



NWT Water Monitoring Bulletin

– May 08, 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](#). 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 Town of Hay River and K'atl'odeeche First Nation have issued Evacuation Orders for certain areas;
- Provisional water levels recorded at the Hay River near Hay River gauge are higher than the peak from last year;
 - All tributaries to the Hay River are recording water levels higher than the ice-induced peak earlier this week, and continue to rise in response to high precipitation amounts;
- Climate models are suggesting an additional 10-40 mm of precipitation over the Hay River basin;
 - ENR gauges recorded just over 30 mm of rain around Hay River yesterday;
 - It is rare for a precipitation event of this magnitude to coincide with break up;
- The potential for further/continued flooding remains high as ice and water continue to move down the Hay River;
- Ice on the Liard River is moving in sections around Fort Liard;
- The Dehcho (Mackenzie River) is open in small sections (around Fort Providence and Strong Point);
- Neither the Dehcho (Mackenzie River) nor the Liard River have broken at Fort Simpson as of May 08 at 12:00;
 - Cool temperatures are forecast over the Dehcho region until Wednesday.

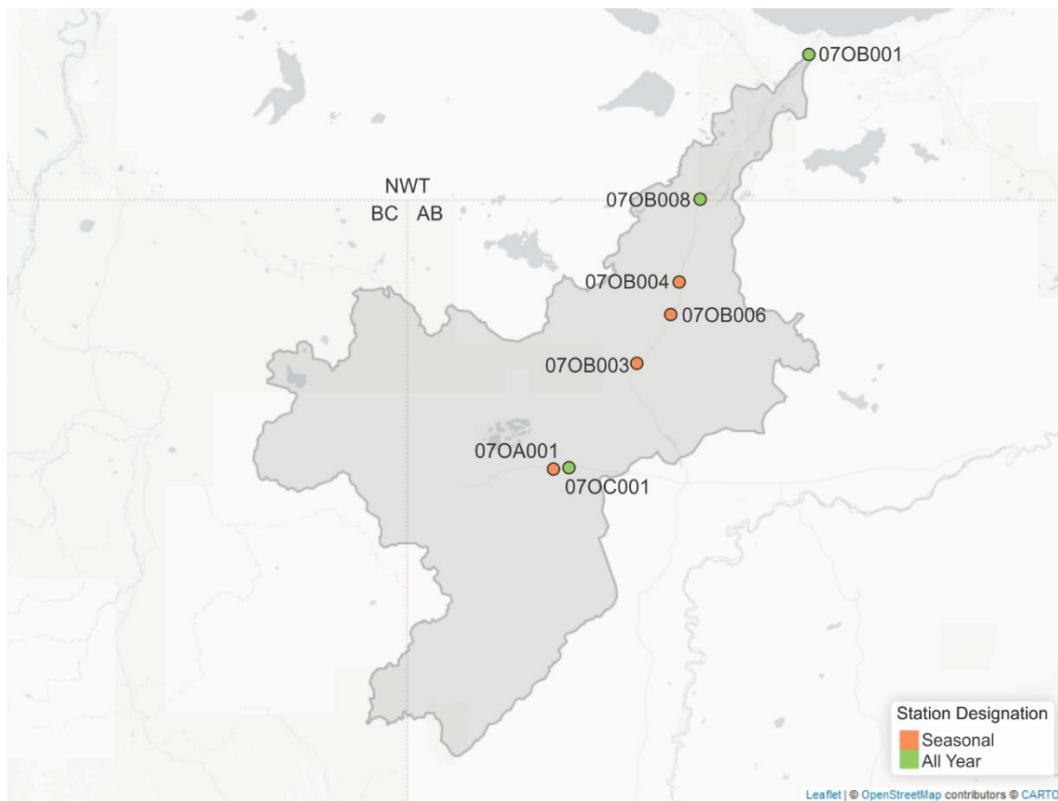
Contents

Current Status:	1
Hay River:	3
Current Status:	3
Hydrometric Data:	4
Chinchaga River near High Level (Alberta) [07OC001]:.....	4
Sousa Creek near High Level (Alberta) [07OA001]:	5
Steen River near Steen River (Alberta) [07OB004]:	6
Lutose Creek near Steen River (Alberta) [07OB006]:	7
Hay River near the border [07OB008]:	8
Hay River near Hay River [07OB001]:	9
Great Slave Lake at Hay River [07OB002]:.....	11
Liard River:	12
Current Status:	12
Imagery:	13
Hydrometric Data:	14
Liard River at Upper Crossing (Yukon) [10AA001]:.....	14
Liard River at Lower Crossing (British Columbia) [10BE001]:	15
Liard River at Fort Liard [10ED001]:.....	16
Liard River near the mouth [10ED002]:.....	17
Slave River / Great Slave Lake / Dehcho (Mackenzie River)	18
Current Status:	18
Imagery:	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
Mackenzie River (Peel Channel) at Aklavik [10MC003]:	27
Weather Data:	28
Factors to Watch:	32
Spring Break up on NWT Rivers: Mechanical vs Thermal	32

Hay River:

Current Status:

- Evacuation orders have been issued by the Town of Hay River for Vale Island and by K'atl'odeeche First Nation (Old Village and Lower Village/Wolf Drive area);
- Provisional water levels recorded at the Hay River near Hay River gauge are higher than the peak from last year;
- Ice continues to move downstream along the Hay River into Town;
- A low-pressure system continues to sit over the Hay River basin with ongoing precipitation continuing to Monday;
 - Climate models are estimating an additional 10-40 mm of precipitation falling as a mix of rain and snow;
- ENR rain gauges in Hay River and Enterprise recorded 33 mm and 32 mm of rain respectively yesterday (May 07);
 - High Level (AB) recorded 39 mm of rain between Friday and Saturday;
- Water levels on Hay River tributaries continue to rise and have passed the ice-influenced peaks from earlier this week;
- The response of water levels on the Hay River and its tributaries to precipitation is very rapid at this time of year due to low basin storage and frozen ground;
- Refer to the [Town of Hay River website](#) for the most up-to-date information, as well as webcam images of current conditions.

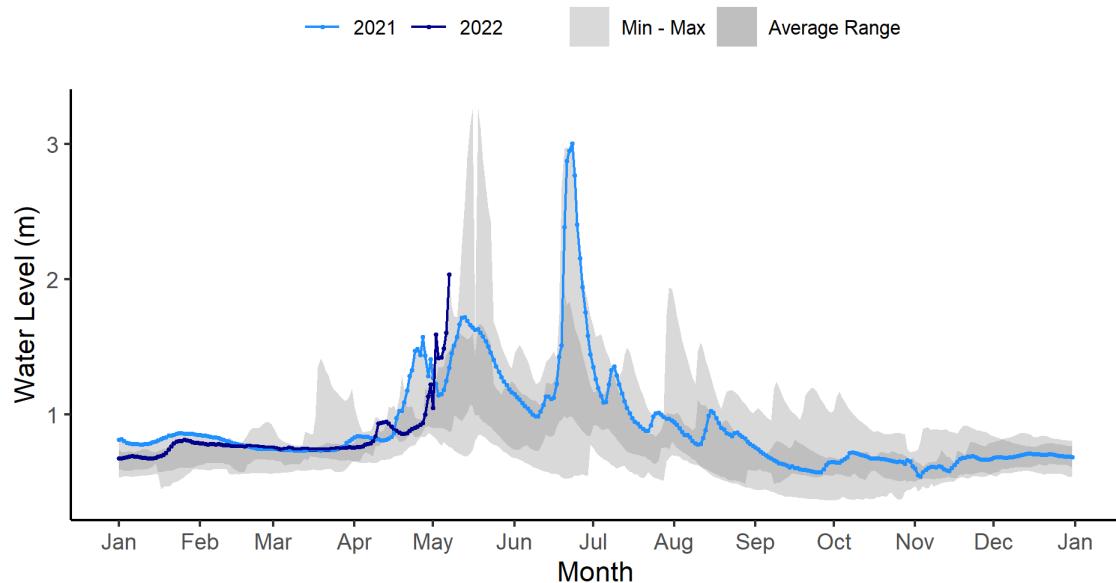


Above – Map of hydrometric stations in the Hay River basin. The station numbers are referenced in the water level plots below.

Hydrometric Data:

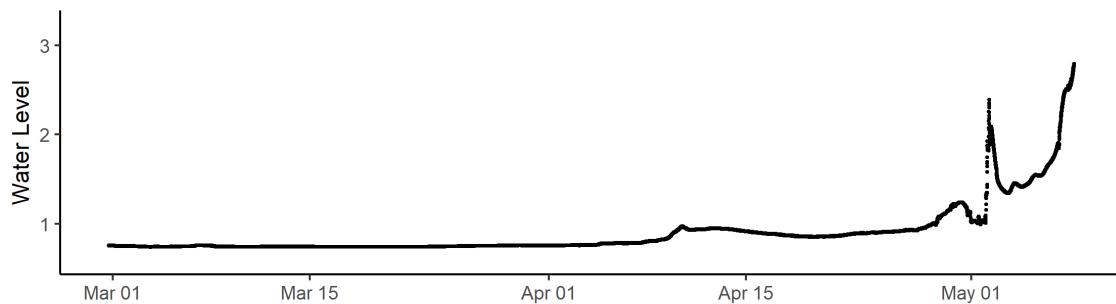
Chinchaga River near High Level (Alberta) [07OC001]:

CHINCHAGA RIVER NEAR HIGH LEVEL (07OC001)

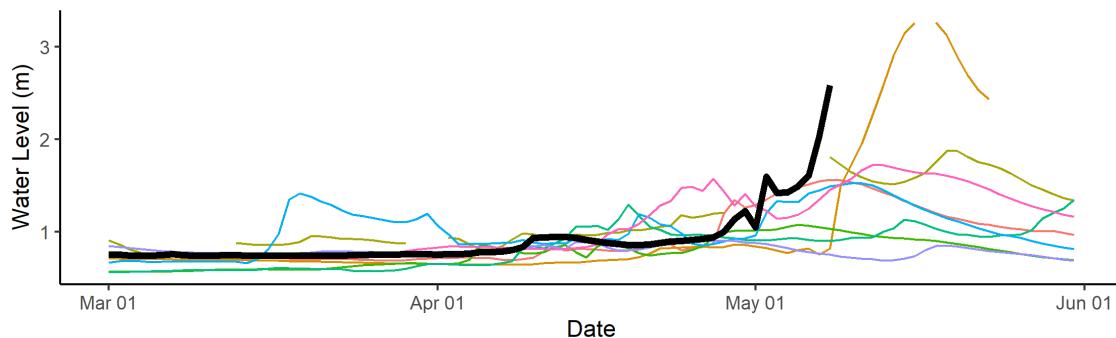


CHINCHAGA RIVER NEAR HIGH LEVEL (07OC001)

2022 Water Levels (5 minute resolution)

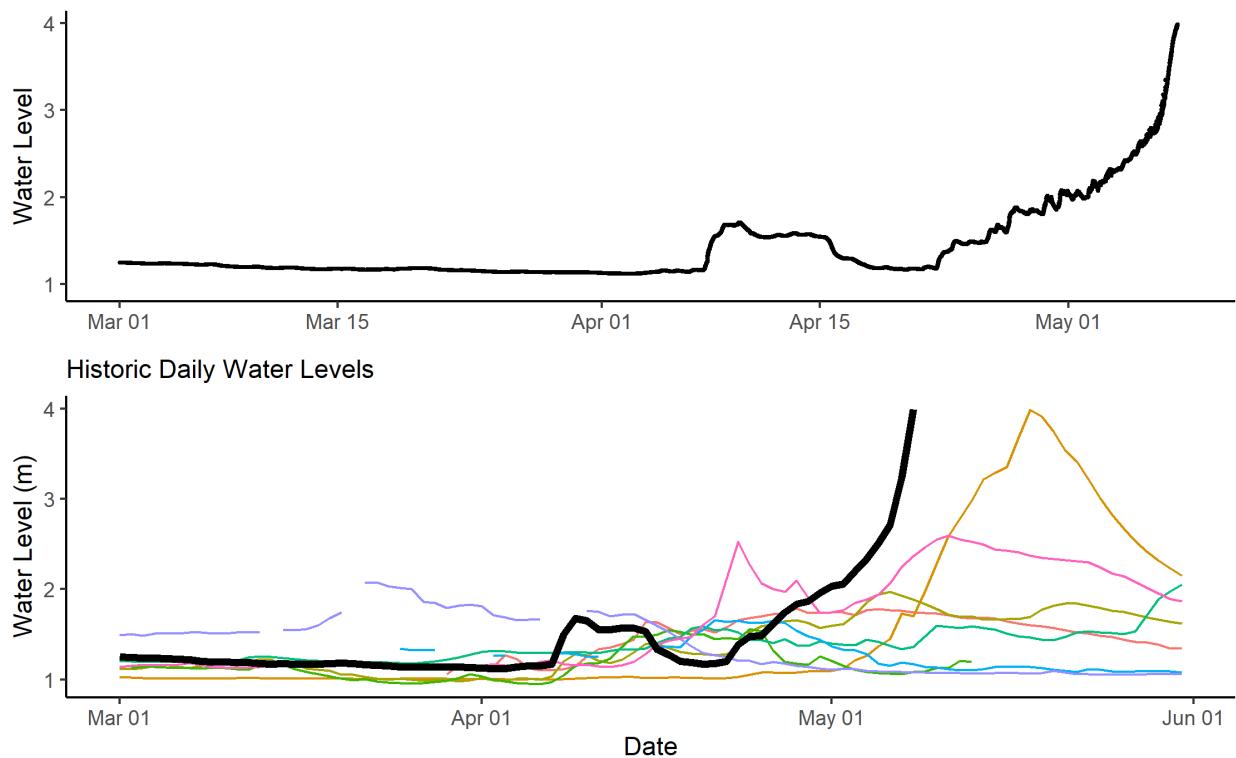


Historic Daily Water Levels



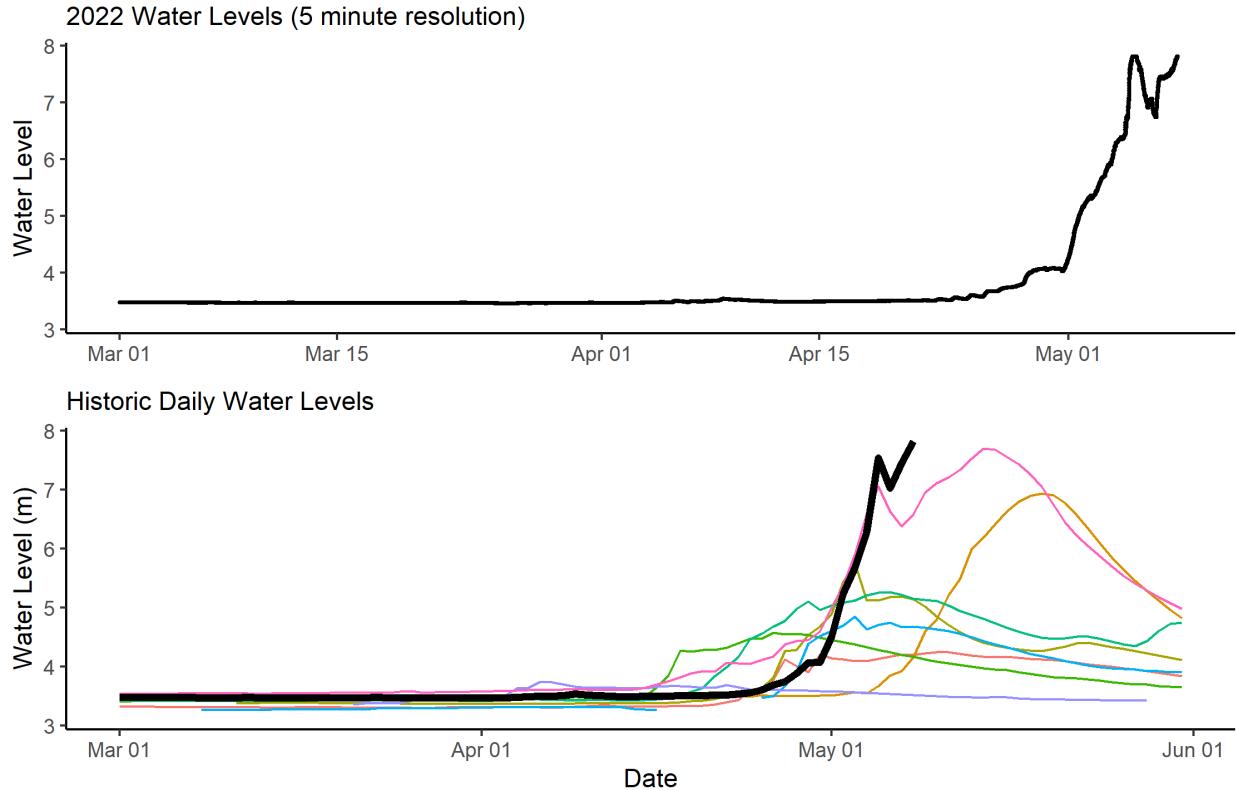
Above – Water level data at the Chinchaga River near High Level, AB. This plot shows high resolution (5 minute) water level data in the middle, and daily average data on the bottom. Water levels have increased by 1.0 m since yesterday morning and continue to rise.

Sousa Creek near High Level (Alberta) [070A001]:
SOUSA CREEK NEAR HIGH LEVEL (070A001)
2022 Water Levels (5 minute resolution)



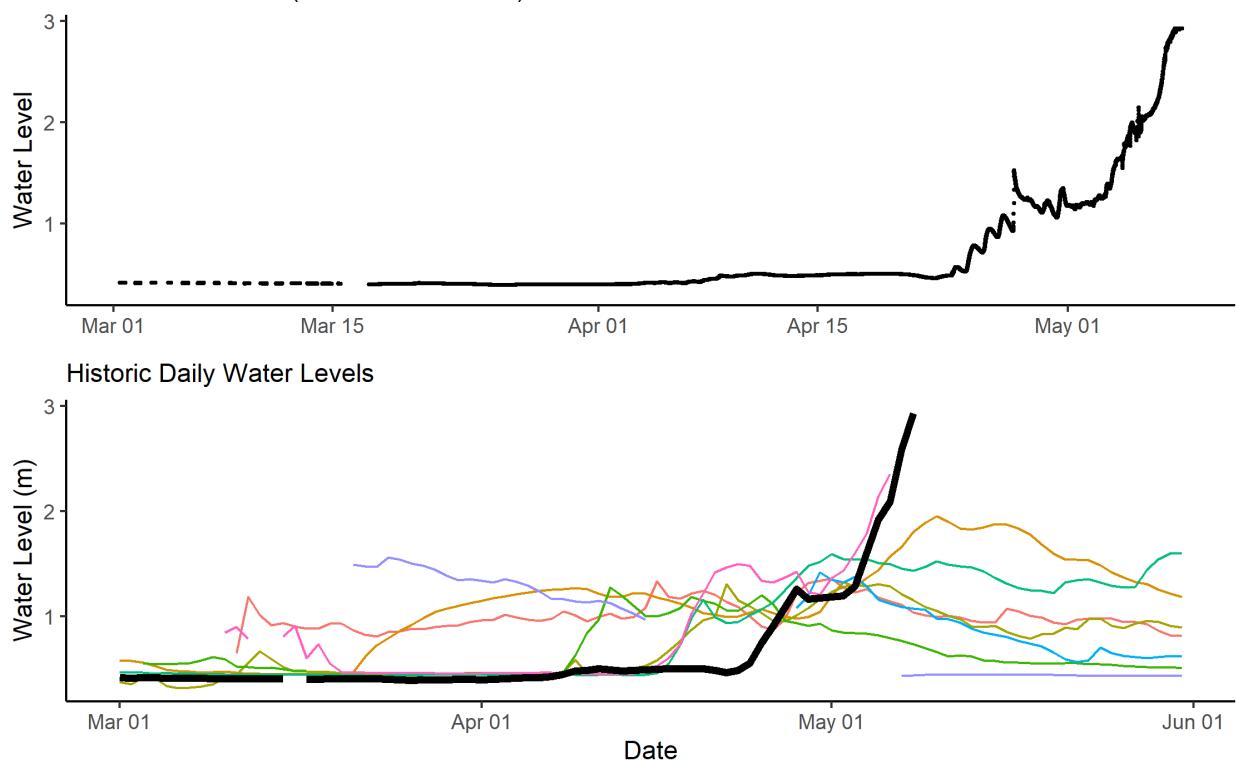
Above – Water level data on Sousa Creek near High Level, AB. The Sousa River is a small tributary to the Hay River. Water levels have increased by 1.1 m since yesterday morning and continue to rise.

Steen River near Steen River (Alberta) [07OB004]:
STEEN RIVER NEAR STEEN RIVER (07OB004)



Above – Water level data on the Steen River near Steen River, AB. The Steen River is a tributary to the Hay River. Water levels have increased by 0.6 m since yesterday morning and continue to rise.

Lutose Creek near Steen River (Alberta) [070B006]:
UTOSE CREEK NEAR STEEN RIVER (070B006)
2022 Water Levels (5 minute resolution)



Above – Water level data on Lutose Creek near Steen River, AB. Lutose Creek is a small tributary to the Hay River. Water levels have increased by 0.2 m since yesterday morning.

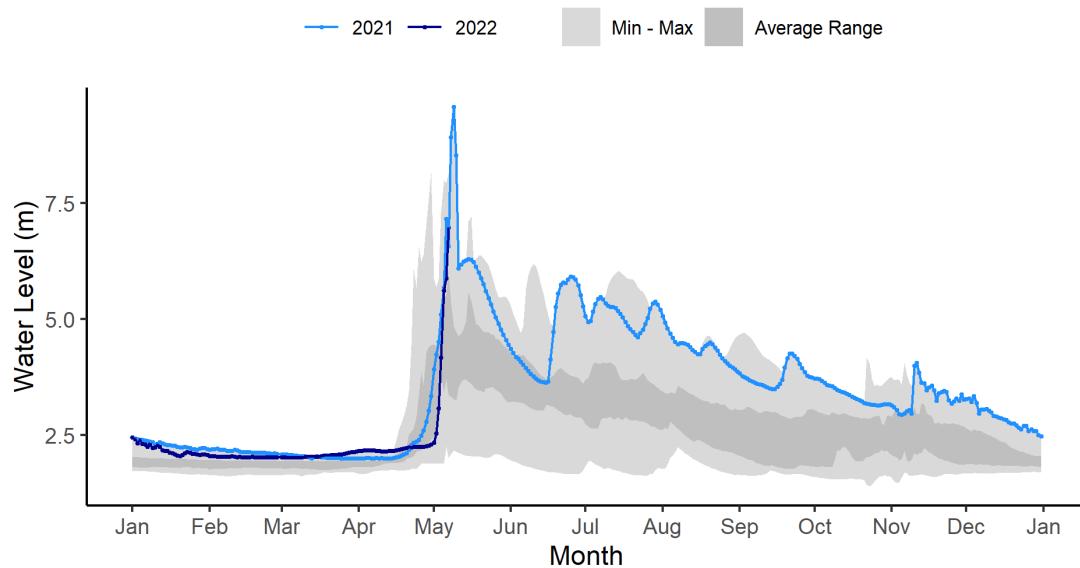
Hay River near the border [070B008]:

Note: Ice has impacted the gauge and real time data are not available at this location. **The most recent data are from May 06 at 18:25**

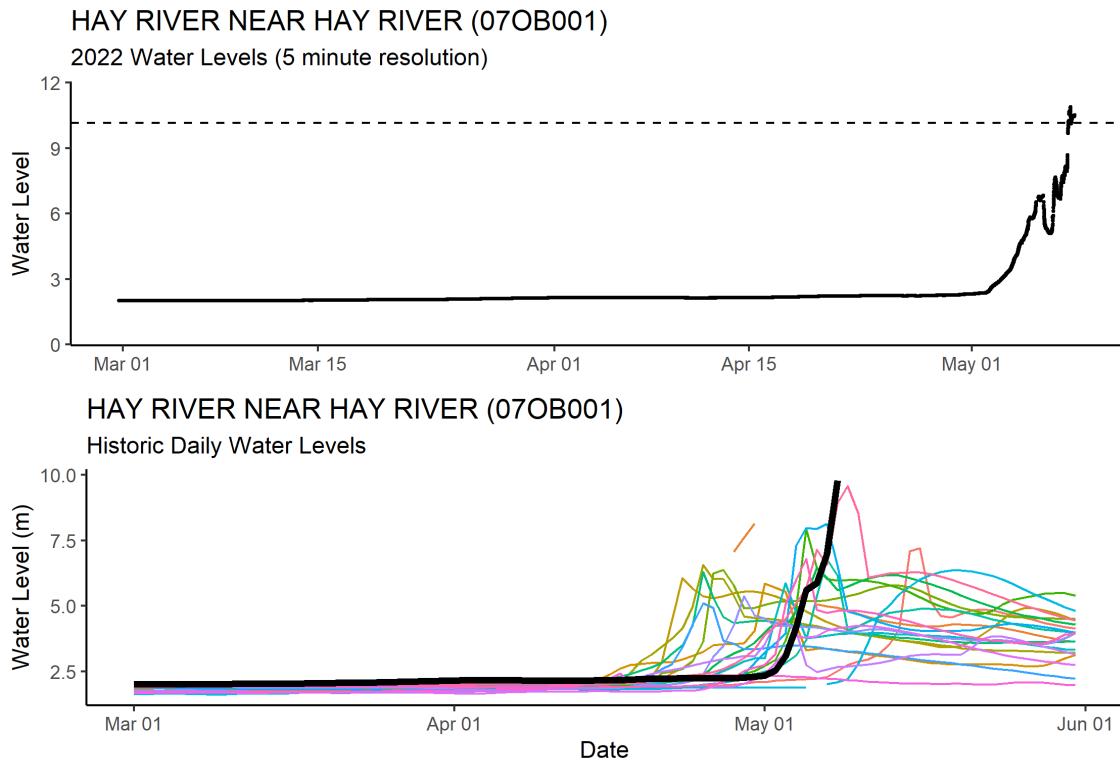


Above – Hay River near the border hydrometric gauge photo on May 08 at 11:00. Photo courtesy of Water Survey of Canada and GNWT.

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 07** (yesterday).



Above - The upper graph in this figure presents real time water level data at 5-minute resolution with the dashed line representing the peak water level from last year (2021). The lower graph shows daily average levels relative to the previous 20 years. Water levels at the gauge have passed the instantaneous peak from last year and continue to be affected by ice movement.

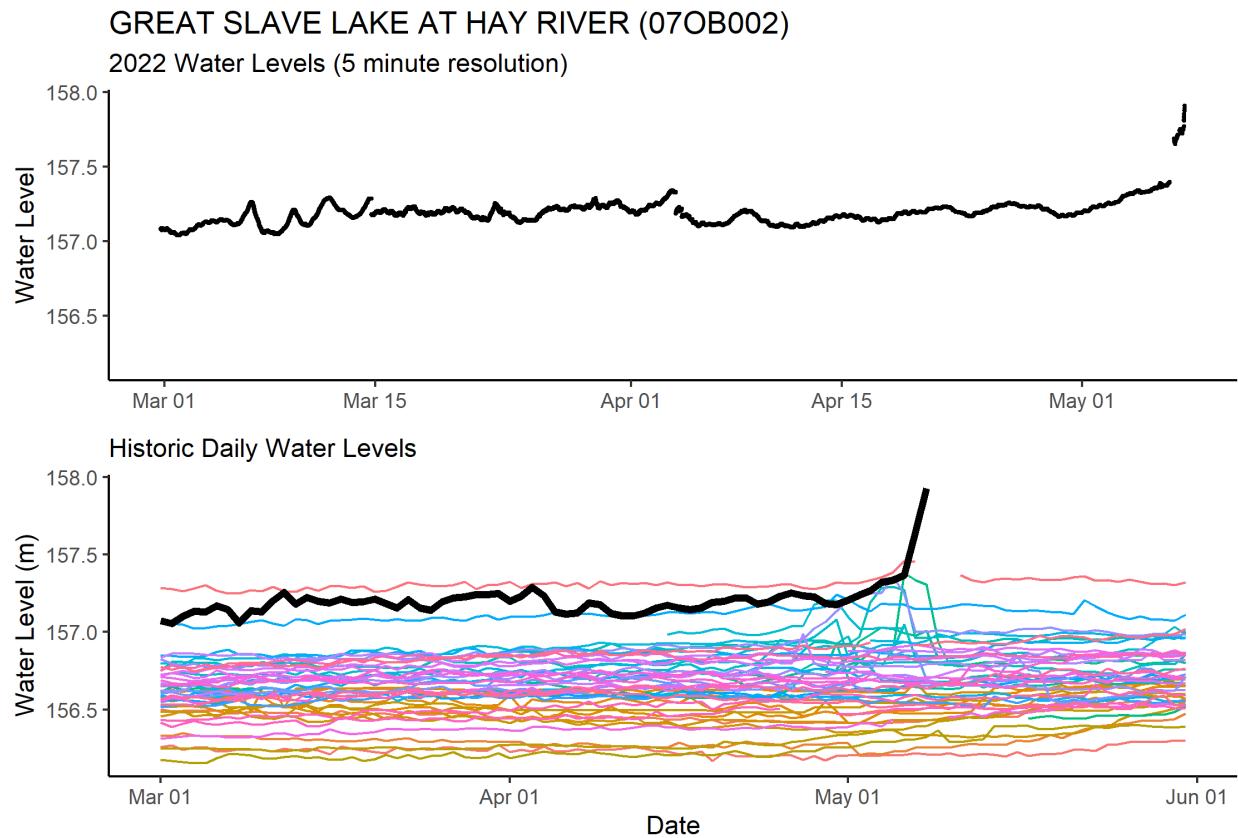
0708001 2022-05-08 17:01:14 UTC
60.74340, -115.85955 12.8V, 25°C P



Above – Hay River near the Town of Hay River hydrometric gauge photo on May 07 at 11:00. Photo courtesy of Water Survey of Canada and GNWT.

Great Slave Lake at Hay River [07OB002]:

Note: This gauge is at the mouth of the East Channel of the Hay River and is therefore sensitive to rising river levels. During ice break up, this gauge provides an indication of water levels on the East Channel of the Hay River and not water levels on Great Slave Lake.



Above – Water levels at the Great Slave Lake at Hay River gauge. The pink line at the top of the lower graph was the water level last year (2021). The peak level this year has now passed the peak level from last year. **Note:** these values are all **provisional** and may be subject to sensor drag from ice.

Liard River:

Current Status:

- The Liard River at Fort Liard is currently open as ice shifted downstream sometime overnight;
- As of yesterday afternoon, there was an open water section on the Liard River beginning just downstream of the Poplar River for about 15 kilometres;
- Ice on the Liard River at Fort Simpson is still stationary as of 12:00 today;
- Water levels are climbing slowly on the Liard River.



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

Imagery:

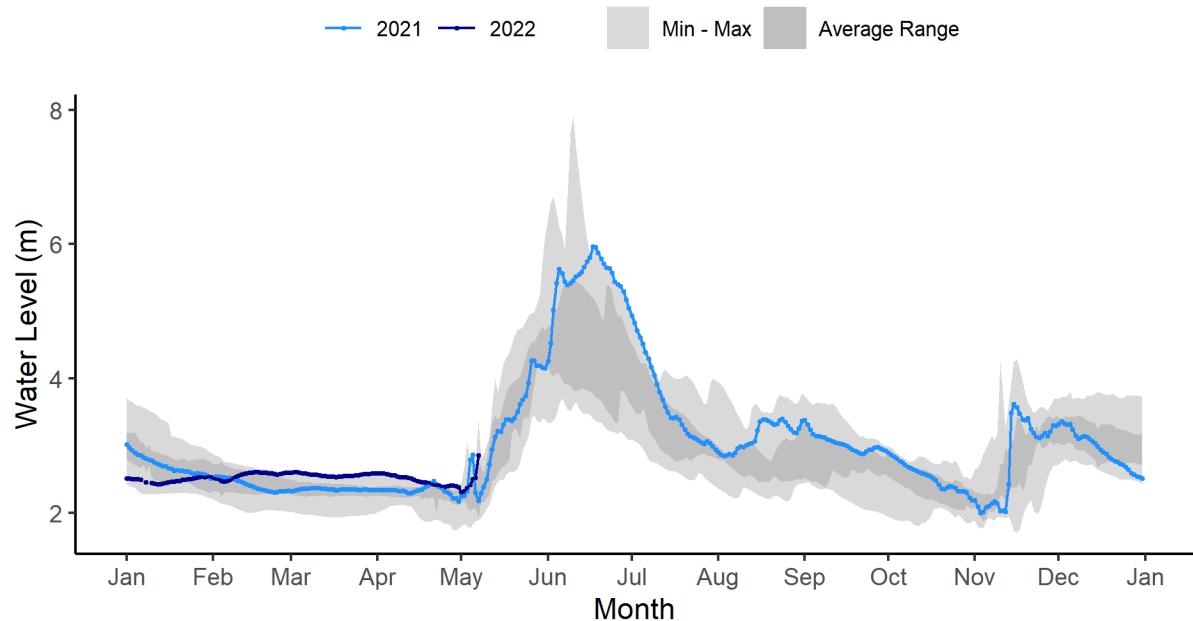


Above - Imagery from 13:30 on May 07 in the lower section of the Liard River (between the mouth and ~60km upstream). (A) Intact ice. close to the mouth of the Liard River, facing upstream (to the south) towards the ferry crossing; (B) Intact ice. Facing downstream (to the north); (C) Largely intact ice, with ~1.5km long open water channel. Facing downstream (to the north); (D) Broken ice abutting intact ice. Facing west (downstream is to the right); (E) Broken ice, with open water upstream (to the left). Images courtesy of GNWT.

Hydrometric Data:

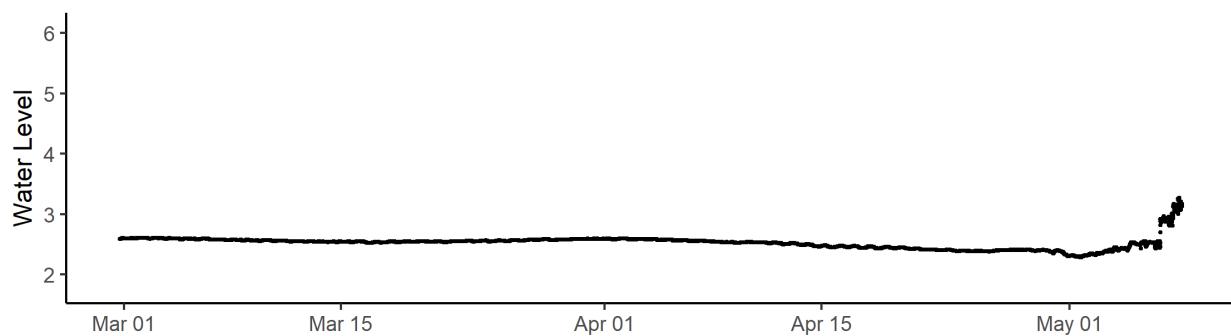
Liard River at Upper Crossing (Yukon) [10AA001]:

LIARD RIVER AT UPPER CROSSING (10AA001)

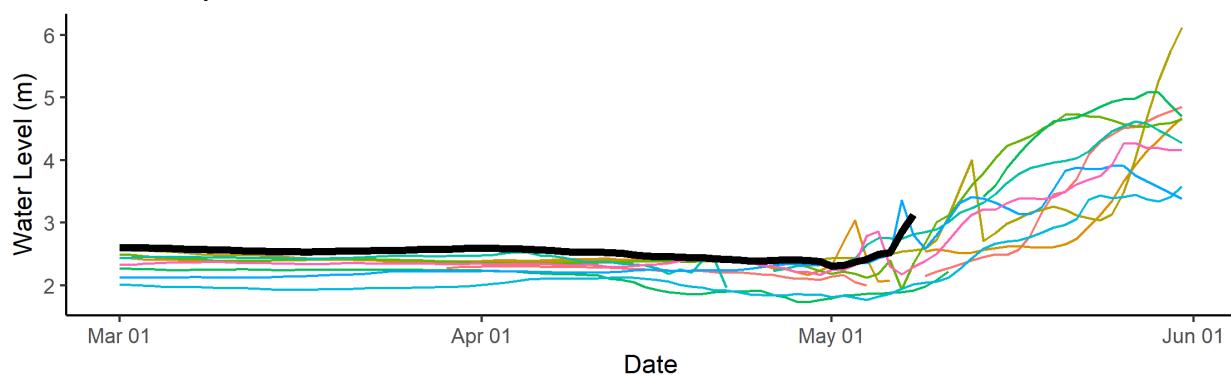


LIARD RIVER AT UPPER CROSSING (10AA001)

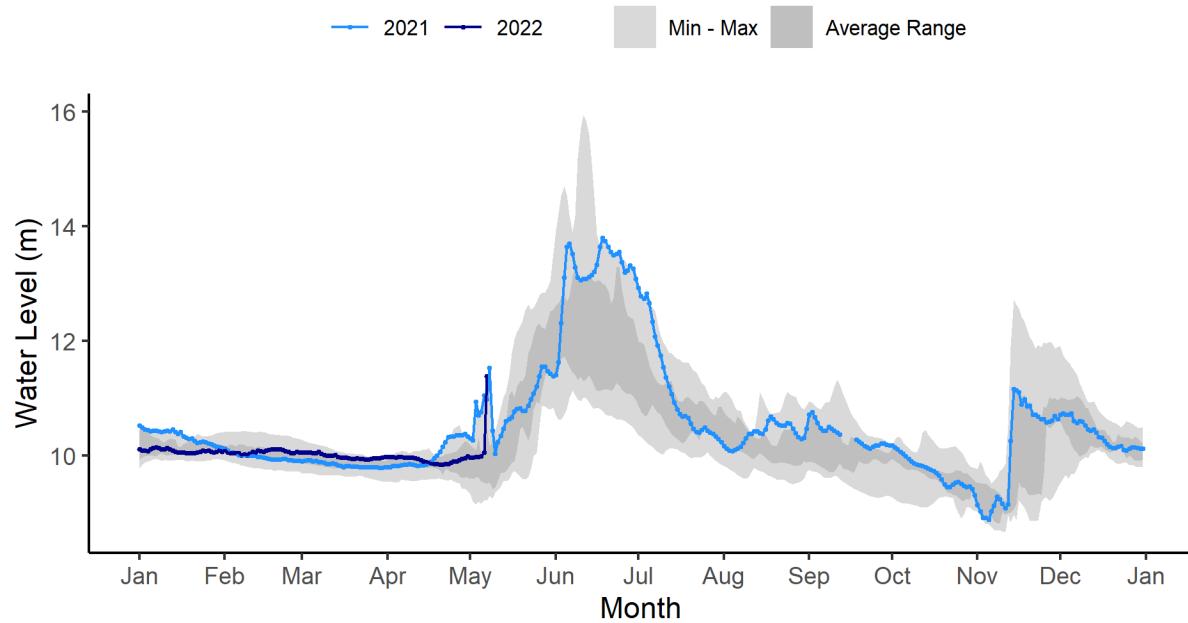
2022 Water Levels (5 minute resolution)



Historic Daily Water Levels

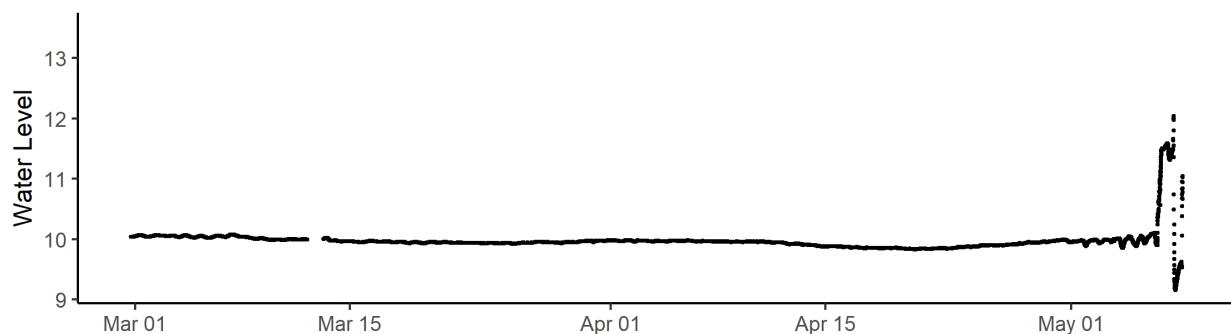


Liard River at Lower Crossing (British Columbia) [10BE001]:
LIARD RIVER AT LOWER CROSSING (10BE001)

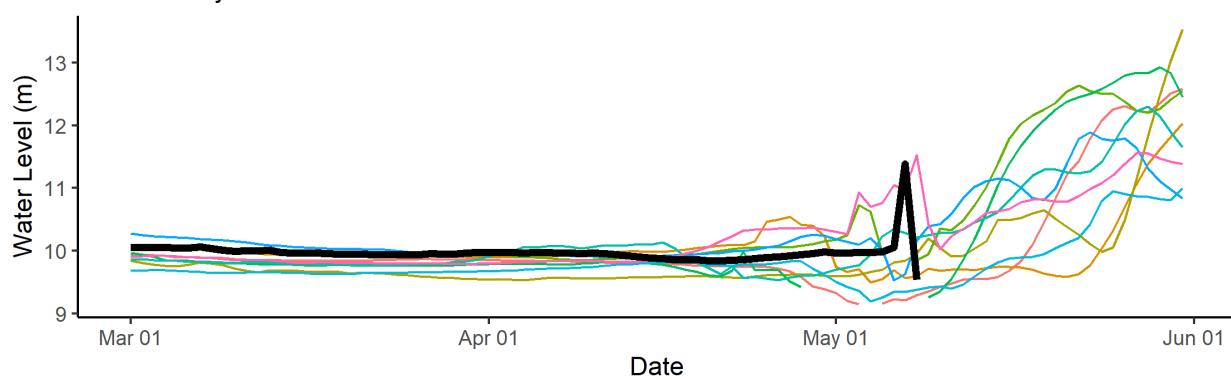


LIARD RIVER AT LOWER CROSSING (10BE001)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels



Liard River at Fort Liard [10ED001]:

Note: Ice has impacted the site and dragged the water level sensor as of **May 06 at 18:10**. The **provisional water level data that are currently being produced are not considered reliable**.

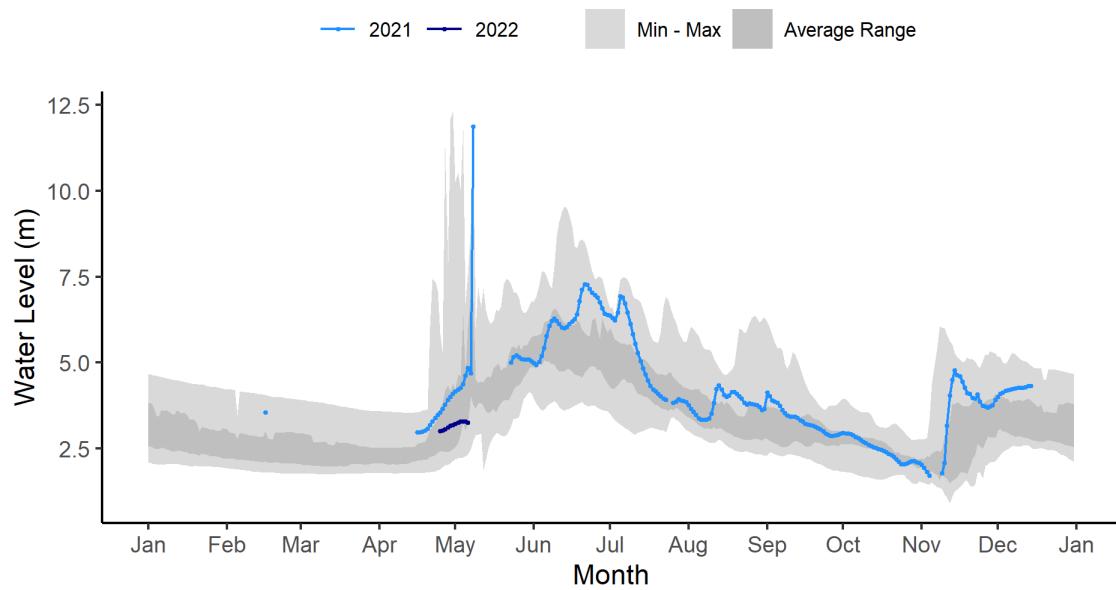


Above – Liard River at Fort Liard hydrometric gauge photo from May 08 at 11:00. Photo courtesy of Water Survey of Canada and GNWT.

Liard River near the mouth [10ED002]:

Note: The sensor is not currently producing data. Water survey of Canada of Canada staff visited the gauge yesterday (May 07) at 10:20 and measured an instantaneous water level of 4.55 m.

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.

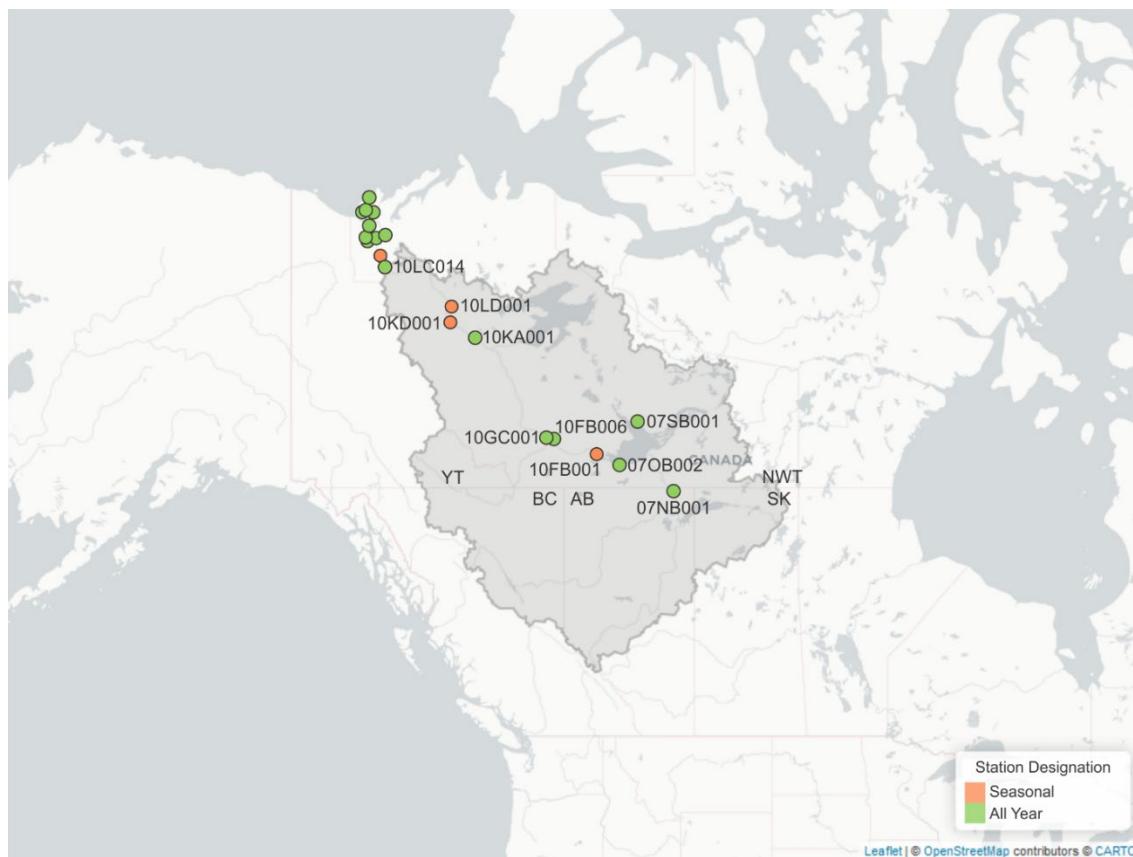


Above – Liard River near the mouth hydrometric gauge photo from May 08 at 10:00. Photo courtesy of Water Survey of Canada and GNWT.

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

Current Status:

- Break up is progressing along the Peace River and the Slave River;
 - There have been reports of an ice jam on the Slave River at km 10 as of May 06;
- Ice moved locally on the Dehcho (Mackenzie River) at Fort Providence, and around Mackenzie River (between Jean Marie River and Fort Simpson);
 - As of yesterday (May 07) at 14:00, ice was still solid at Jean-Marie River. There is open water and broken ice from the RabbitSkin River to just downstream of Green Island (~25 km) where a small ice jam has formed;
- Ice on the Dehcho near Fort Simpson remains stationary as of May 08 at 12:00;
- Environment and Climate Change Canada has forecast cloudy conditions with below normal temperatures until Wednesday.



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

Imagery:

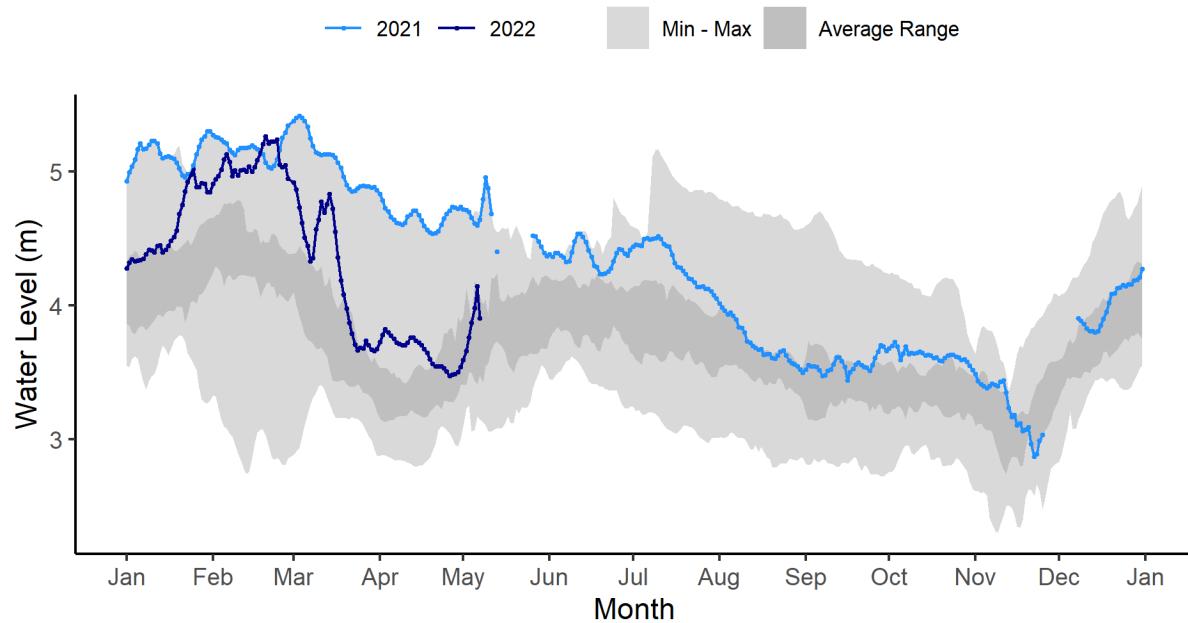


Above – Imagery from 14:00 on May 07 from the Mackenzie River between Fort Simpson and Jean Marie River. (A) Broken ice accumulating upstream of intact ice (intact ice not visible in photo). Facing north (downstream to the left); (B) Broken ice around Green Island. Facing north (downstream to the left); (C) Broken ice (middle channel) and intact ice on edges. Facing upstream (to the east); (D) Open water at the mouth of the RabbitSkin River. Intact ice upstream (to the right). Facing northeast; (E) Intact ice. Facing downstream (to the north). Images courtesy of GNWT.

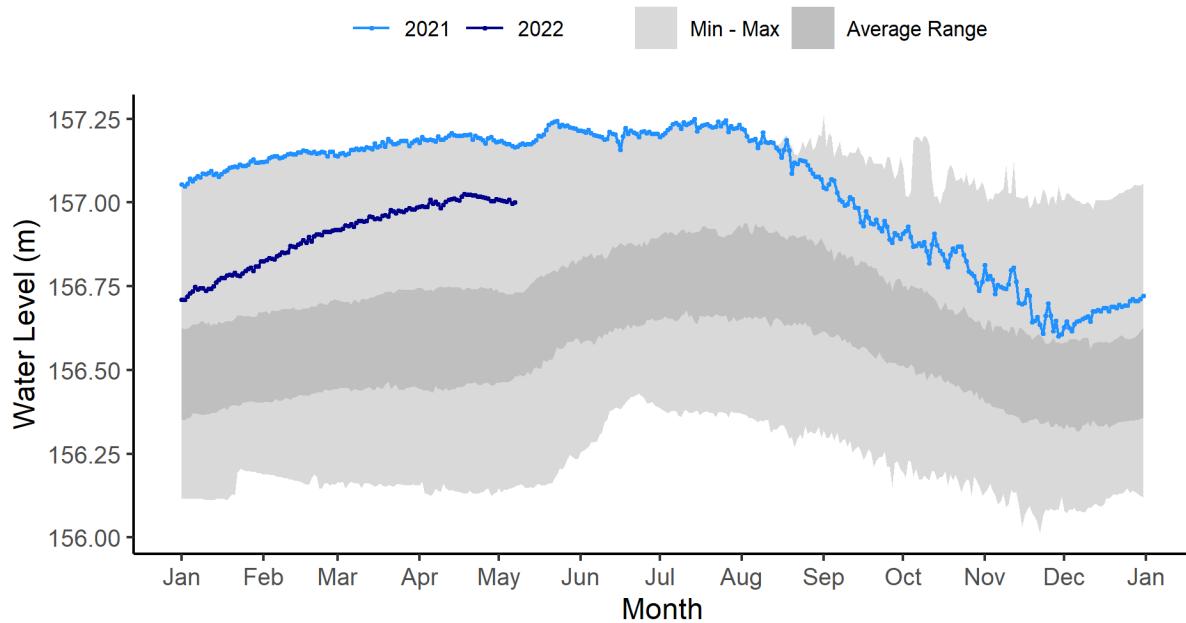
Hydrometric Data:

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

SLAVE RIVER AT FITZGERALD (ALBERTA) (07NB001)

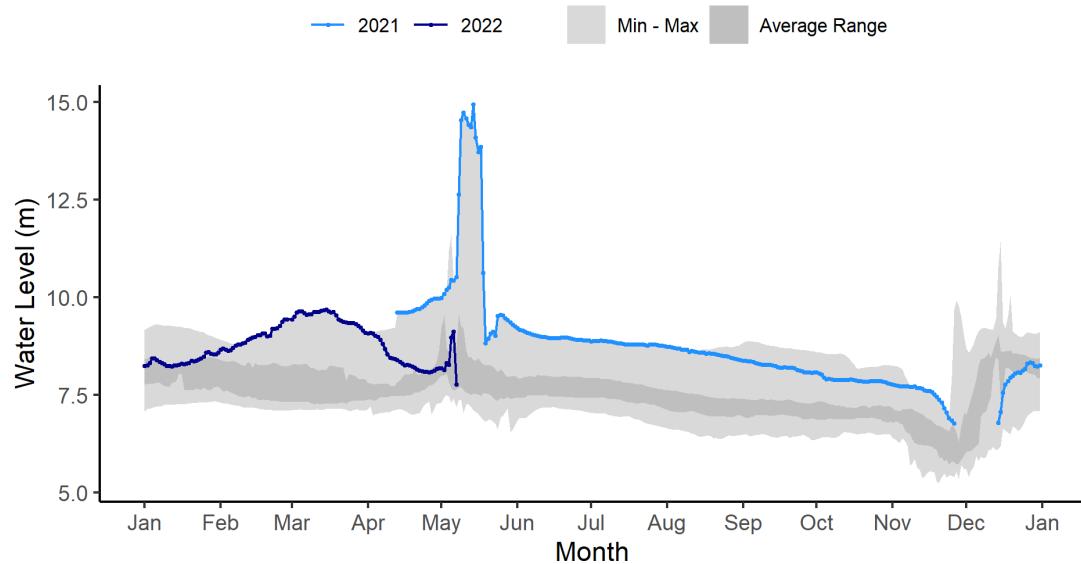


Great Slave Lake at Yellowknife Bay [07SB001]:
GREAT SLAVE LAKE AT YELLOWKNIFE BAY (07SB001)

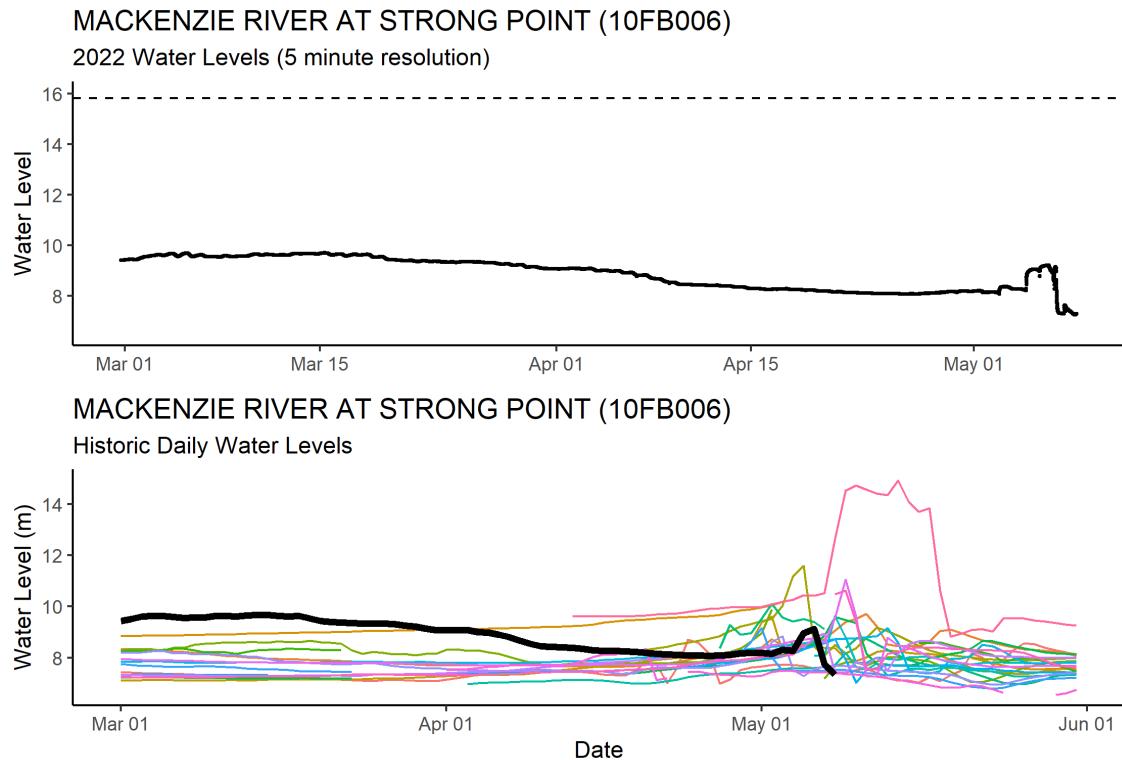


Above – Water levels on Great Slave Lake at Yellowknife Bay for the previous two years. Although water levels have receded since the highs of 2020 and 2021, levels remain much higher than normal.

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



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 07** (yesterday).

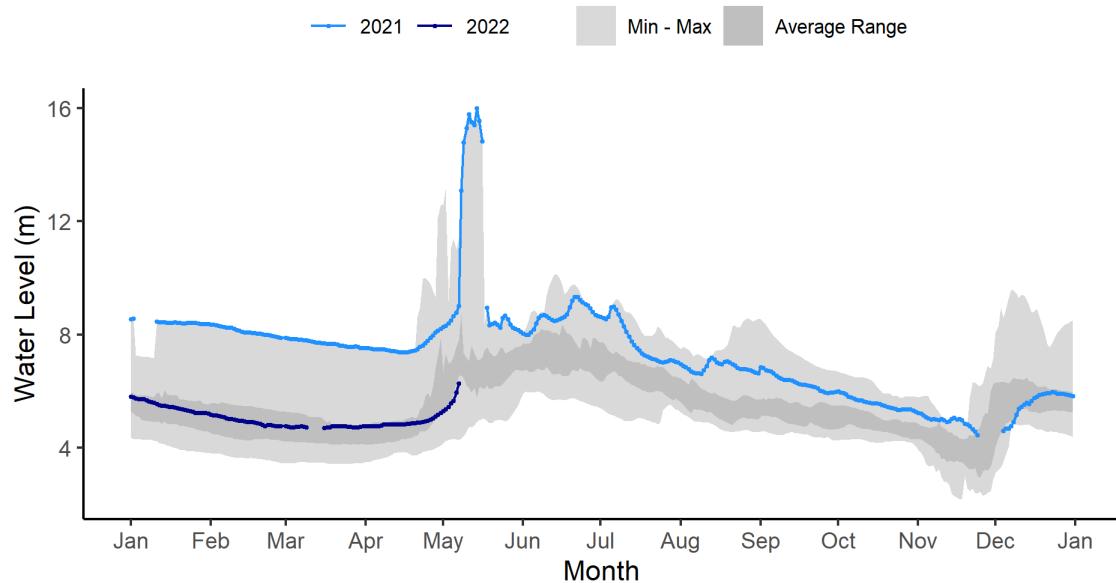


Above - The upper graph in the figure presents real time water level data at 5-minute resolution with the dashed line representing the peak water level from last year (2021). The lower graph shows daily average levels relative to the previous 20 years. Ice movement has led to abrupt changes in level over the past few days.

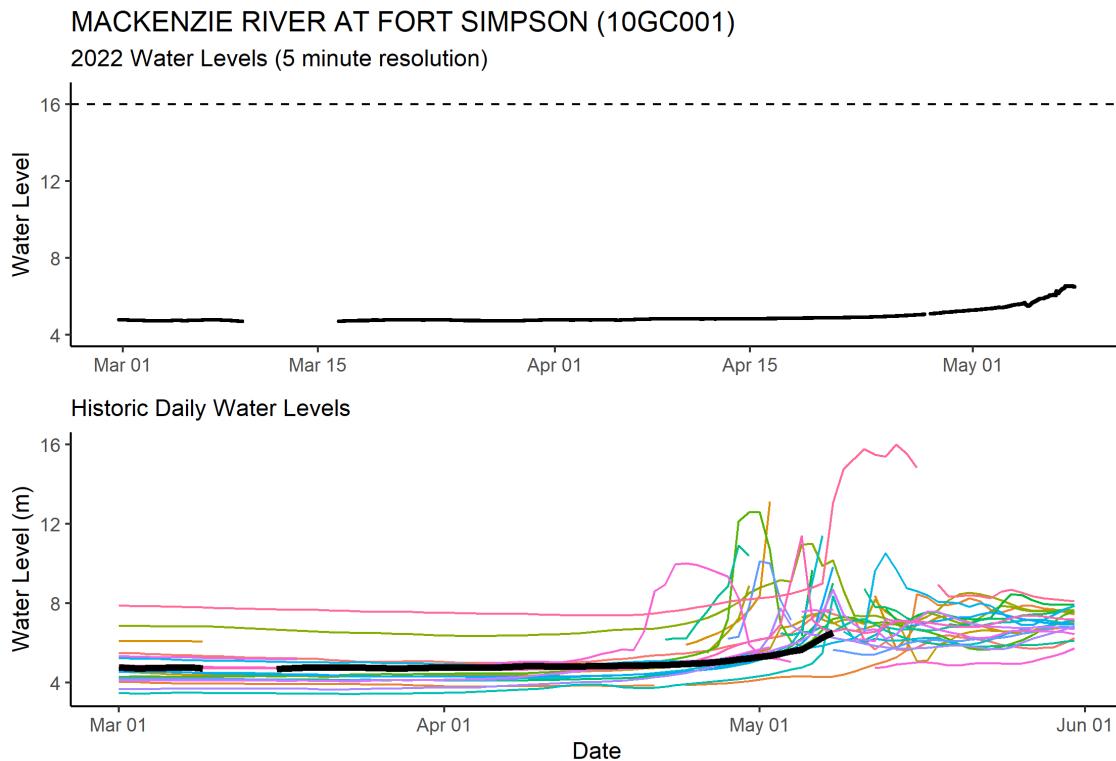


Above – Dehcho (Mackenzie River) at Strong Point hydrometric gauge photo from May 08 at 11:00. Photo courtesy of Water Survey of Canada and GNWT.

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



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 07** (yesterday).



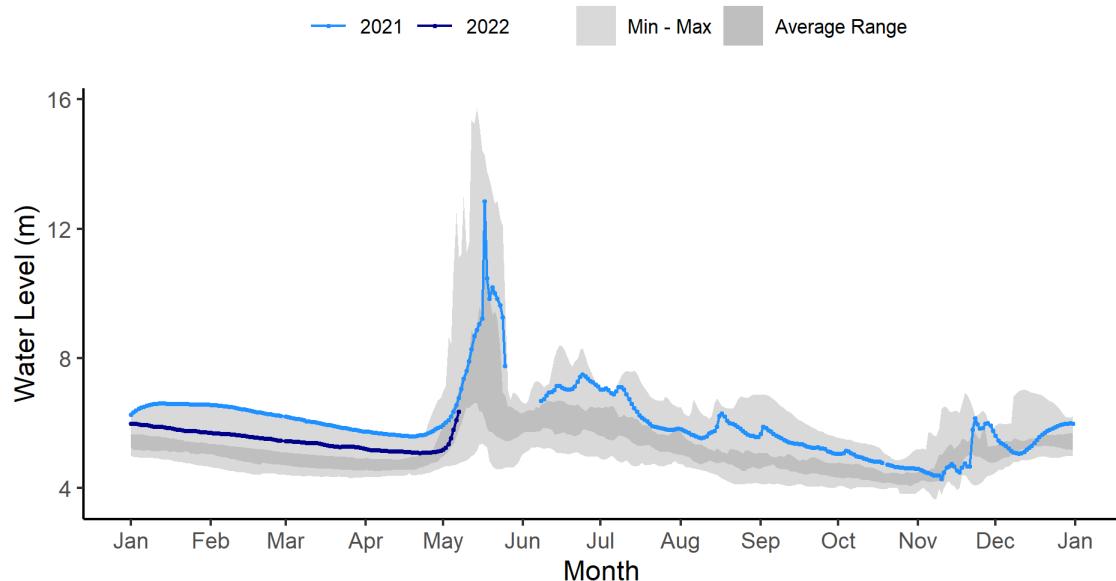
Above - The upper graph in the figure presents real time water level data at 5-minute resolution with the dashed line representing the peak water level from last year (2021). The lower graph shows daily average levels relative to the previous 20 years. Water levels continue to slowly rise as is normal for this time of year.

10GC001_MackSimpson 2022-05-08 17:01:15 UTC
61.86801, -121.35837 12.7V 3.0°C P

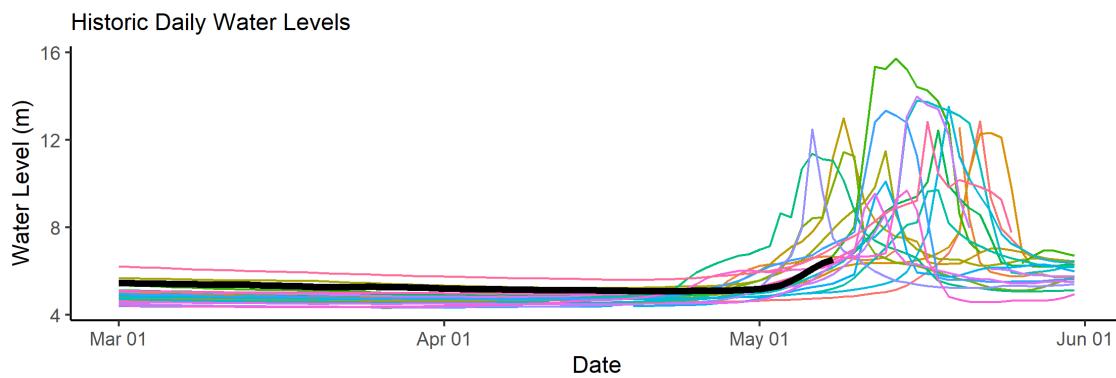
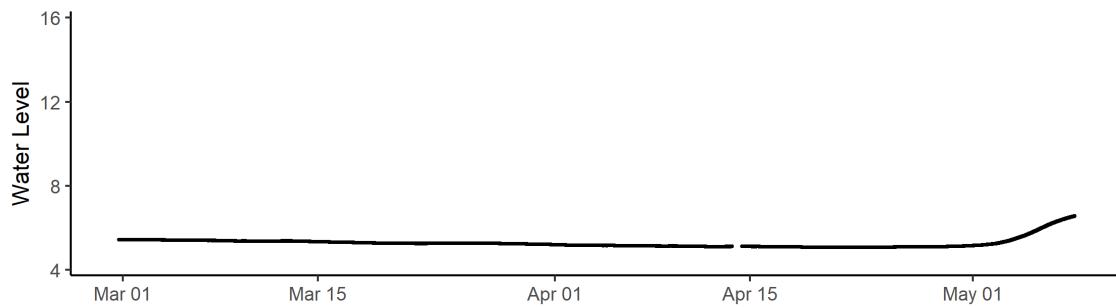


Above – Dehcho (Mackenzie River) at Fort Simpson hydrometric gauge photo from May 07 at 11:00. Photo courtesy of Water Survey of Canada and GNWT.

Mackenzie River at Norman Wells [10KA001]:
MACKENZIE RIVER AT NORMAN WELLS (10KA001)

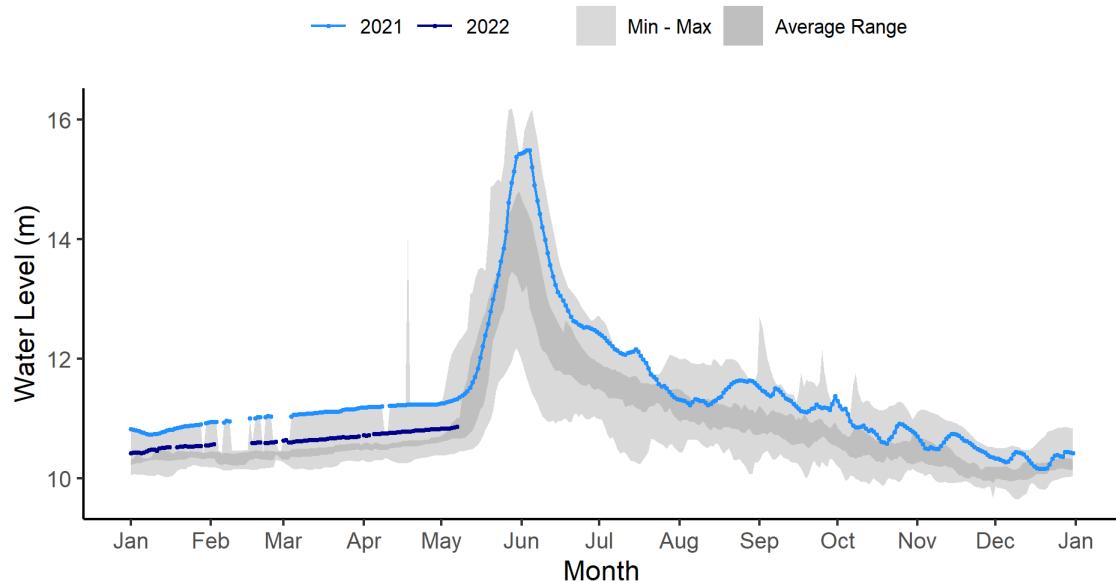


MACKENZIE RIVER AT NORMAN WELLS (10KA001)
2022 Water Levels (5 minute resolution)

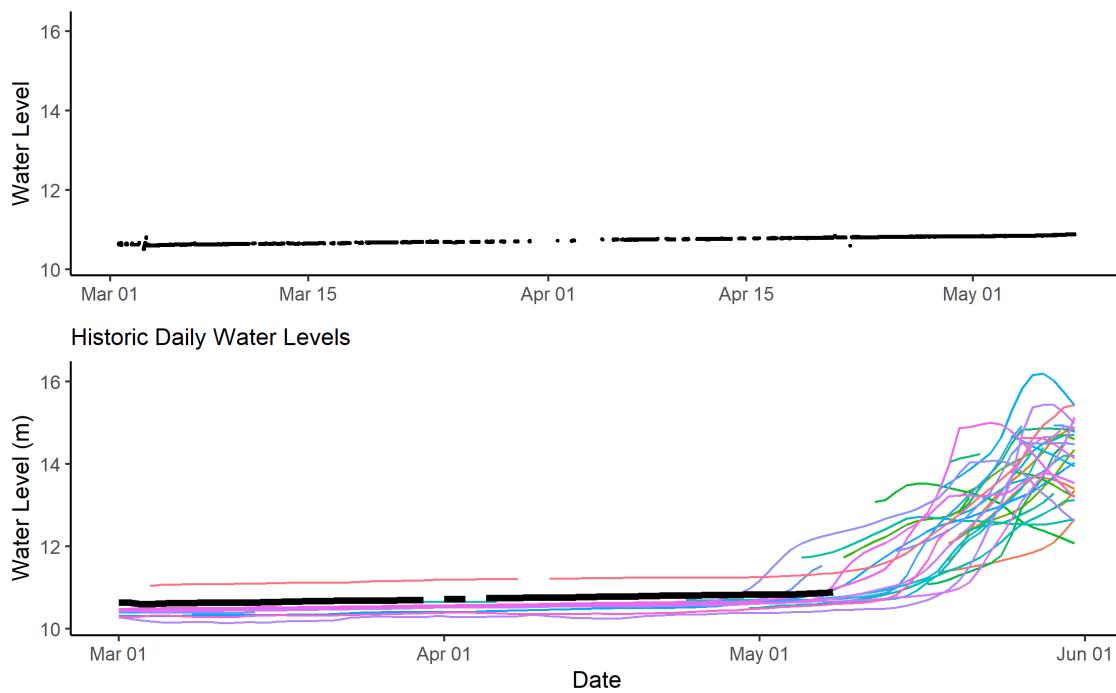


Above – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels on the Mackenzie River at Norman Wells have begun to slowly rise, with the timing being approximately average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

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)

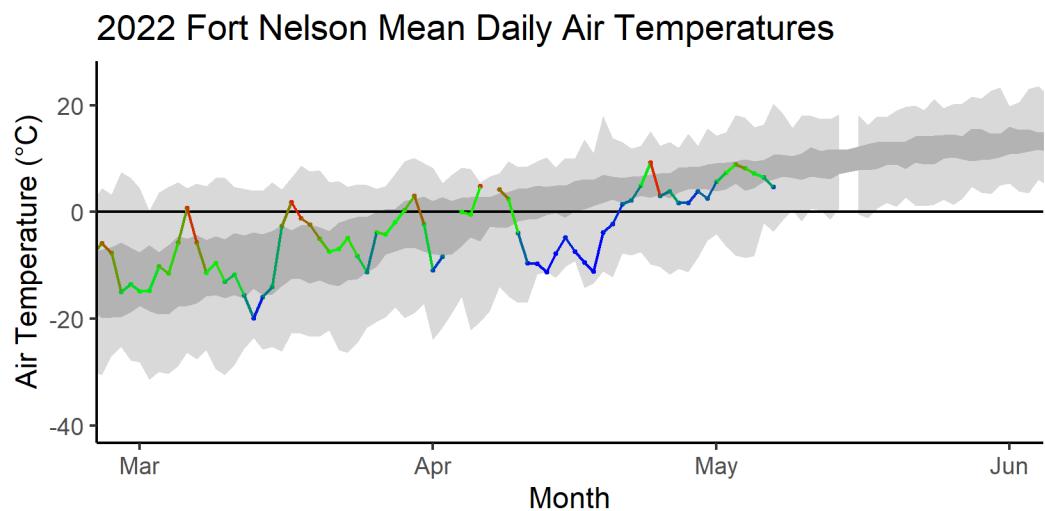
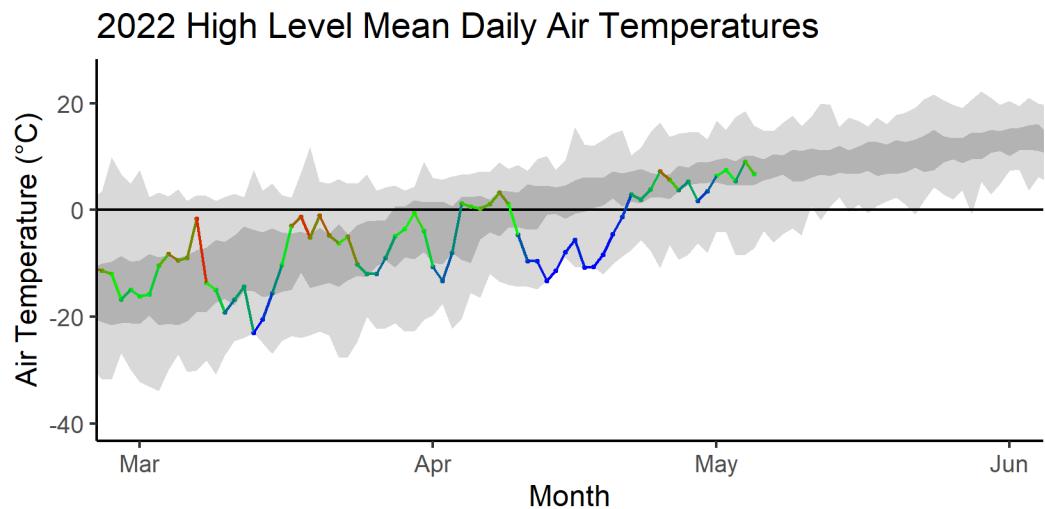


Above – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels in the Delta have not yet started to rise. Water levels are lower than last year but have been higher than average throughout the winter.

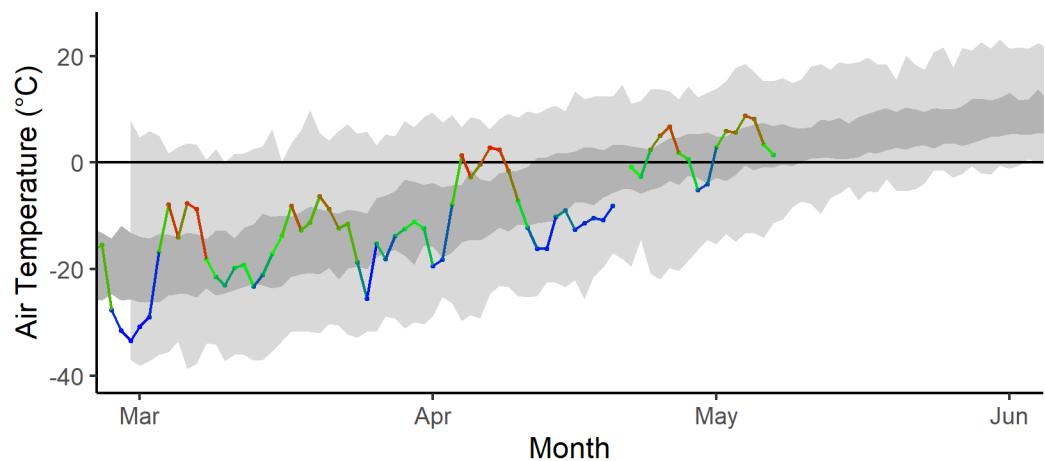
Weather Data:

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.

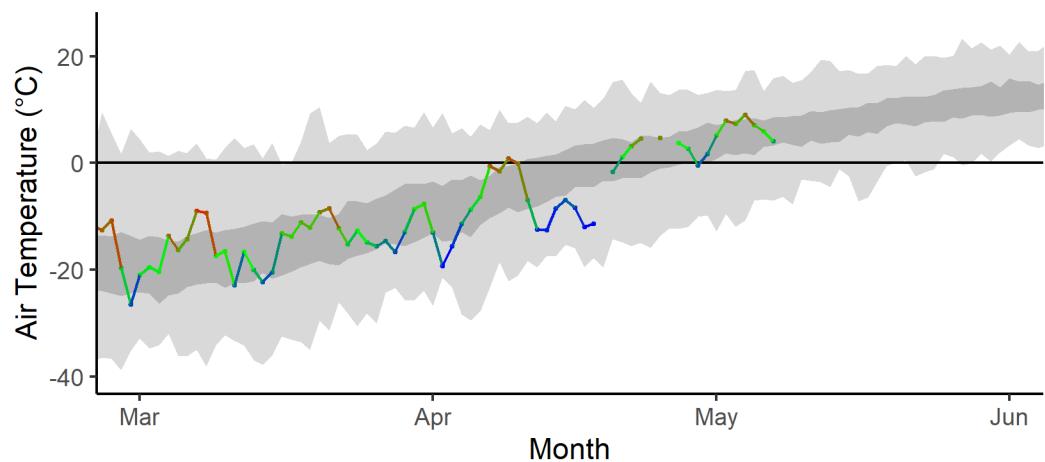
A low-pressure system has developed over the Hay River basin which is bringing significant precipitation (falling as a mix of rain and snow) and cool temperatures. Approximately 30 to 40 mm of rain has fallen so far, and models are predicting an additional 10 to 40 mm of precipitation through to Monday.



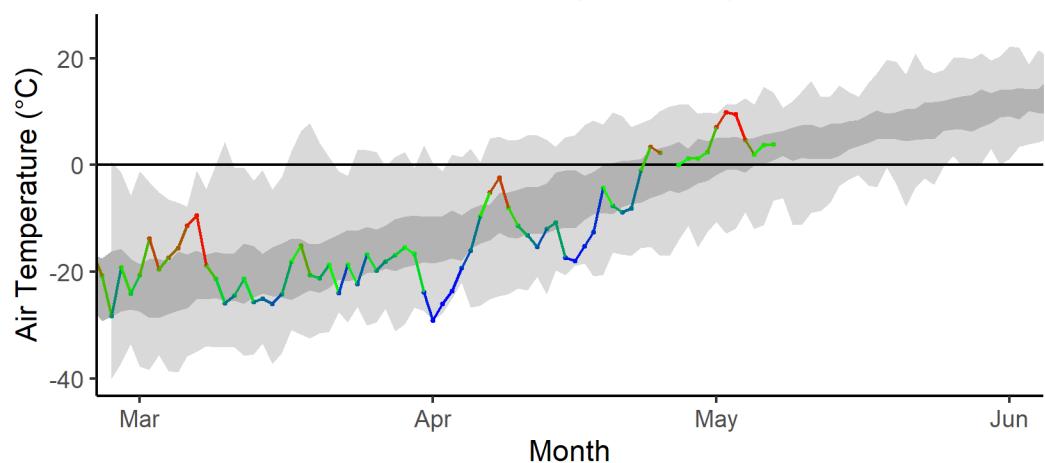
2022 Hay River Mean Daily Air Temperatures



2022 Fort Simpson Mean Daily Air Temperatures



2022 Norman Wells Mean Daily Air Temperatures



High Level seven-day weather forecast:

Sun 8 May	Mon 9 May	Tue 10 May	Wed 11 May	Thu 12 May	Fri 13 May	Sat 14 May
 3°C Periods of rain or snow	 0°C Periods of snow	 4°C Cloudy	 9°C A mix of sun and cloud	 14°C Sunny	 13°C A mix of sun and cloud	 15°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 -4°C Snow	 -5°C 60% Chance of flurries	 -5°C Cloudy periods	 -3°C Cloudy periods	 3°C Cloudy periods	 2°C Cloudy periods	

Fort Nelson seven-day weather forecast:

▼ Forecast							Hourly Forecast	Alerts	Jet Stream
Sun 8 May	Mon 9 May	Tue 10 May	Wed 11 May	Thu 12 May	Fri 13 May	Sat 14 May			
 1°C Snow or rain	 1°C Snow	 7°C Cloudy	 5°C 60% Chance of flurries or rain showers	 14°C 60% Chance of rain showers or flurries	 15°C A mix of sun and cloud	 15°C A mix of sun and cloud			
Tonight	Night	Night	Night	Night	Night	Night			
 -3°C Snow	 -4°C Periods of snow	 -1°C Cloudy	 0°C Cloudy	 3°C Cloudy periods	 3°C Cloudy periods				

Hay River seven-day weather forecast:

▼ Forecast							Hourly Forecast	Alerts	Jet Stream
Sun 8 May	Mon 9 May	Tue 10 May	Wed 11 May	Thu 12 May	Fri 13 May	Sat 14 May			
 2°C Rain or snow	 -2°C Snow	 1°C Cloudy	 4°C A mix of sun and cloud	 5°C Sunny	 8°C A mix of sun and cloud	 10°C A mix of sun and cloud			
Tonight	Night	Night	Night	Night	Night	Night			
 -4°C Snow	 -4°C Cloudy	 -3°C Cloudy	 -7°C Clear	 1°C Clear	 2°C Cloudy periods				

Fort Simpson seven-day weather forecast:

Forecast							Hourly Forecast	Alerts	Jet Stream
<u>Sun</u> <u>8 May</u>	Mon 9 May	Tue 10 May	Wed 11 May	Thu 12 May	Fri 13 May	Sat 14 May			
 2°C	 -2°C	 1°C	 4°C	 5°C	 8°C	 10°C			
Rain or snow	Snow	Cloudy	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	Night			
 -4°C	 -4°C	 -3°C	 -7°C	 1°C	 2°C				
Snow	Cloudy	Cloudy	Clear	Clear	Cloudy periods				

Norman Wells seven-day weather forecast:

<u>Sun</u> <u>8 May</u>	Mon 9 May	Tue 10 May	Wed 11 May	Thu 12 May	Fri 13 May	Sat 14 May
 4°C	 6°C	 8°C	 9°C	 13°C	 13°C	 11°C
A mix of sun and cloud	Mainly sunny	Sunny	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	Night
 -7°C	 -4°C	 -4°C	 -1°C	 -1°C	 1°C	
Partly cloudy	Clear	Cloudy periods	Clear	Cloudy periods	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.