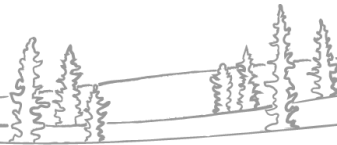




NWT Water Monitoring Bulletin

– May 04, 2022



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](#).

Current Status:

- The initiation of spring break up has been delayed relative to average break up times due to cooler than normal spring temperatures
 - For example, Fort Simpson experienced the third coldest April in the last 35 years
- Break up is under way in the upper Hay River basin. There is a small section of open water on the river above Alexandra Falls and small ice movement has been seen at the border with Alberta
- Some ice movement on the Dehcho (Mackenzie River) has been reported around Fort Providence and Strong Point (between Jean Marie River and Fort Simpson), but Liard and Mackenzie ice is still solid at Fort Simpson
- Water levels continue to rise slowly on the Liard River at Fort Liard
- Warmer than normal weather is forecast throughout the Hay River and Dehcho regions for the next three days

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 (07OB001) gauge has a current level of approximately 287 m. The Hay River near Hay River gauge has a current level of approximately 4.2 m. This **does not mean** that the water level at the Hay River at the border site is 283 m higher than the water level at the Hay River near Hay River site.

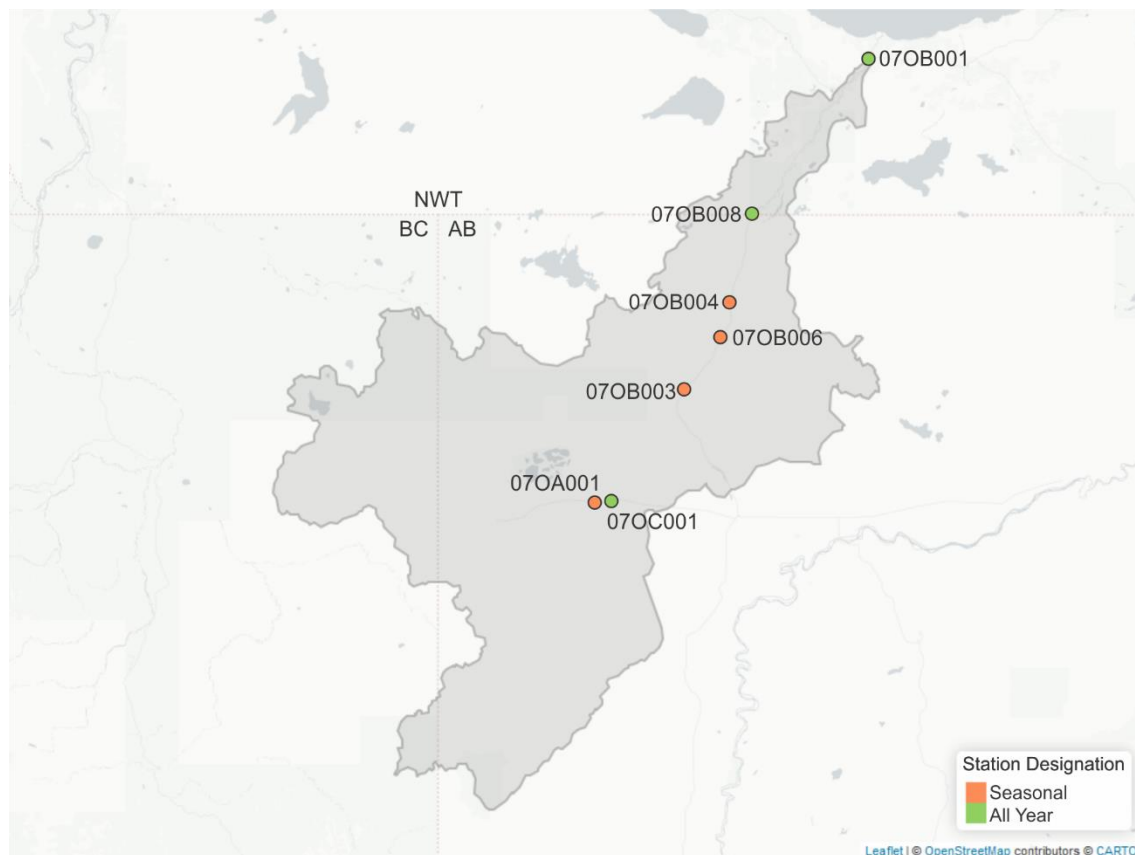
Contents

Current Status:	1
Technical Note:	1
Hay River:	3
Current Status:	3
Satellite Imagery:	4
Hydrometric Data:	5
Chinchaga River near High Level (Alberta) [07OC001]:.....	5
Hay River near Meander River (Alberta) [07OB003]:	6
Steen River near Steen River (Alberta) [07OB004]:	7
Hay River near the border [07OB008]:	8
Hay River near Hay River [07OB001]:	10
Liard River:	12
Current Status:	12
Hydrometric Data:	13
Liard River at Upper Crossing (Yukon) [10AA001]:.....	13
Liard River at Lower Crossing (British Columbia) [10BE001]:	14
Liard River at Fort Liard [10ED001]:.....	15
Liard River near the mouth [10ED002]:	17
Slave River / Great Slave Lake / Dehcho (Mackenzie River)	19
Current Status:	19
Hydrometric Data:	20
Slave River at Fitzgerald (Alberta) [07NB001]:.....	20
Great Slave Lake at Yellowknife Bay [07SB001]:.....	21
Mackenzie River at Strong Point [10FB006]:	22
Mackenzie River at Fort Simpson [10GC001]:	24
Mackenzie River at Norman Wells [10KA001]:	26
Weather Data:	27
Factors to Watch:	31
Spring Break up on NWT Rivers: Mechanical vs Thermal	31

Hay River:

Current Status:

- Snowmelt is ongoing in the northern part of the basin and has concluded in the southern reaches;
- Ice on tributaries to the Hay River in Alberta have broken and have shown signs of ice movement;
- The ice on the Hay River at the NWT-AB broke early in the morning on May 04 and water levels are continually rising at a rate consistent with previous years;
- According to Town of Hay River officials and satellite imagery, there is open water for about 2 kilometres above Alexandra Falls;
- Ice is still intact at the Town of Hay River;
- Warm temperatures and possible rain showers are forecast for today, with warmer than seasonal temperatures predicted through the weekend.



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

Satellite Imagery:

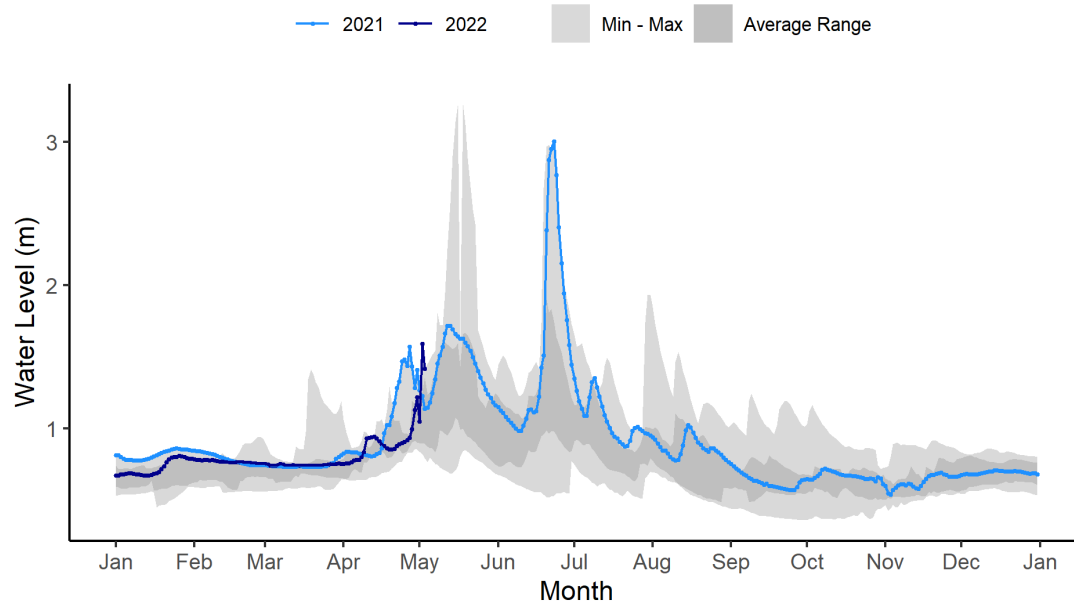


Above – Optical satellite imagery of Hay River. The section of open water above Alexandra Falls is visible in the lower photo (satellite imagery courtesy of Sentinel-2).

Hydrometric Data:

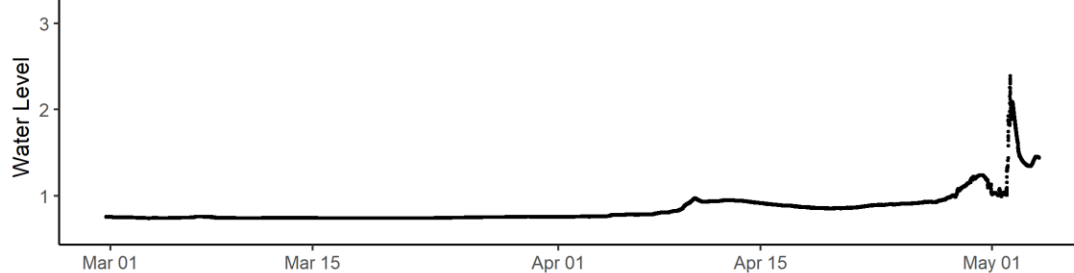
Chinchaga River near High Level (Alberta) [07OC001]:

CHINCHAGA RIVER NEAR HIGH LEVEL (07OC001)

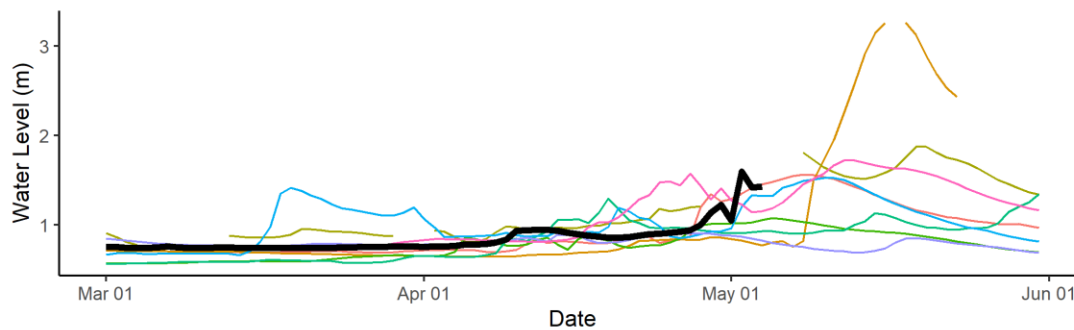


CHINCHAGA RIVER NEAR HIGH LEVEL (07OC001)

2022 Water Levels (5 minute resolution)

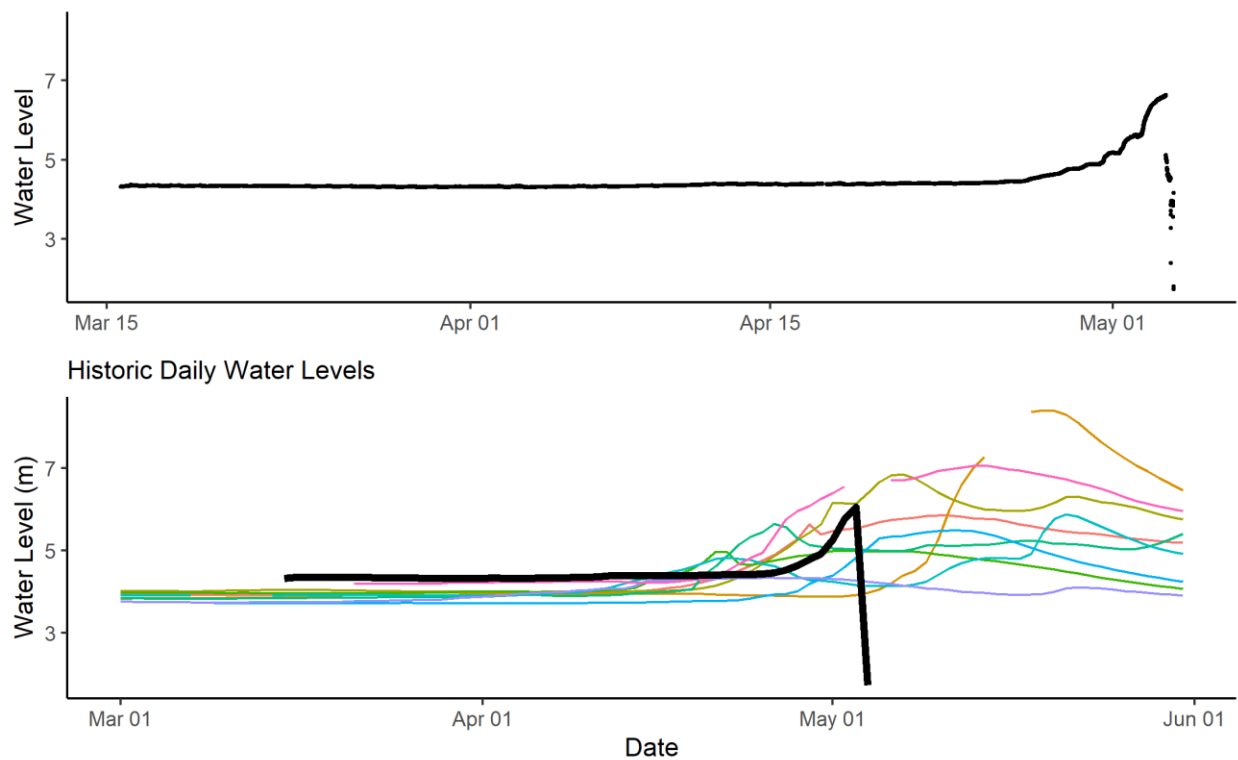


Historic Daily Water Levels



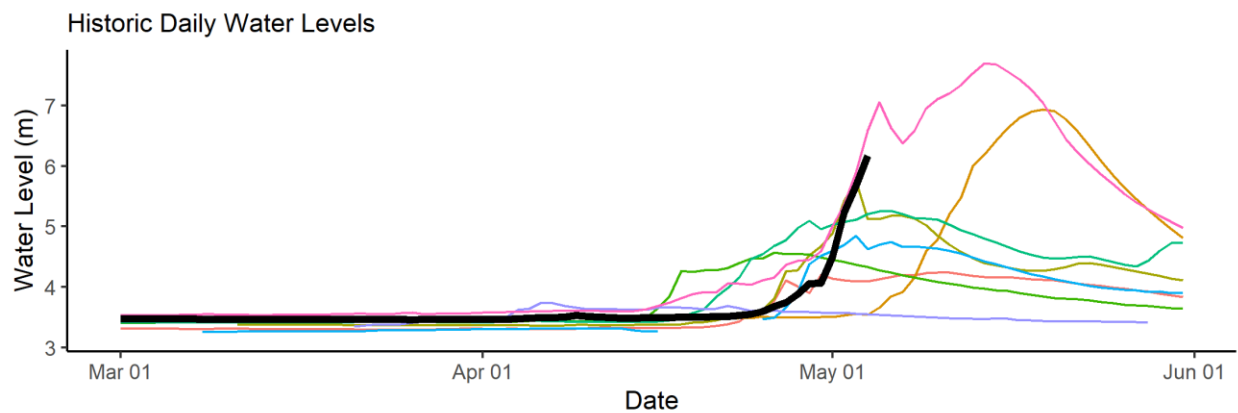
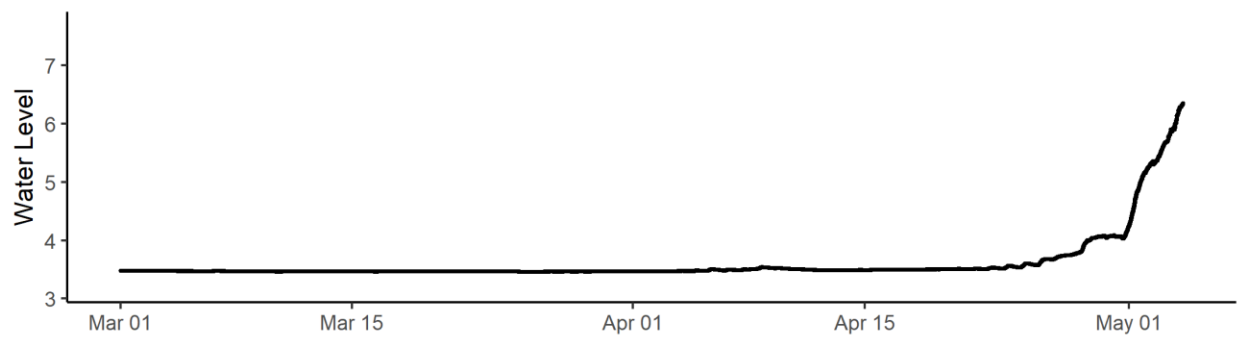
Above – Water level data at the Chinchaga River near High Level, AB. This plot shows high resolution (5 minute) water level data in the middle, and daily average data on the bottom. An ice jam and release can be observed on May 02.

Hay River near Meander River (Alberta) [07OB003]:
HAY RIVER NEAR MEANDER RIVER (07OB003)
2022 Water Levels (5 minute resolution)



Above – Water level data on the Hay River near Meander River, AB. The hydrometric gauge appears to have been impacted by ice.

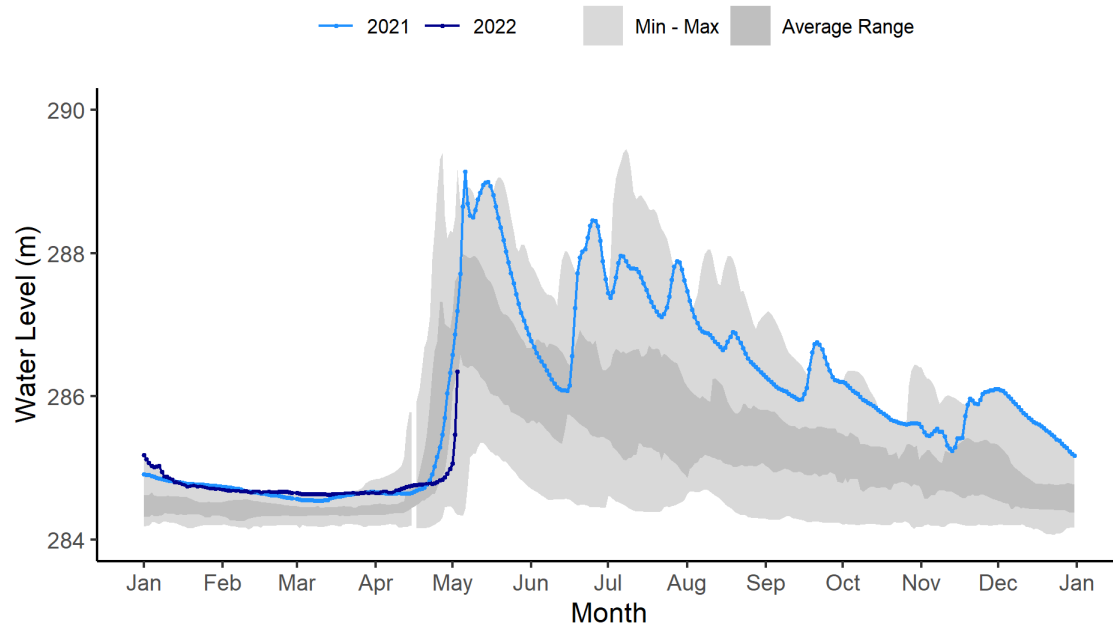
Steen River near Steen River (Alberta) [07OB004]:
STEEN RIVER NEAR STEEN RIVER (07OB004)
2022 Water Levels (5 minute resolution)



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 have been steadily rising since May 01.

Hay River near the border [07OB008]:

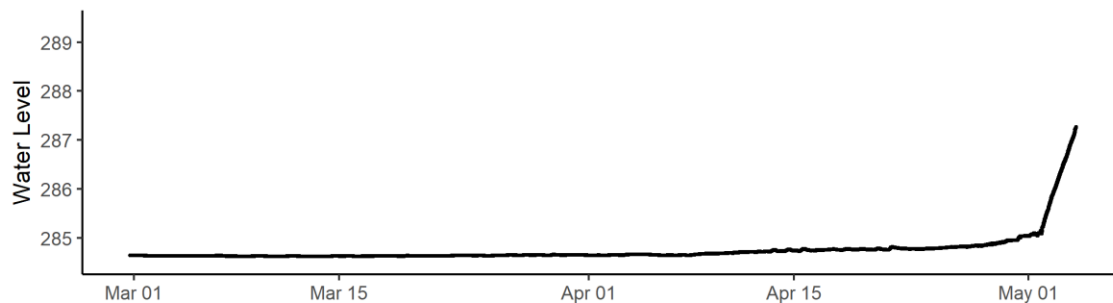
HAY RIVER NEAR ALTA/NWT BOUNDARY (07OB008)



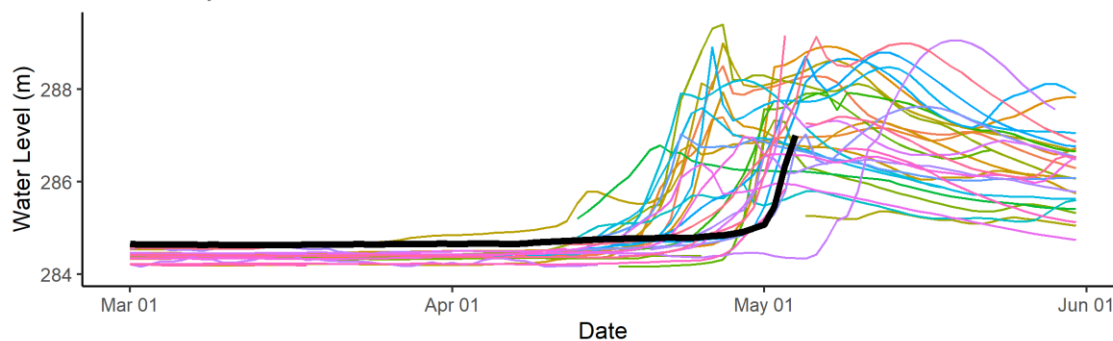
Above - hydrograph of daily average levels for the previous two years. Note that the most recent point on this graph shows the **daily average level from May 03** (yesterday).

HAY RIVER NEAR ALTA/NWT BOUNDARY (07OB008)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels



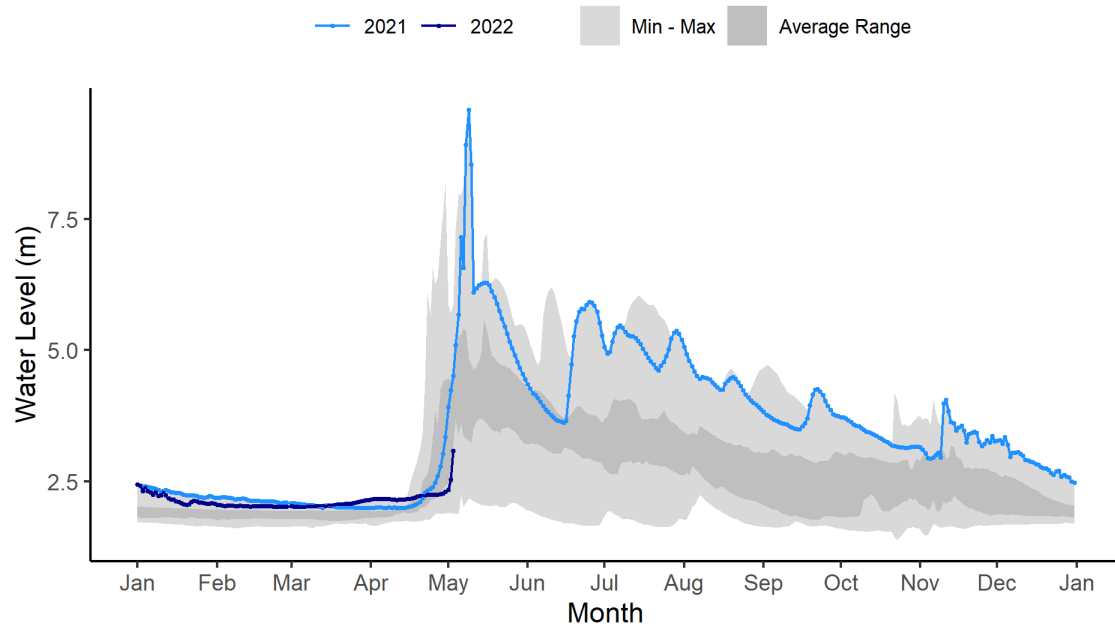
Above - The upper graph in the figure presents real time water level data at 5-minute resolution **until 07:00 on May 04** (287.3 m), while the lower graph shows daily average levels relative to the previous 20 years



Above – Hay River near the border hydrometric gauge photo on May 04 at 07:00. Photo courtesy of Water Survey of Canada and GNWT.

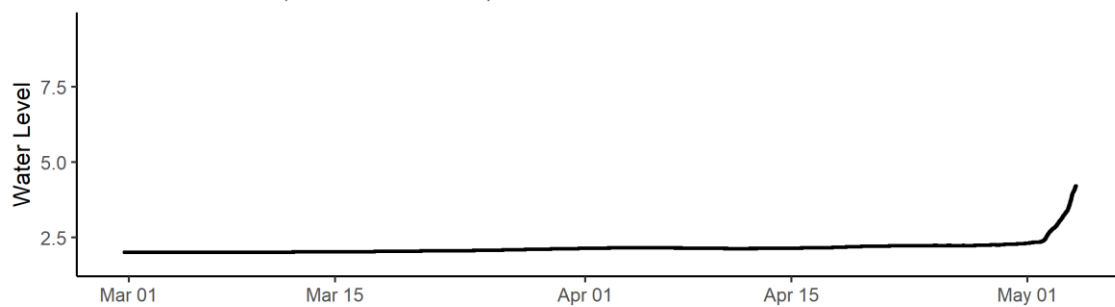
The ice broke at the NWT-AB border early in the morning on May 04. Water levels at the border have been steadily rising since May 02.

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

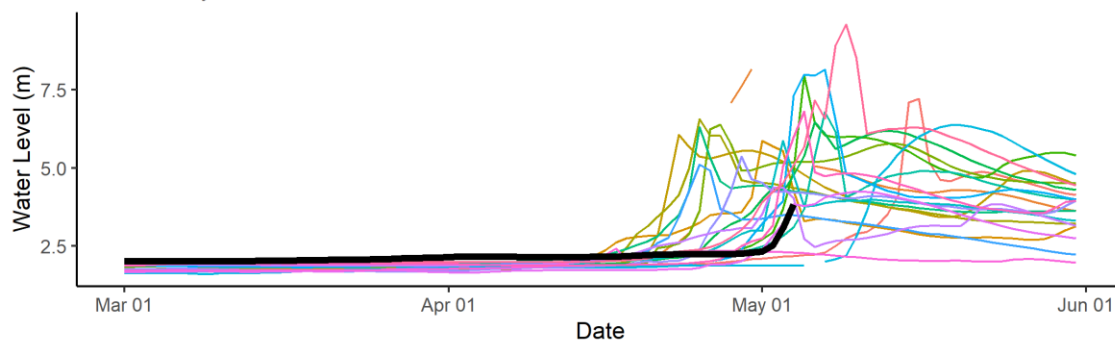


Above – hydrograph of daily average levels for the previous two years. Note that the most recent point on this graph shows the **daily average level from May 03** (yesterday).

HAY RIVER NEAR HAY RIVER (07OB001) 2022 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 **until 07:00 on May 04** (4.2 m), while 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 May 04 at 09:00. Photo courtesy of Water Survey of Canada and GNWT.

Liard River:

Current Status:

- Snowpack continues to melt across the basin;
- Water levels are slowly beginning to rise underneath the ice at the Liard River at Fort Liard;
- Break up has been reported to start in the Upper Liard (YT), and there is reported ice movement in the NT around the mouth of the Birch River;
- Warm temperatures and possible rain are forecast for this week.

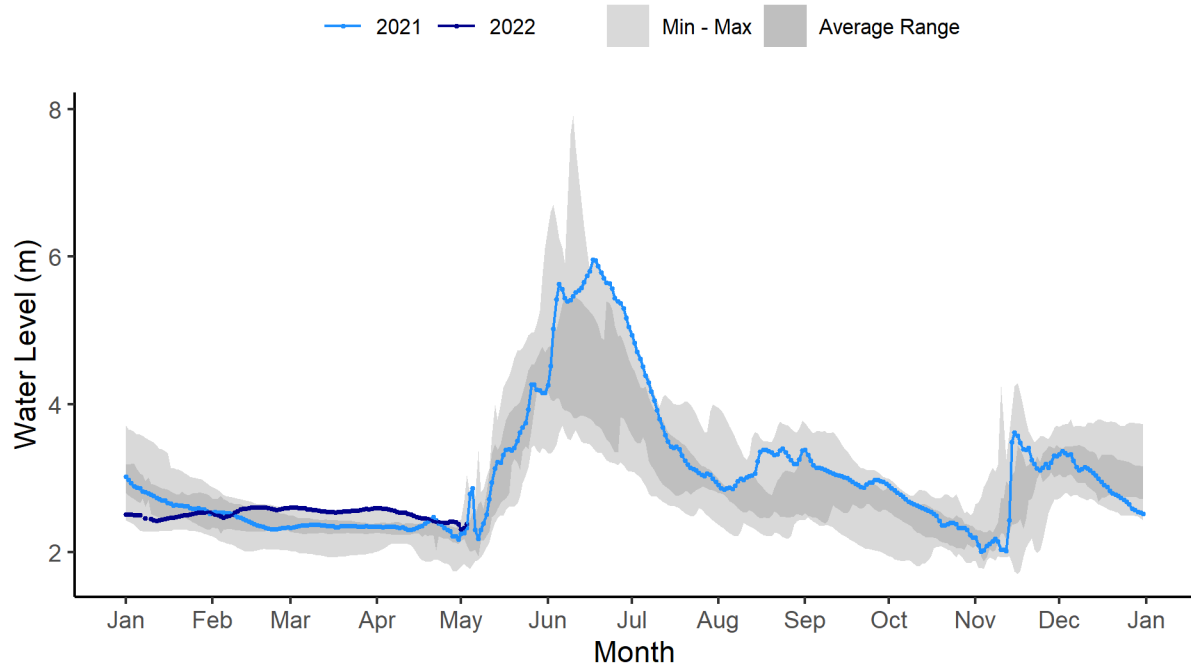


Above – Map of hydrometric stations in the Liard River basin. The station numbers are referenced in the water level plots below.

Hydrometric Data:

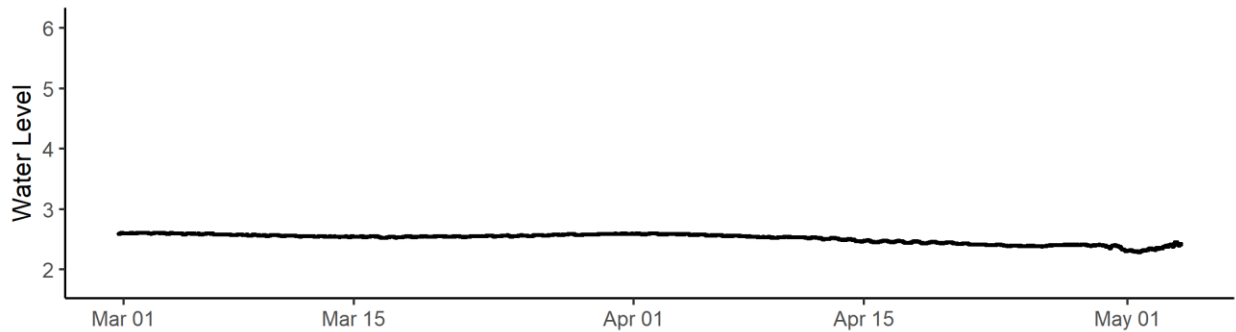
Liard River at Upper Crossing (Yukon) [10AA001]:

LIARD RIVER AT UPPER CROSSING (10AA001)

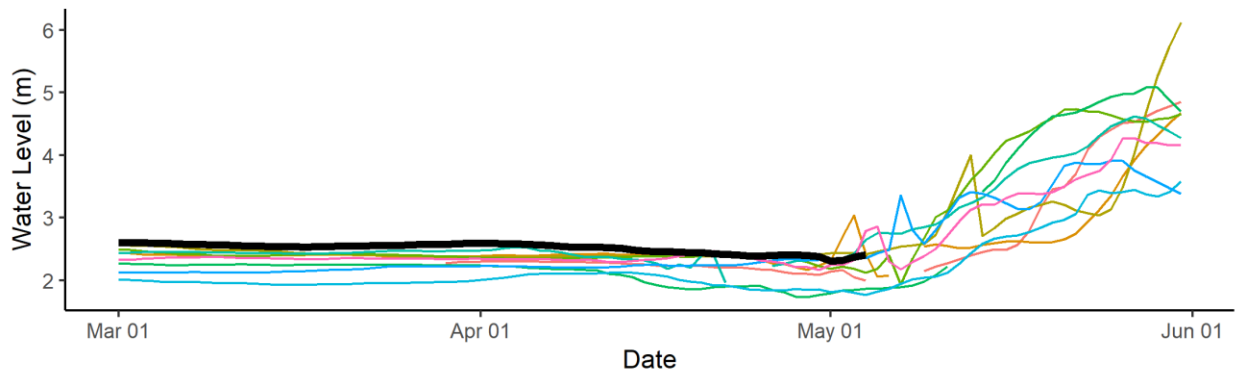


LIARD RIVER AT UPPER CROSSING (10AA001)

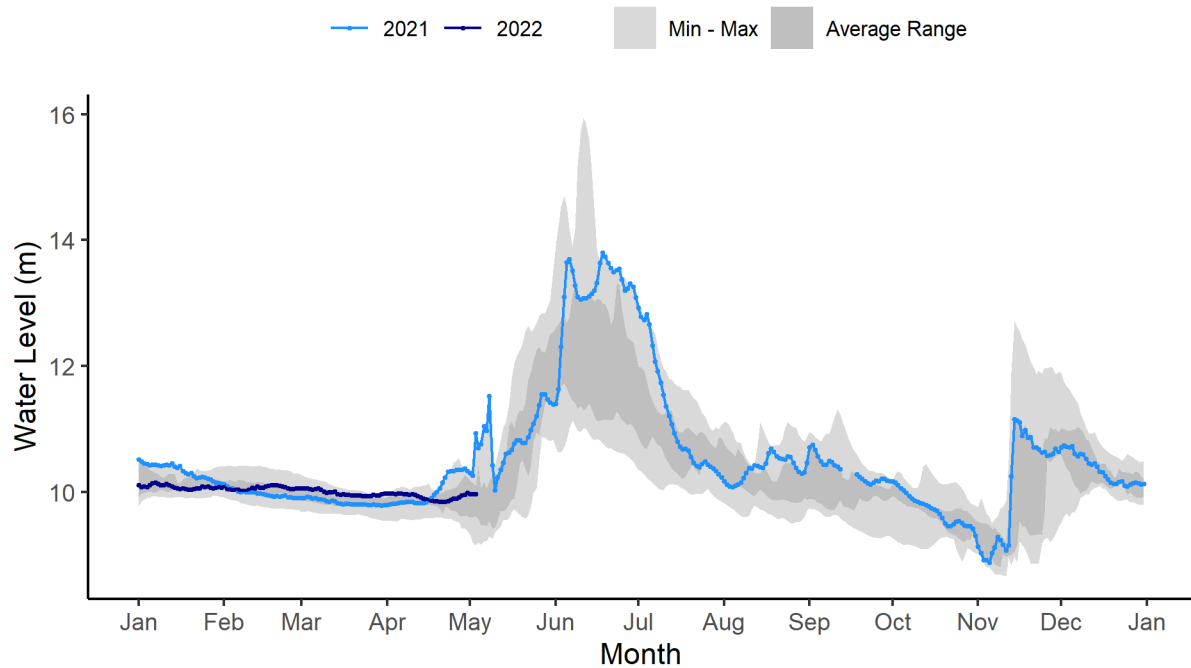
2022 Water Levels (5 minute resolution)



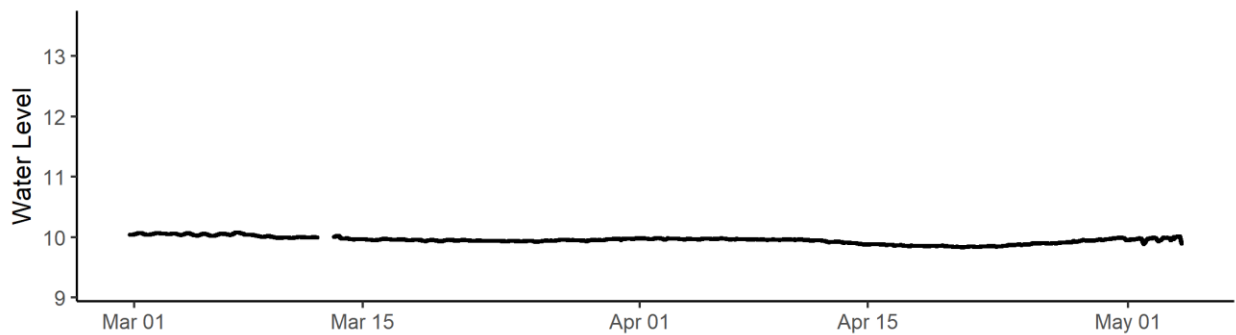
Historic Daily Water Levels



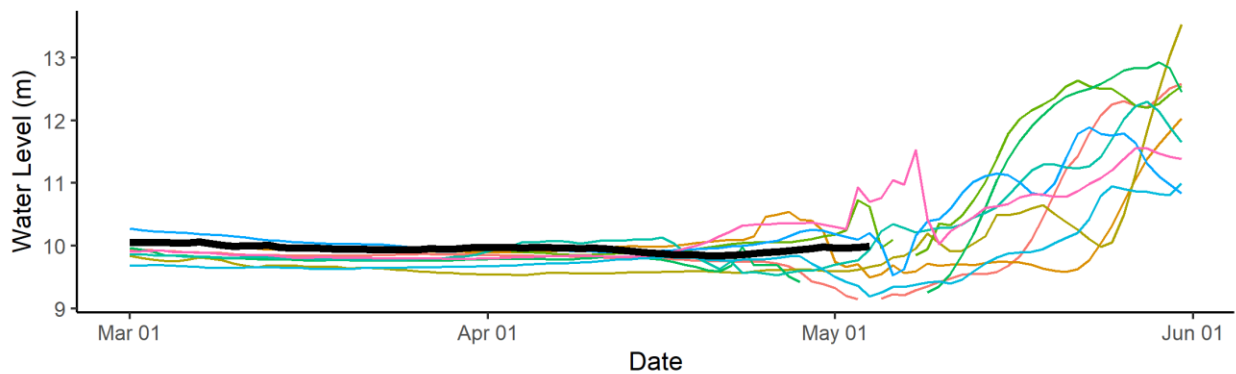
Liard River at Lower Crossing (British Columbia) [10BE001]:
 LIARD RIVER AT LOWER CROSSING (10BE001)



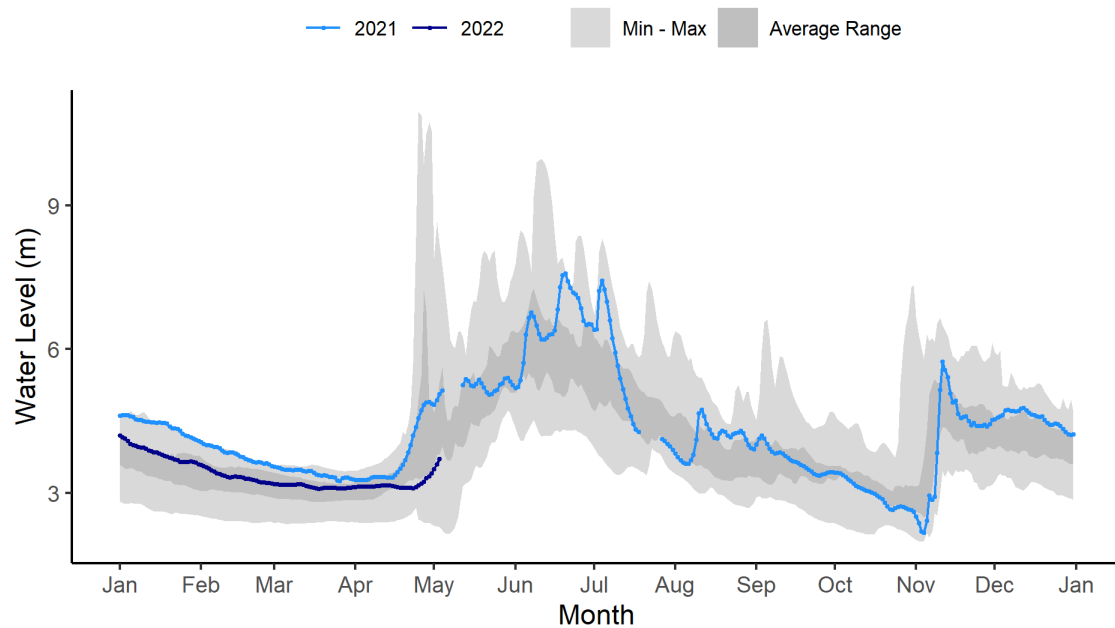
LIARD RIVER AT LOWER CROSSING (10BE001)
 2022 Water Levels (5 minute resolution)



Historic Daily Water Levels

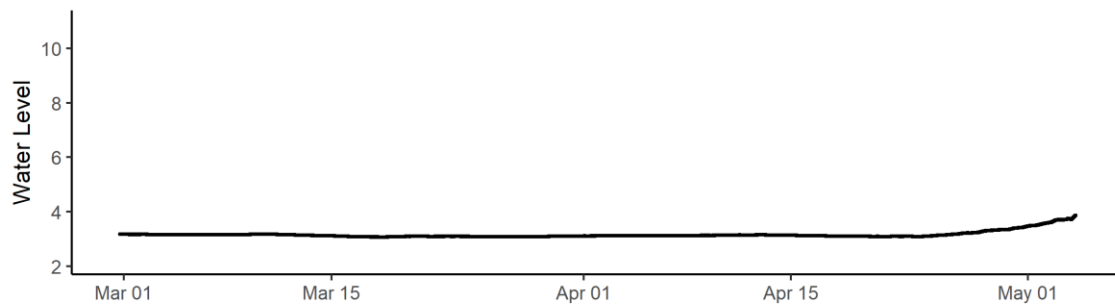


Liard River at Fort Liard [10ED001]:
LIARD RIVER AT FORT LIARD (10ED001)

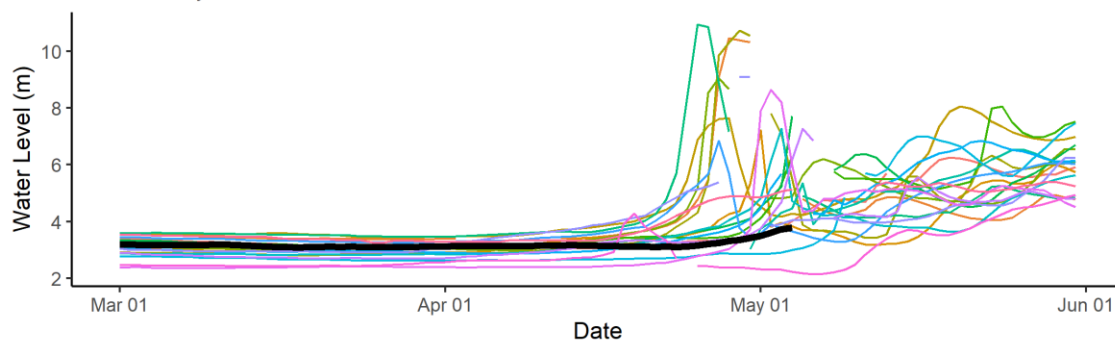


Above – hydrograph of daily average levels for the previous two years. The spring water level rise is delayed relative to previous years

LIARD RIVER AT FORT LIARD (10ED001)
2022 Water Levels (5 minute resolution)



Historic Daily Water Levels

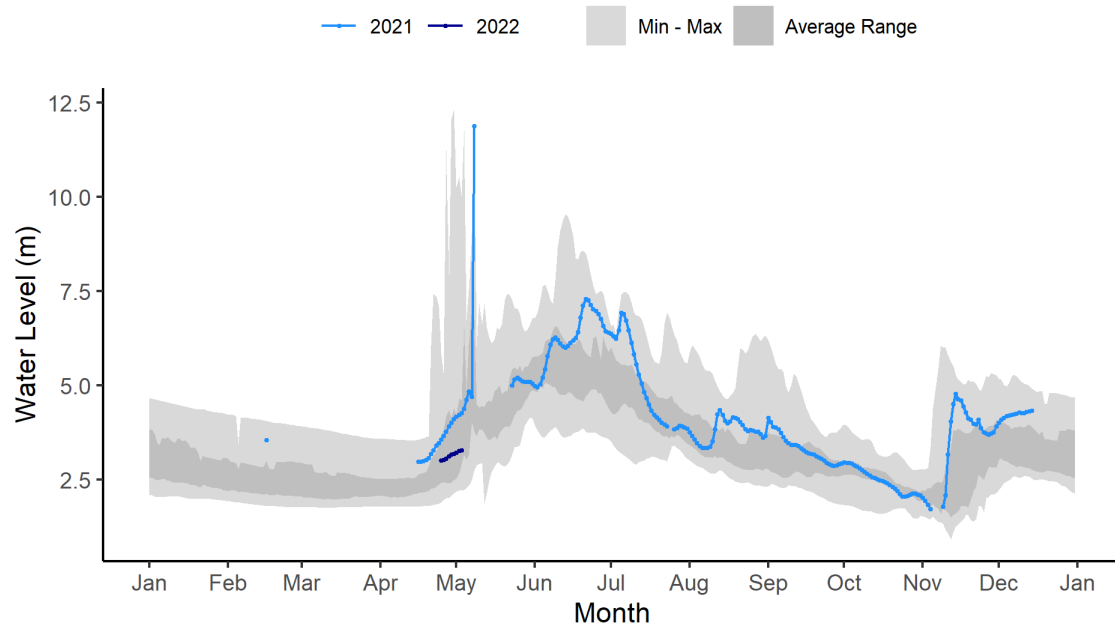




Above – Liard River at Fort Liard hydrometric gauge photo from May 03 at 21:00. Photo courtesy of Water Survey of Canada and GNWT.

Liard River near the mouth [10ED002]:

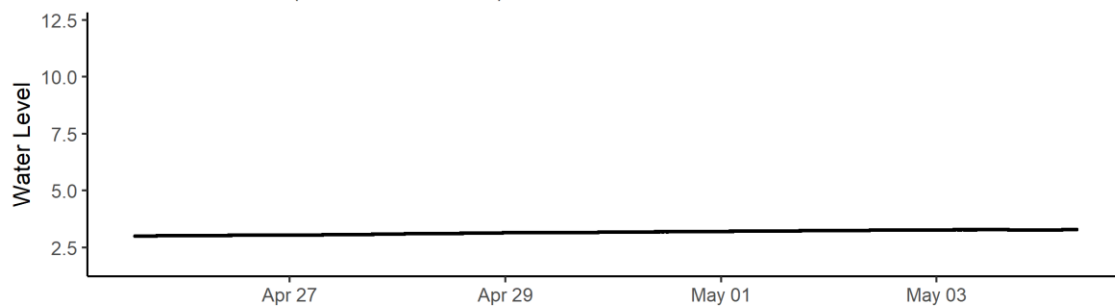
LIARD RIVER NEAR THE MOUTH (10ED002)



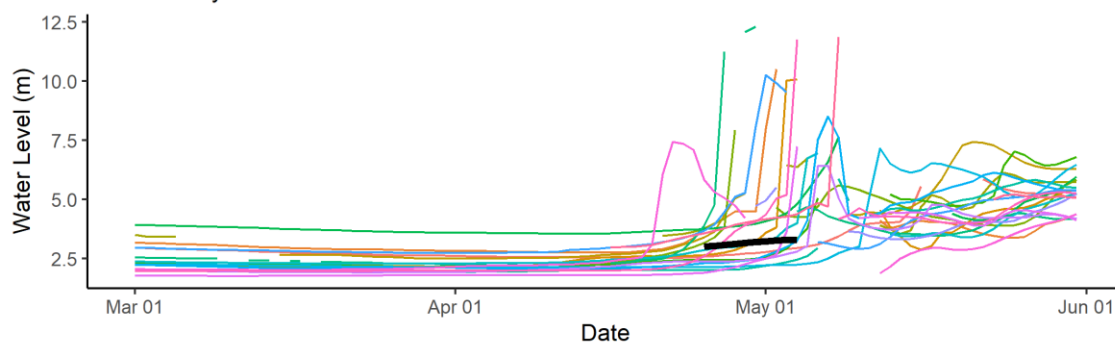
Above – hydrograph of daily average levels for the previous two years. The spring water level rise is delayed relative to previous years

LIARD RIVER NEAR THE MOUTH (10ED002)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels



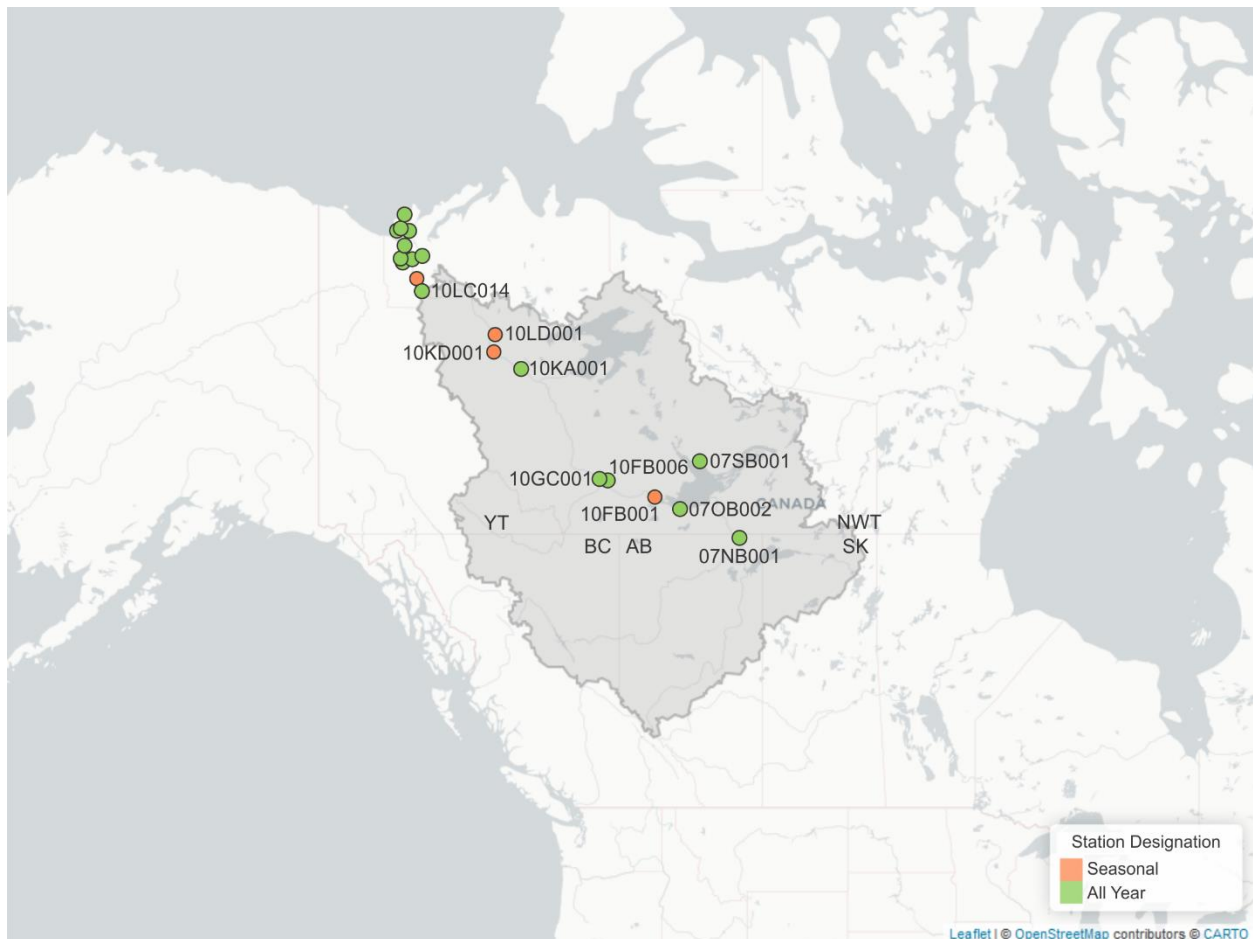


Above – Liard River near the mouth hydrometric gauge photo from May 04 at 7:00. Photo courtesy of Water Survey of Canada and GNWT.

Slave River / Great Slave Lake / Dehcho (Mackenzie River)

Current Status:

- Break up is well underway in the Peace/Athabasca basins, which drain into the Slave River;
- Break up has been delayed this year due to colder than normal temperatures;
 - April air temperatures in Fort Simpson were the third coldest over the past 35 years (the two colder years were 2002 and 2013).
- Ice is reported to have begun moving on the Dehcho (Mackenzie River) at Fort Providence, and around Strong Point (between Jean Marie River and Fort Simpson);
- Ice on the Liard and Mackenzie rivers near Fort Simpson is still solid;
- A snow cover remains on the ground in the Dehcho, which will continue to release water to local rivers and streams;
- Environment and Climate Change Canada has forecast above seasonal temperatures for this afternoon in the Dehcho region with a chance of showers/thunderstorms this evening.
 - Rain brings significant amounts of energy (via latent heat) which expedites the melting of snow and ice.

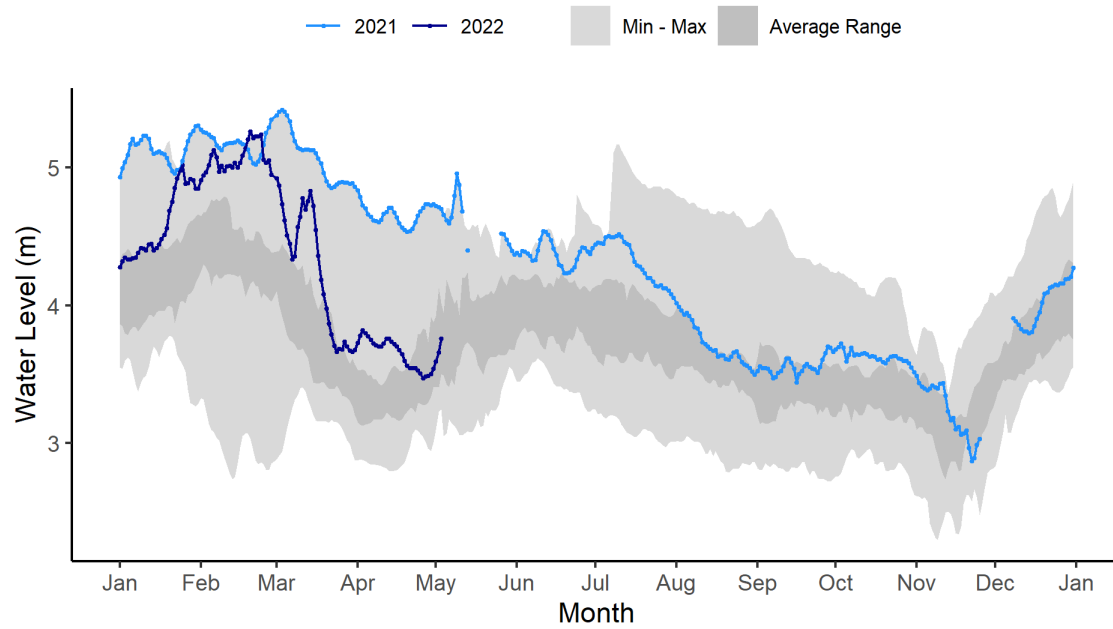


Above – Map of hydrometric stations in the Dehcho (Mackenzie River) basin. The station numbers are referenced in the water level plots below.

Hydrometric Data:

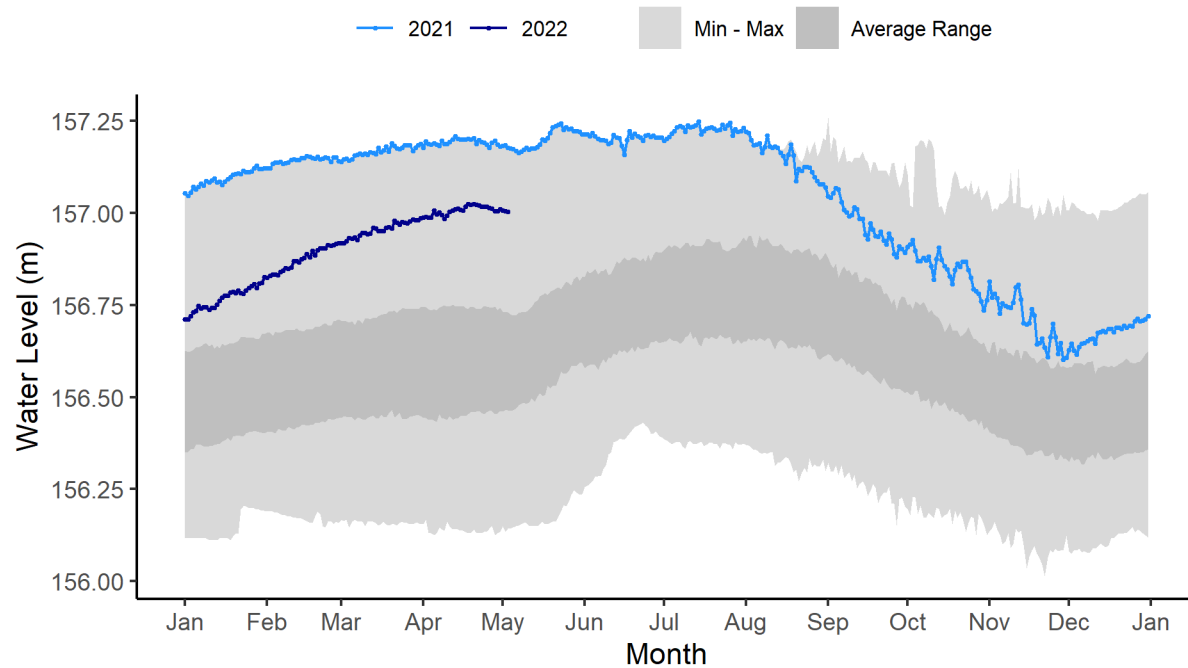
Slave River at Fitzgerald (Alberta) [07NB001]:

SLAVE RIVER AT FITZGERALD (ALBERTA) (07NB001)



Great Slave Lake at Yellowknife Bay [07SB001]:

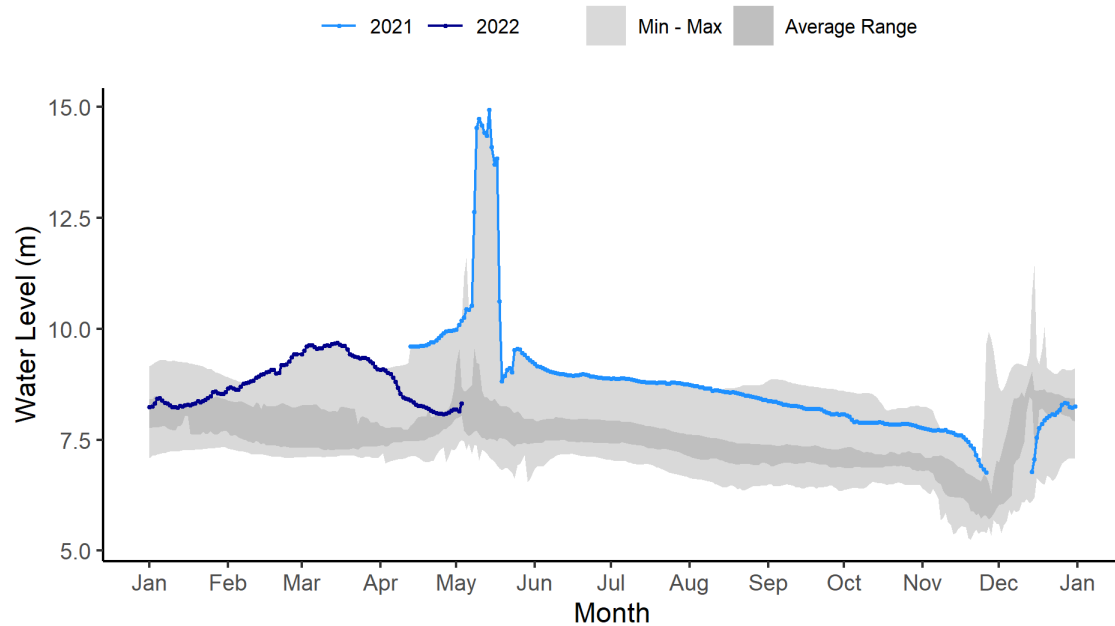
GREAT SLAVE LAKE AT YELLOWKNIFE BAY (07SB001)



Above – Water levels on Great Slave Lake at Yellowknife Bay for the previous two years. Although water levels have receded since the highs of 2020 and 2021, levels remain much higher than normal.

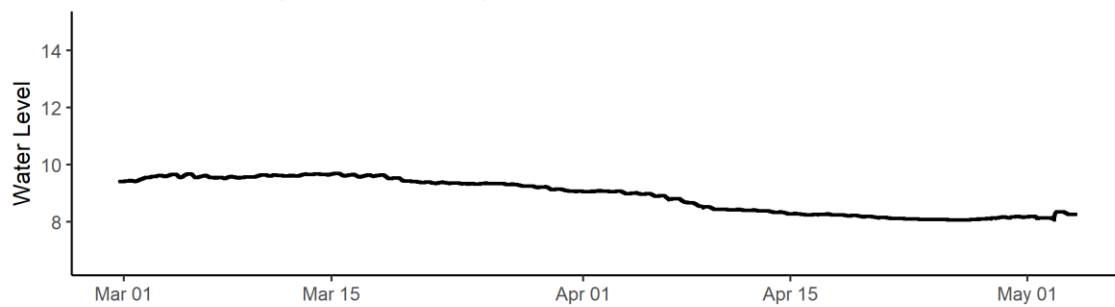
Mackenzie River at Strong Point [10FB006]:

MACKENZIE RIVER AT STRONG POINT (10FB006)

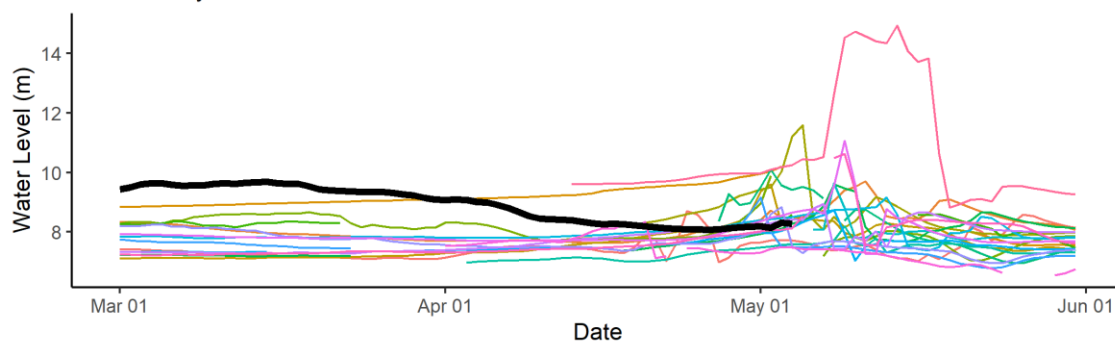


MACKENZIE RIVER AT STRONG POINT (10FB006)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels



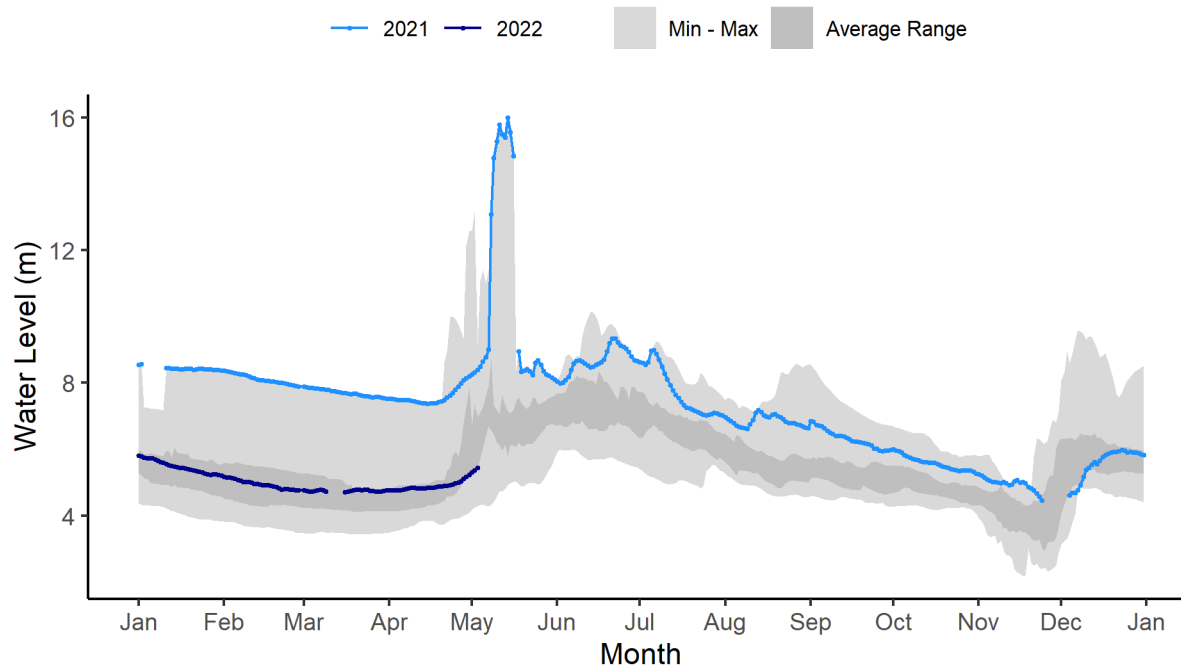
Above – The middle graph in the figure presents real time water level data at 5-minute resolution **until 08:30 on May 04** (8.3 m), while the lower graph shows daily average levels relative to the previous 20 years.



Above – Mackenzie River at Strong Point hydrometric gauge photo from May 04 at 10:00. Photo courtesy of Water Survey of Canada and GNWT.

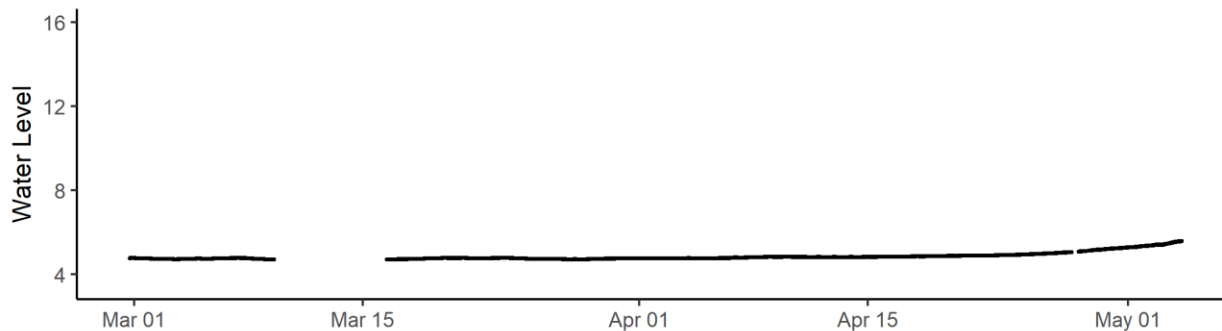
Mackenzie River at Fort Simpson [10GC001]:

MACKENZIE RIVER AT FORT SIMPSON (10GC001)

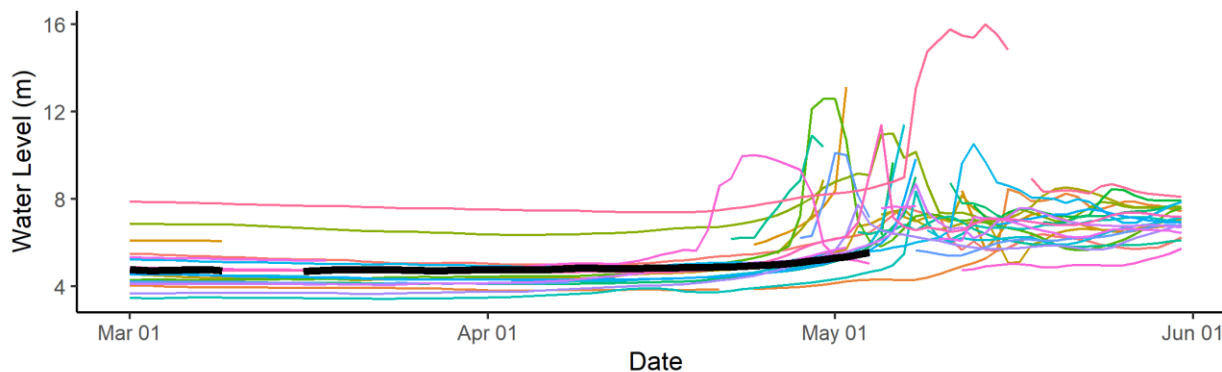


MACKENZIE RIVER AT FORT SIMPSON (10GC001)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels



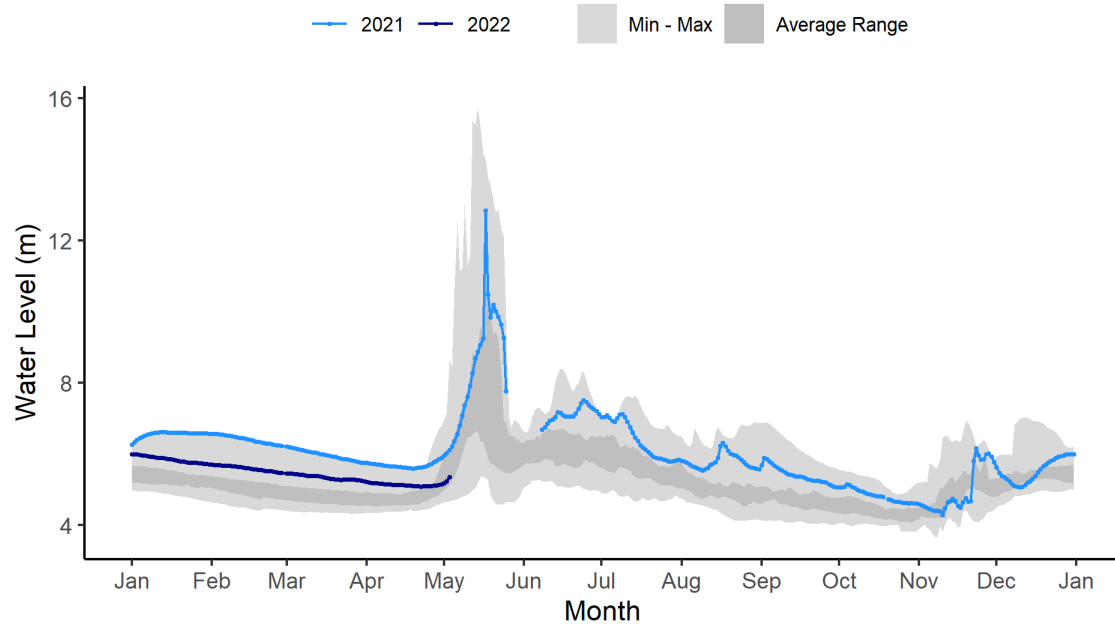


Above – Mackenzie River at Fort Simpson hydrometric gauge photo from May 04 at 07:00. Photo courtesy of Water Survey of Canada and GNWT.

Water levels on the Dehcho (Mackenzie River) near Fort Simpson are beginning to rise and snowmelt is ongoing, but river ice remains solid.

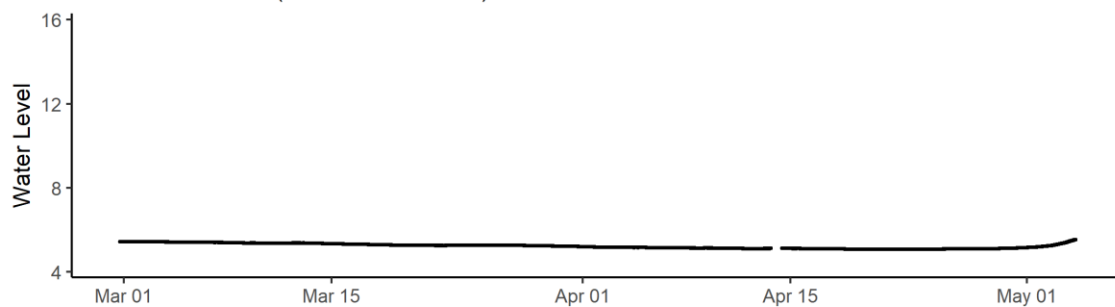
Mackenzie River at Norman Wells [10KA001]:

MACKENZIE RIVER AT NORMAN WELLS (10KA001)

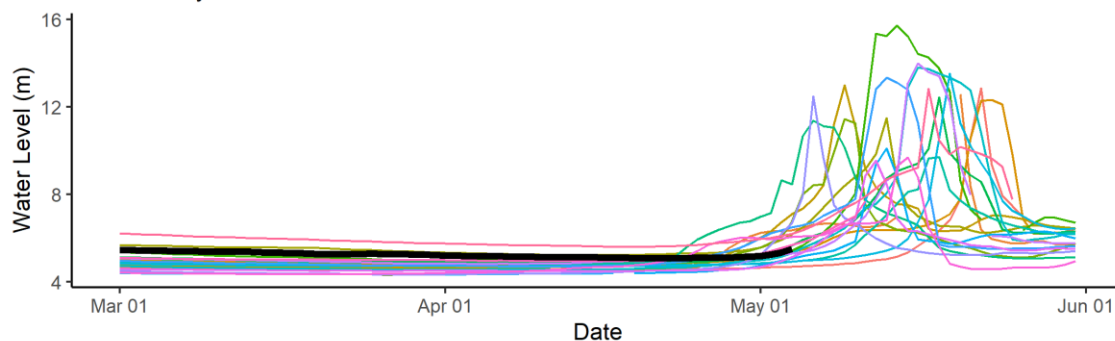


MACKENZIE RIVER AT NORMAN WELLS (10KA001)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels



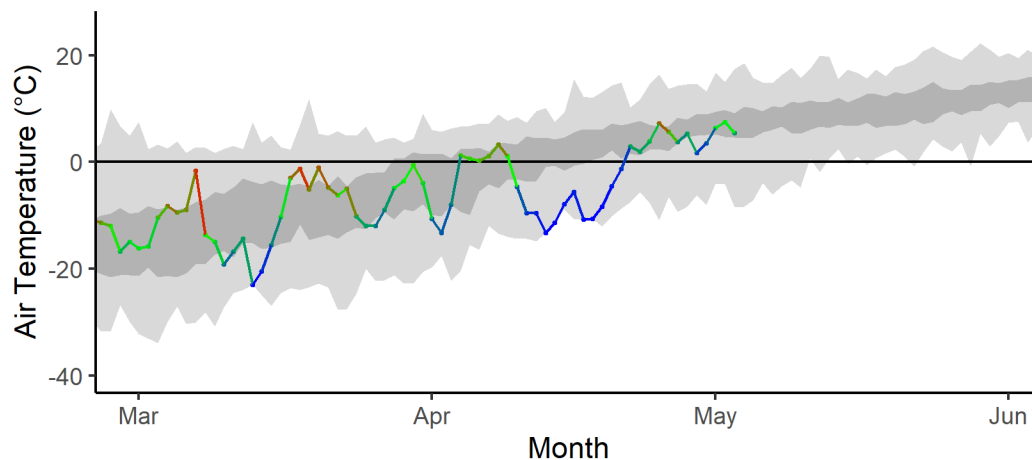
Above – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels have begun to slowly rise, with the timing being approximately average to previous years.

Weather Data:

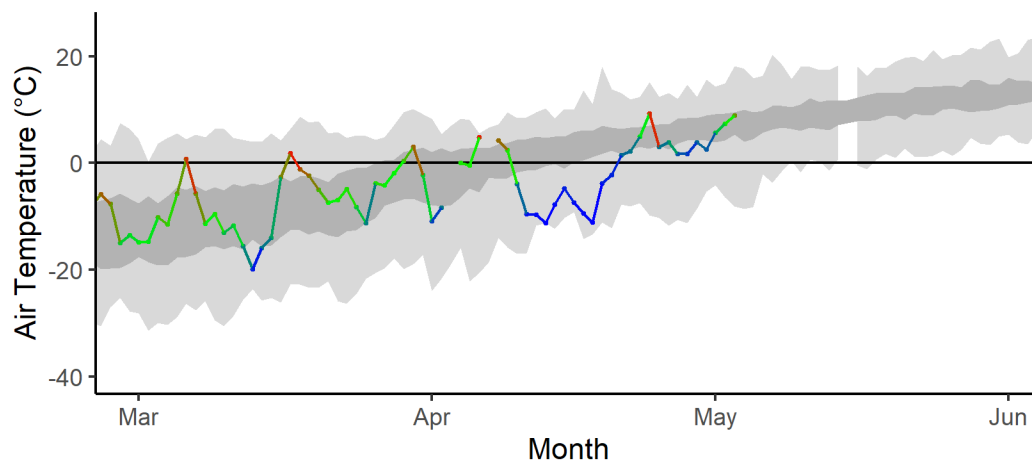
Weather information informs how snow and ice will melt and provides information about how this spring is unfolding relative to previous springs. Locations included here cover basin areas that feed into NWT rivers that are currently undergoing break up.

Temperatures in regions where break up is ongoing have been between average and above average for the previous three days. Temperatures are forecast to remain high for the next three days, with the potential for rain showers in the afternoon of May 04 in the Hay River and Dehcho regions

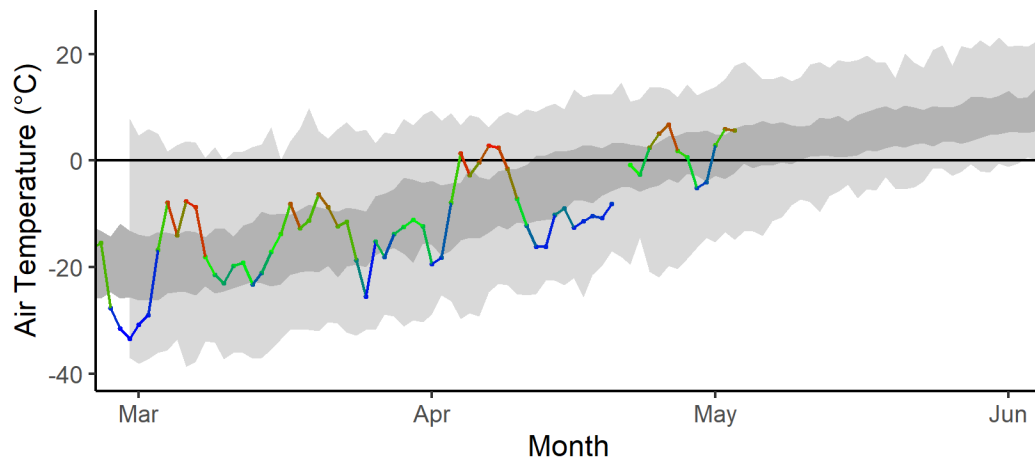
2022 High Level Mean Daily Air Temperatures



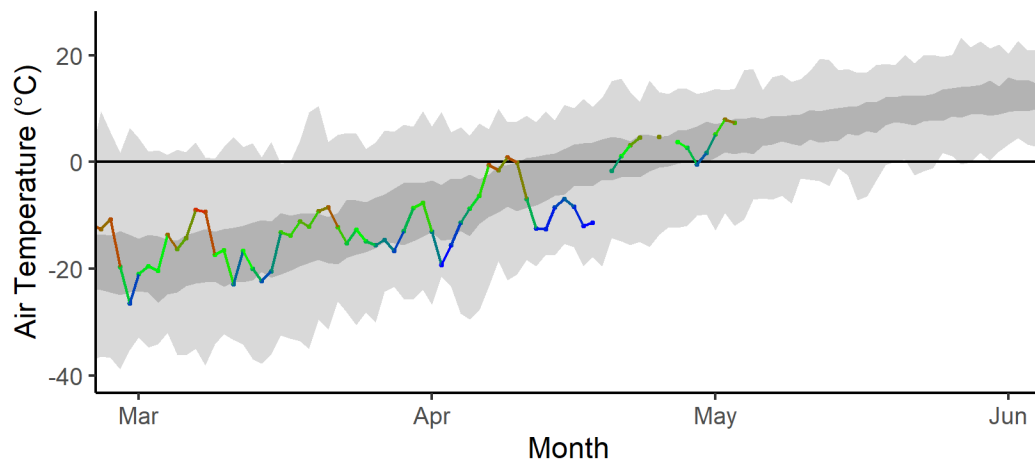
2022 Fort Nelson Mean Daily Air Temperatures



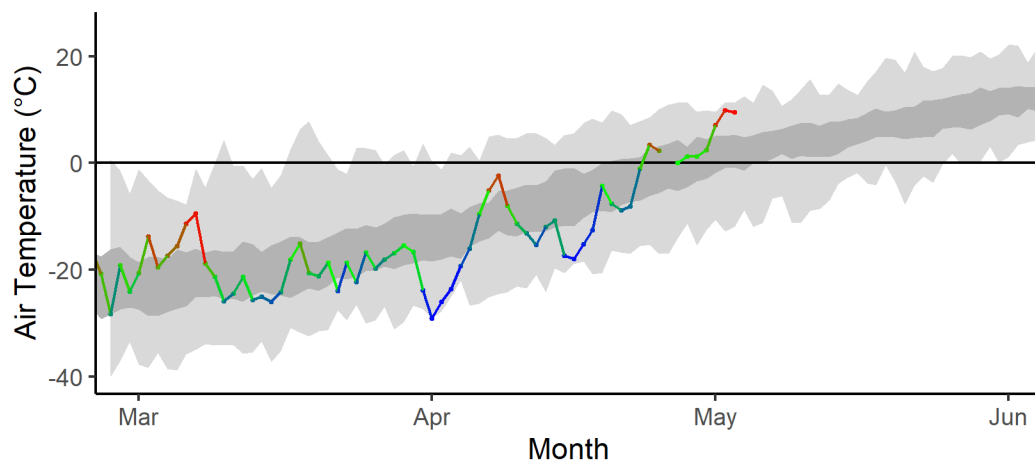
2022 Hay River Mean Daily Air Temperatures
















2022 Fort Simpson Mean Daily Air Temperatures
















2022 Norman Wells Mean Daily Air Temperatures
















High Level seven-day weather forecast:

Wed 4 May	Thu 5 May	Fri 6 May	Sat 7 May	Sun 8 May	Mon 9 May	Tue 10 May
 16°C 30% Chance of showers	 12°C A mix of sun and cloud	 12°C Cloudy	 14°C A mix of sun and cloud	 10°C Sunny	 11°C Sunny	 12°C Sunny
Tonight	Night	Night	Night	Night	Night	
 1°C 30% Chance of showers	 4°C 60% Chance of showers	 4°C Cloudy	 1°C Clear	 -4°C Clear	 -3°C Clear	














Fort Nelson seven-day weather forecast:

Wed 4 May	Thu 5 May	Fri 6 May	Sat 7 May	Sun 8 May	Mon 9 May	Tue 10 May
 14°C 30% Chance of showers	 14°C A mix of sun and cloud	 13°C Cloudy	 12°C Cloudy	 14°C A mix of sun and cloud	 14°C A mix of sun and cloud	 15°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 2°C 30% Chance of showers	 2°C Cloudy	 3°C Cloudy	 3°C Cloudy	 0°C Cloudy periods	 1°C Cloudy periods	














Hay River seven-day weather forecast:

Wed 4 May	Thu 5 May	Fri 6 May	Sat 7 May	Sun 8 May	Mon 9 May	Tue 10 May
 14°C 30% Chance of showers	 13°C A mix of sun and cloud	 9°C A mix of sun and cloud	 8°C A mix of sun and cloud	 0°C Sunny	 2°C Sunny	 6°C Sunny
Tonight	Night	Night	Night	Night	Night	
 0°C 30% Chance of showers	 2°C 70% Chance of showers	 2°C Cloudy	 -5°C Cloudy periods	 -7°C Clear	 -5°C Clear	

Fort Simpson seven-day weather forecast:

▼ Forecast						Hourly Forecast	Alerts	Jet Stream
Wed 4 May	Thu 5 May	Fri 6 May	Sat 7 May	Sun 8 May	Mon 9 May	Tue 10 May		
 15°C 30% Chance of showers	 15°C Mainly sunny	 14°C A mix of sun and cloud	 9°C A mix of sun and cloud	 11°C A mix of sun and cloud	 11°C A mix of sun and cloud	 13°C A mix of sun and cloud		
Tonight	Night	Night	Night	Night	Night			
 2°C 30% Chance of showers	 0°C Clear	 3°C Cloudy periods	 0°C Cloudy periods	 -3°C Cloudy periods	 -1°C Cloudy periods			

Norman Wells seven-day weather forecast:

Wed 4 May	Thu 5 May	Fri 6 May	Sat 7 May	Sun 8 May	Mon 9 May	Tue 10 May		
 15°C 30% Chance of showers	 15°C Mainly sunny	 14°C A mix of sun and cloud	 9°C A mix of sun and cloud	 11°C A mix of sun and cloud	 11°C A mix of sun and cloud	 13°C A mix of sun and cloud		
Tonight	Night	Night	Night	Night	Night			
 2°C 30% Chance of showers	 0°C Clear	 3°C Cloudy periods	 0°C Cloudy periods	 -3°C Cloudy periods	 -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.