Government of
Northwest Territories

NWT Water Monitoring Bulletin – May 10th, 2024 at 16:00

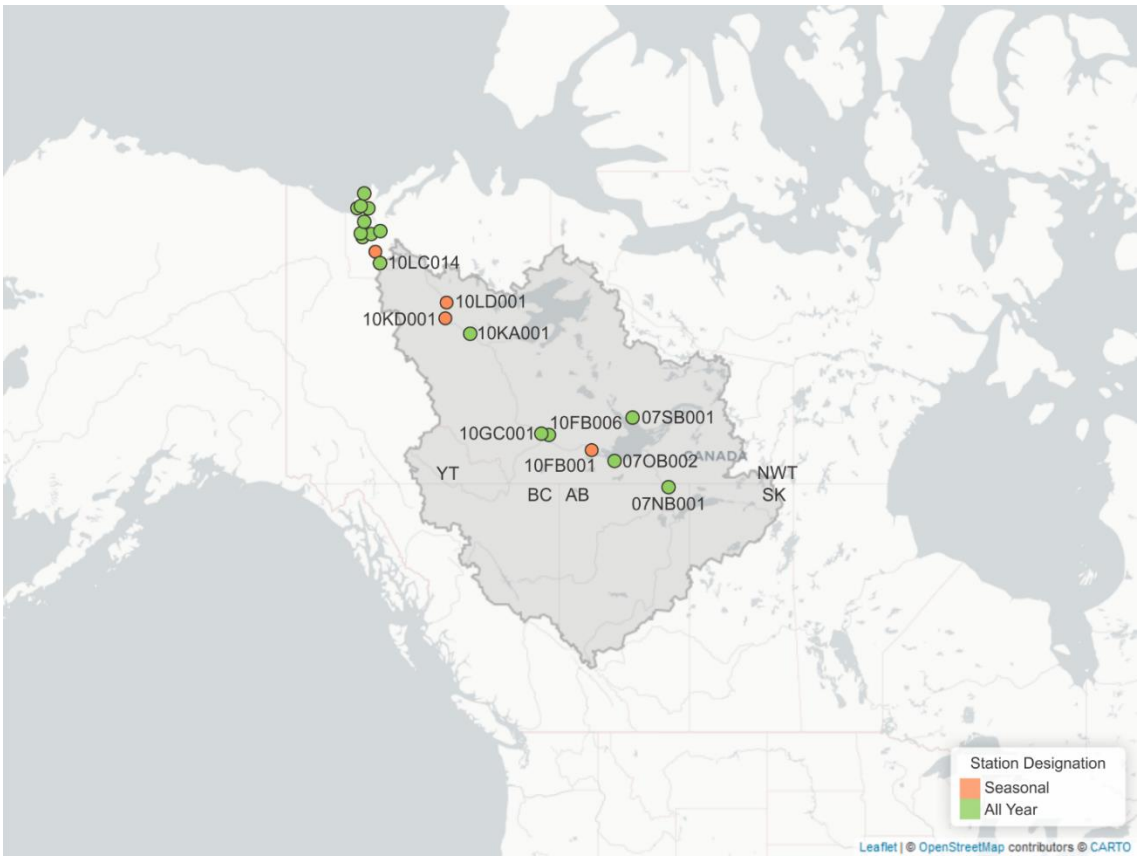
NWT break up reports will be published routinely as break up unfolds. These reports will focus on regions with active snowmelt and ice break up. The geographic focus of the report will shift as conditions change. Additional information about basin conditions can be found in the ECC Snow Survey Bulletin 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 of river ice on the Mackenzie River is progressing with the ice front currently situated upstream of Tulita.
    - Imagery from hydrometric gauges indicate that river ice is starting to melt along the shore of the Mackenzie River at Norman Wells and Fort Good Hope.
- Water levels on the Mackenzie River at Norman Wells have been the lowest recorded values on record over winter.
    - Water levels are currently rising underneath the ice as is normal for this time of year.
- Warmer than normal temperatures are forecast for this weekend in the Sahtu region.

Contents

Hydrometric station map:



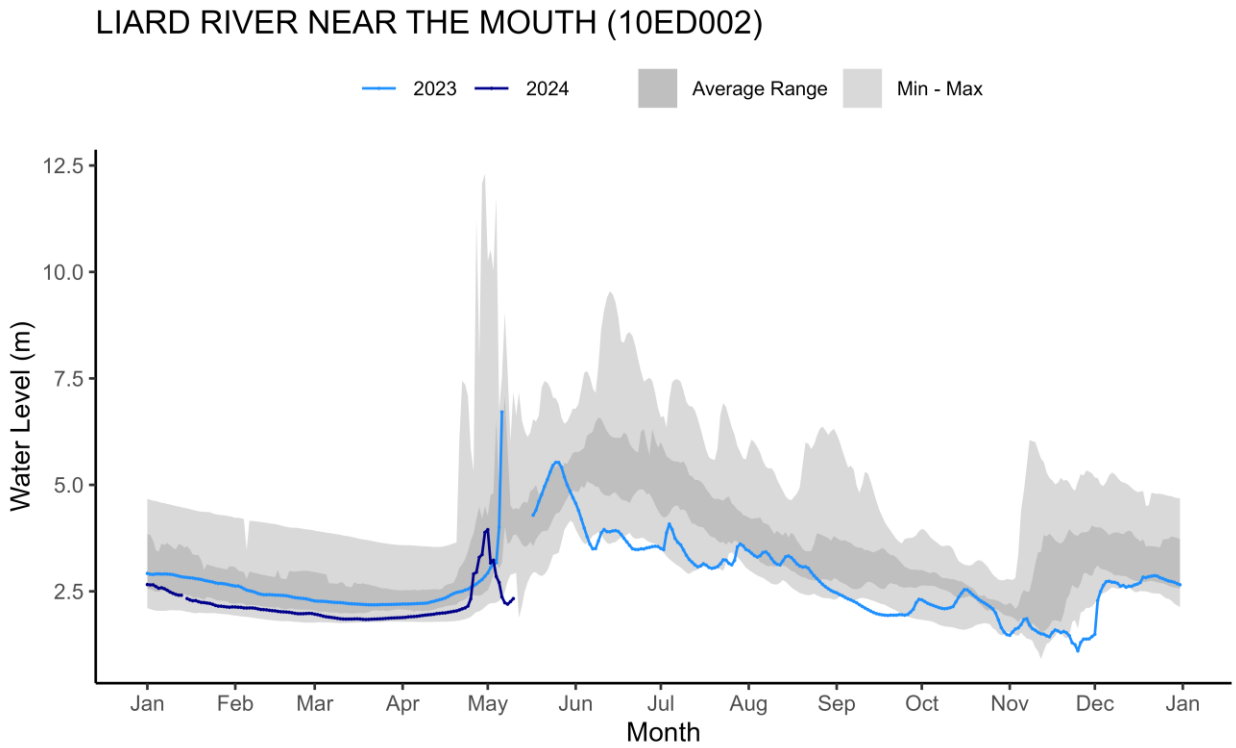
Above – Map of hydrometric stations in the Mackenzie River basin. The station numbers are referenced in the water level plots below.

Satellite Imagery:

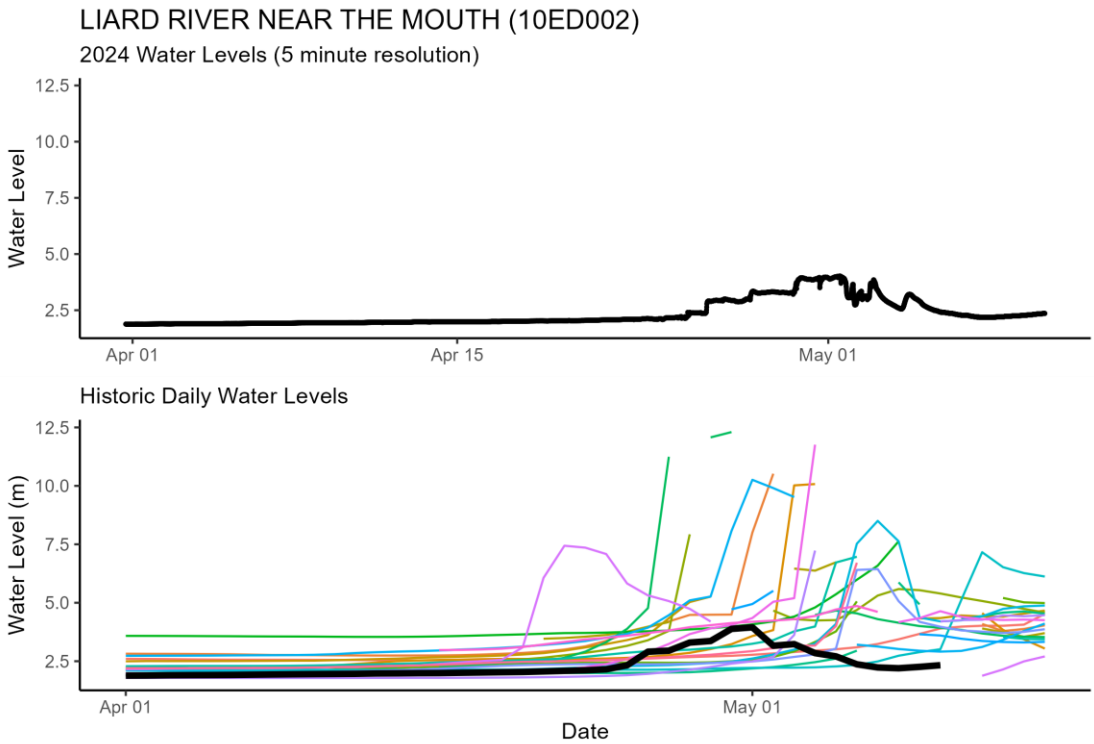
Above – River ice classification imagery of the Mackenzie River upstream of Tulita. The image was acquired on May 9th at 19:54 MDT. The image shows an ice jam upstream of Tulita (red arrow indicates the head of the ice jam) with open water behind it.

Hydrometric Data:

Liard River near the mouth [10ED002]:



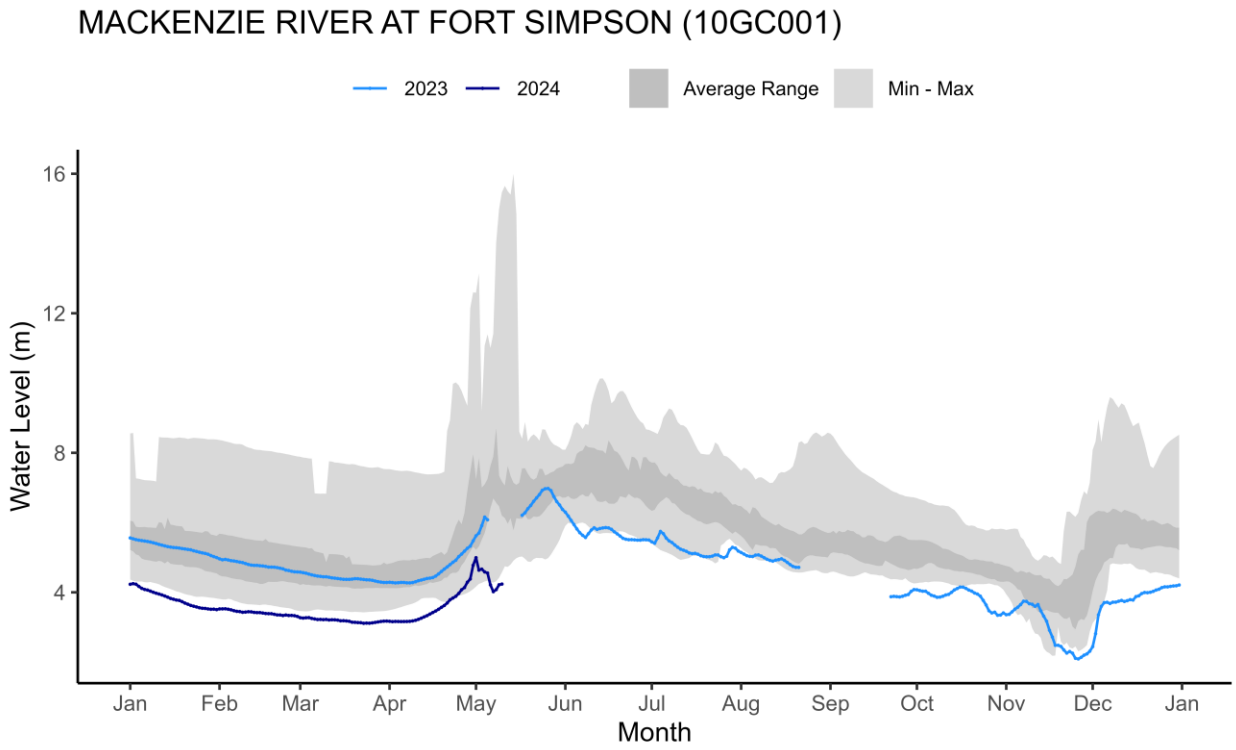
Above – Water level data for the Liard River near the mouth. Data for the previous year are also shown here.



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 – Liard River near the mouth hydrometric gauge photo from May 10th at 12:00. Photo provided by GNWT.

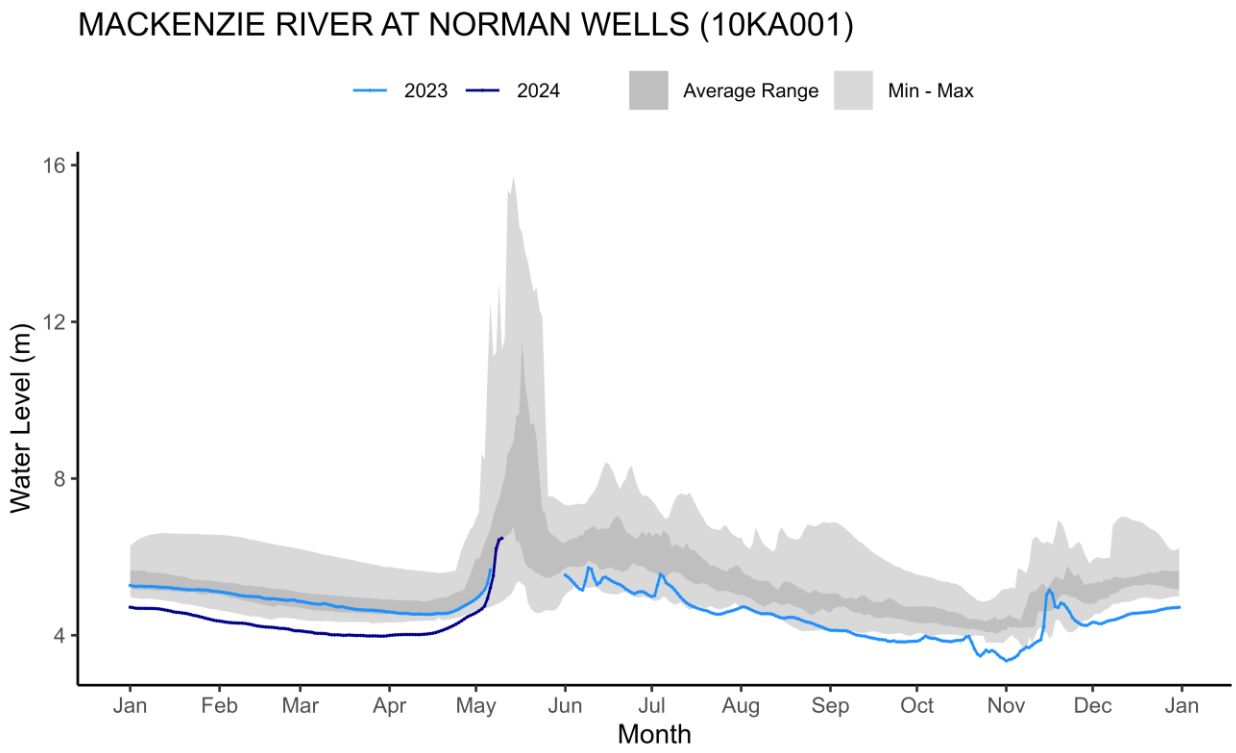
Mackenzie River at Fort Simpson [10GC001]:



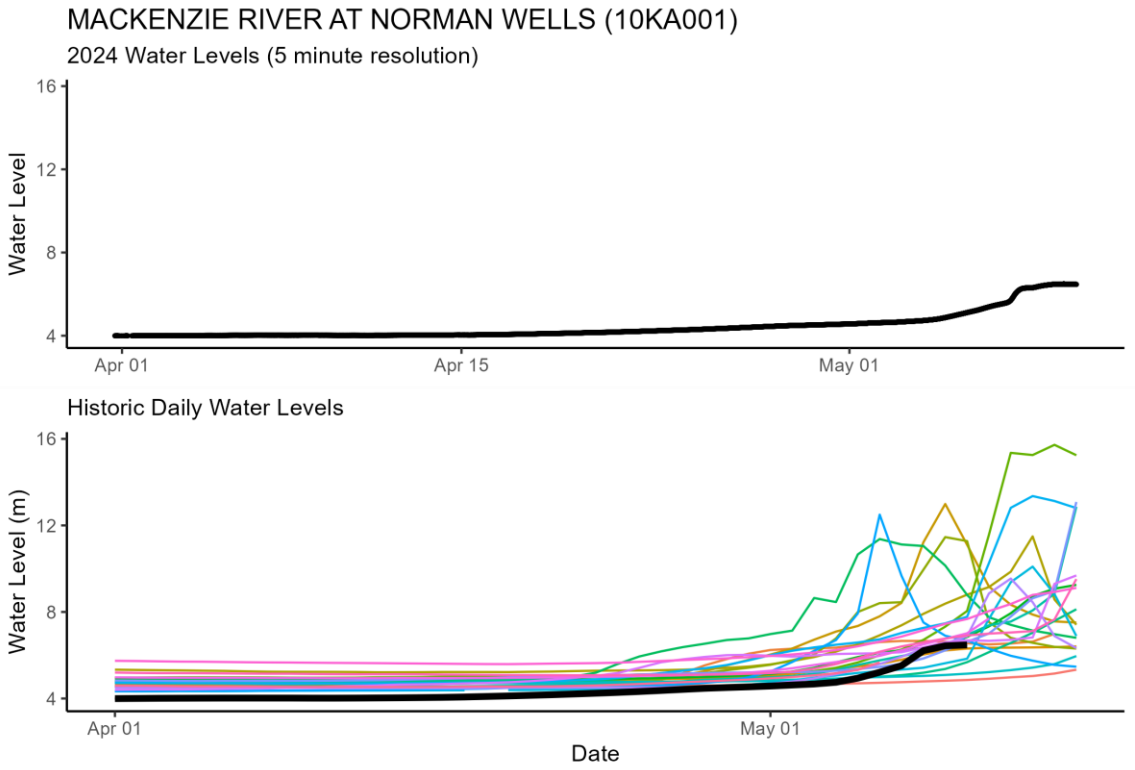
Above – Water level data for the Mackenzie River at Fort Simpson. Data for the previous year are also shown here.

Above – Mackenzie River at Fort Simpson hydrometric gauge photo from May 10th at 12:00. Photo provided by GNWT.

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.



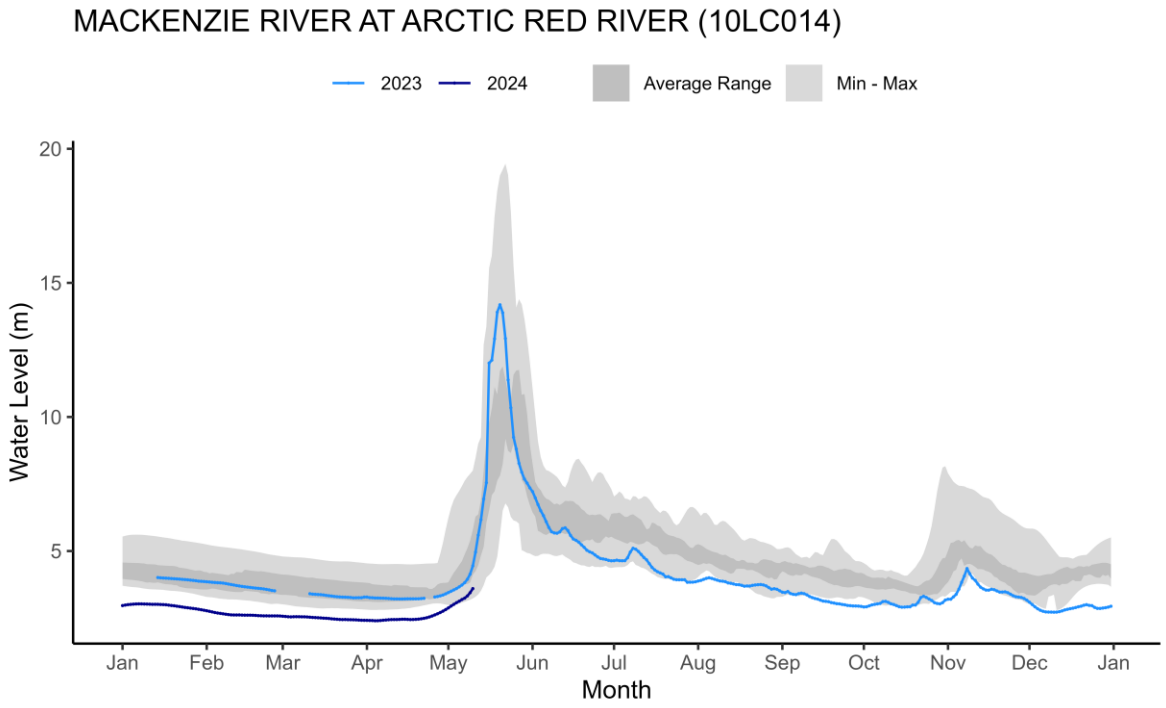
Above – The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.

Above – Mackenzie River at Norman Wells hydrometric gauge photo from May 10th at 14:00. Photo courtesy of Water Survey of Canada and GNWT.

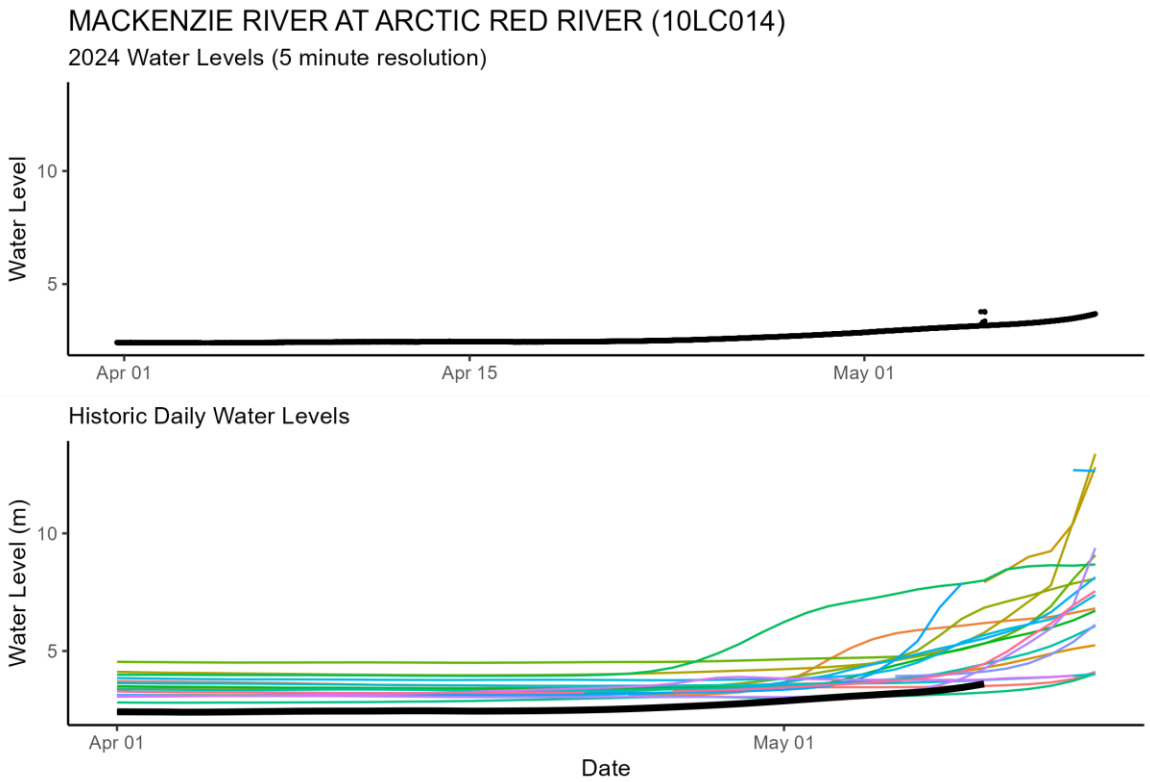
Mackenzie River at Fort Good Hope [10LC014]:

Above – Mackenzie River at Fort Good Hope hydrometric gauge photo from May 10th at 08:00. 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.



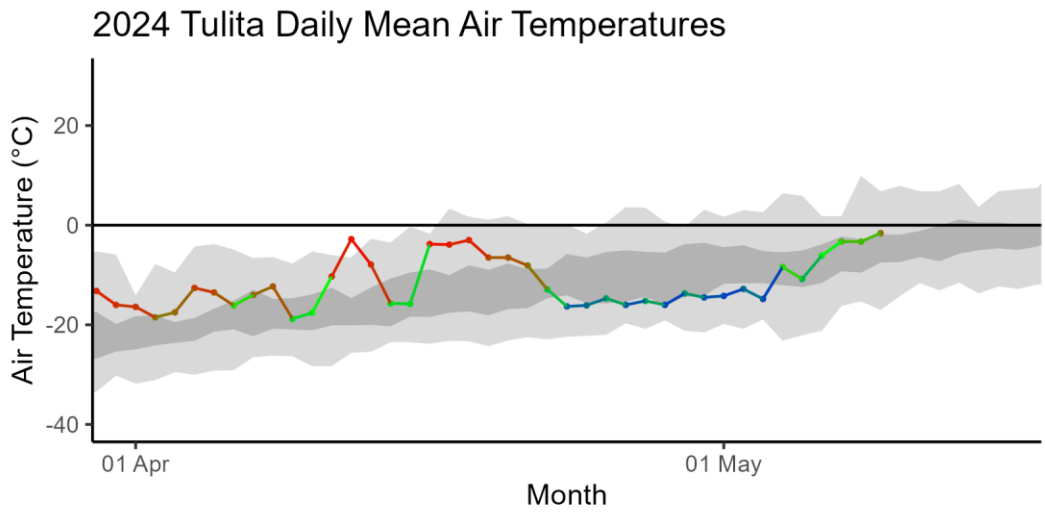
Above – The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.

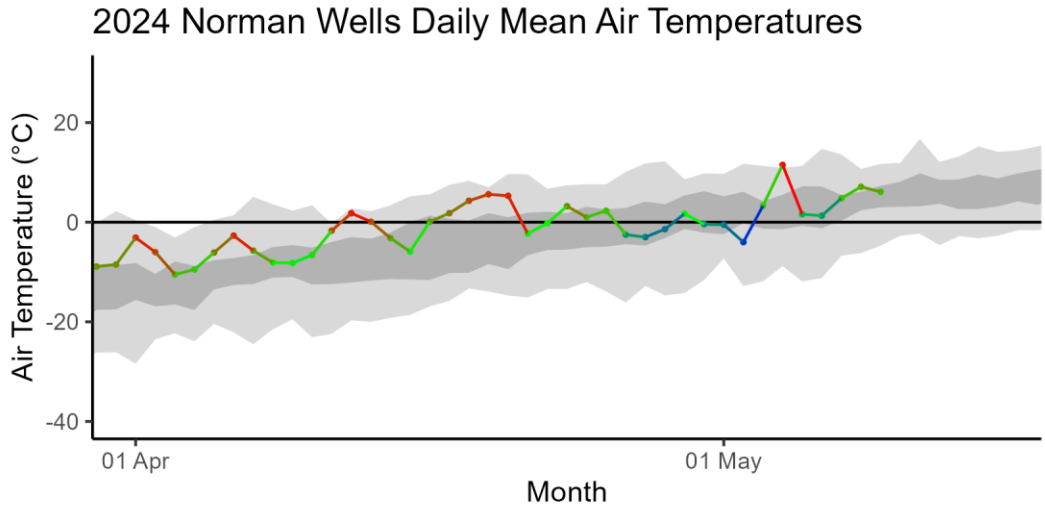
Above – Mackenzie River at Arctic Red River hydrometric gauge photo from May 10th at 12:00. Photo courtesy of Water Survey of Canada and GNWT.

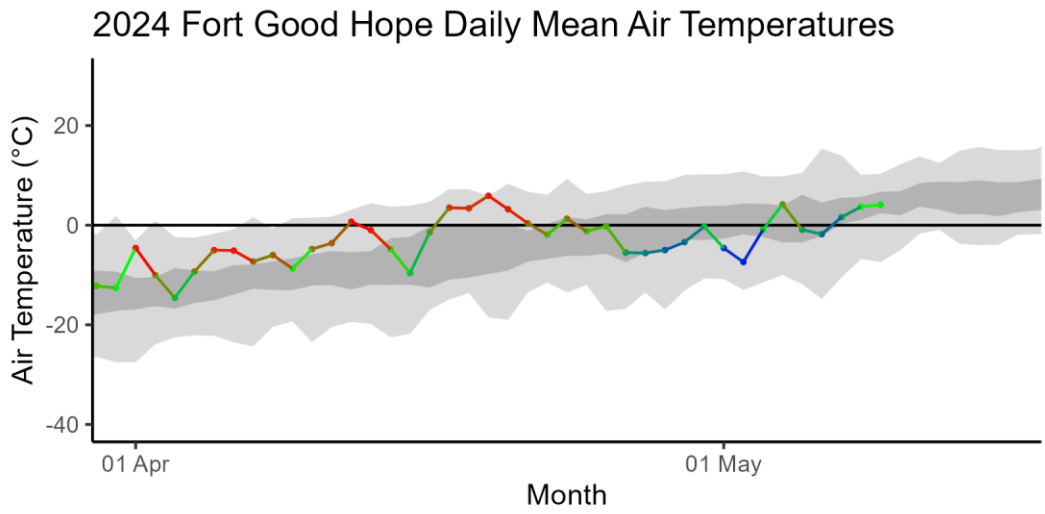
Weather Data:

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. The first set of figures show how temperatures have been relative to average (dark grey band) this spring, while the second set shows Environment and Climate Change Canada (ECCC) weather forecast data for the next seven days.

The Sahtu region is forecast to see temperatures that are warmer than normal over the weekend. Small amounts of precipitation are forecast for the Sahtu region today.






2024 Fort Good Hope Daily Mean Air Temperatures
Air Temperature (°C)
20
0
-20
-40
01 Apr
01 May
Month

Tulita seven-day weather forecast:

Fri 10 May	Sat 11 May	Sun 12 May	Mon 13 May	Tue 14 May	Wed 15 May	Thu 16 May
9°C 60% Chance of showers	13°C A mix of sun and cloud	18°C Sunny	11°C 60% Chance of showers	12°C A mix of sun and cloud	10°C A mix of sun and cloud	11°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
-2°C 60% Chance of showers	3°C Clear	3°C Cloudy periods	1°C 60% Chance of showers	0°C Cloudy periods	1°C Cloudy periods	

Norman Wells seven-day weather forecast:

Fri 10 May	Sat 11 May	Sun 12 May	Mon 13 May	Tue 14 May	Wed 15 May	Thu 16 May
9°C 60% Chance of showers	13°C A mix of sun and cloud	18°C Sunny	11°C 60% Chance of showers	12°C A mix of sun and cloud	10°C A mix of sun and cloud	11°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
-2°C 60% Chance of showers	3°C Clear	3°C Cloudy periods	1°C 60% Chance of showers	0°C Cloudy periods	1°C Cloudy periods	

Fort Good Hope seven-day weather forecast:

Fri 10 May	Sat 11 May	Sun 12 May	Mon 13 May	Tue 14 May	Wed 15 May	Thu 16 May
7°C Showers	14°C Mainly sunny	17°C Sunny	7°C Cloudy	11°C A mix of sun and cloud	7°C A mix of sun and cloud	8°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
-3°C 60% Chance of showers	2°C Clear	4°C Cloudy	0°C Cloudy	-2°C Cloudy periods	-2°C 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.