Government of
Northwest Territories

NWT Water Monitoring Bulletin – April 27, 2024 at 11:00

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:

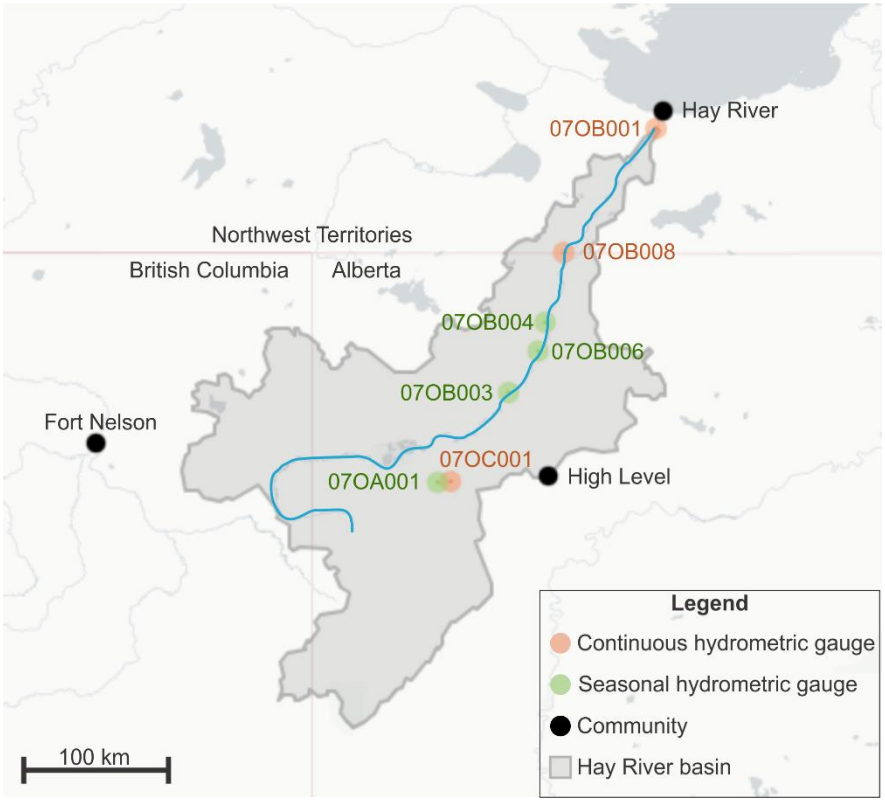
- The Hay River upstream of Alexandra Falls and into Alberta is mostly ice-free. Most of the ice has melted out rather than having pushed downstream;
    - While some ice remains downstream of the falls and close to Town, this ice is generally not cause for flooding concern
- Water levels the Hay River remain well below normal for this time of year.
- River ice is generally intact on the Liard River and Mackenzie River, but some movement has been observed;
    - Open water sections are growing on each river;
    - Ice is starting to shift in some places.
- On the Liard River and on the Mackenzie River at Fort Simpson, water levels are slowly rising under the ice, but the rates of increase are small.
- Cooler than normal temperatures are expected over the weekend in the southern NWT.

Contents

Hay River:

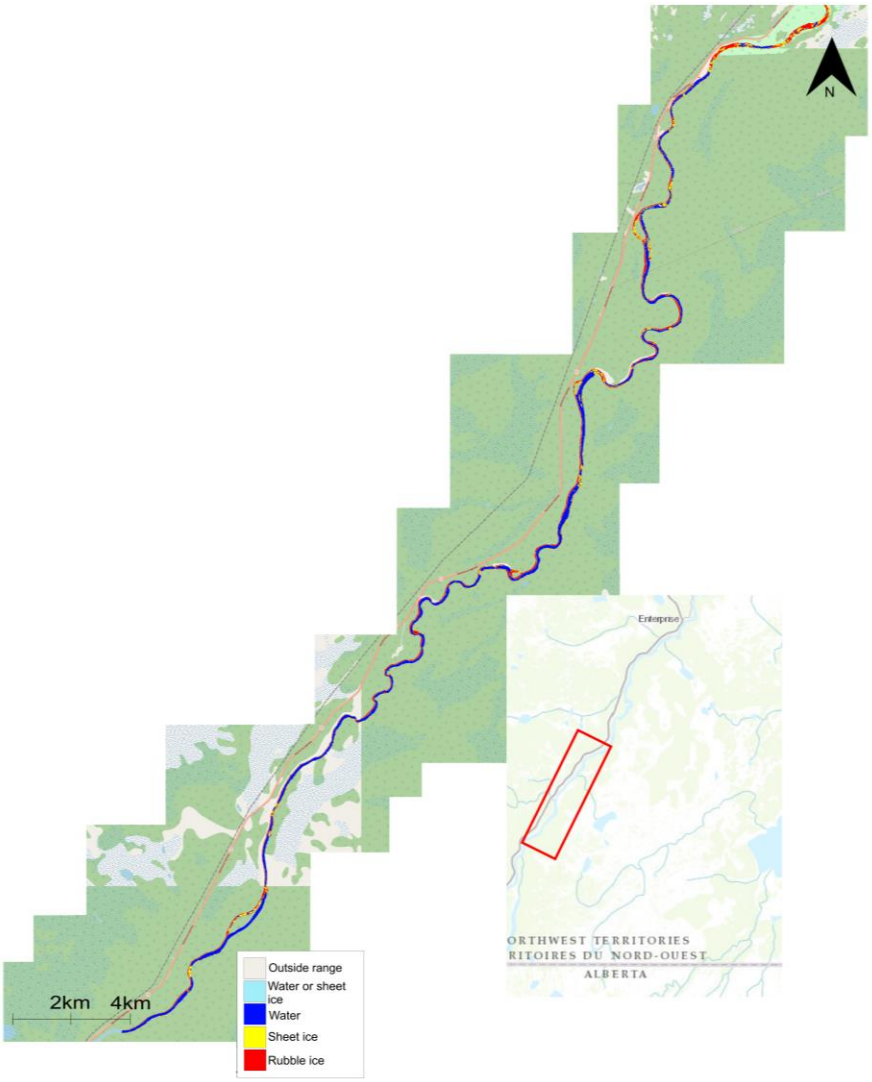
Current Status:

- The snowpack has almost entirely melted across the basin.
- The Hay River upstream of Alexandra Falls and into Alberta is mostly ice-free. Most of the ice has melted out rather than having pushed downstream;
    - While some ice remains downstream of the falls and close to Town, this ice is generally not cause for flooding concern;
    - See satellite imagery below for more information.
- Water levels on the Hay River remain extremely low.
- Breakup was earlier than normal this year.
- Temperatures in the Hay River basin are expected to be cool for the weekend and early next week. No significant precipitation is forecast for the basin over the weekend.
- Refer to the [Town of Hay River website] for the most up-to-date information, as well as webcam images of current conditions.



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

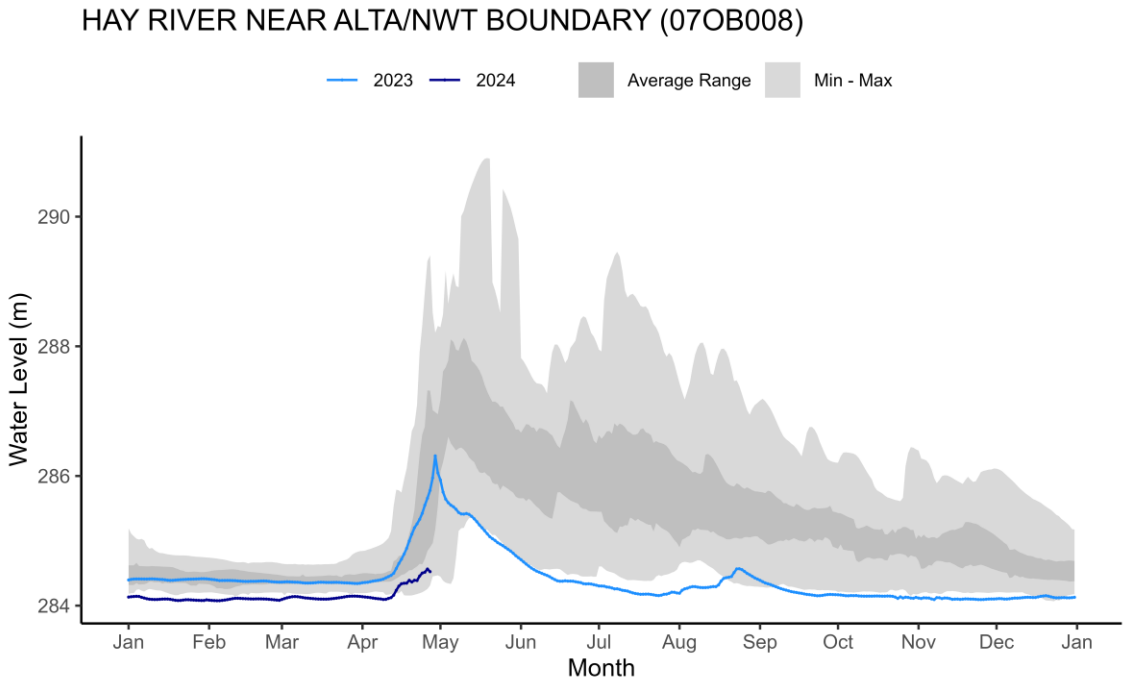
Satellite Data:



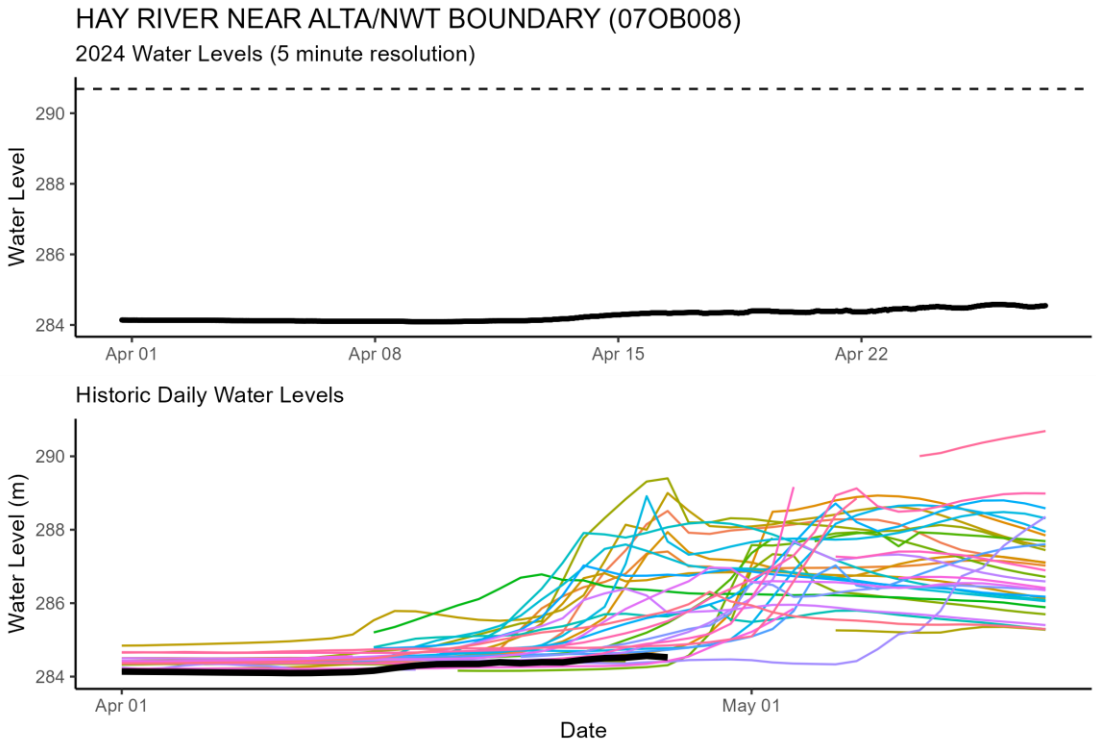
Above – Classified river ice imagery of the Hay River above Alexandra Falls as of Apr 26 at 08:37. The imagery was acquired by the RADARSAT Constellation Mission via the Government Operations Centre. The image shows primarily open water along the river.

Hydrometric Data:

Hay River near the border [07OB008]:



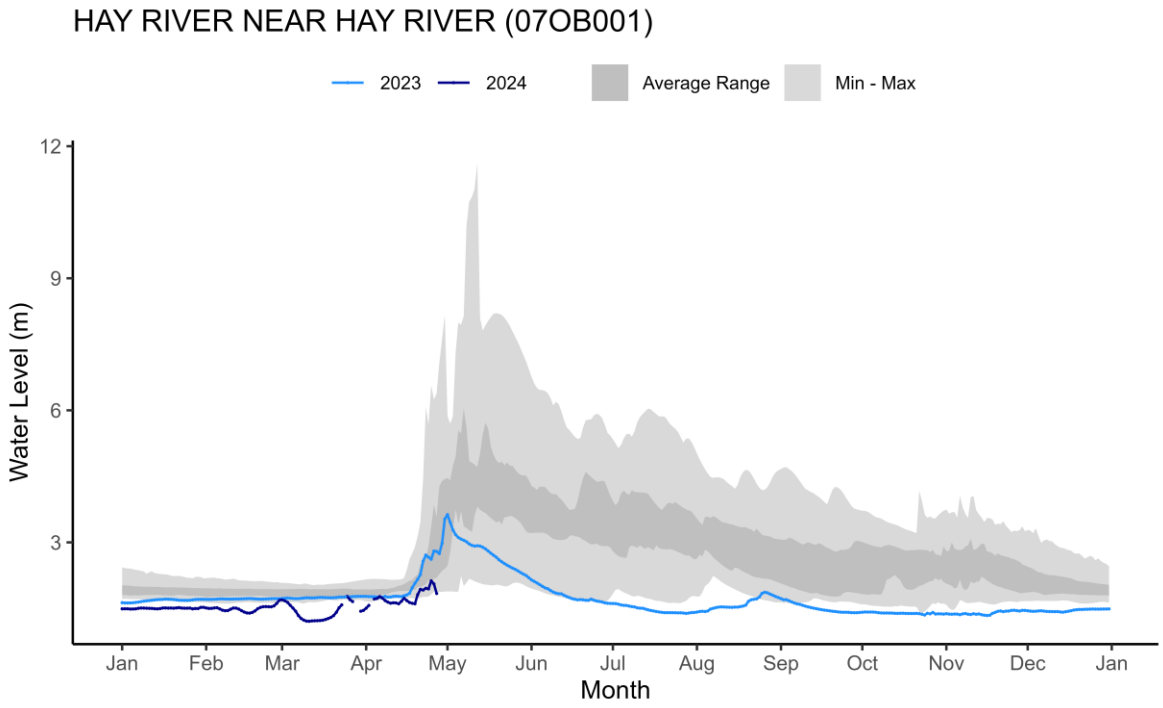
Above – Water level data for the Hay River near the Alberta- NWT border. Data for the previous year are also shown here.



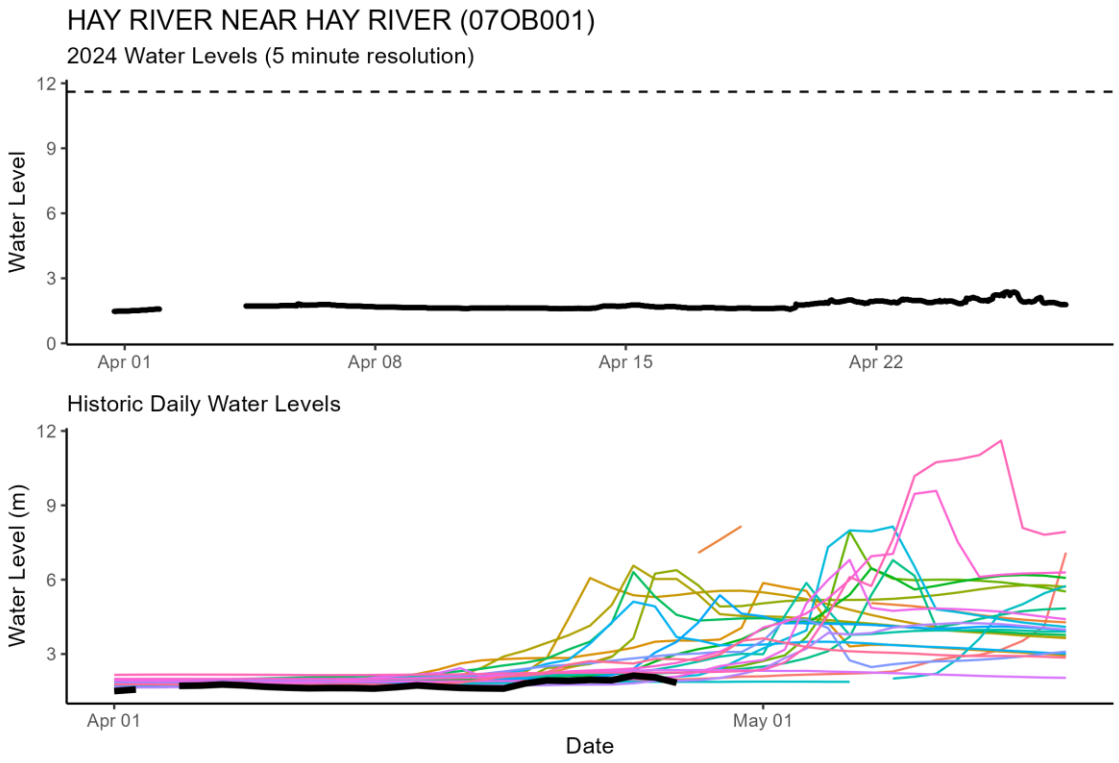
Above - The upper graph in the figure presents real time water level data at 5-minute resolution with the dashed line representing the peak water level from 2022. The lower graph shows daily average levels relative to the previous 20 years.

Above – Hay River near the border hydrometric gauge photo on April 26 at 16:00.

Hay River near Hay River [07OB001]:



Above – Water level data for the Hay River near the Town of Hay River. Daily average levels 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 with the dashed line representing the peak water level from 2022. The lower graph shows daily average levels relative to the previous 20 years.

Above – Hay River near the Town of Hay River hydrometric gauge photo on April 27 at 08:00.

Liard River:

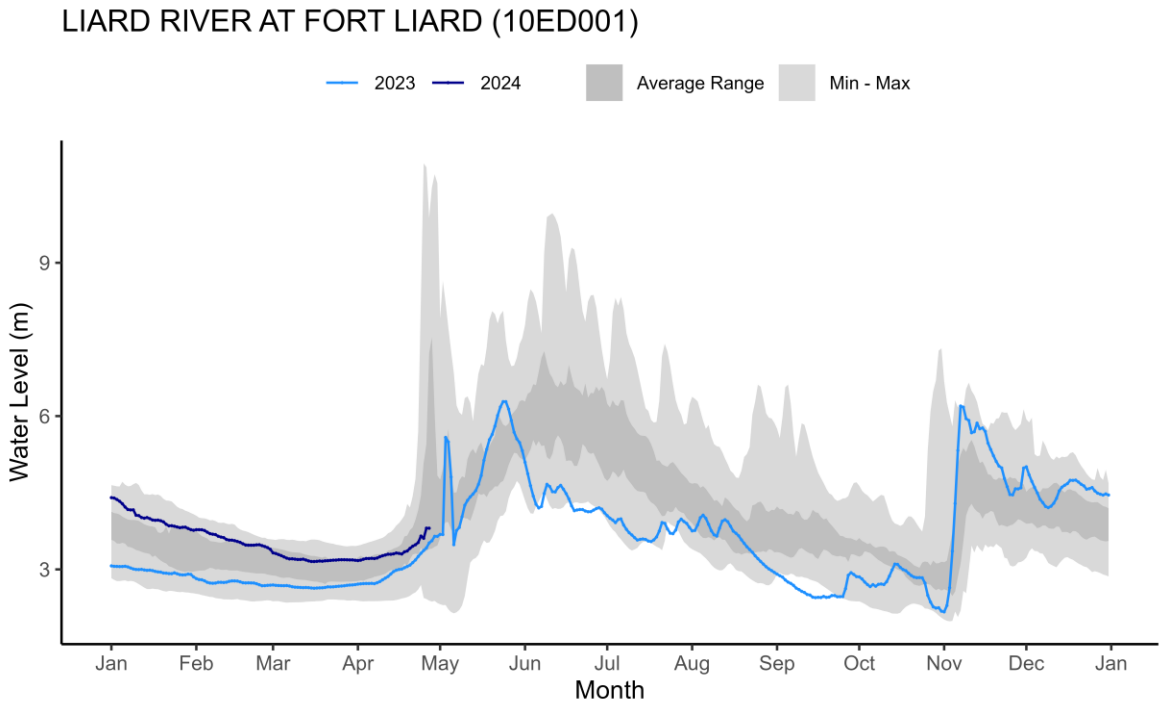
Current Status:

- Snowmelt is well underway in the Liard River basin
    - Almost all of the snow has melted in the low-lying (i.e., non-mountainous) parts of the basin in BC
    - Some snow remains in the NWT part of the basin
- Some open water sections are evident on the river and ice is starting to shift in some locations;
    - An open water lead was observed at the Liard River crossing near Fort Simpson.
- Water levels on the Liard River are increasing, but are well within the normal range for this time of year.
- Temperatures at Fort Liard and Fort Simpson are expected to be cooler than normal for the next three days. No significant precipitation is expected over the basin over this time.

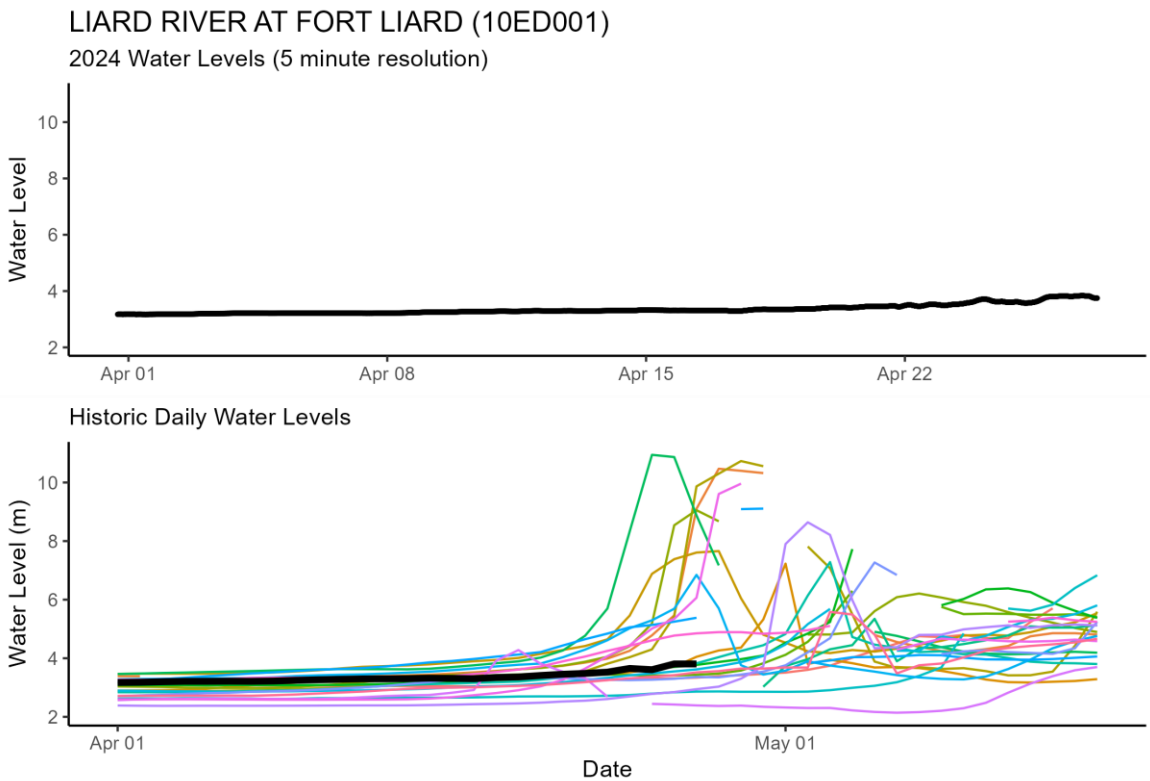
Above – Map of hydrometric stations in the Liard River basin. The station numbers are referenced in the water level plots below.

Hydrometric Data:

Liard River at Fort Liard [10ED001]:



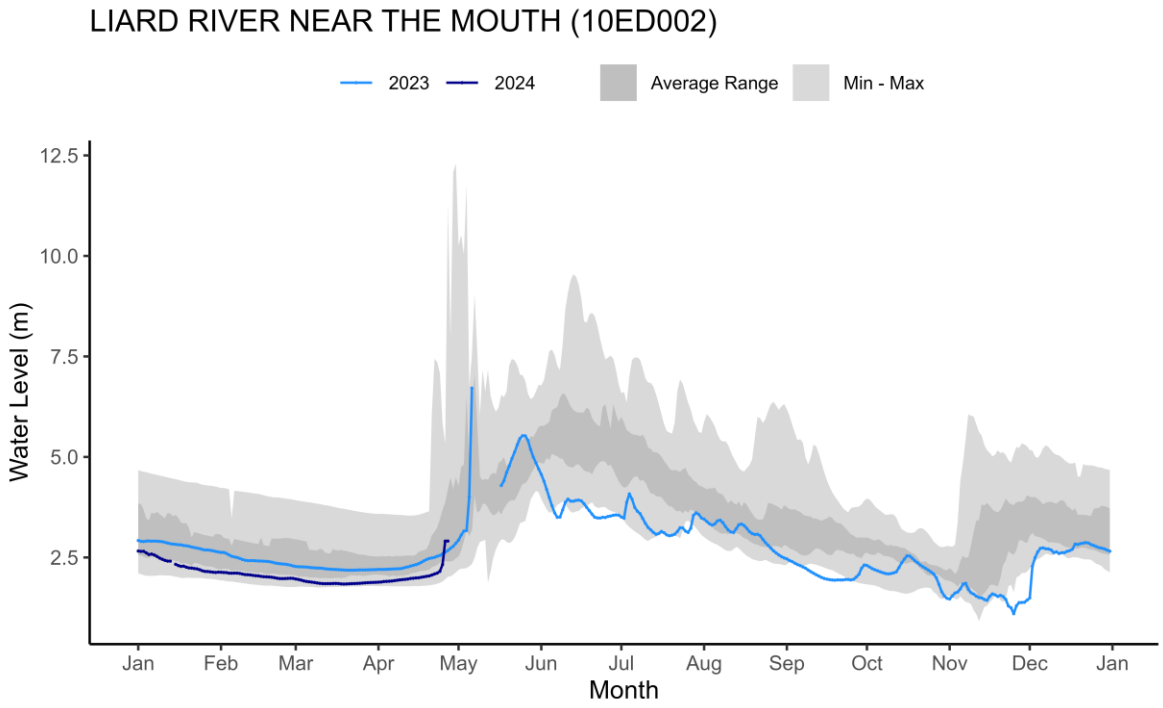
Above – Water level data for the Liard River at Fort Liard. Data for the previous year are also shown here.



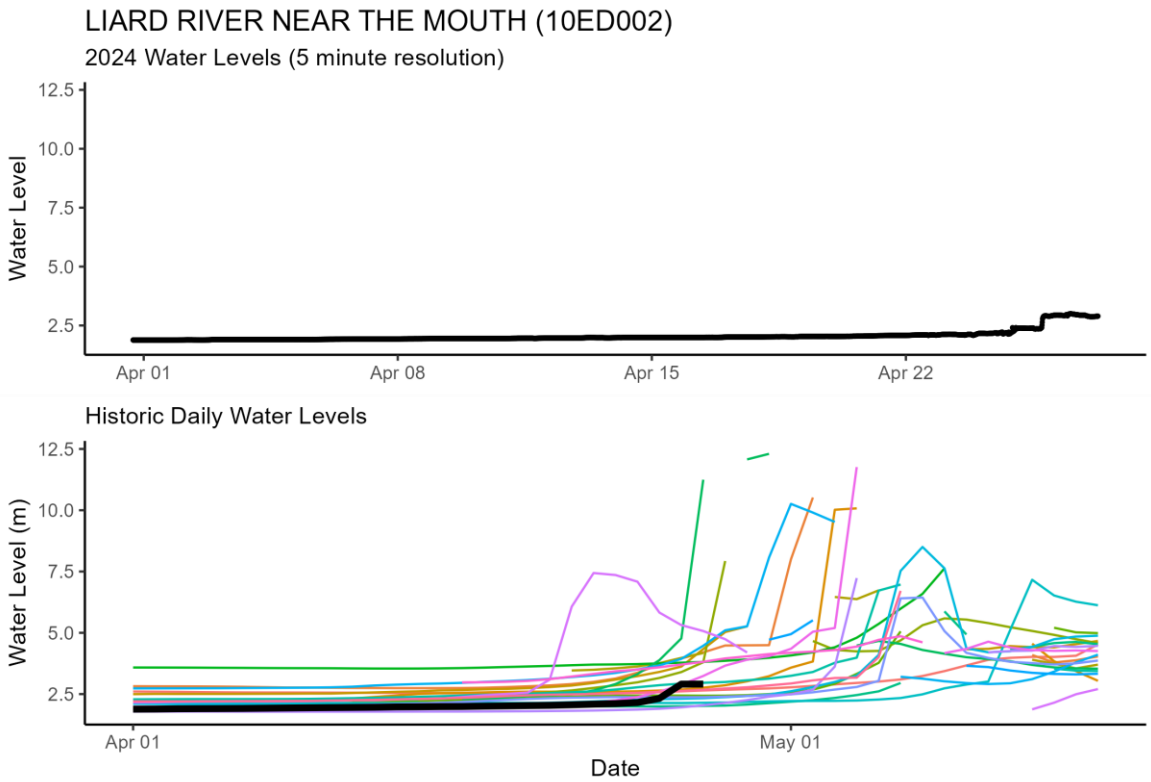
Above - The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.

Above – Liard River at Fort Liard hydrometric gauge photo from April 27 at 09:00.

Liard River near the mouth [10ED002]:



Above – Water level data for the Liard River near the mouth (at Fort Simpson). Data for the previous year are also shown here.



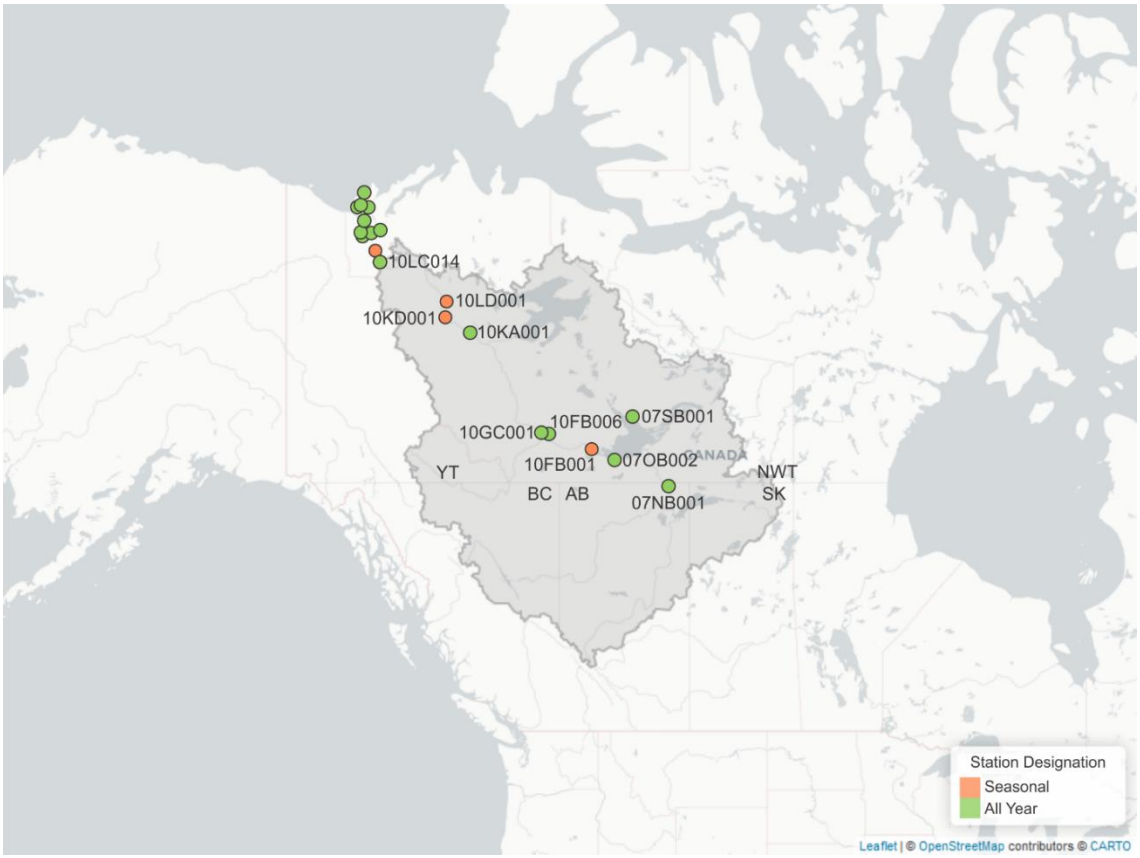
Above - The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.

Above – Liard River near the mouth hydrometric gauge photo from April 27 at 09:00.

Mackenzie River

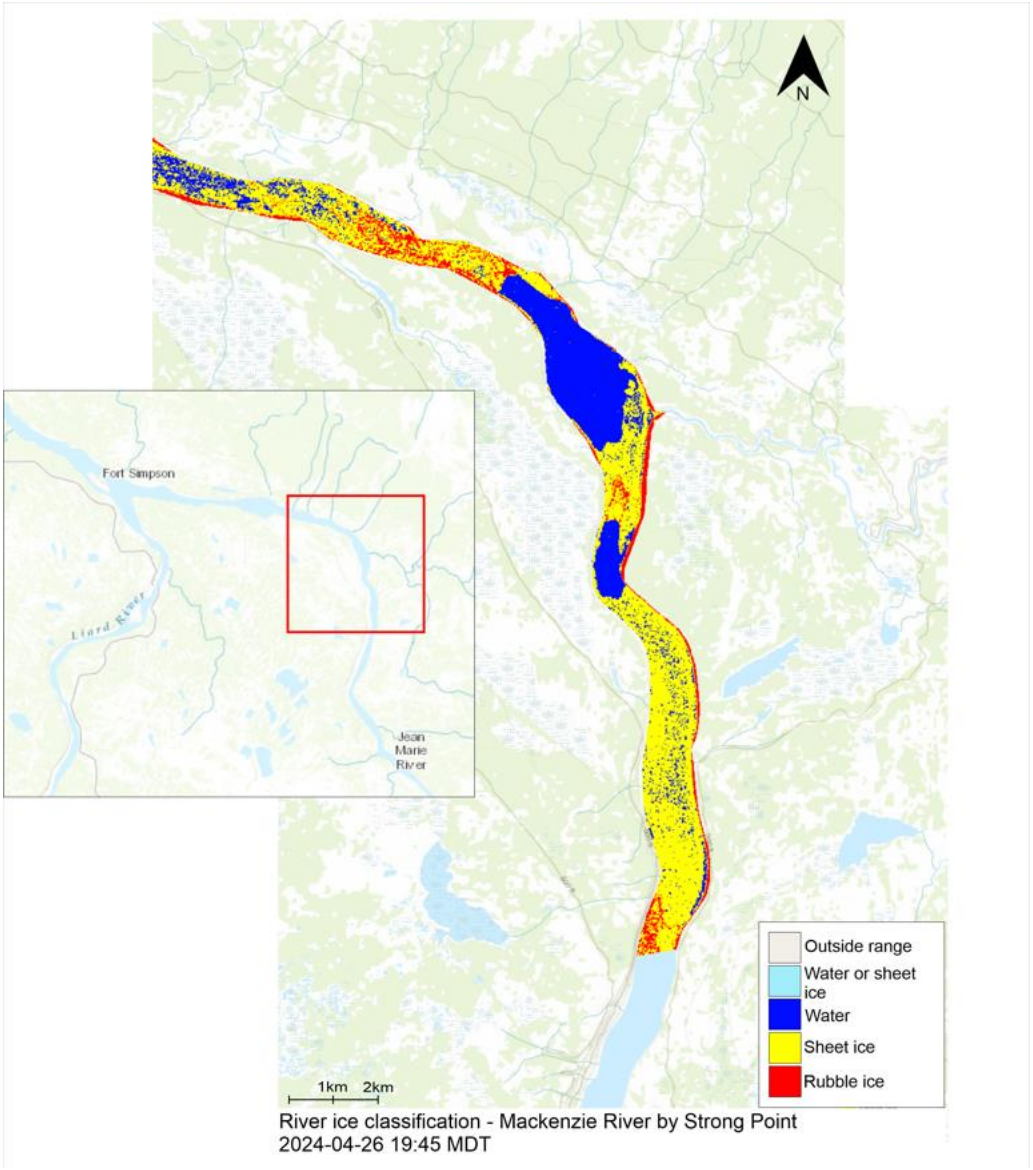
Current Status:

- Open water leads are developing on the Mackenzie River between Jean Marie River and Fort Simpson;
    - A small ice jam has been observed downstream of Jean Marie River, near the mouth of the Rabbitskin River (see image below);
    - Water levels are slowly increasing behind the ice jam but remain low
- Ice remains solid on the Mackenzie River at Fort Simpson;
    - Water levels are rising underneath the ice;
        - The rate of increase is normal for this time of year;
        - The water level remains very low.

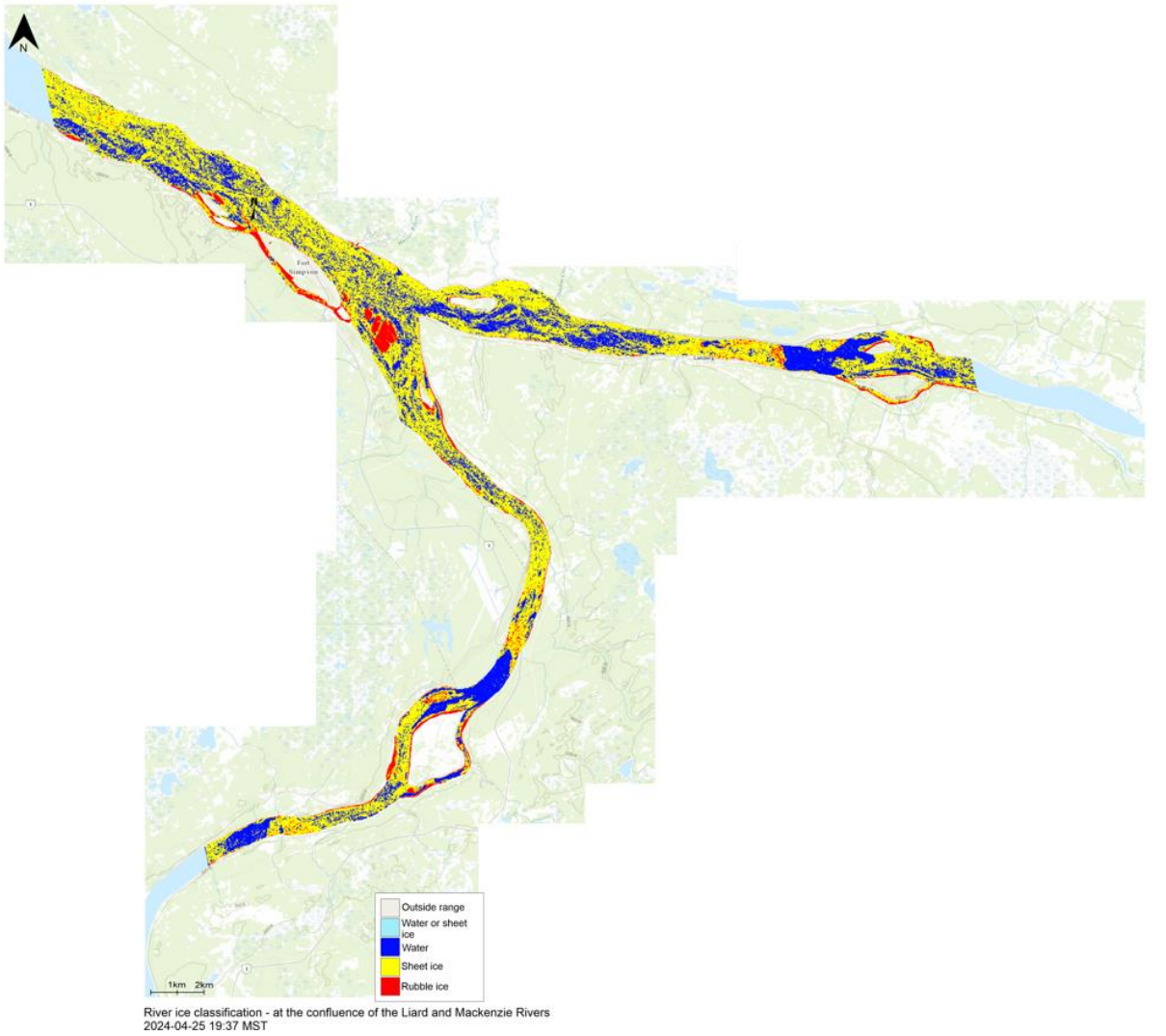


Above – Map of hydrometric stations in the Mackenzie River basin. The station numbers are referenced in the water level plots below.

Satellite Data:



Above – Classified river ice imagery of the Mackenzie River at Strong Point (between Jean Marie River and Fort Simpson) as of Apr 26 at 19:45 MDT. The imagery was acquired by the RADARSAT Constellation Mission via the Government Operations Centre. The image shows an open water section at the mouth of the Rabbitskin River, and the start of a small ice jam (which is inferred by a mixture of yellow and red pixels).



Above – Classified river ice imagery of the confluence of the Liard and Mackenzie rivers as of Apr 25 at 19:37 MDT. The imagery was acquired by the RADARSAT Constellation Mission via the Government Operations Centre image shows some open water sections along the Mackenzie and Liard rivers.

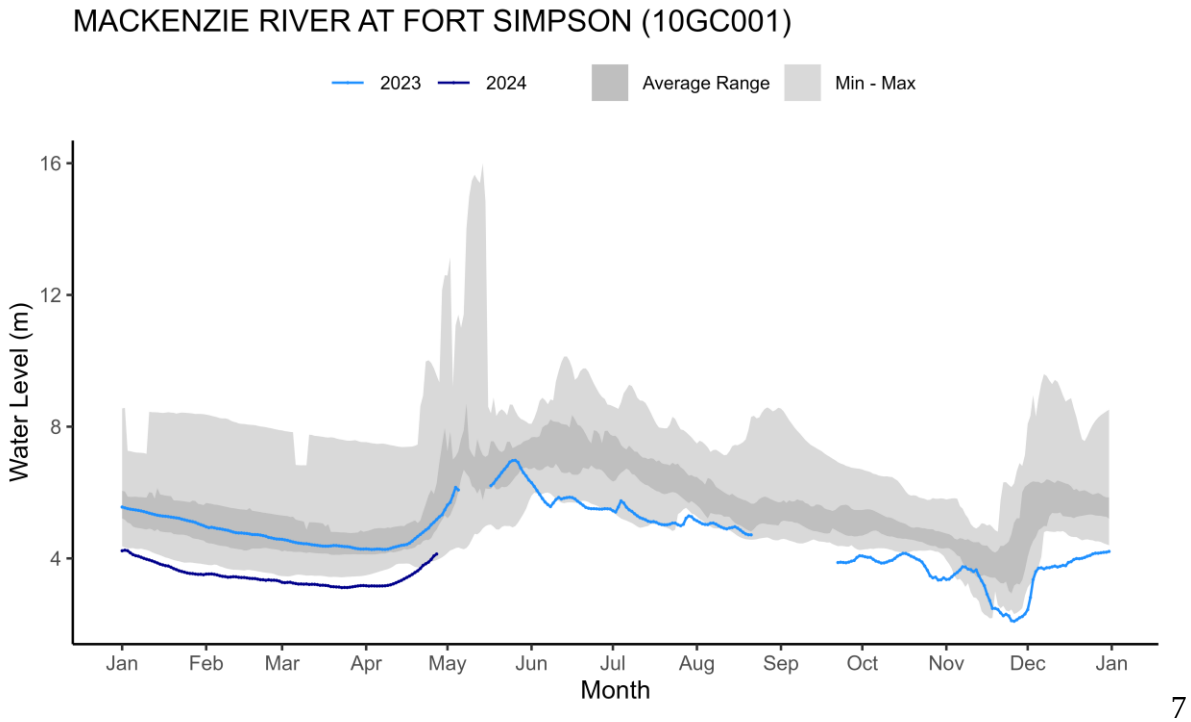
Hydrometric Data:

Mackenzie River at Strong Point [10FB006]:

Note: The gauge appears to have been dragged by ice. Current provisional data are not representative of current conditions.

Above – Mackenzie River at Strong Point hydrometric gauge photo from April 27 at 09:00.

Mackenzie River at Fort Simpson [10GC001]:



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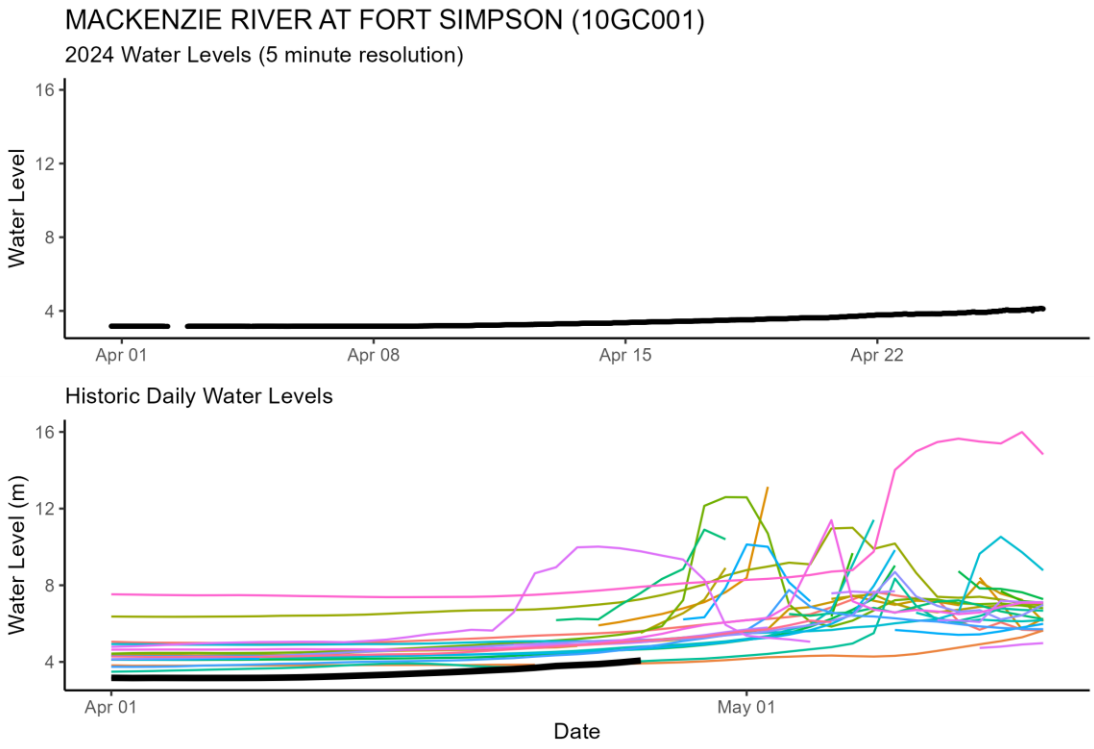
Above – Water level data for the Mackenzie River at Fort Simpson. Data for the previous year are also shown here.



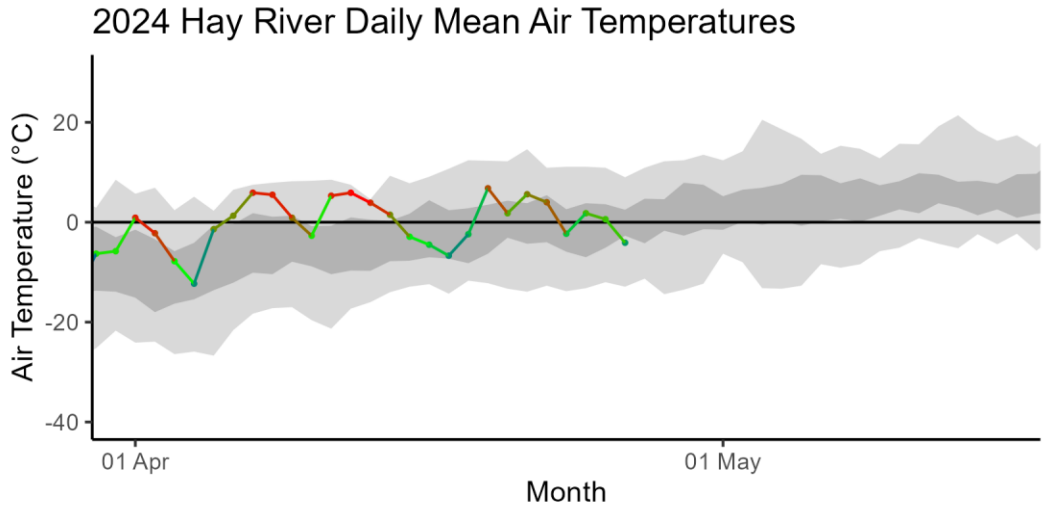
Above - The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.

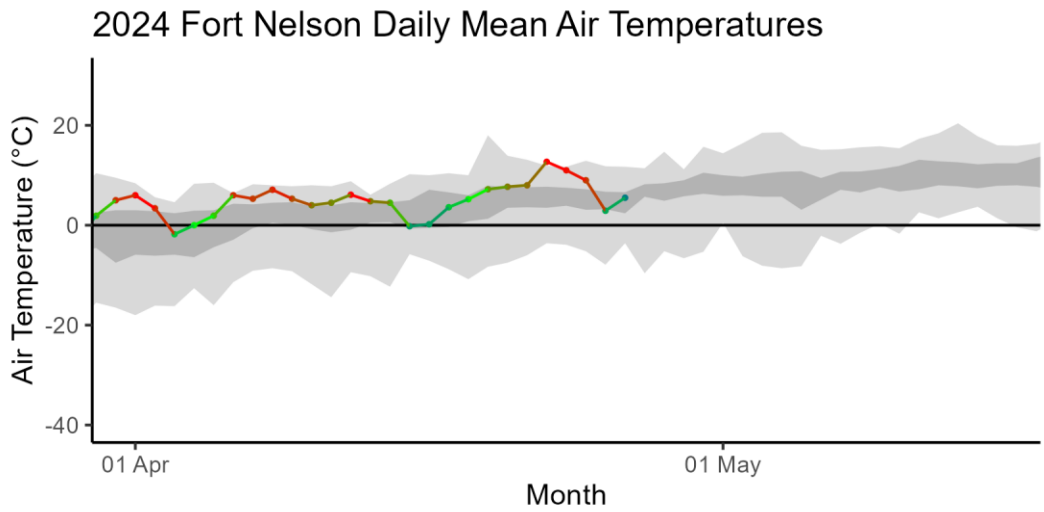
Above – Mackenzie River at Fort Simpson hydrometric gauge photo from April 27 at 09:00.

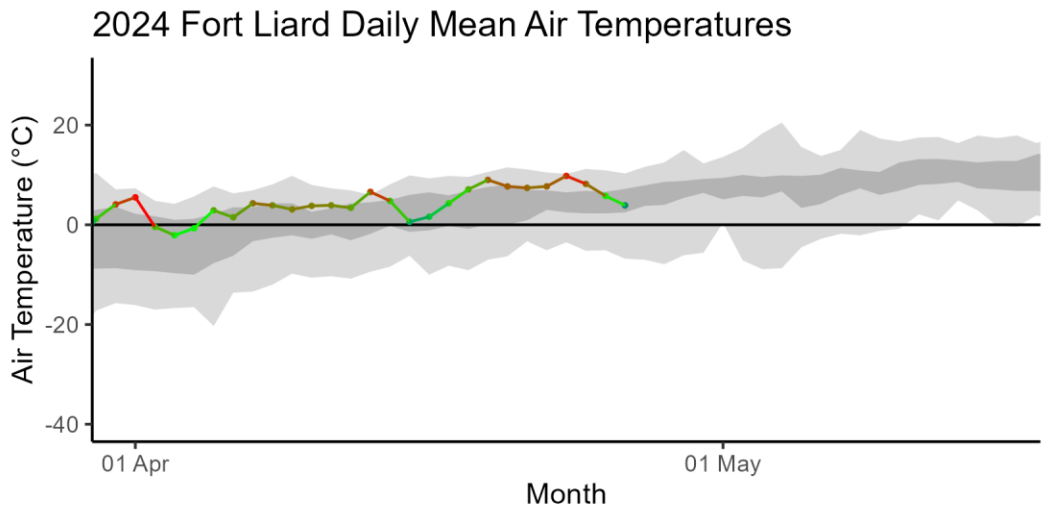
Weather Data:

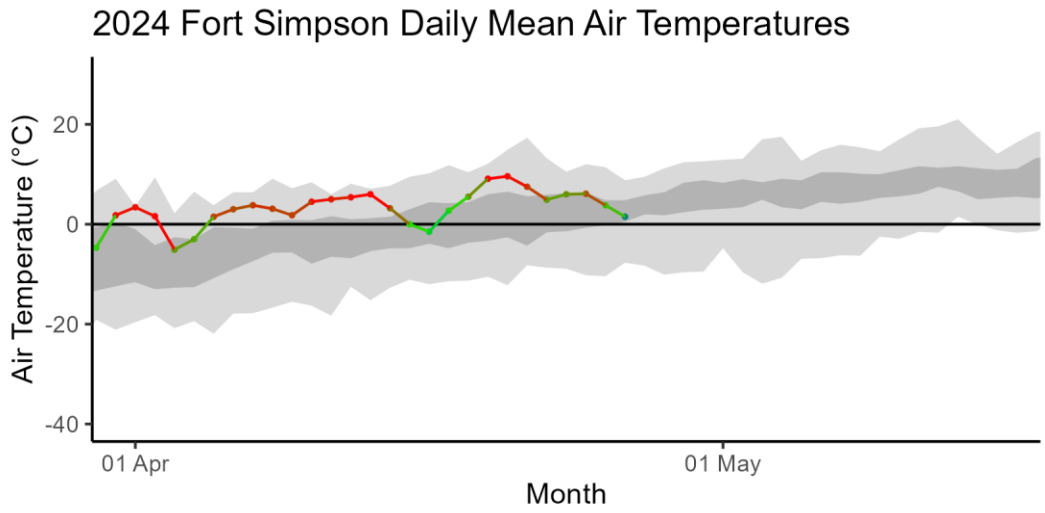
Weather information informs how snow and ice will melt and provides information about how this spring is unfolding relative to previous springs. Warmer than normal conditions early in the spring allow for additional energy to melt the snowpack and soften river ice. Rain-on-snow events can cause rapid 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 is Environment and Climate Change Canada (ECCC) weather forecast data for the next seven days.

The Hay River basin and the southern Dehcho region are forecast to see temperatures that are slightly cooler than normal over the weekend. A small amount of precipitation (5-10 mm) is forecast for the Dehcho region over the weekend.






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


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

Hay River seven-day weather forecast:

Sat 27 Apr	Sun 28 Apr	Mon 29 Apr	Tue 30 Apr	Wed 1 May	Thu 2 May	Fri 3 May
1°C	1°C	1°C	1°C	5°C	6°C	11°C
Periods of snow	Sunny	A mix of sun and cloud	Sunny	Sunny	Sunny	Sunny
Tonight	Night	Night	Night	Night	Night	
-4°C	-7°C	-9°C	-7°C	-6°C	-2°C	
Clear	Clear	Clear	Clear	Clear	Clear	

Fort Nelson seven-day weather forecast:

Sat 27 Apr	Sun 28 Apr	Mon 29 Apr	Tue 30 Apr	Wed 1 May	Thu 2 May	Fri 3 May
15°C	14°C	12°C	15°C	17°C	17°C	18°C
A mix of sun and cloud	Increasing cloudiness	Periods of snow	A mix of sun and cloud	Sunny	A mix of sun and cloud	A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
4°C	1°C	0°C	1°C	0°C	1°C	
Partly cloudy	Periods of rain	Cloudy periods	Clear	Cloudy periods	Cloudy periods	

Fort Liard seven-day weather forecast:

Sat 27 Apr	Sun 28 Apr	Mon 29 Apr	Tue 30 Apr	Wed 1 May	Thu 2 May	Fri 3 May
8°C	7°C	10°C	16°C	18°C	15°C	16°C
Sunny	A mix of sun and cloud	Cloudy	Sunny	Sunny	A mix of sun and cloud	A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
-2°C	-2°C	-4°C	0°C	-1°C	0°C	
A few clouds	Cloudy periods	Clear	Clear	Cloudy periods	Cloudy periods	

Fort Simpson seven-day weather forecast:

Sat 27 Apr	Sun 28 Apr	Mon 29 Apr	Tue 30 Apr	Wed 1 May	Thu 2 May	Fri 3 May
 4°C Periods of light snow	 7°C Mainly cloudy	 9°C Sunny	 12°C Sunny	 15°C Sunny	 11°C A mix of sun and cloud	 14°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 -4°C Partly cloudy	 -6°C Cloudy periods	 -2°C Clear	 -1°C Clear	 -2°C Cloudy periods	 1°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.