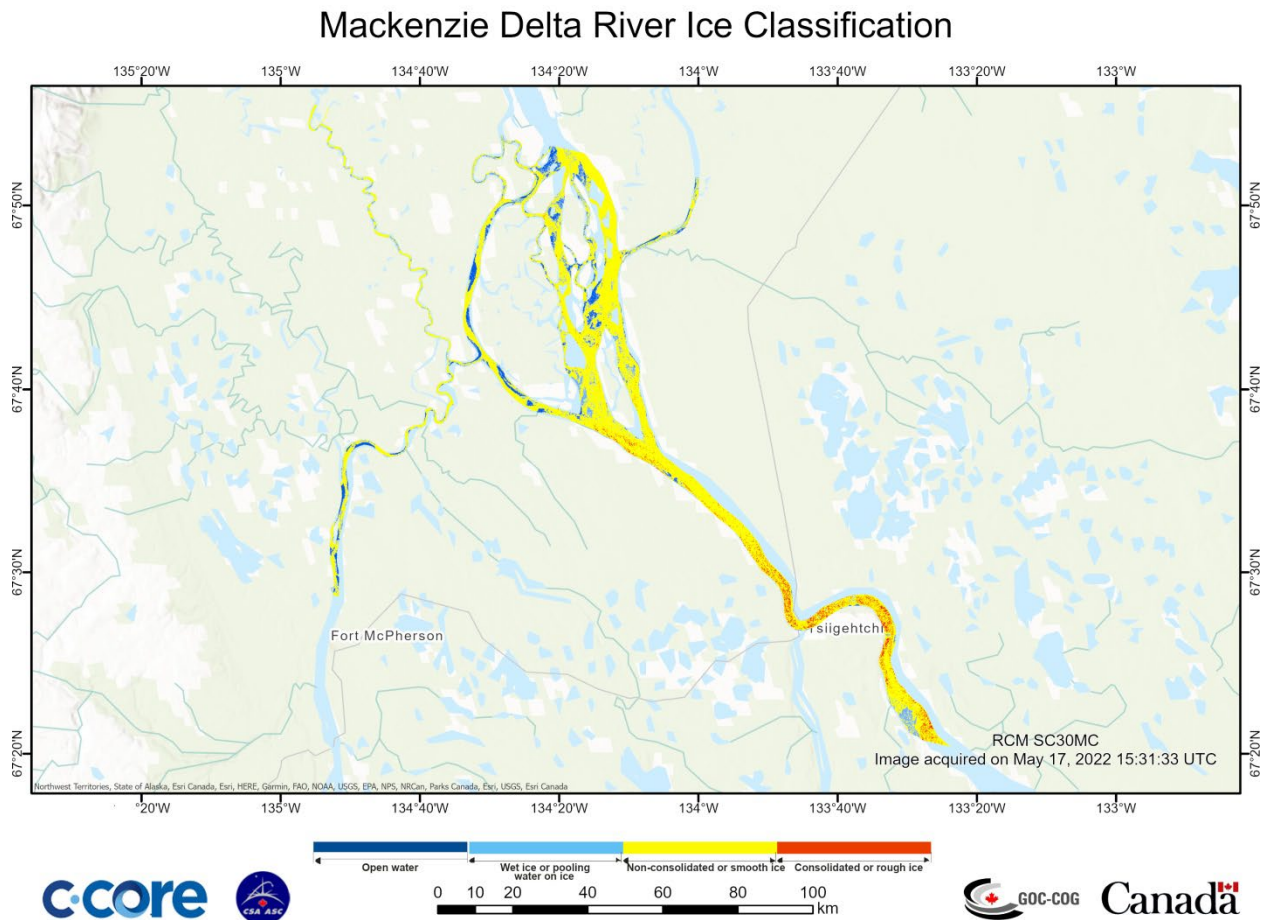
- Water levels continue to increase on the Peel River, as is usual for this time of year;
- Ice has not yet moved on the Mackenzie River near Tsiigehtchic (May 17 22:00);
- Radar imagery of ice conditions in the lower Mackenzie River around Tsiigehtchic, the Mackenzie Delta, and a stretch of the Peel River around Fort McPherson indicate there has been little movement as of May 17 09:30;
- 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.



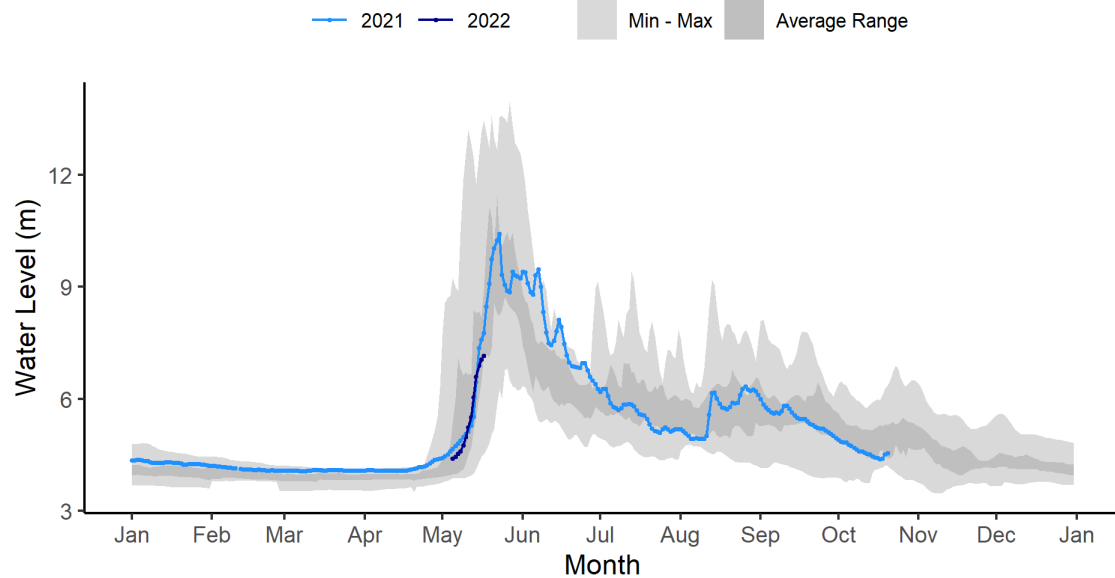
Imagery:



*Above:* Ice classification map based on radar imagery of the lower Mackenzie River around Tsiigehtchic, the Mackenzie Delta, and a stretch of the Peel River around Fort McPherson. Taken on 17th May at 09:31 MDT.

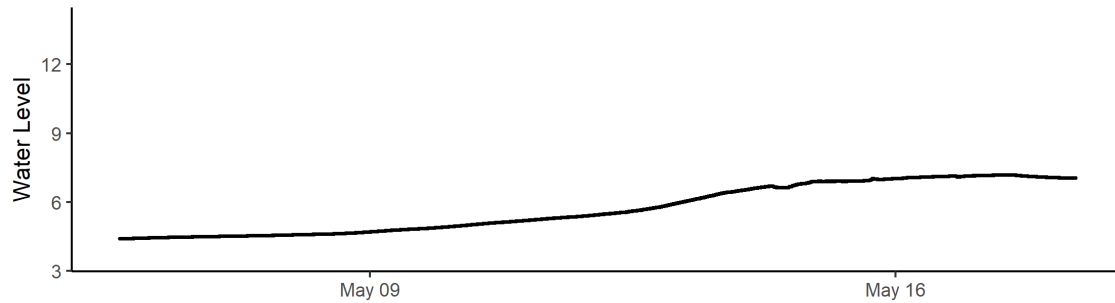
# Peel River at Fort McPherson [10MC002]:

## PEEL RIVER ABOVE FORT MCPHERSON (10MC002)

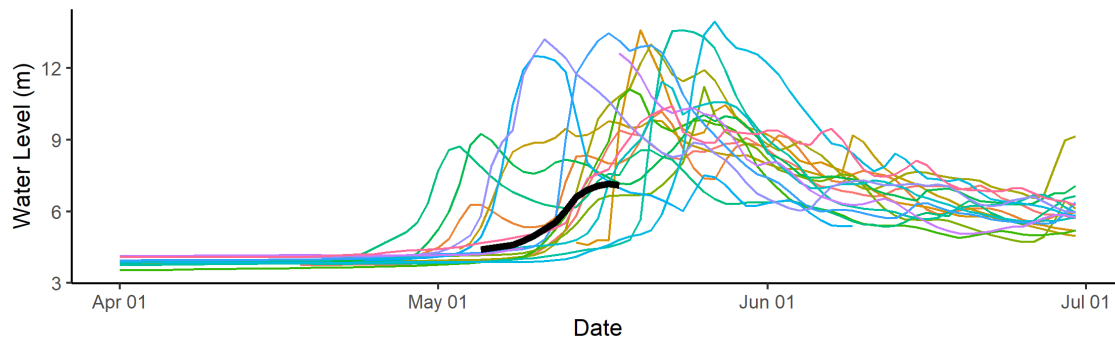


## PEEL RIVER ABOVE FORT MCPHERSON (10MC002)

2022 Water Levels (5 minute resolution)



## Historic Daily Water Levels



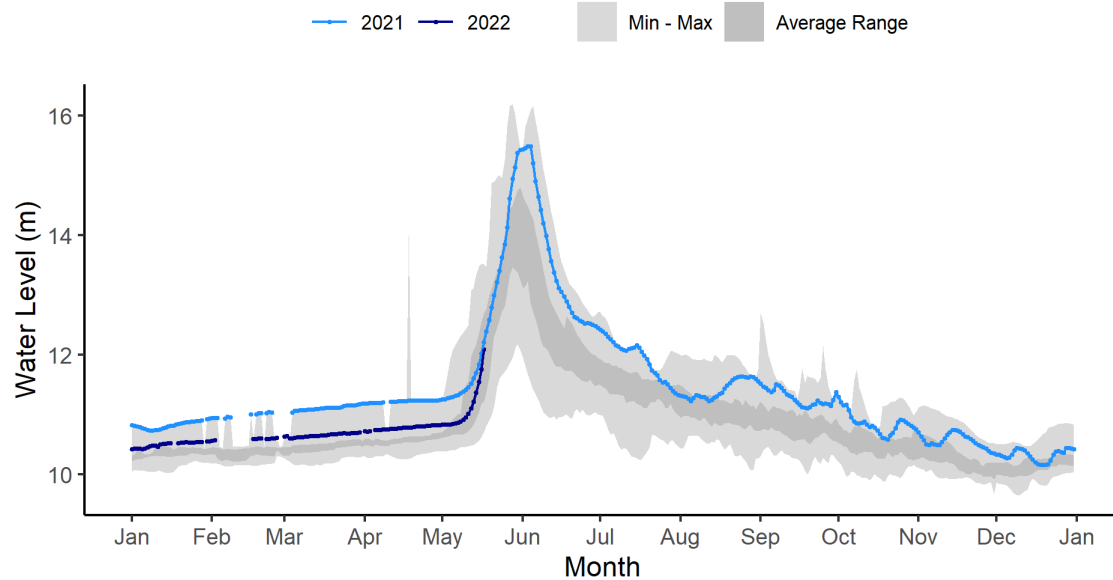
*Above* – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels on the Peel River at Fort McPherson have slowly begun to rise, with the timing being approximately average to previous years. Water level rise has levelled off in response to cool temperatures and cloud coverage.



*Above* – Peel River at Fort McPherson hydrometric gauge photo from May 18 at 06:00. Photo courtesy of Water Survey of Canada and GNWT.

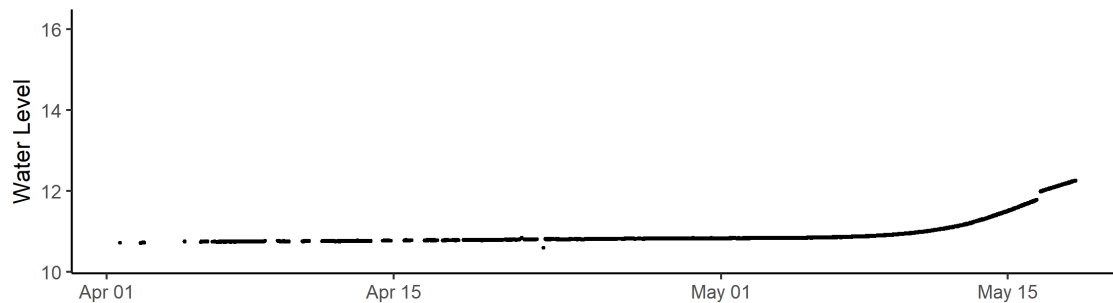
Mackenzie River (Peel Channel) at Aklavik [10MC003]:

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

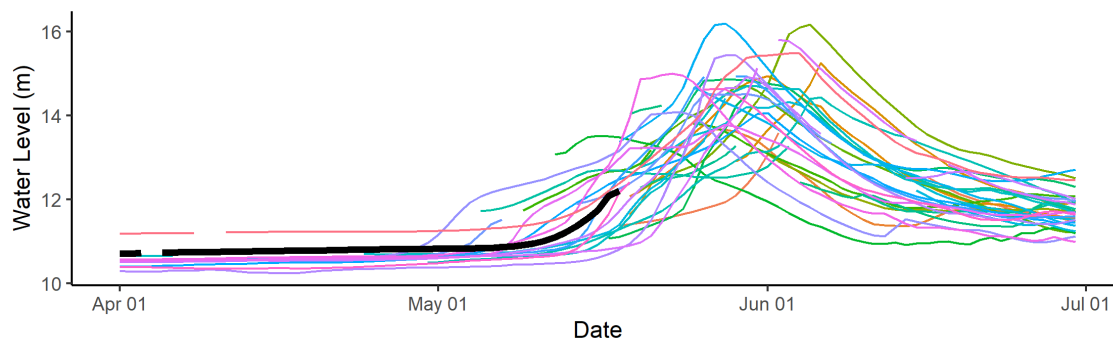


## MACKENZIE RIVER (PEEL CHANNEL) ABOVE AKLAVIK (10MC003)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels



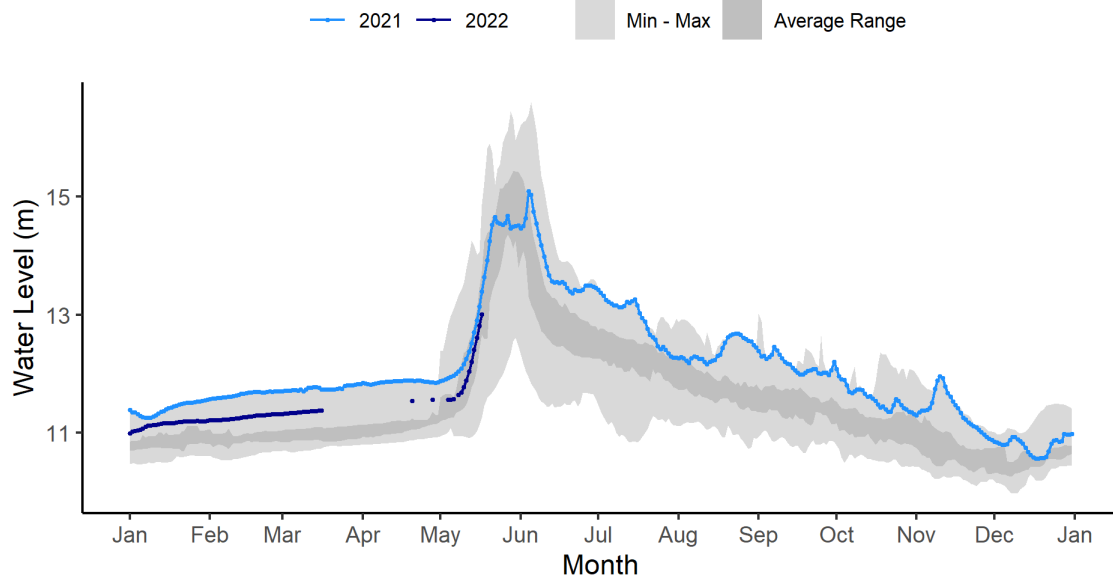
*Above* – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels in the Mackenzie Delta are rising as is normal for this time of year.



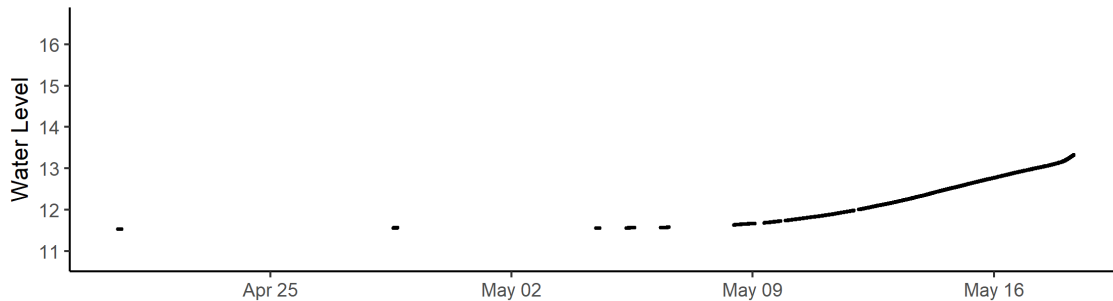


*Above* – Mackenzie River above Aklavik hydrometric gauge photo from May 17 at 22:00. Photo courtesy of Water Survey of Canada and GNWT.

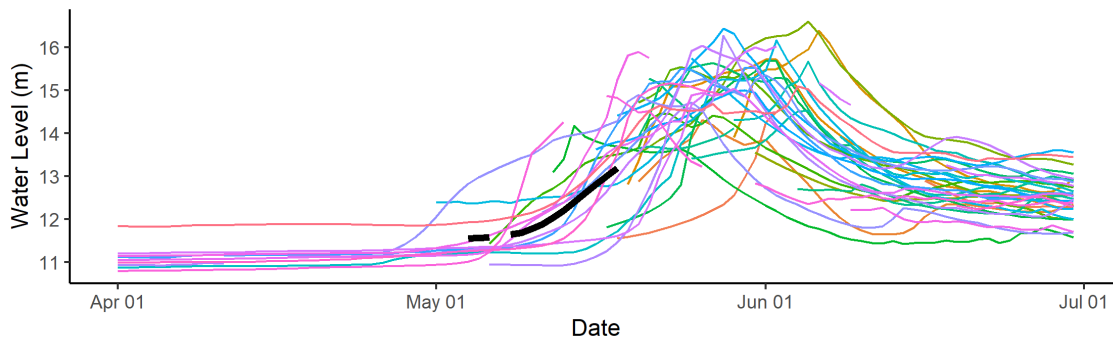
Mackenzie River (Middle Channel) below Raymond Channel [10MC008]:  
MACKENZIE RIVER (MIDDLE CHANNEL) BELOW RAYMOND CHANNEL



MACKENZIE RIVER (MIDDLE CHANNEL) BELOW RAYMOND CHANNEL (10MC008)  
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.

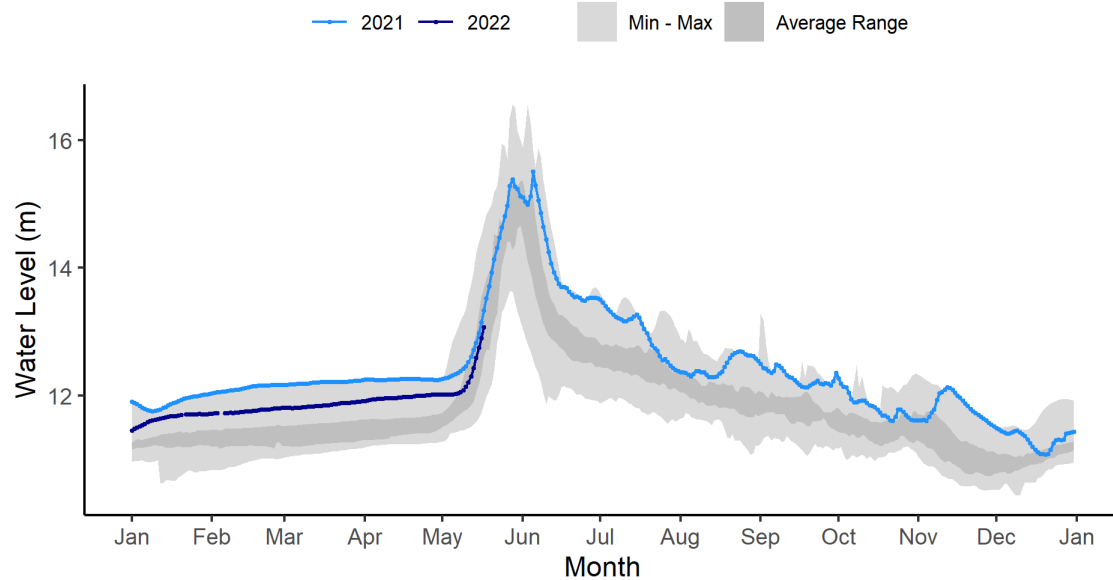


*Above* – Mackenzie River below Raymond Channel hydrometric gauge photo from May 17 at 08:00. Photo courtesy of Water Survey of Canada and GNWT.



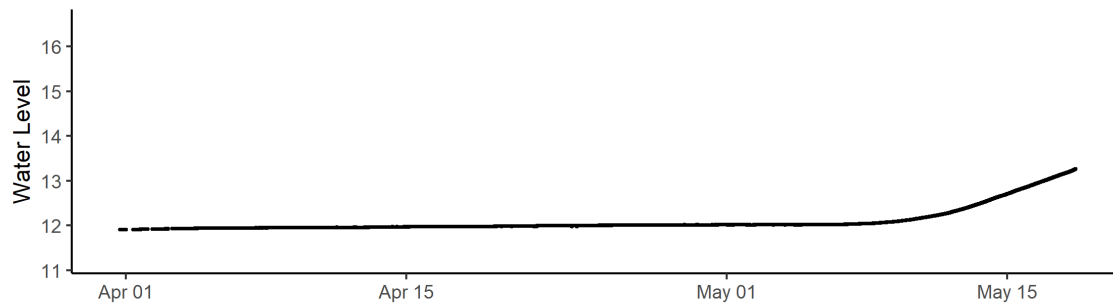
Mackenzie River (East Channel) at Inuvik [10LC002]:

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

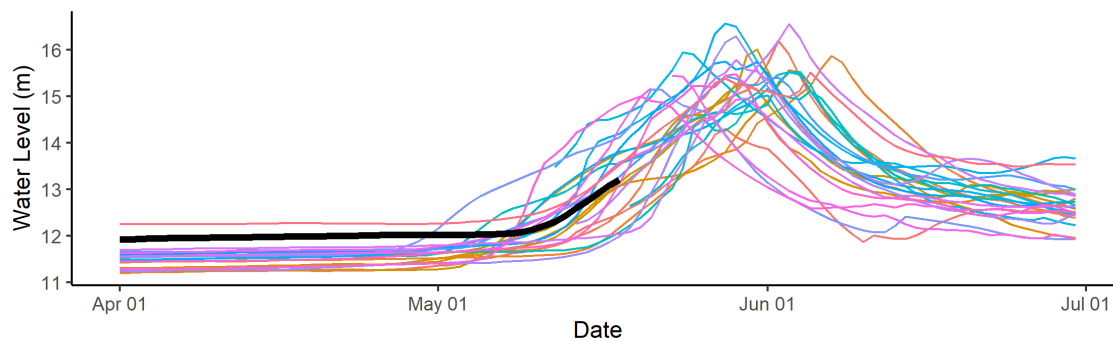


## MACKENZIE RIVER (EAST CHANNEL) AT INUVIK (10LC002)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels

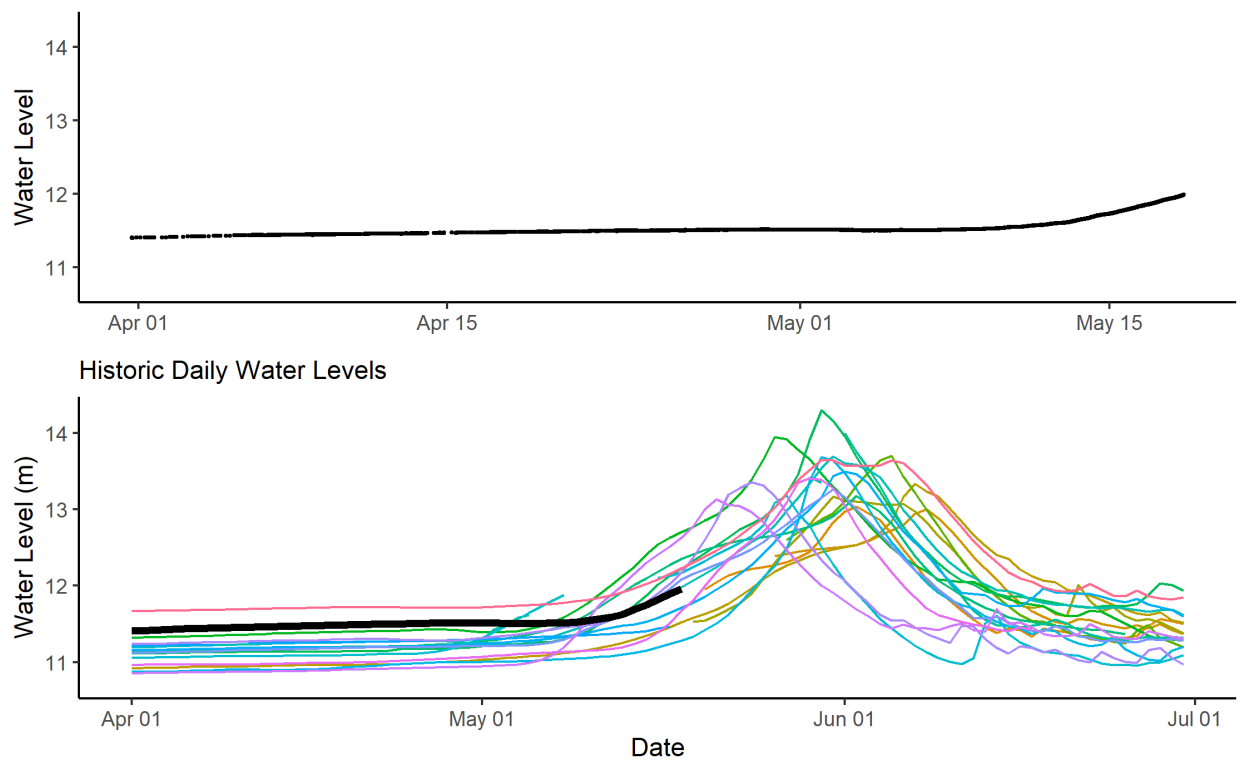


*Above* – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels in the Mackenzie Delta are rising as is normal for this time of year.

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

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

2022 Water Levels (5 minute resolution)

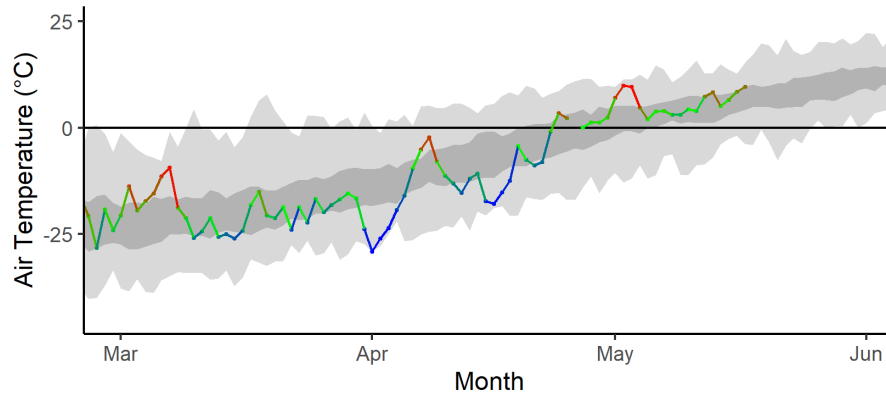


*Above* – The top graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels in the Mackenzie Delta are rising as is normal for this time of year.

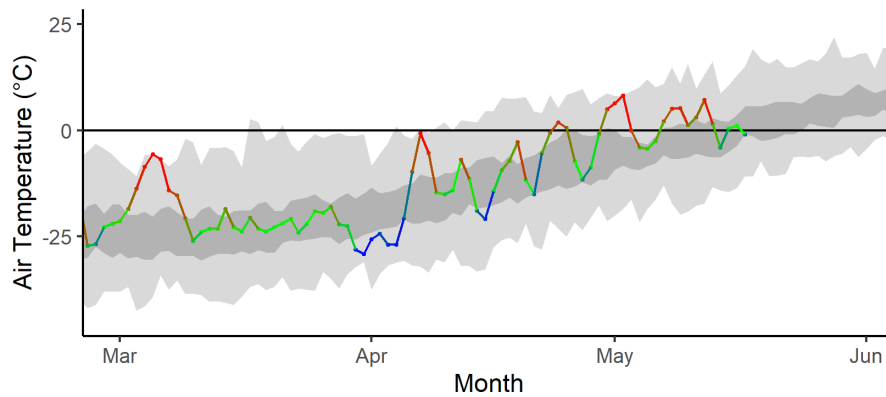
## Weather Data:

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.

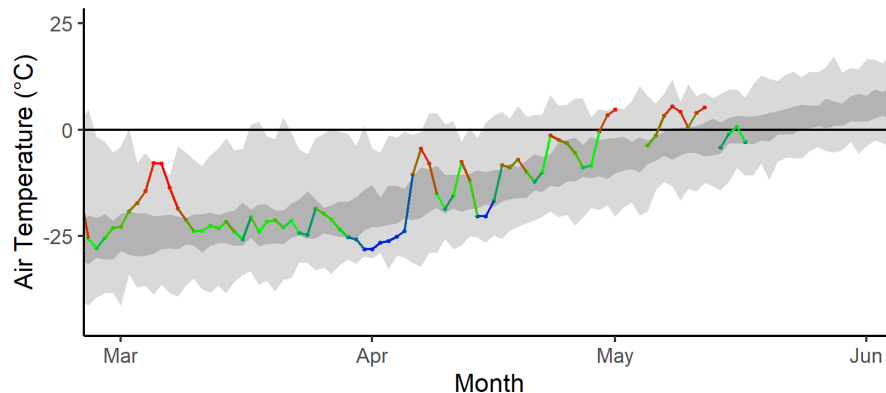
2022 Norman Wells Mean Daily Air Temperatures
















2022 Inuvik Mean Daily Air Temperatures
















2022 Aklavik Mean Daily Air Temperatures
















### Norman Wells seven-day weather forecast:

<u>Wed</u> 18 May	Thu 19 May	Fri 20 May	Sat 21 May	Sun 22 May	Mon 23 May	Tue 24 May
 9°C Periods of rain	 11°C 30% Chance of showers	 14°C A mix of sun and cloud	 13°C 60% Chance of showers	 12°C 60% Chance of showers	 10°C A mix of sun and cloud	 12°C Sunny
<b>Tonight</b>	<b>Night</b>	<b>Night</b>	<b>Night</b>	<b>Night</b>	<b>Night</b>	
 4°C Periods of rain	 3°C Cloudy periods	 5°C 60% Chance of showers	 5°C Showers	 2°C Cloudy periods	 0°C Cloudy periods	

### Inuvik seven-day weather forecast:

<u>Wed</u> 18 May	Thu 19 May	Fri 20 May	Sat 21 May	Sun 22 May	Mon 23 May	Tue 24 May
 2°C 60% Chance of flurries	 5°C 60% Chance of flurries	 6°C Cloudy	 5°C Periods of snow or rain	 6°C Cloudy	 4°C A mix of sun and cloud	 9°C A mix of sun and cloud
<b>Tonight</b>	<b>Night</b>	<b>Night</b>	<b>Night</b>	<b>Night</b>	<b>Night</b>	
 -1°C 30% Chance of flurries	 -3°C Clear	 0°C 60% Chance of rain showers or flurries	 -1°C Cloudy	 -8°C Cloudy periods	 -5°C A mix of sun and cloud	

### Aklavik seven-day weather forecast:

<u>Wed</u> 18 May	Thu 19 May	Fri 20 May	Sat 21 May	Sun 22 May	Mon 23 May	Tue 24 May
 1°C 60% Chance of flurries	 4°C 60% Chance of flurries	 7°C 60% Chance of flurries or rain showers	 4°C Periods of rain or snow	 4°C Cloudy	 2°C A mix of sun and cloud	 5°C A mix of sun and cloud
<b>Tonight</b>	<b>Night</b>	<b>Night</b>	<b>Night</b>	<b>Night</b>	<b>Night</b>	
 -1°C 30% Chance of flurries	 -3°C Clear	 1°C 60% Chance of showers	 0°C Cloudy	 -7°C Cloudy periods	 -4°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.