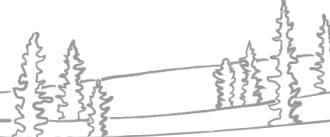




# NWT Water Monitoring Bulletin

## – April 26, 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 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:

- Snowmelt, river ice melt, and rises in water levels continue in southern basins in the NWT;
- On the Hay River, ice has begun to break and consolidate locally;
- The initiation of spring break up and water level rise in the Hay River is earlier than normal due to warm spring temperatures.
- On the Liard River and on the Mackenzie River at Fort Simpson, water levels are beginning to rise under the ice, but the rates of increase are still very small.
- Warmer than seasonal temperatures are forecast for the Hay River and lower Liard River basins this weekend, beginning Friday
  - Temperatures will approach 20°C in the southern parts of the basins and will rapidly melt residual snowpack

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# Hay River:

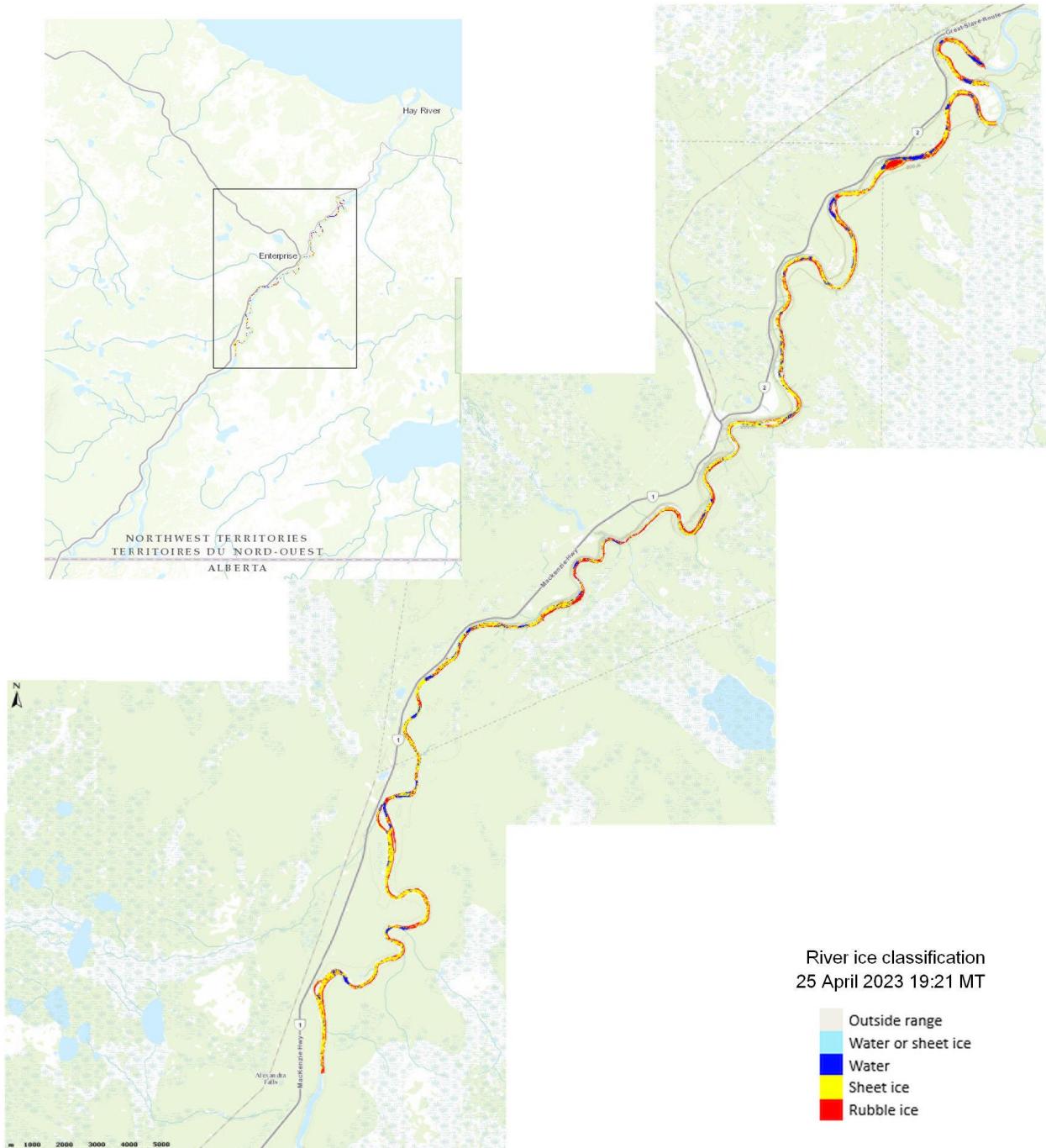
## Current Status:

- Snow across the entire Hay River basin continues to melt;
- Water levels are rising on the Hay River and its tributaries
  - Rates of rise are normal for this stage of breakup;
- The onset of water level rise occurred earlier than normal and much earlier than last year;
- Ice is degrading on the Hay River, with small amounts of local ice movement and consolidation
  - Small patches of open water are developing
- An upper ridge will bring warmer than normal temperatures to the Hay River basin beginning on Friday and last through the weekend.
  - Highs of near 20°C are forecast for the upper (southern) part of the basin
  - Warm temperatures expedite the melting of snow and ice in the basin
- 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:

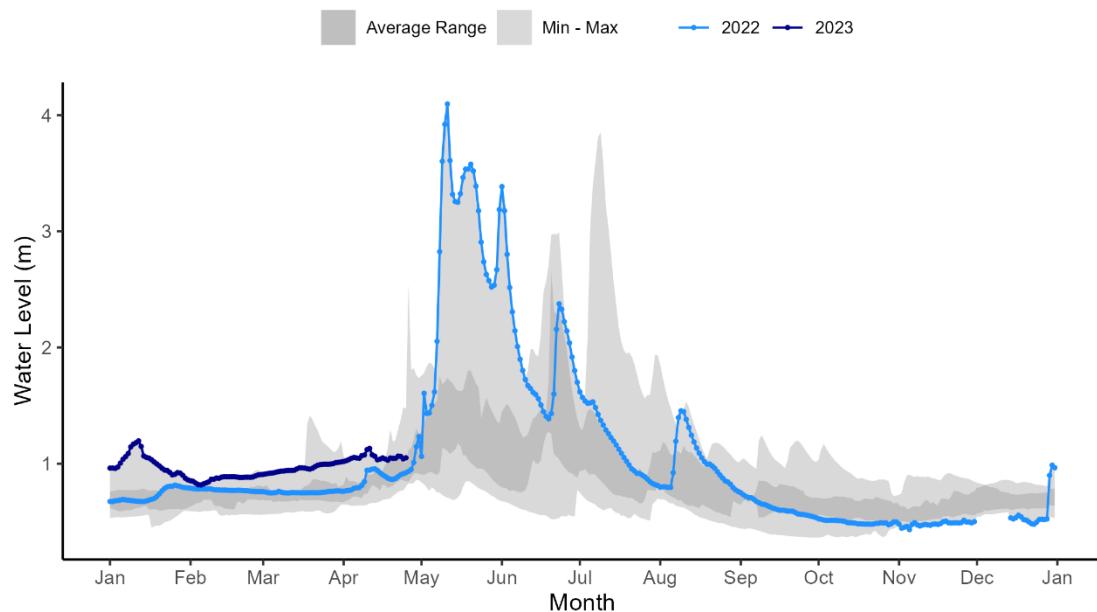


Above – River ice classification information for the Hay River, using radar imagery taken on 25 April 2023. The images show mainly rubble (consolidated) ice along the Hay River, with some patches of open water forming.

## Hydrometric Data:

Chinchaga River near High Level (Alberta) [07OC001]:

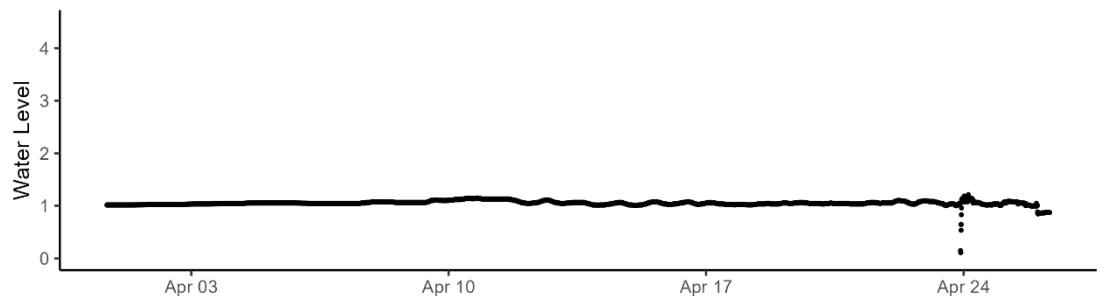
CHINCHAGA RIVER NEAR HIGH LEVEL (07OC001)



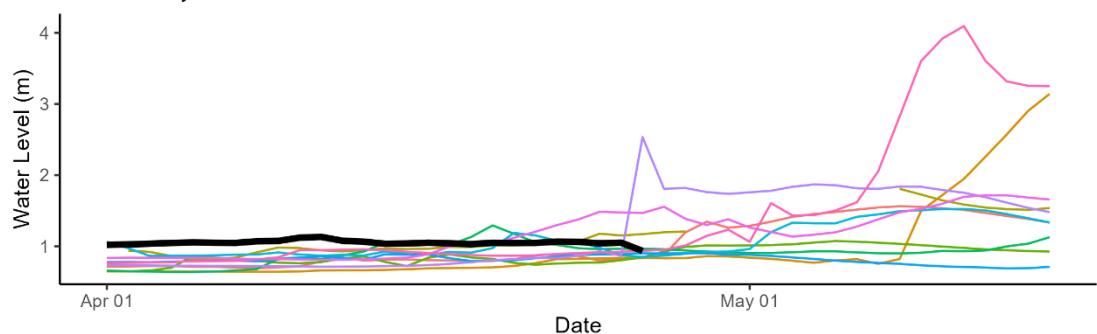
Above – Water level data for the Chinchaga River near High Level. Daily average levels for the previous year are shown here.

CHINCHAGA RIVER NEAR HIGH LEVEL (07OC001)

2023 Water Levels (5 minute resolution)

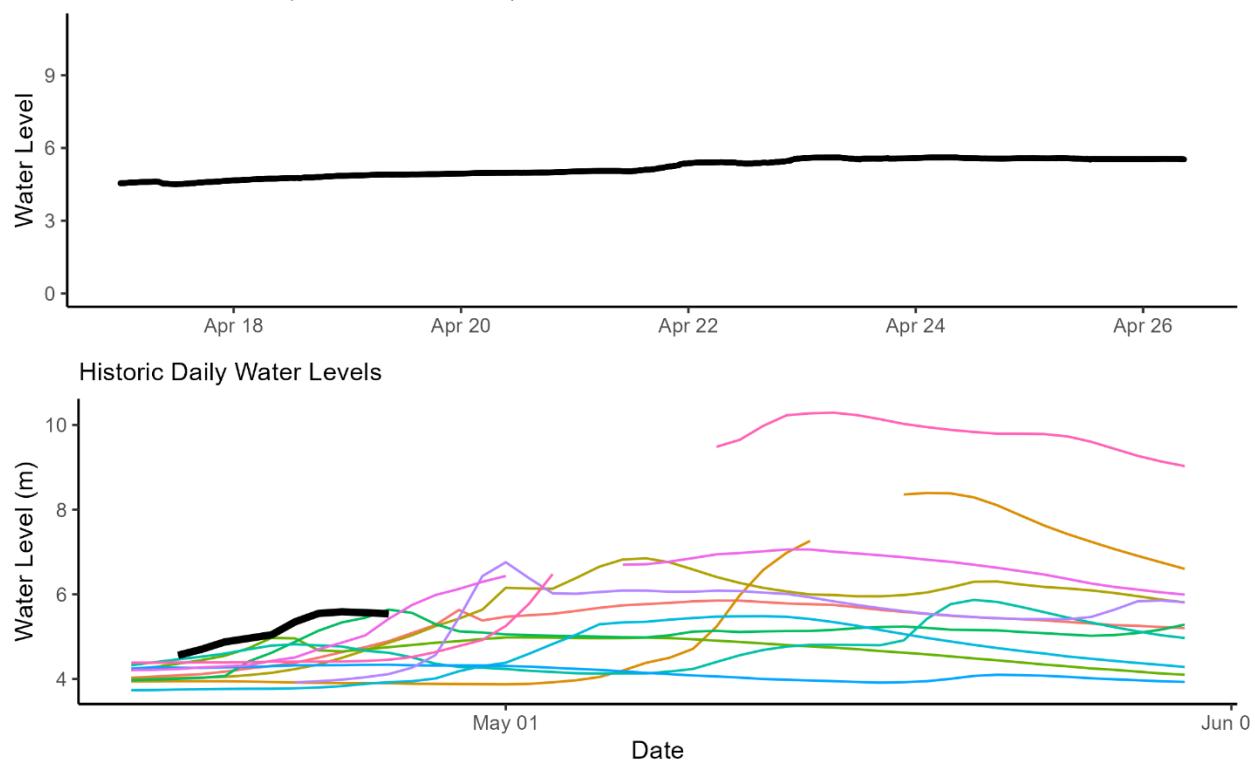


Historic Daily Water Levels



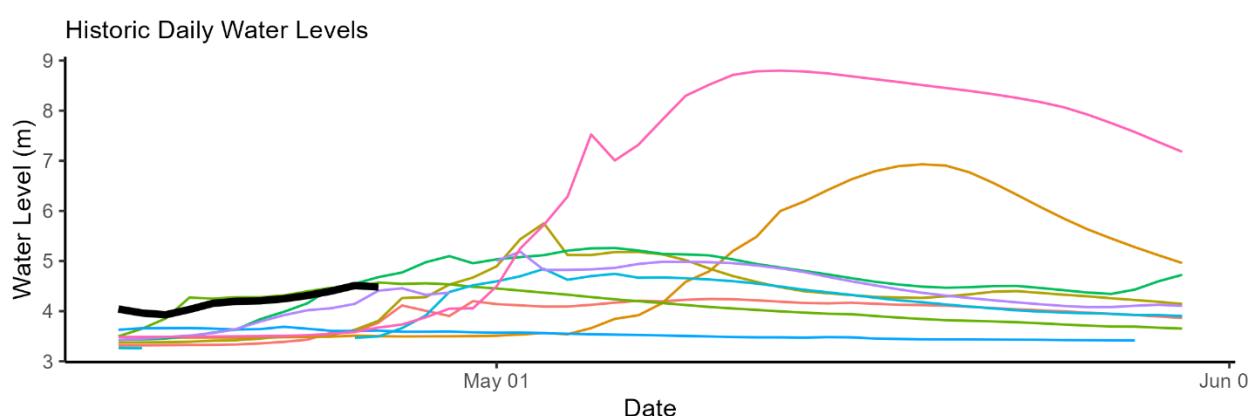
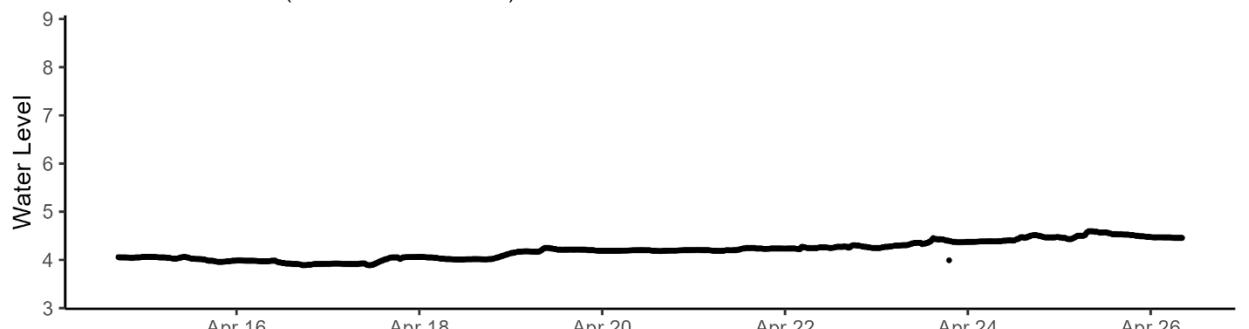
Above – Water level data at the Chinchaga River near High Level, AB. This plot shows high resolution (5 minute) water level data in the middle, and daily average data on the bottom.

Hay River near Meander River (Alberta) [070B003]:  
HAY RIVER NEAR MEANDER RIVER (070B003)  
2023 Water Levels (5 minute resolution)



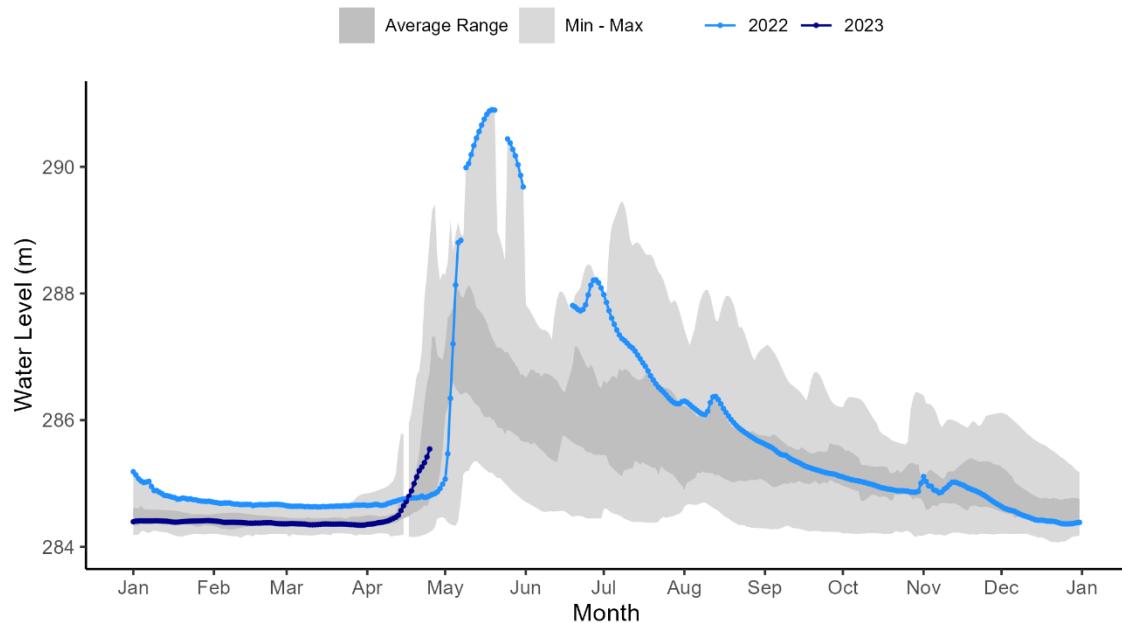
Above – Water level data on the Hay River near Meander River, AB. Water levels are slowly starting to rise.

Steen River near Steen River (Alberta) [07OB004]:  
STEEN RIVER NEAR STEEN RIVER (07OB004)  
2023 Water Levels (5 minute resolution)

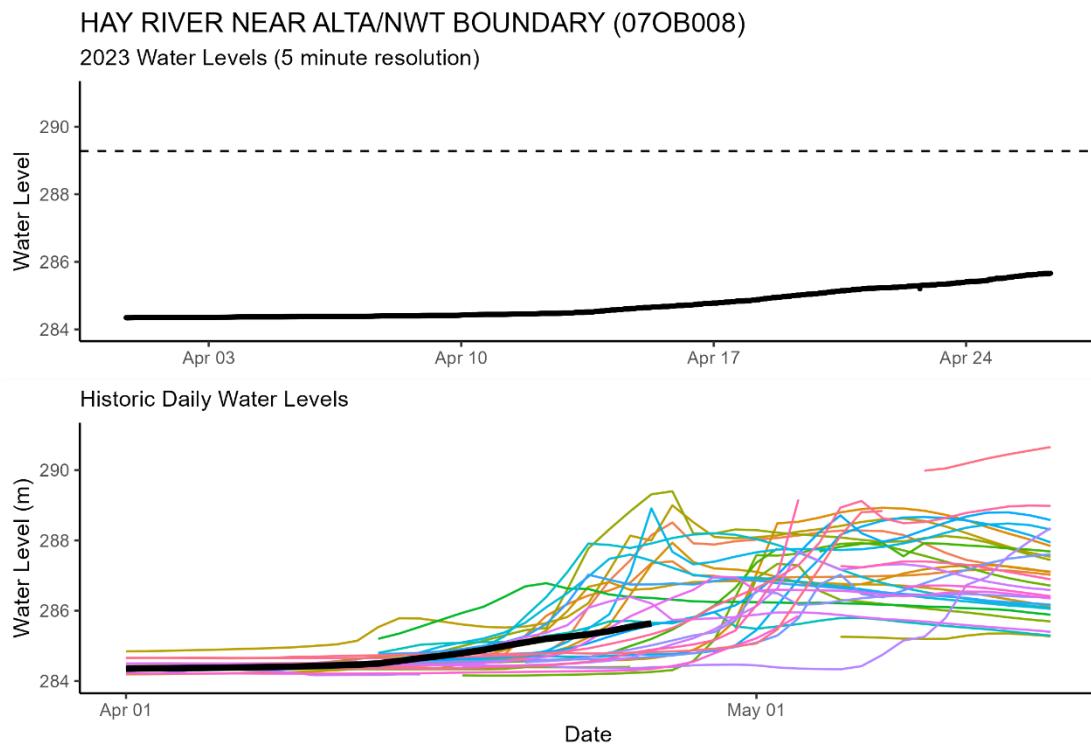


Above – Water level data on the Steen River near Steen River, AB. The Steen River is a small tributary to the Hay River. Water levels are slowly rising.

Hay River near the border [070B008]:  
**HAY RIVER NEAR ALTA/NWT BOUNDARY (070B008)**



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

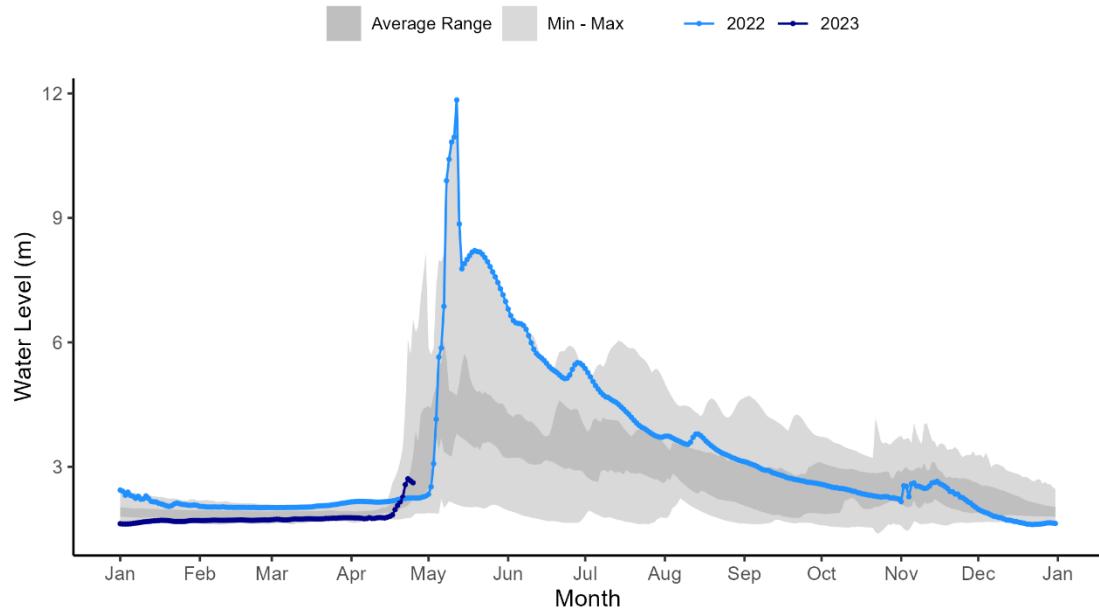


Above - The upper graph in the figure presents real time water level data at 5-minute resolution with the dashed line representing the peak water level from last year (2022). The lower graph shows daily average levels relative to the previous 20 years.



*Above* – Hay River near the border hydrometric gauge photo on April 26 at 13:00. Photo courtesy of Water Survey of Canada and GNWT.

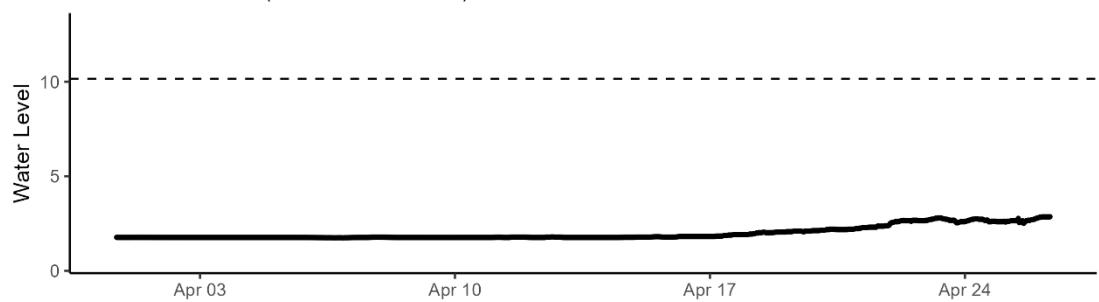
Hay River near Hay River [07OB001]:  
**HAY RIVER NEAR HAY RIVER (07OB001)**



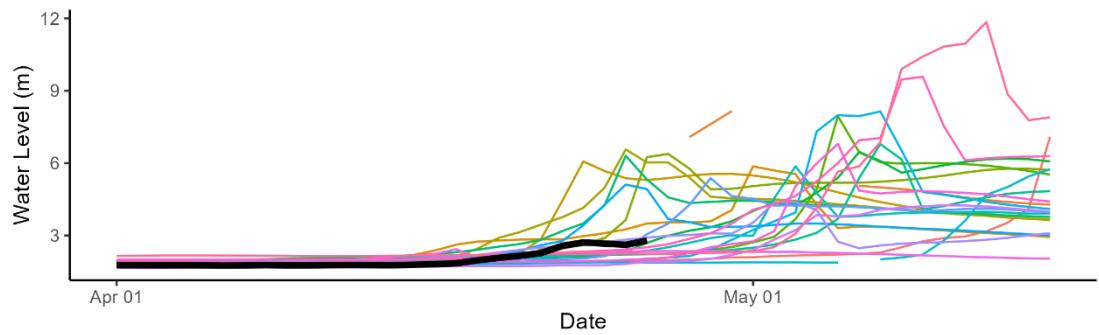
Above – Water level data for the Hay River near the Alberta- NWT border. Daily average levels for the previous year are shown here.

**HAY RIVER NEAR HAY RIVER (07OB001)**

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 with the dashed line representing the peak water level from last year (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 26 at 13:00. Photo courtesy of Water Survey of Canada and GNWT.

## Liard River:

### Current Status:

- Snowpack continues to melt across the basin;
- Ice remains intact along the Liard River within the NWT;
- Water levels are slowly increasing underneath the ice on the Liard River at Fort Liard
  - The small rates of water level rise is normal for this time of year
- The southern Dehcho region is forecast to receive warmer than normal temperatures beginning on Friday and lasting through the weekend.
  - Fort Liard and Nahanni Butte are forecast to receive small amounts of rain (10-20 mm) Sunday night and Monday morning

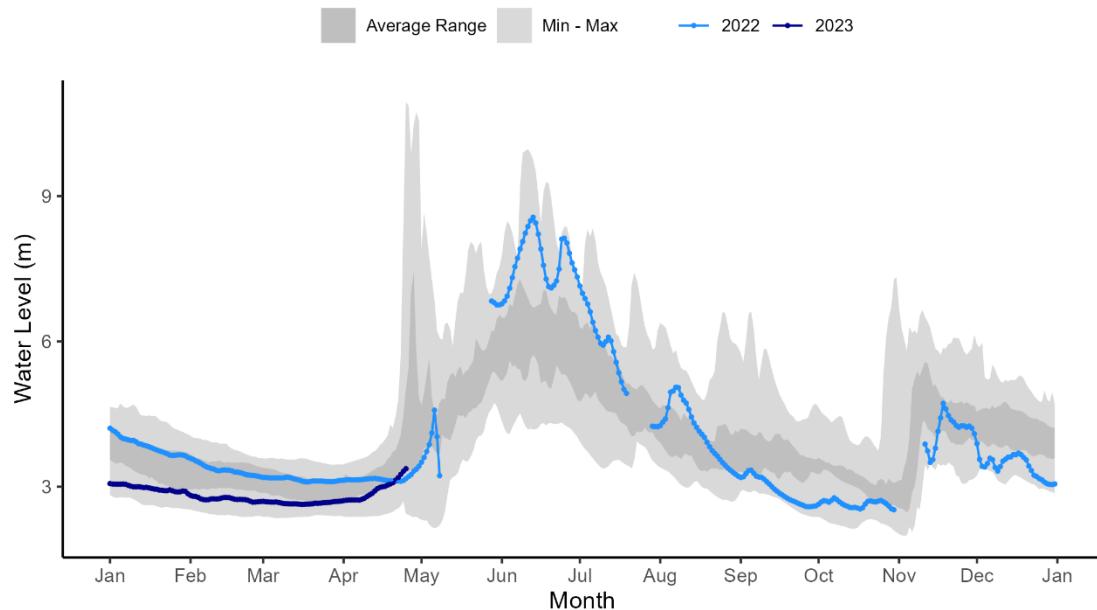


Above – Map of hydrometric stations in the Liard River basin. The station numbers are referenced in the water level plots below.

## Hydrometric Data:

### Liard River at Fort Liard [10ED001]:

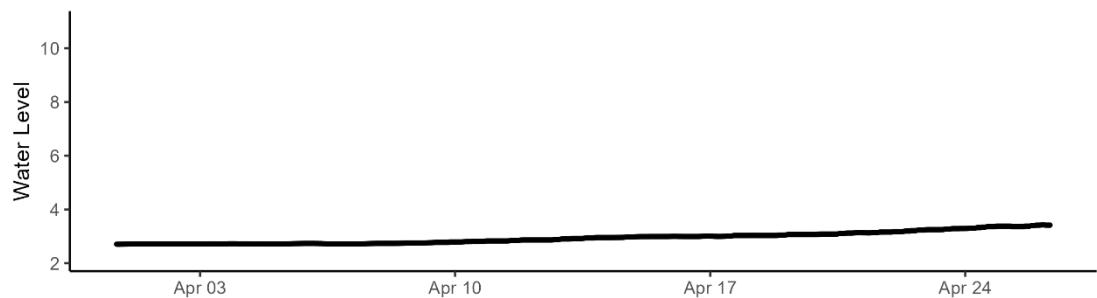
#### LIARD RIVER AT FORT LIARD (10ED001)



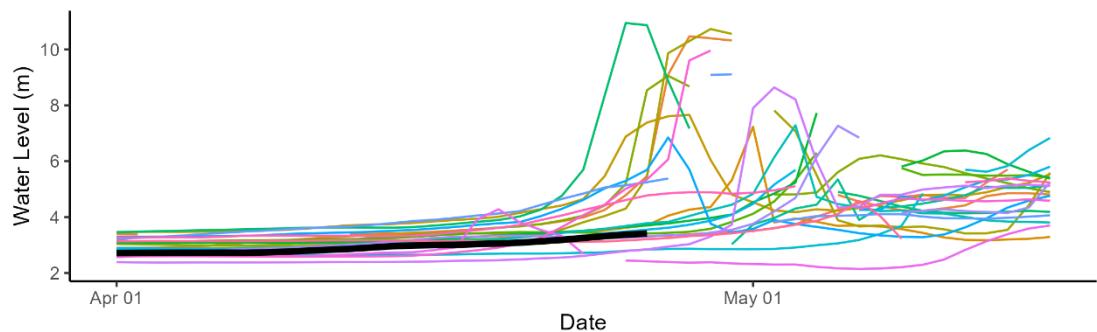
Above – Water level data for the Liard River at Fort Liard. Daily average levels for the previous year are shown here.

#### LIARD RIVER AT FORT LIARD (10ED001)

2023 Water Levels (5 minute resolution)



#### Historic Daily Water Levels

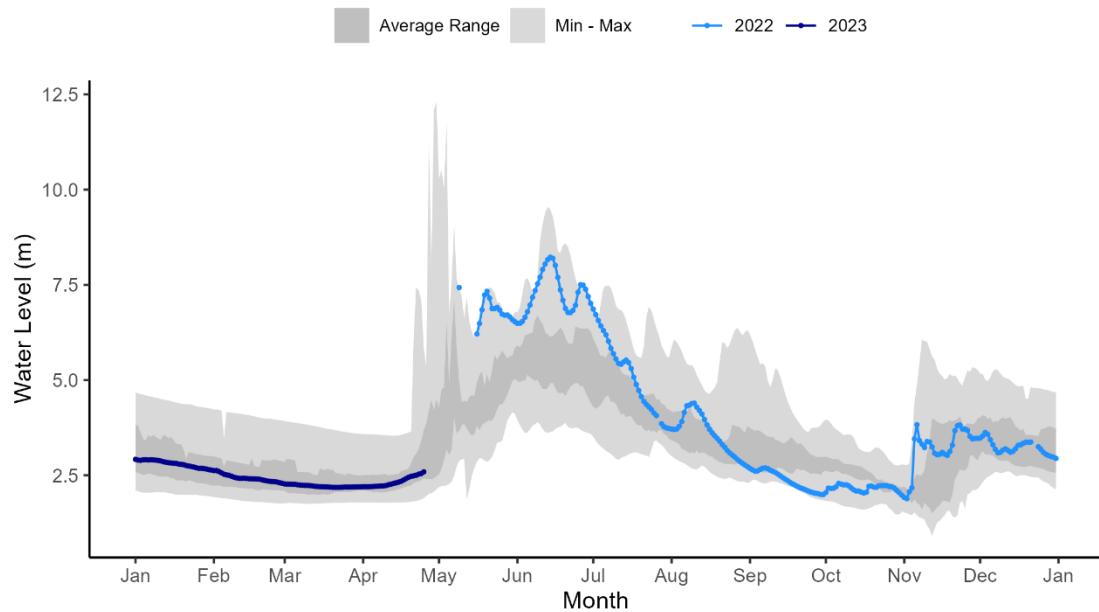


Above - The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.

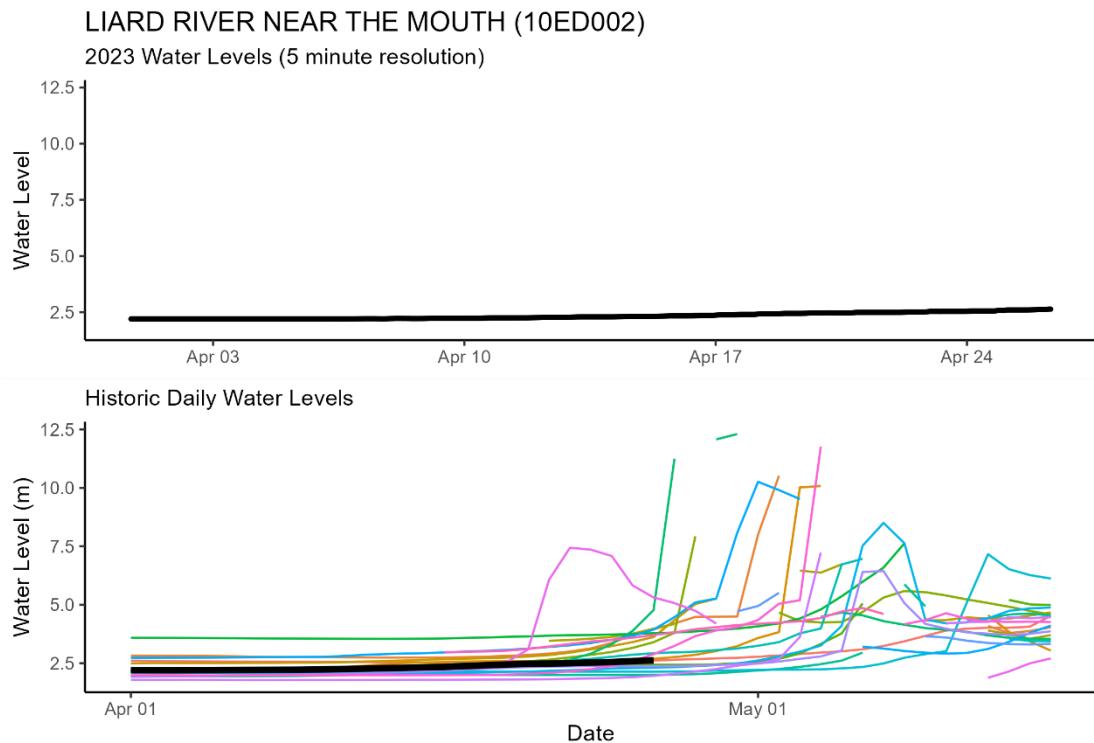


*Above* – Liard River at Fort Liard hydrometric gauge photo from April 26 at 13:00. Photo courtesy of Water Survey of Canada and GNWT.

Liard River near the mouth [10ED002]:  
**LIARD RIVER NEAR THE MOUTH (10ED002)**



*Above* – Water level data for the Liard River near the mouth (at Fort Simpson). Daily average levels for the previous year are 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.

10ED002, LiardMouth 2023-04-26 1301:14 UTC  
61.74289, -121.22787 12.0V 25°C P

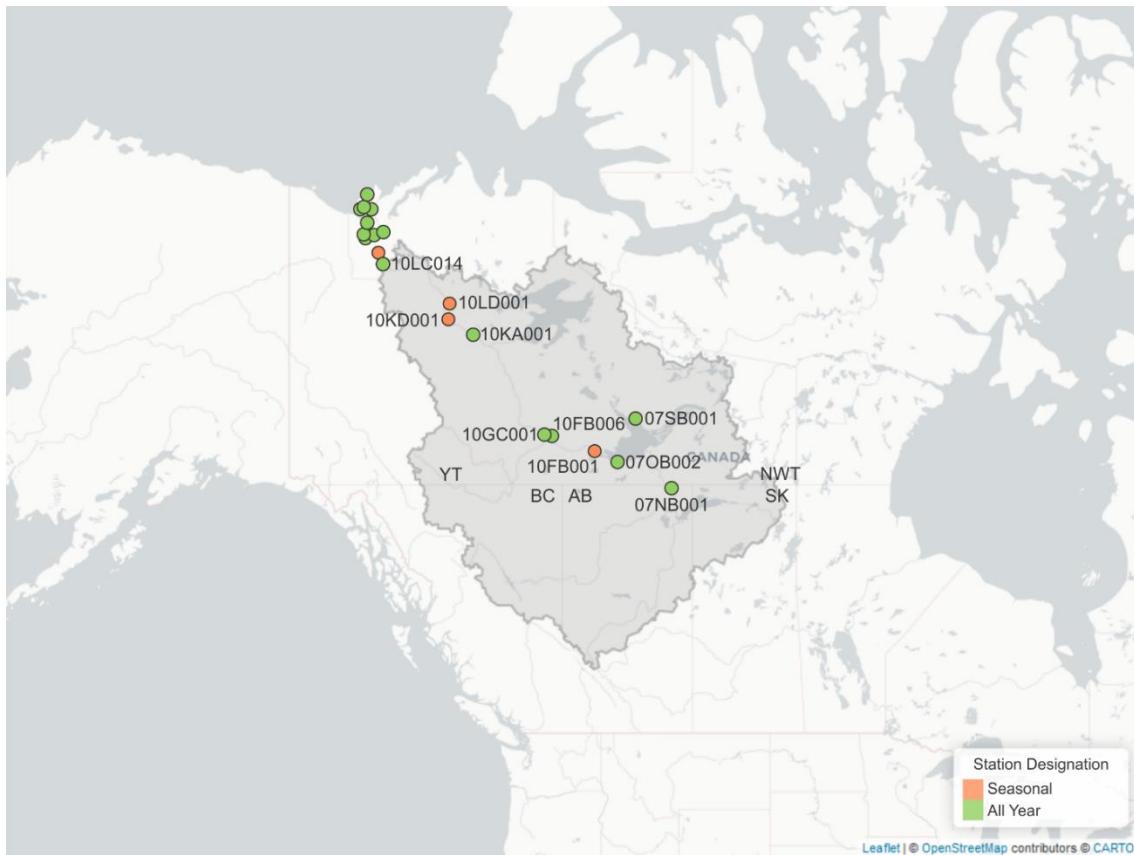


*Above* – Liard River near the mouth hydrometric gauge photo from April 26 at 13:00. Photo courtesy of Water Survey of Canada and GNWT.

## Slave River / Great Slave Lake / Mackenzie River

### Current Status:

- Break up is well underway in the Peace/Athabasca basins, which drain into the Slave River;
  - Break up has been mostly thermal on the Peace and Athabasca rivers;
- Break up has not yet commenced on the Mackenzie River;
- Water levels are slowly beginning to rise underneath the ice at the Mackenzie River at Fort Simpson, but the rate of increase is still very small.
- The southern Dehcho region is forecast to receive warmer than normal temperatures beginning on Friday and lasting through the weekend.

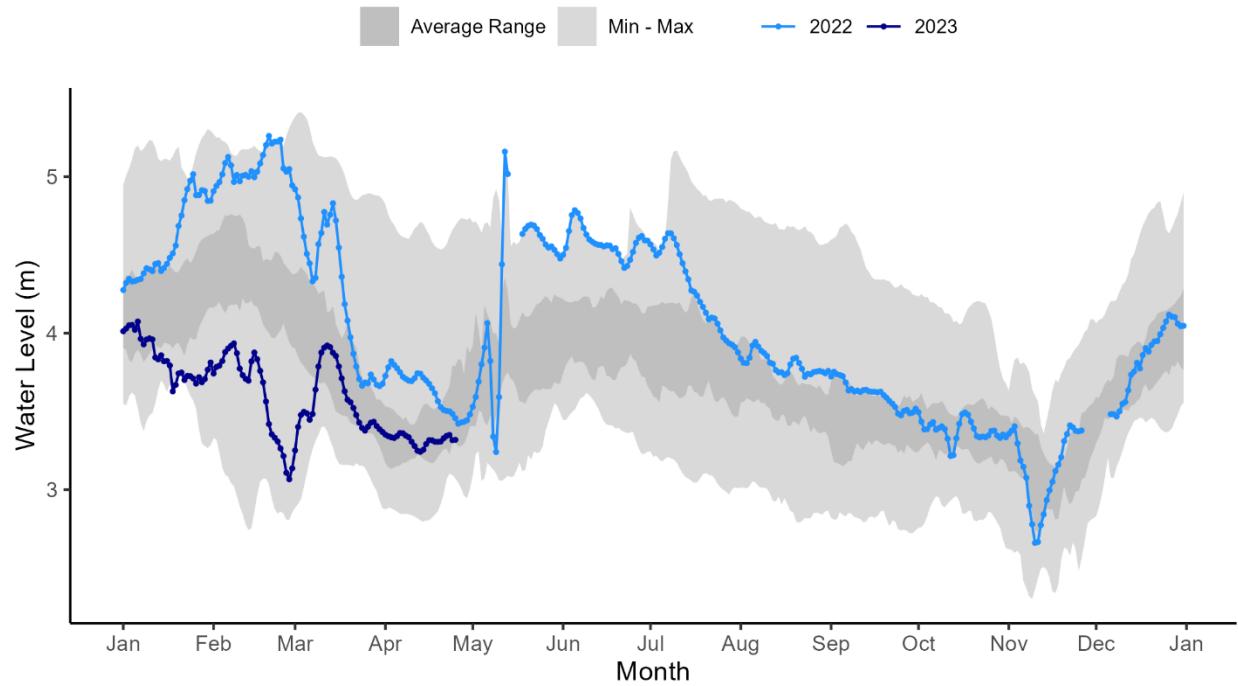


Above – Map of hydrometric stations in the Dehcho (Mackenzie River) basin. The station numbers are referenced in the water level plots below.

## Hydrometric Data:

Slave River at Fitzgerald (Alberta) [07NB001]:

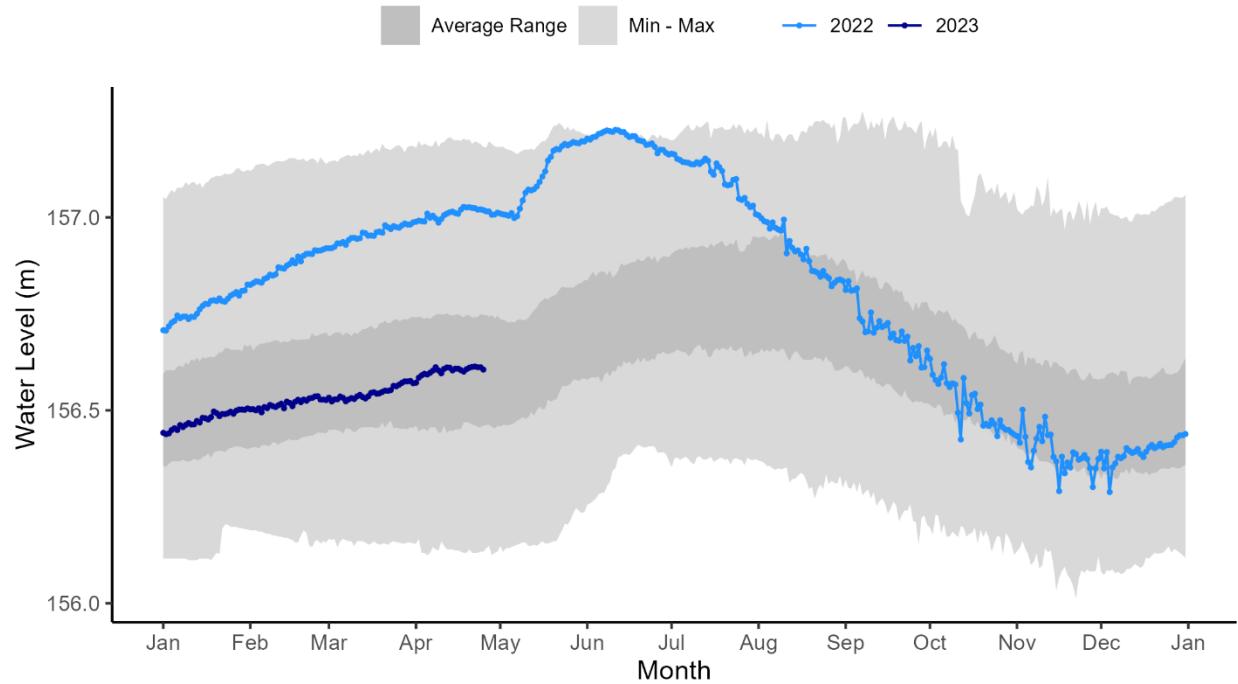
SLAVE RIVER AT FITZGERALD (ALBERTA) (07NB001)



Above – Water level data for the Slave River at Fitzgerald. Daily average levels for the previous year is shown here.

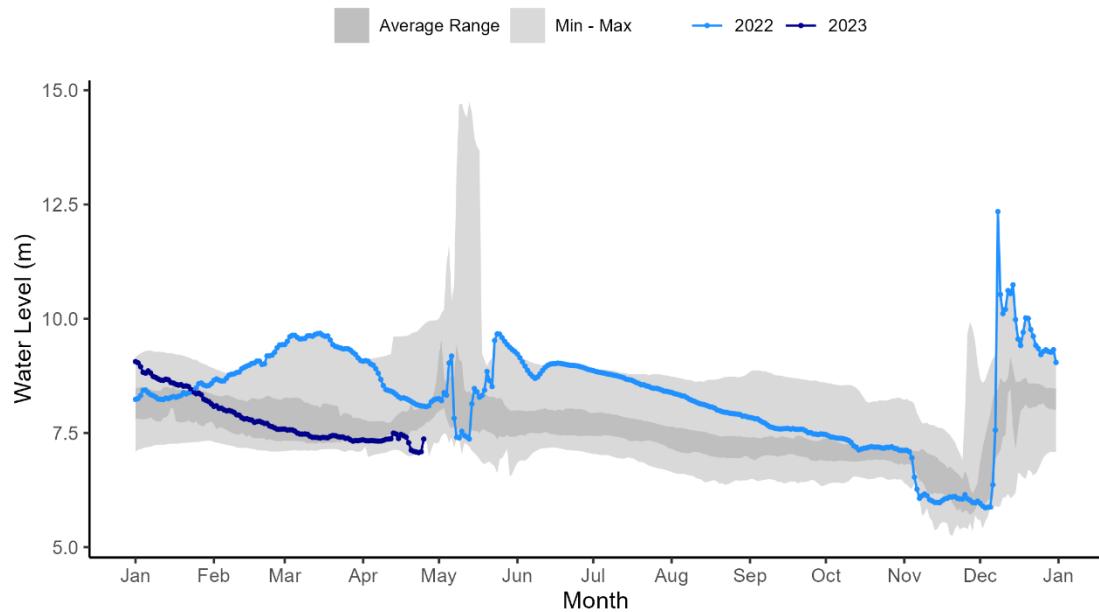
Great Slave Lake at Yellowknife Bay [07SB001]:

GREAT SLAVE LAKE AT YELLOWKNIFE BAY (07SB001)

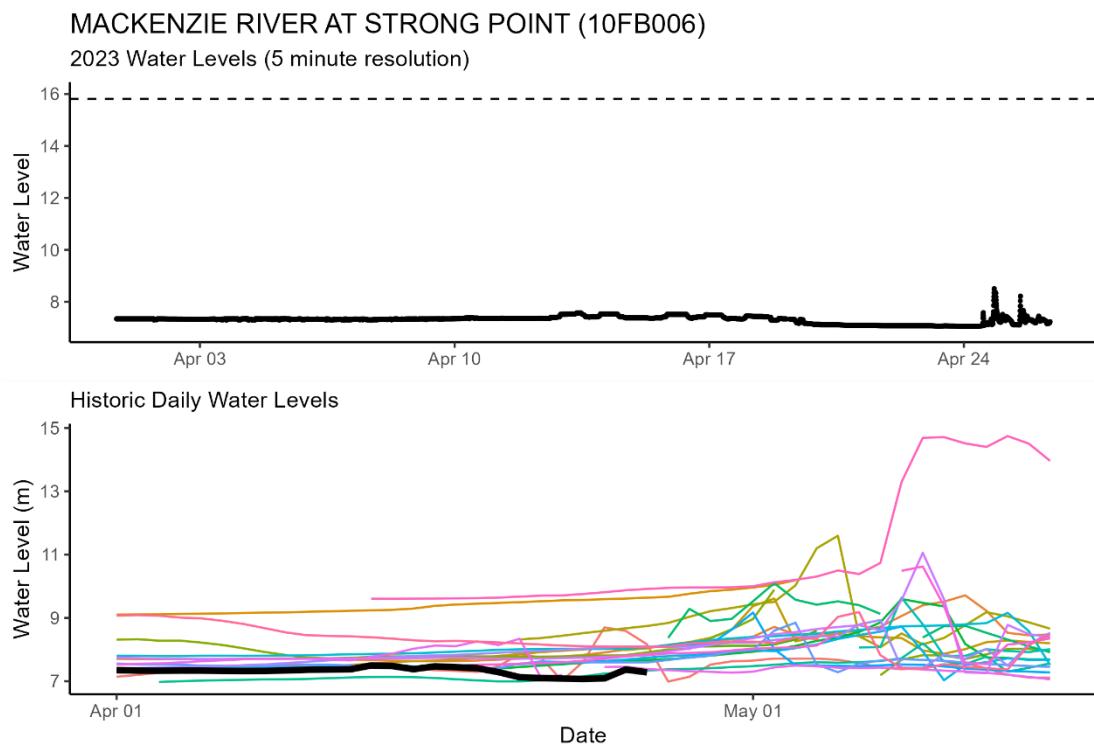


Above – Water level data for Great Slave Lake at Yellowknife Bay. Daily average levels for the previous year are shown here.

Mackenzie River at Strong Point [10FB006]:  
**MACKENZIE RIVER AT STRONG POINT (10FB006)**



Above – Water level data for the Mackenzie River at Strong Point. Daily average levels for the previous year are shown here.



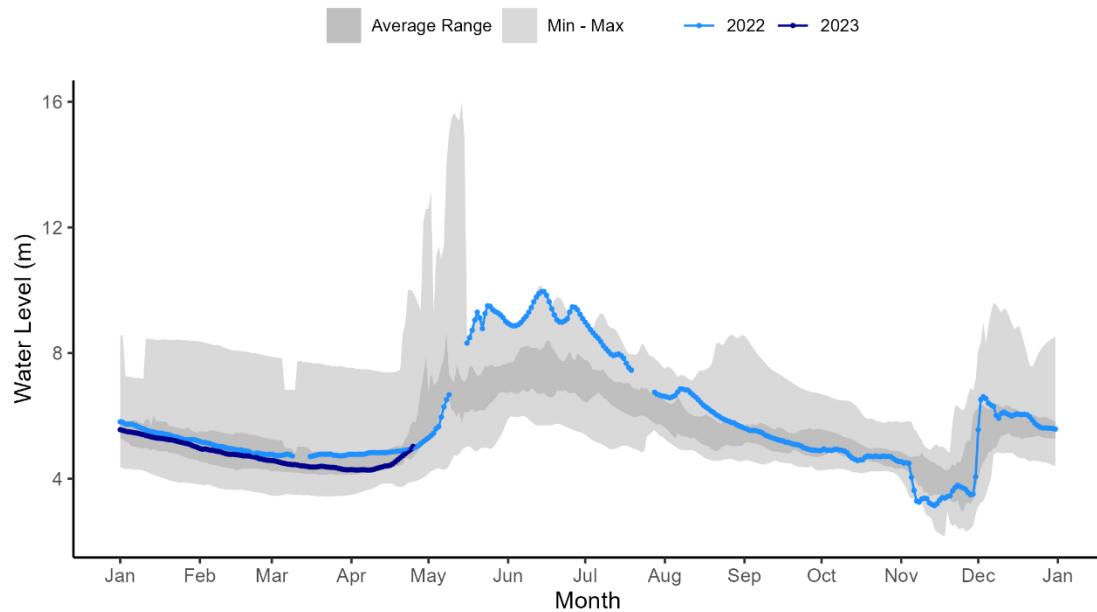
Above – The upper graph in the figure presents real time water level data at 5-minute resolution with the dashed line representing the peak water level from 2021. The lower graph shows daily average levels relative to the previous 20 years.

10F8006\_MackStrongPoint 2023-04-26 1901:14 UTC  
6181644, -120.79191 145V 3.0°C P

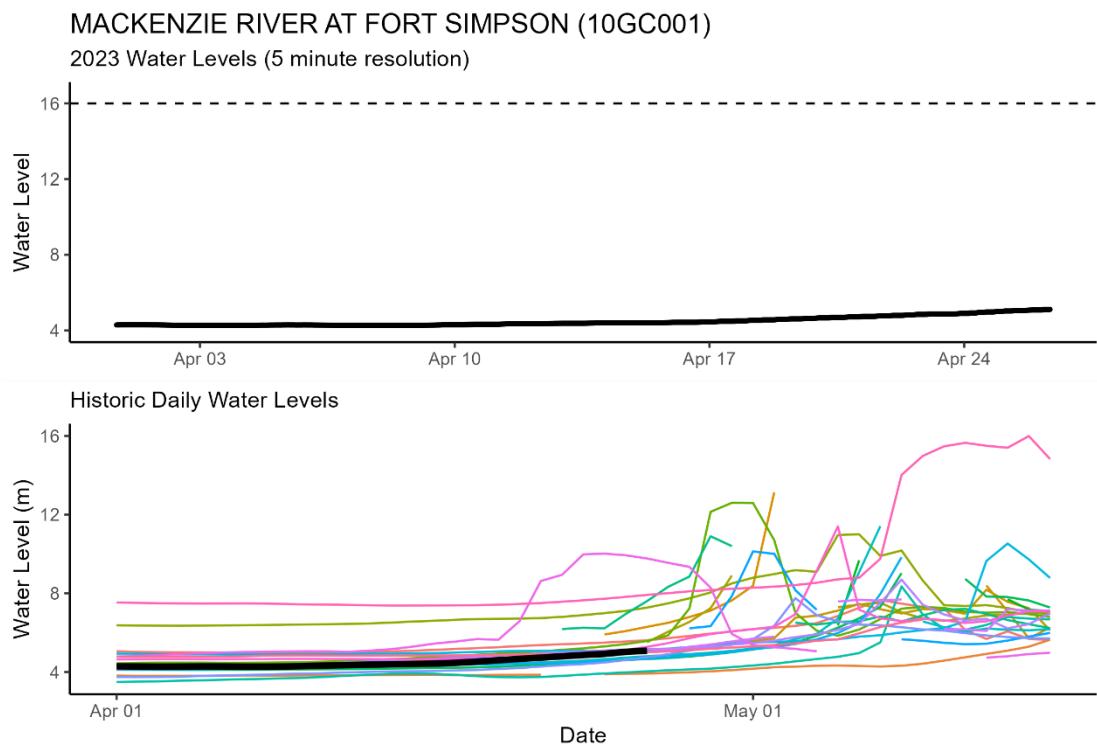


*Above* – Mackenzie River at Strong Point hydrometric gauge photo from April 26 at 13:00. Photo courtesy of Water Survey of Canada and GNWT.

Mackenzie River at Fort Simpson [10GC001]:  
**MACKENZIE RIVER AT FORT SIMPSON (10GC001)**



Above – Water level data for the Mackenzie River at Fort Simpson. Daily average levels for the previous year are 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.

10GC001\_MackSimpson 2023-04-26 1901:14 UTC  
61.86797, -121.35829 145V 11.0°C P



*Above* – Mackenzie River at Fort Simpson hydrometric gauge photo from April 26 at 13:00. 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 Hay River basin and the southern Dehcho region are forecast to receive above seasonal temperatures beginning on Friday and these will last through the weekend. Daytime high temperatures are forecast in the mid to high teens, with some areas near 20°C on Sunday and Monday between Fort Nelson, High Level, and Hay River. These high temperatures will help to melt residual snowpack and ice cover.

## High Level seven-day weather forecast:

▼ Forecast							<a href="#">Hourly Forecast</a>	<a href="#">Alerts</a>	<a href="#">Jet Stream</a>
<u>Wed</u> <u>26 Apr</u>	Thu 27 Apr	Fri 28 Apr	Sat 29 Apr	Sun 30 Apr	Mon 1 May	Tue 2 May			
 8°C 60% Chance of showers	 14°C A mix of sun and cloud	 15°C Sunny	 18°C Sunny	 20°C Sunny	 17°C 60% Chance of showers	 17°C A mix of sun and cloud			
 1°C 60% Chance of showers	 4°C Cloudy periods	 0°C Clear	 7°C Cloudy periods	 4°C Cloudy	 3°C 30% Chance of showers				

## Fort Nelson seven-day weather forecast:

<u>Wed</u> <u>26 Apr</u>	Thu 27 Apr	Fri 28 Apr	Sat 29 Apr	Sun 30 Apr	Mon 1 May	Tue 2 May
 6°C Showers	 14°C A mix of sun and cloud	 17°C Sunny	 21°C Sunny	 21°C Sunny	 14°C 60% Chance of showers	 16°C A mix of sun and cloud
 -2°C Partly cloudy	 3°C Clear	 2°C Clear	 7°C Cloudy periods	 3°C 40% Chance of showers	 2°C Cloudy periods	

## Fort Smith seven-day weather forecast:

<u>Wed</u> <u>26 Apr</u>	Thu 27 Apr	Fri 28 Apr	Sat 29 Apr	Sun 30 Apr	Mon 1 May	Tue 2 May
 6°C 60% Chance of drizzle	 12°C 30% Chance of showers	 12°C Sunny	 15°C Sunny	 16°C Cloudy	 18°C A mix of sun and cloud	 15°C A mix of sun and cloud
 1°C 60% Chance of showers	 4°C Cloudy	 -2°C Clear	 5°C Clear	 3°C Cloudy periods	 3°C Cloudy periods	

## Hay River seven-day weather forecast:

Wed 26 Apr	Thu 27 Apr	Fri 28 Apr	Sat 29 Apr	Sun 30 Apr	Mon 1 May	Tue 2 May
 3°C 30% Chance of light snow	 13°C Mainly sunny	 13°C Sunny	 14°C Sunny	 17°C A mix of sun and cloud	 9°C A mix of sun and cloud	 7°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>	
 -9°C Partly cloudy	 2°C Cloudy periods	 -4°C Clear	 7°C Cloudy periods	 2°C Cloudy periods	 1°C Cloudy periods	

## Fort Liard seven-day forecast:

Wed 26 Apr	Thu 27 Apr	Fri 28 Apr	Sat 29 Apr	Sun 30 Apr	Mon 1 May	Tue 2 May
 3°C 60% Chance of rain showers or flurries	 12°C Mainly sunny	 16°C Sunny	 20°C Sunny	 14°C A mix of sun and cloud	 13°C 30% Chance of showers	 15°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>	
 -2°C 60% Chance of rain showers or flurries	 4°C Clear	 1°C Clear	 8°C Cloudy	 2°C 60% Chance of showers	 2°C Cloudy periods	

## Fort Simpson seven-day weather forecast:

Wed 26 Apr	Thu 27 Apr	Fri 28 Apr	Sat 29 Apr	Sun 30 Apr	Mon 1 May	Tue 2 May
 6°C A mix of sun and cloud	 12°C Mainly sunny	 15°C Sunny	 18°C Sunny	 11°C A mix of sun and cloud	 11°C Cloudy	 13°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>	
 -5°C Partly cloudy	 -1°C Clear	 -1°C Clear	 5°C Cloudy periods	 3°C 60% Chance of showers	 1°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.