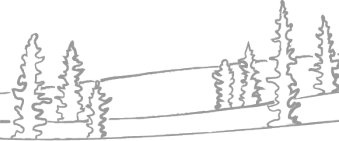




NWT Water Monitoring Bulletin

– May 11, 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:

- Evacuation Orders and Alerts for the Town of Hay River and K'atl'odeeche First Nation remain in place for certain areas;
- Water levels on the Hay River and its tributaries continue to steadily rise in response to rain and snowmelt from the recent storm event;
 - It is expected that water levels at gauge locations will either continue increasing steadily or hold at their current level;
 - If remaining river ice that is currently sitting upstream moves into the community, there is potential for rapid water level increases;
- Fort Liard reported some localized flooding yesterday late afternoon/evening as a result of an ice jam on the Liard River near the community;
 - Ice remains present in Fort Liard but water levels have decreased;
- Ice on the Mackenzie River had not yet started moving at Jean Marie River as of this morning;
- The Mackenzie River at Fort Simpson has primarily open water and Liard River ice continues to clear well at this time (12:00);
- Water levels downstream on the Mackenzie River are slowly starting to rise, as is normal for spring break up.

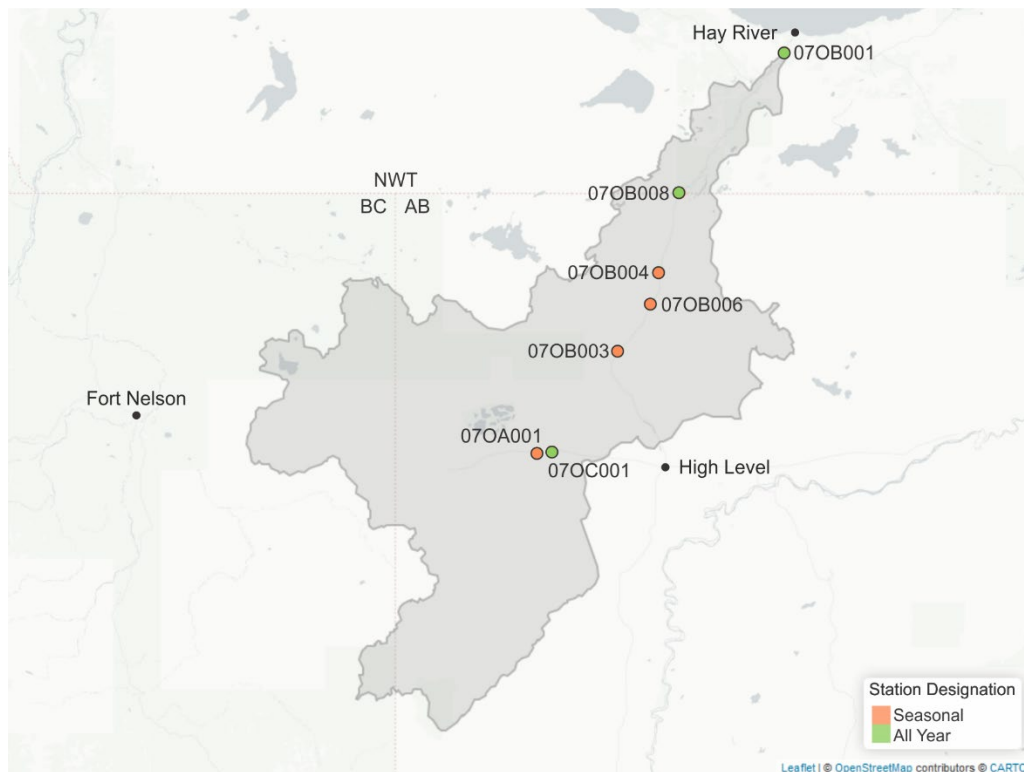
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Hay River:

Current Status:

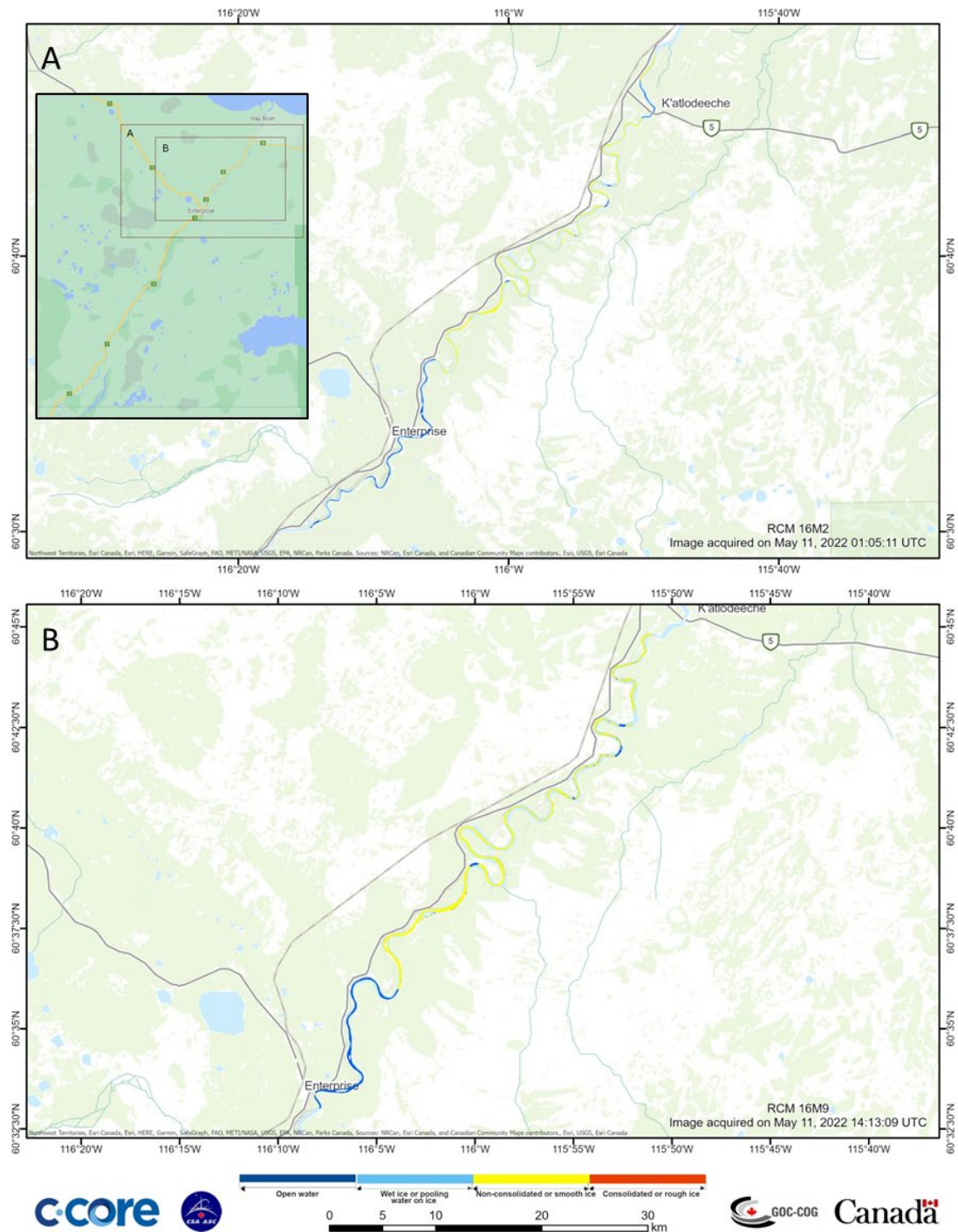
- Water levels on the Hay River and its tributaries continue to steadily rise in response to rain and snowmelt from the recent storm event;
- It is expected that water levels at gauge locations will either continue increasing steadily or hold at their current level;
- The impact of the existing/rising water levels on the downstream locations will depend on how and when remaining ice clears out of the river;
- If remaining river ice that is currently sitting upstream moves into the community, there is potential for rapid water level increases;
- Climate models from Environment and Climate Change Canada reported up to 125 mm of precipitation in the Hay Basin over the duration of the storm event;
- The water level response on the Hay River and its tributaries to precipitation is 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.

Imagery:

Hay River Ice Classification

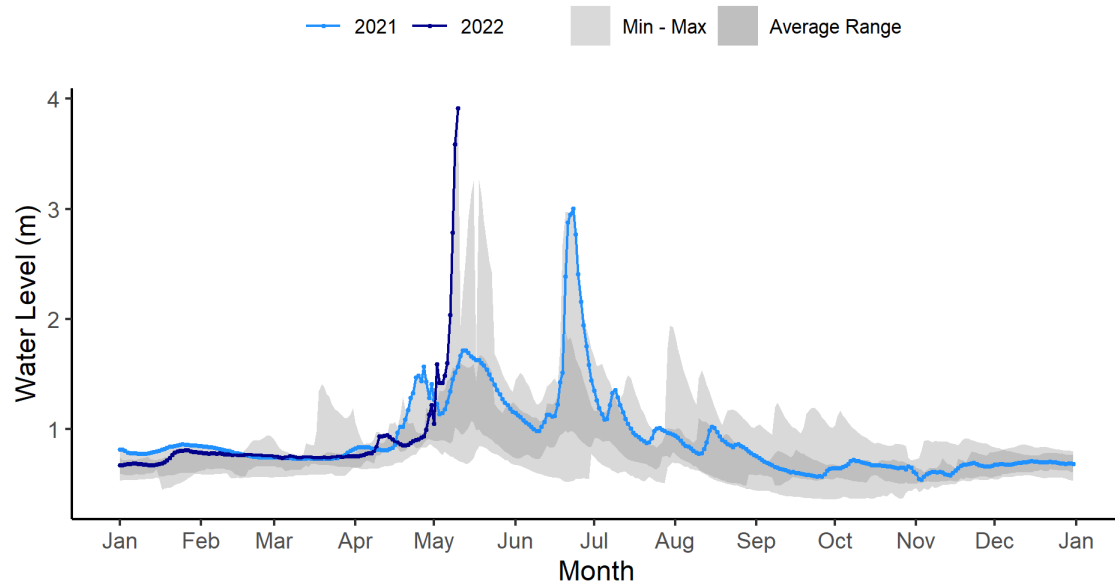


Above – Ice classification maps based on radar imagery of stretches of the Hay River taken on A) 10th May at 19:05 MDT; and B) 11th May at 08:13 MDT.

Hydrometric Data:

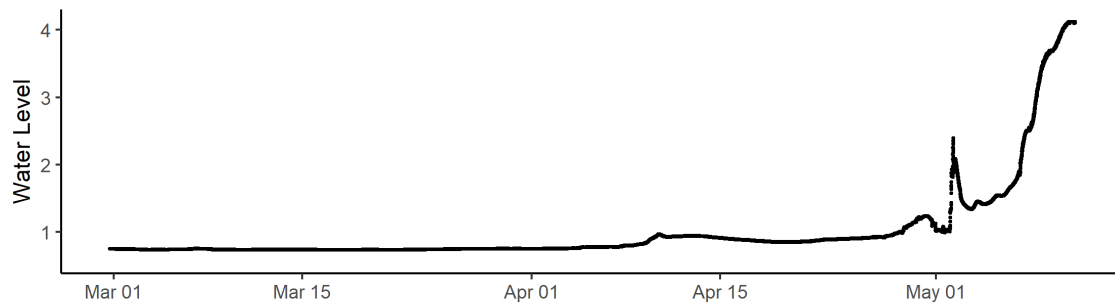
Chinchaga River near High Level (Alberta) [07OC001]:

CHINCHAGA RIVER NEAR HIGH LEVEL (07OC001)



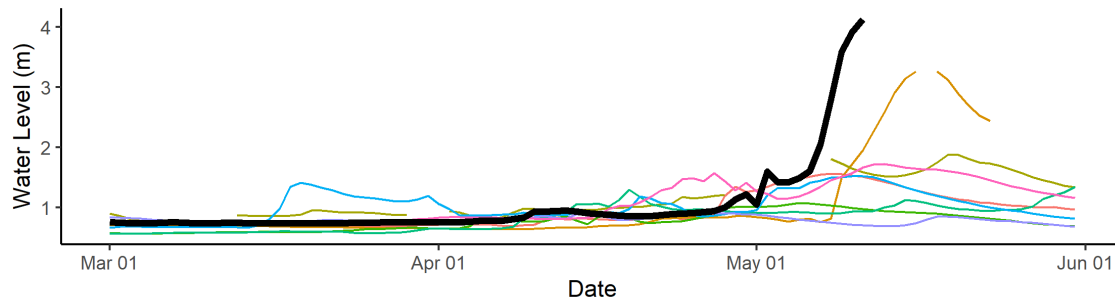
CHINCHAGA RIVER NEAR HIGH LEVEL (07OC001)

2022 Water Levels (5 minute resolution)



CHINCHAGA RIVER NEAR HIGH LEVEL (07OC001)

Historic Daily Water Levels

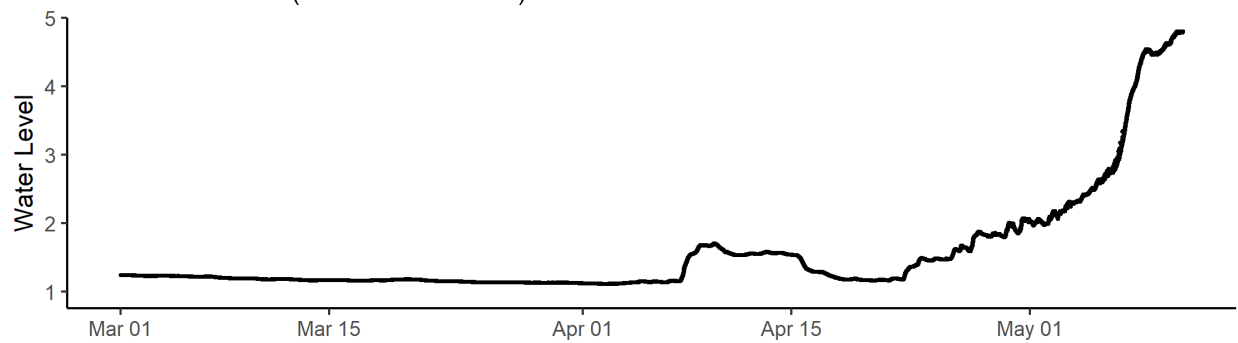


Above – Water level data at the Chinchaga River near High Level, AB. This plot shows high resolution (5 minute) water level data in the middle, and daily average data on the bottom. Water levels continue to rise and provisional water levels at the gauge have now exceeded the previous maximum recorded values (2012 to present).

Sousa Creek near High Level (Alberta) [070A001]:

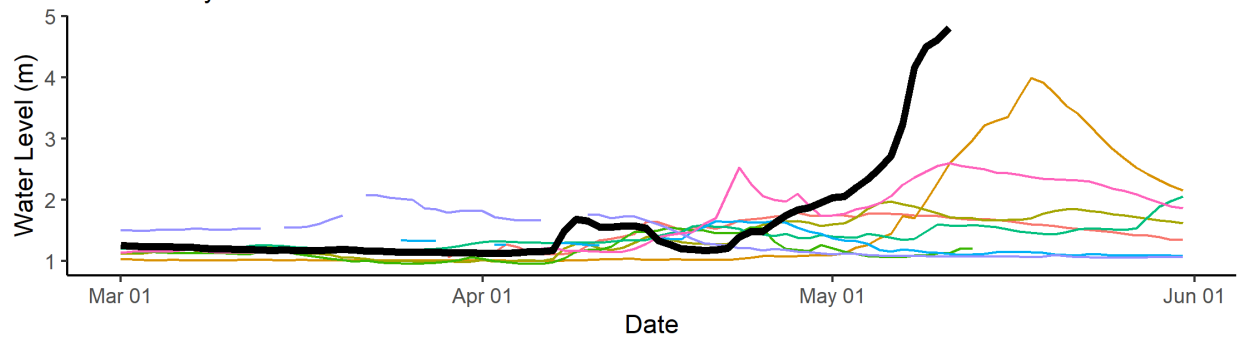
SOUSA CREEK NEAR HIGH LEVEL (070A001)

2022 Water Levels (5 minute resolution)



SOUSA CREEK NEAR HIGH LEVEL (070A001)

Historic Daily Water Levels

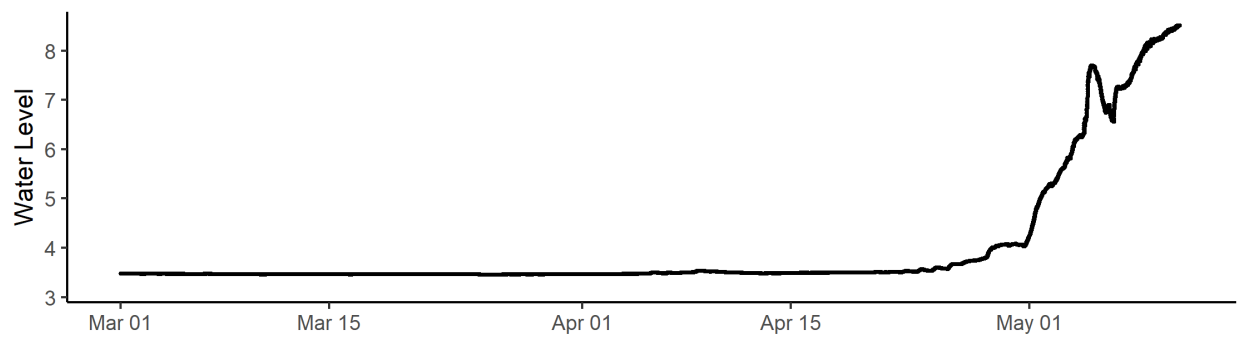


Above – Water level data on Sousa Creek near High Level, AB. The Sousa River is a small tributary to the Hay River. Water levels continue to steadily rise in response to daily snowmelt. Provisional water levels at the gauge have exceeded the previous maximum recorded levels (2012 to present).

Steen River near Steen River (Alberta) [07OB004]:

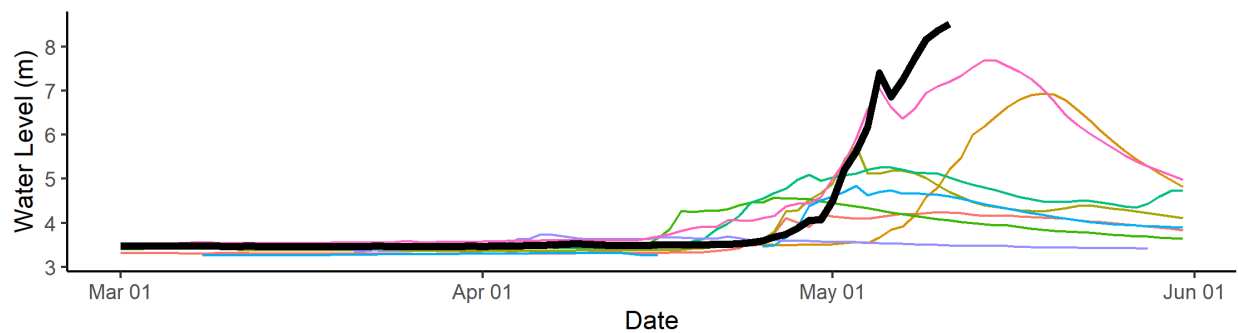
STEEN RIVER NEAR STEEN RIVER (07OB004)

2022 Water Levels (5 minute resolution)



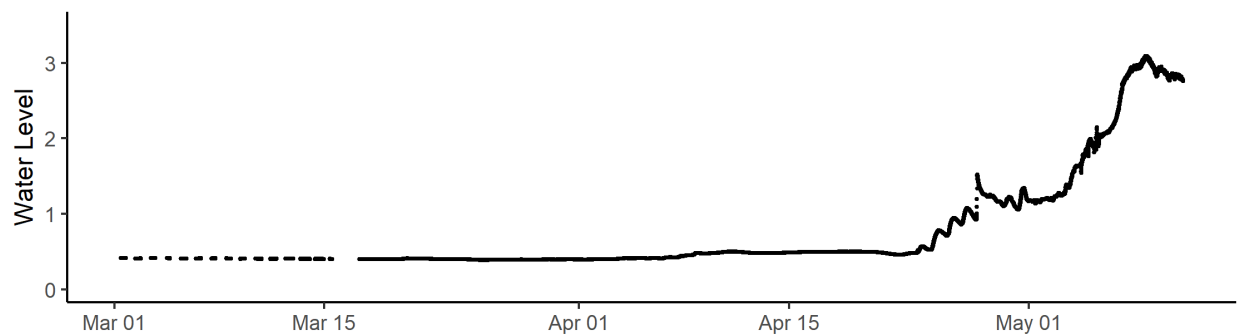
STEEN RIVER NEAR STEEN RIVER (07OB004)

Historic Daily Water Levels

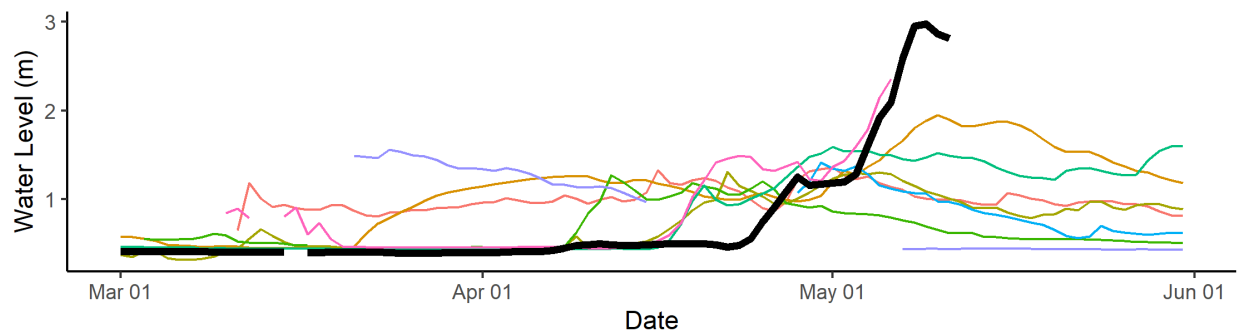


Above – Water level data on the Steen River near Steen River, AB. The Steen River is a tributary to the Hay River. Water levels continue to steadily rise in response to daily snowmelt. Provisional water levels at the gauge have exceeded the previous maximum recorded levels (2012 to present).

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



LUTOSE CREEK NEAR STEEN RIVER (070B006)
 Historic Daily Water Levels

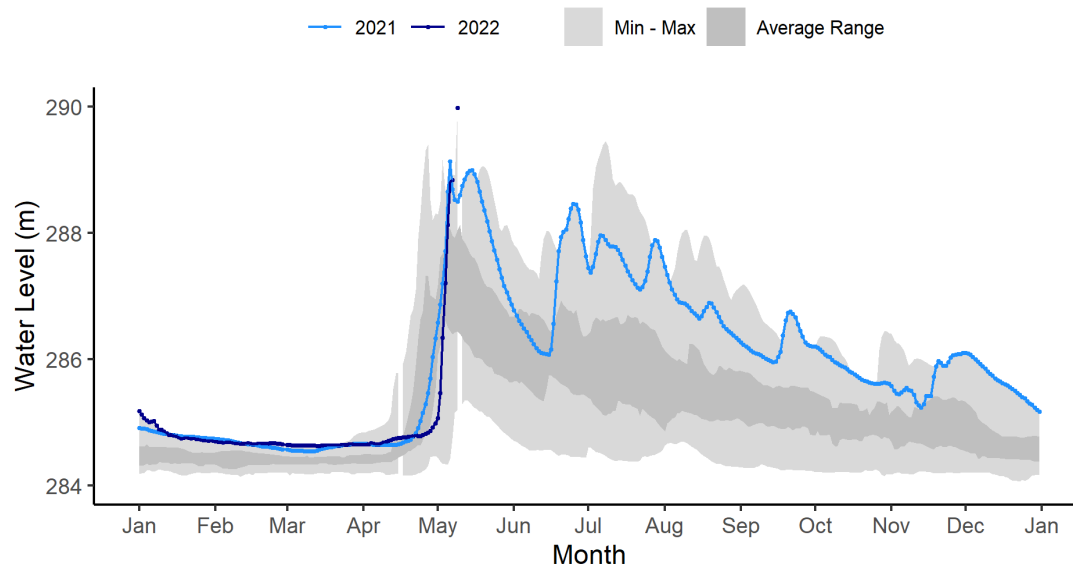


Above – Water level data on Lutose Creek near Steen River, AB. Lutose Creek is a small tributary to the Hay River. Water levels have started to drop from their peak but could continue to rise in response to snowmelt. Provisional water levels at the gauge have exceeded the previous maximum recorded levels (2012 to present).

Hay River near the border [07OB008]:

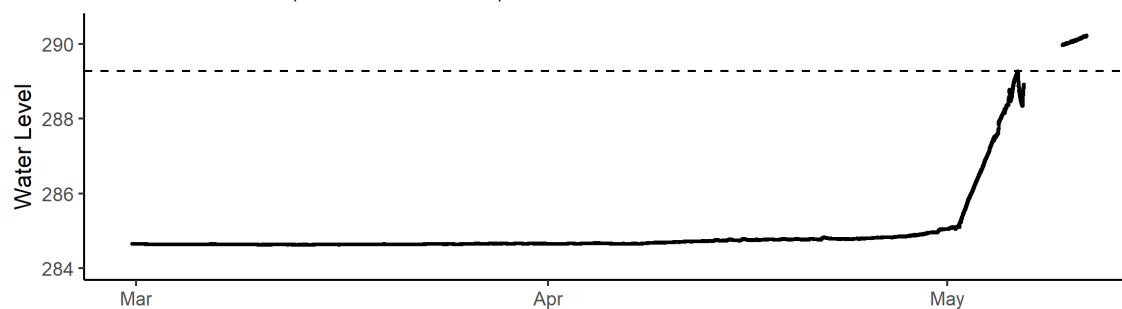
Note: Data were restored at this gauge on **May 09 at 16:15**.

HAY RIVER NEAR ALTA/NWT BOUNDARY (07OB008)



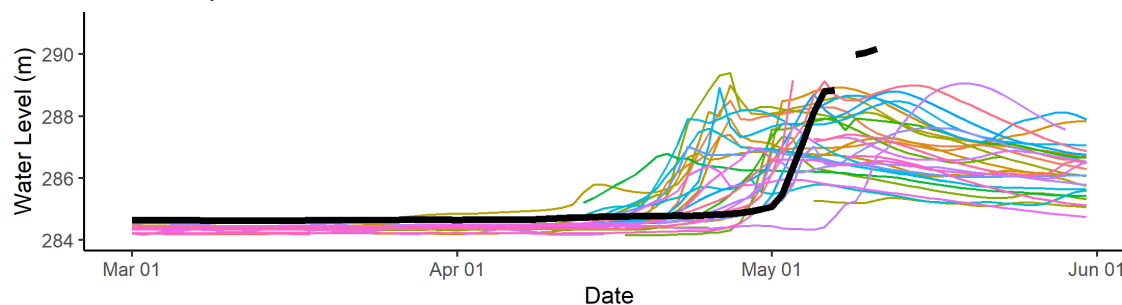
HAY RIVER NEAR ALTA/NWT BOUNDARY (07OB008)

2022 Water Levels (5 minute resolution)



HAY RIVER NEAR ALTA/NWT BOUNDARY (07OB008)

Historic Daily Water Levels

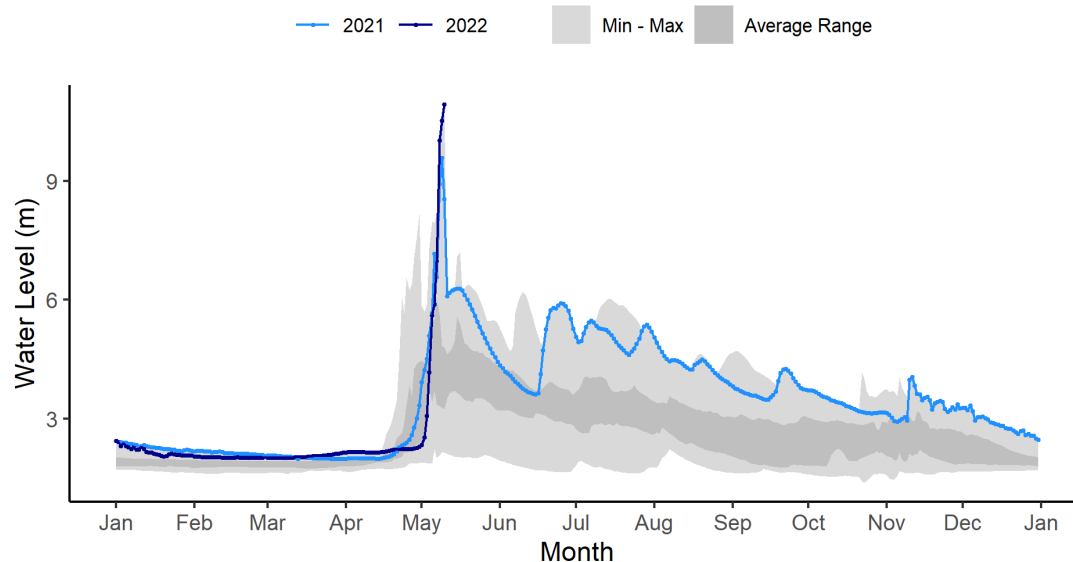


Above - The middle graph in this figure presents real time water level data at 5-minute resolution with the dashed line representing the peak water level from last year (2021). The lower graph shows daily average levels relative to the previous 20 years. Provisional water levels at the gauge have passed the instantaneous peak from last year and have also exceeded the previous maximum recorded levels (1986 to present).

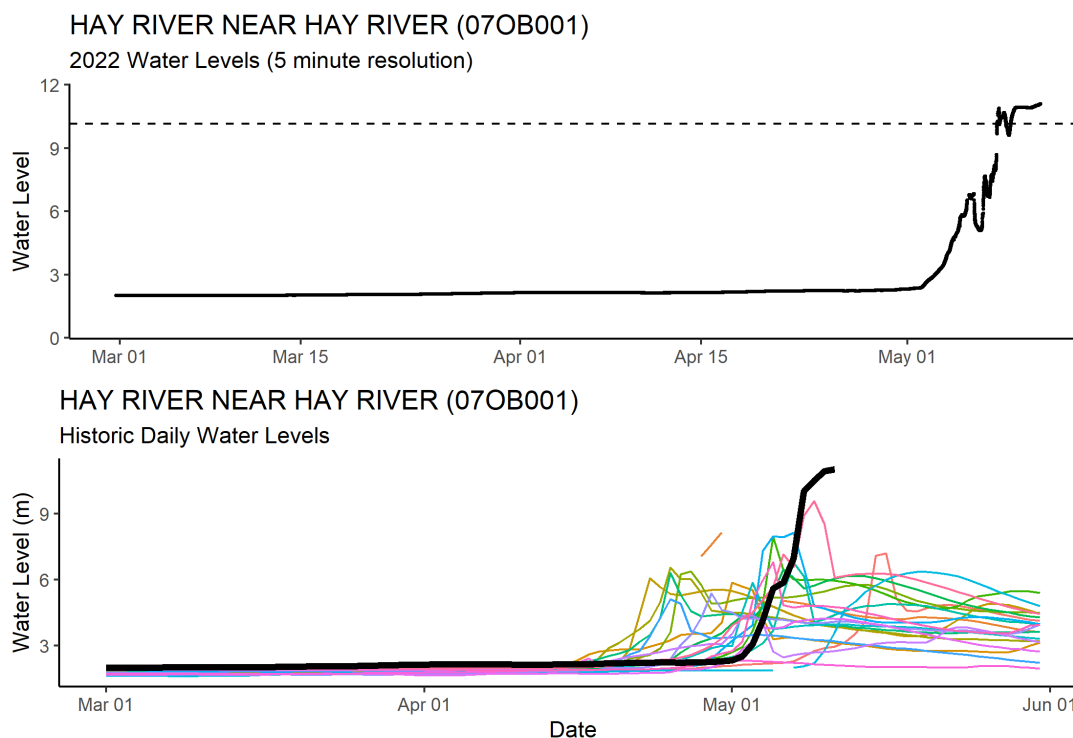


Above – Hay River near the border hydrometric gauge photo on May 11 at 10:00. Photo courtesy of Water Survey of Canada and GNWT.

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 10** (yesterday).



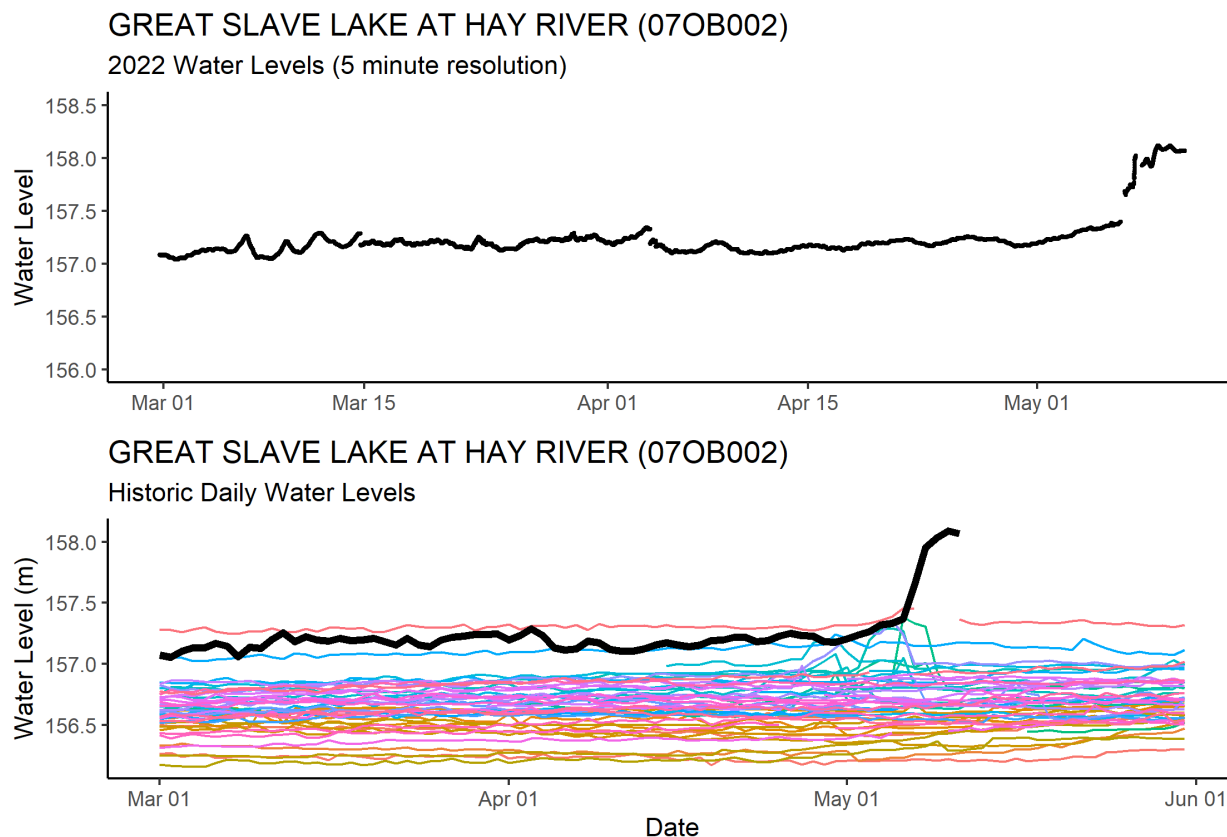
Above - The upper graph in this figure presents real time water level data at 5-minute resolution with the dashed line representing the peak water level from last year (2021). The lower graph shows daily average levels relative to the previous 20 years. Water levels at the gauge have passed the instantaneous peak from last year and continue to be affected by ice. Provisional water levels have also exceeded the previous maximum recorded levels (1964 to present).



Above – Hay River near the Town of Hay River hydrometric gauge photo on May 11 at 10:00. 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. Provisional water levels at the gauge have exceeded previous maximum recorded levels (1983 to present).

Liard River:

Current Status:

- Fort Liard reported some localized flooding yesterday late afternoon/evening as a result of an ice jam on the Liard River near the community;
 - Ice remains in place on the Liard River at Fort Liard, but water levels have decreased since yesterday;
 - Fort Liard Flood Watch continues to monitor the river for additional ice;
- There is open water on the Liard River at the Fort Simpson ferry crossing.

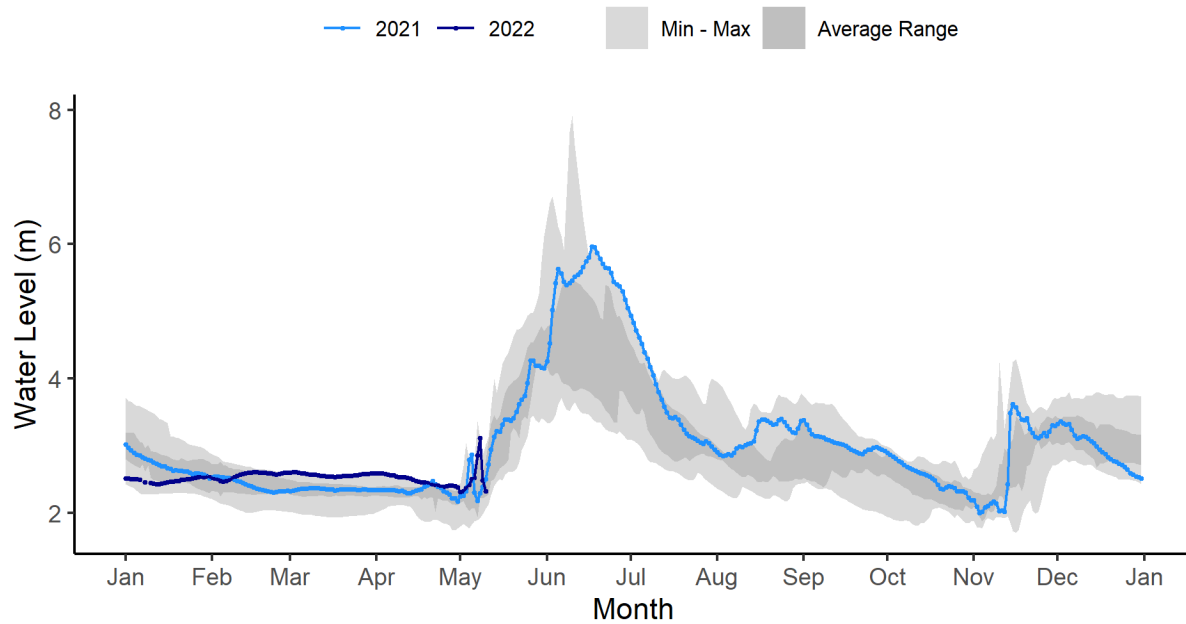


Above – Map of hydrometric stations in the Liard River basin. The station numbers are referenced in the water level plots below.

Hydrometric Data:

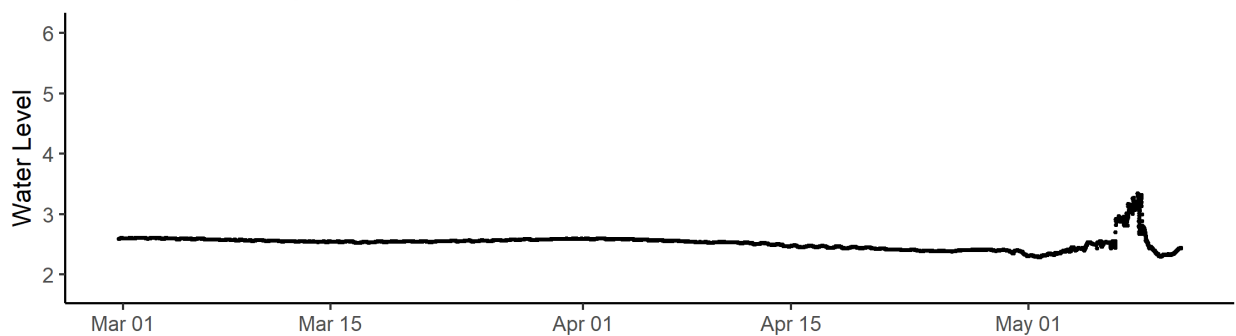
Liard River at Upper Crossing (Yukon) [10AA001]:

LIARD RIVER AT UPPER CROSSING (10AA001)



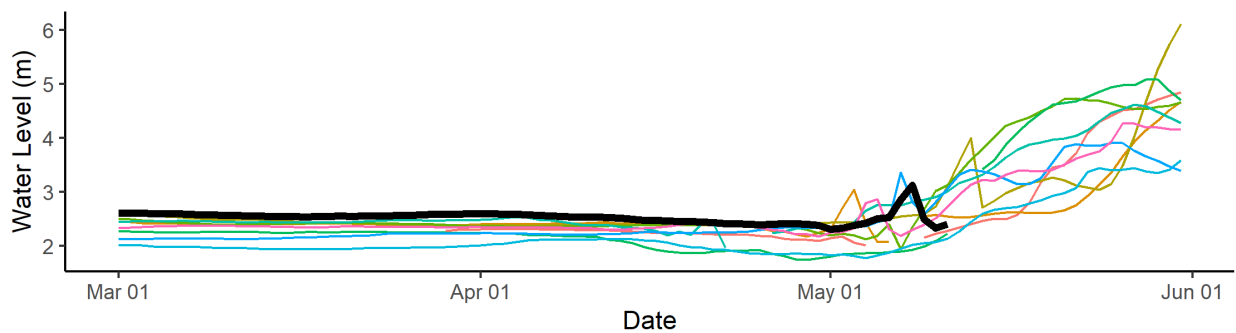
LIARD RIVER AT UPPER CROSSING (10AA001)

2022 Water Levels (5 minute resolution)

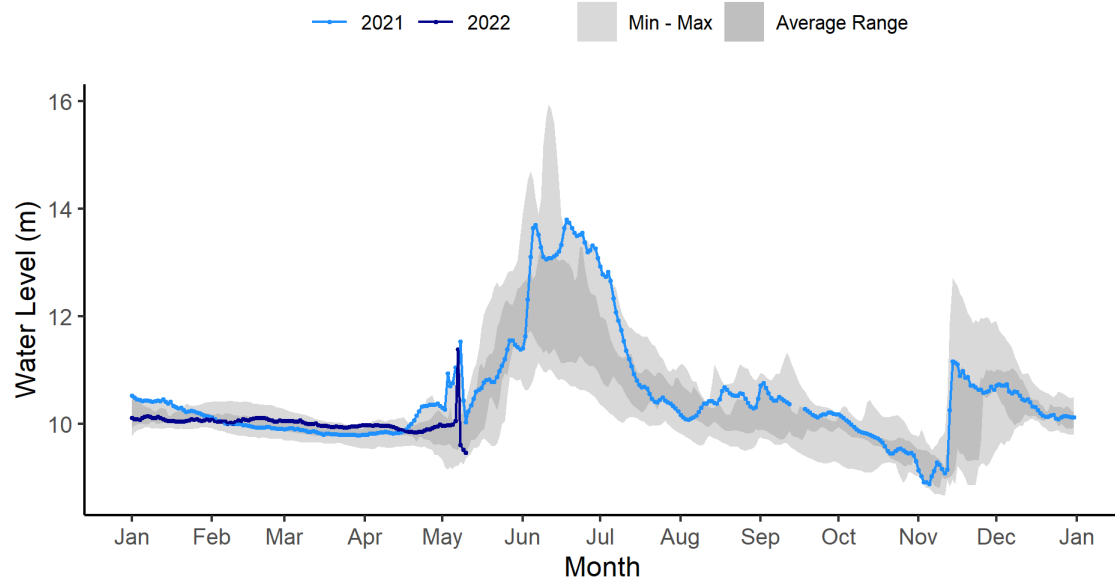


LIARD RIVER AT UPPER CROSSING (10AA001)

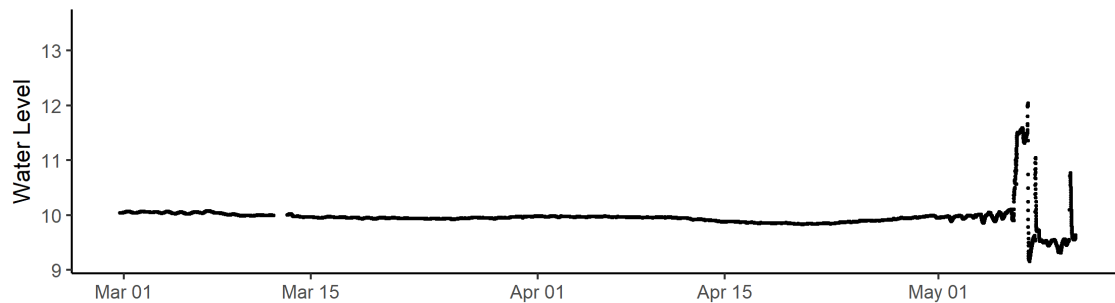
Historic Daily Water Levels



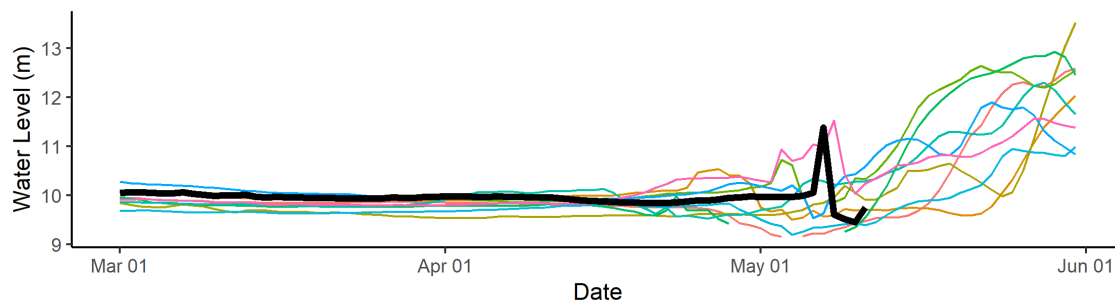
Liard River at Lower Crossing (British Columbia) [10BE001]:
LIARD RIVER AT LOWER CROSSING (10BE001)



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



LIARD RIVER AT LOWER CROSSING (10BE001)
Historic Daily Water Levels



The gauge appears to be affected by ice at this time.

Liard River at Fort Liard [10ED001]:

Note: The gauge is not currently producing data. The last available data were recorded on **May 08 at 04:25**.



Above – Liard River at Fort Liard hydrometric gauge photo from May 11 at 10:00. Photo courtesy of Water Survey of Canada and GNWT.

Liard River near the mouth [10ED002]:

Note: The gauge is not currently producing data. Water Survey of Canada of Canada staff visited the gauge on May 07 at 10:20 and measured an instantaneous water level of 4.55 m and on May 09 at 10:15 and measured an instantaneous water level of 9.16 m.

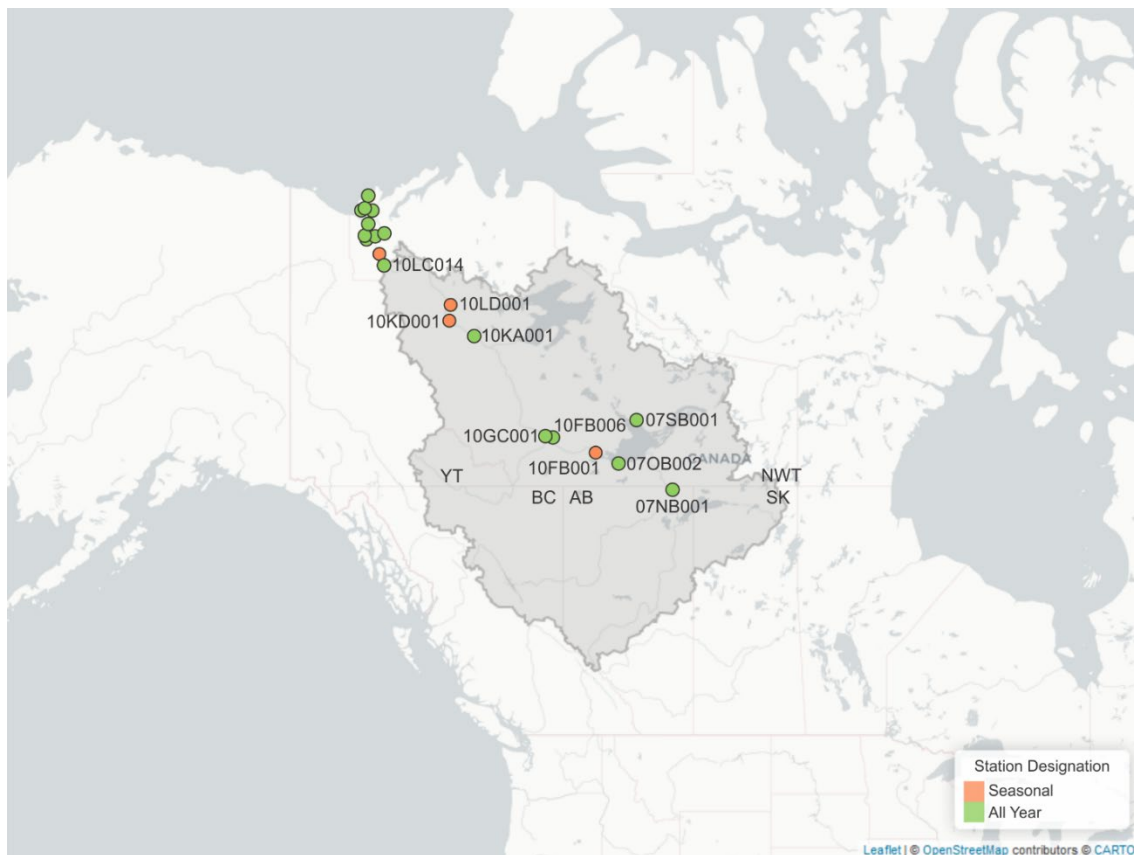


Above – Liard River near the mouth hydrometric gauge photo from May 11 at 10:00. Photo courtesy of Water Survey of Canada and GNWT.

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

Current Status:

- Ice continues to break up on the Slave River;
- The Mackenzie River at Fort Simpson has primarily open water and Liard River ice continues to clear well at this time (12:00);
 - Water levels at the Village sensor are under 9.0 m as of 12:00;
 - Ice has impacted the Mackenzie River at Fort Simpson hydrometric gauge so real time data are not available from that gauge;
- Ice on the Mackenzie River had not yet started moving at Jean Marie River as of this morning;
- Under ice water levels downstream on the Mackenzie River are slowly starting to rise, as is normal for spring break up.

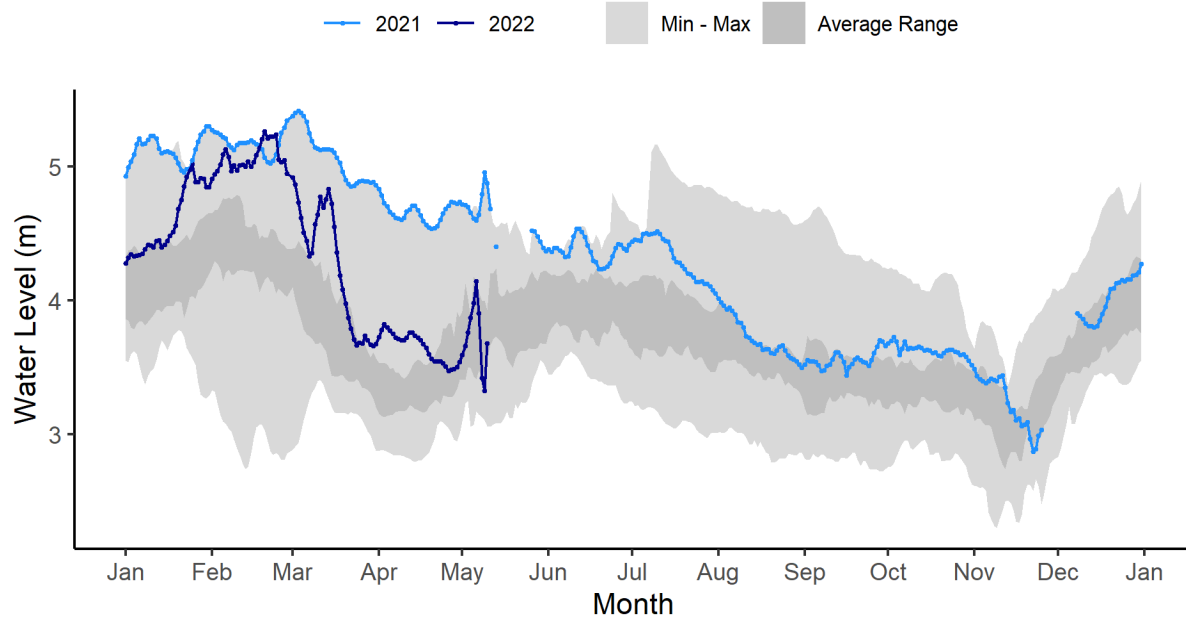


Above – Map of hydrometric stations in the Dehcho (Mackenzie River) basin. The station numbers are referenced in the water level plots below.

Hydrometric Data:

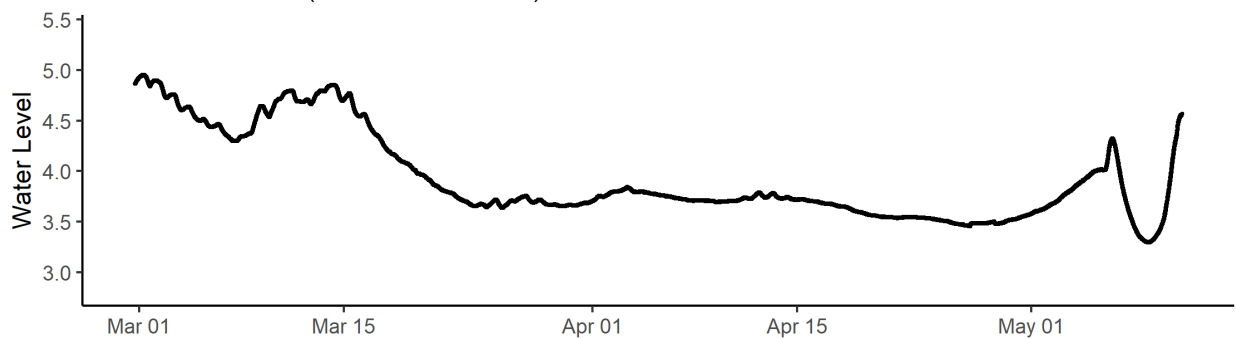
Slave River at Fitzgerald (Alberta) [07NB001]:

SLAVE RIVER AT FITZGERALD (ALBERTA) (07NB001)



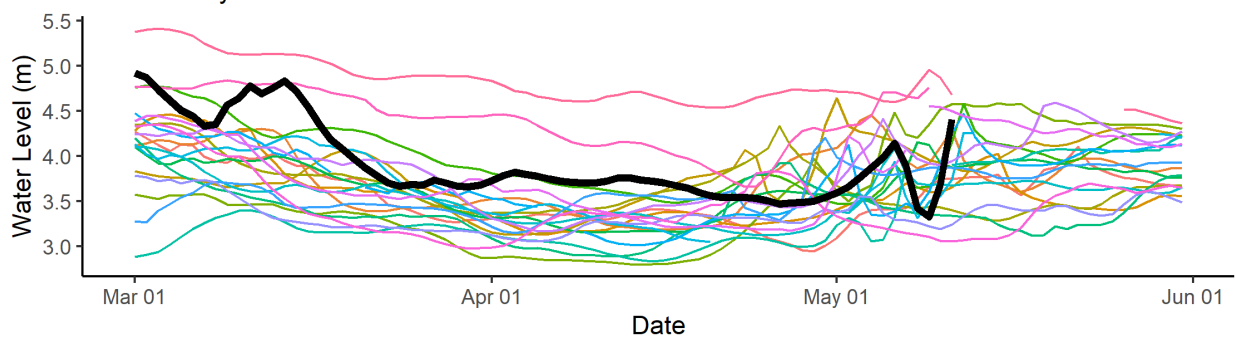
SLAVE RIVER AT FITZGERALD (ALBERTA) (07NB001)

2022 Water Levels (5 minute resolution)



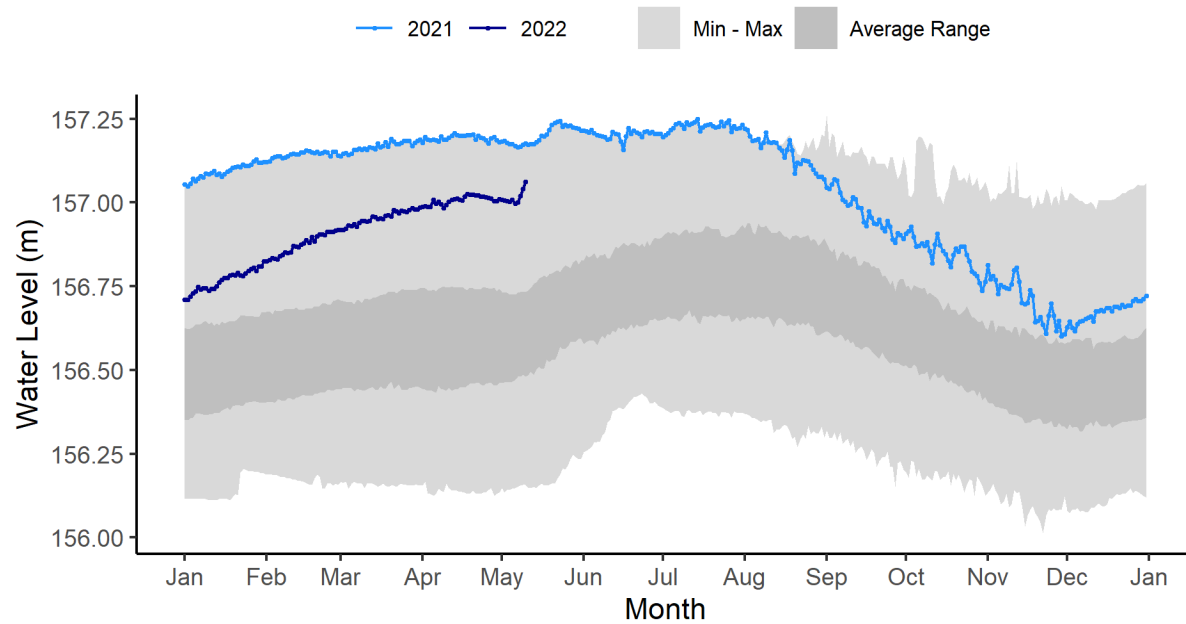
SLAVE RIVER AT FITZGERALD (ALBERTA) (07NB001)

Historic Daily Water Levels



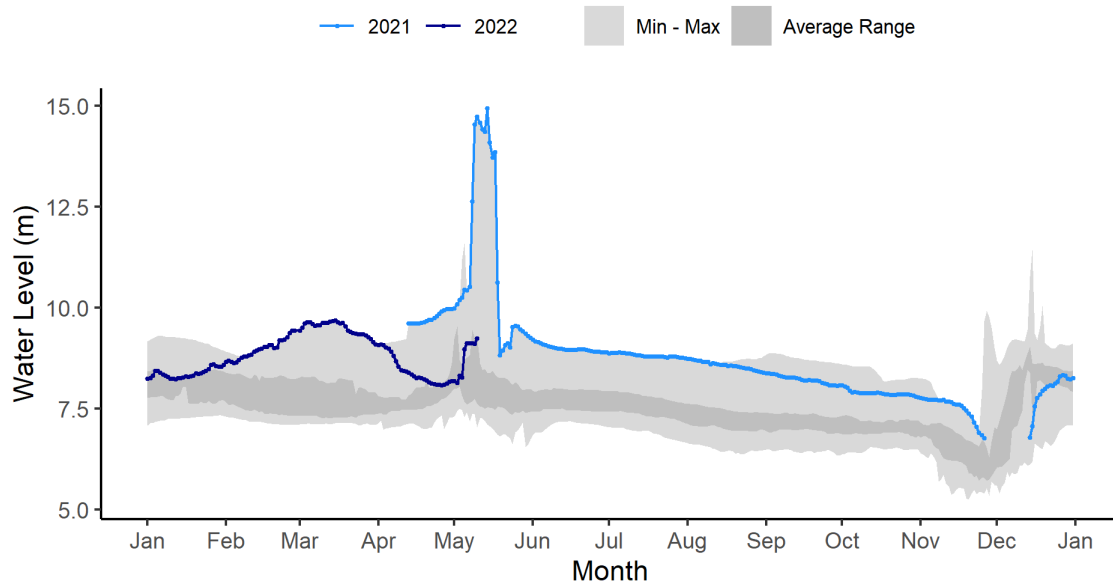
Great Slave Lake at Yellowknife Bay [07SB001]:

GREAT SLAVE LAKE AT YELLOWKNIFE BAY (07SB001)



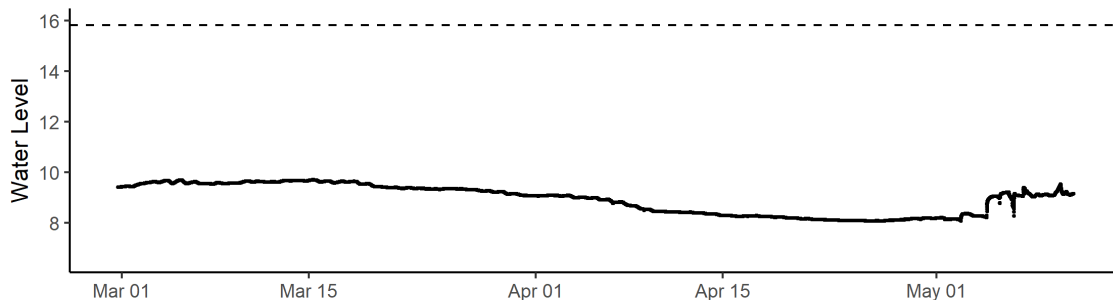
Above – Water levels on Great Slave Lake at Yellowknife Bay for the previous two years. Although water levels have receded since the highs of 2020 and 2021, levels remain much higher than normal.

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

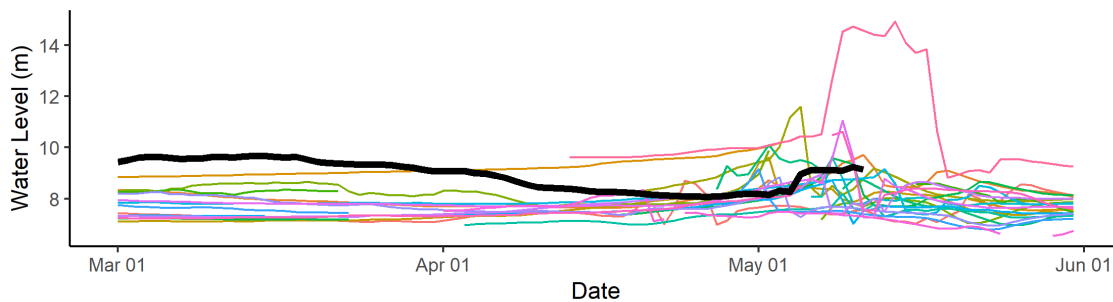


Above – hydrograph of daily average levels for the previous two years. Note that the most recent point on this graph shows the **daily average level from May 10** (yesterday).

MACKENZIE RIVER AT STRONG POINT (10FB006)
2022 Water Levels (5 minute resolution)



MACKENZIE RIVER AT STRONG POINT (10FB006)
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 (2021). The lower graph shows daily average levels relative to the previous 20 years.

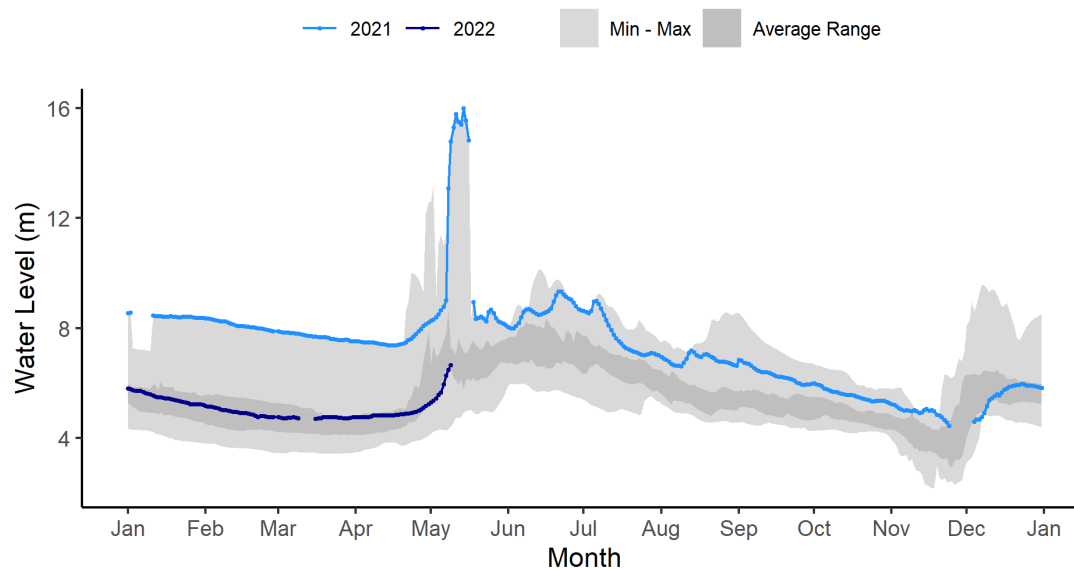


Above – Dehcho (Mackenzie River) at Strong Point hydrometric gauge photo from May 11 at 10:00. Photo courtesy of Water Survey of Canada and GNWT.

Mackenzie River at Fort Simpson [10GC001]:

Note: The sensor is not currently producing data. Manual readings from the Village of Fort Simpson sensor showed less than 9.0 m as of 12:00 today.

MACKENZIE RIVER AT FORT SIMPSON (10GC001)



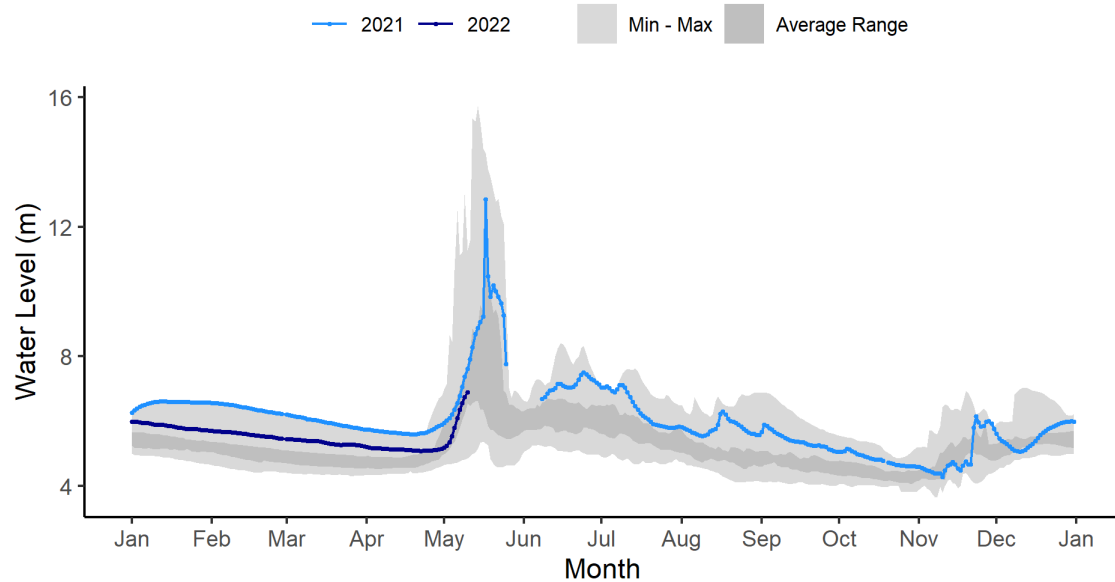
Above – hydrograph of daily average levels for the previous two years. **Note: this plot does not show real-time data but is presented as a reference point for the high water levels last year. Estimated maximum 2022 water levels to-date is 11.7 m at the Village sensor, on May 10th.**



Above – Dehcho (Mackenzie River) at Fort Simpson hydrometric gauge photo from May 11 at 10:00. Photo courtesy of Water Survey of Canada and GNWT.

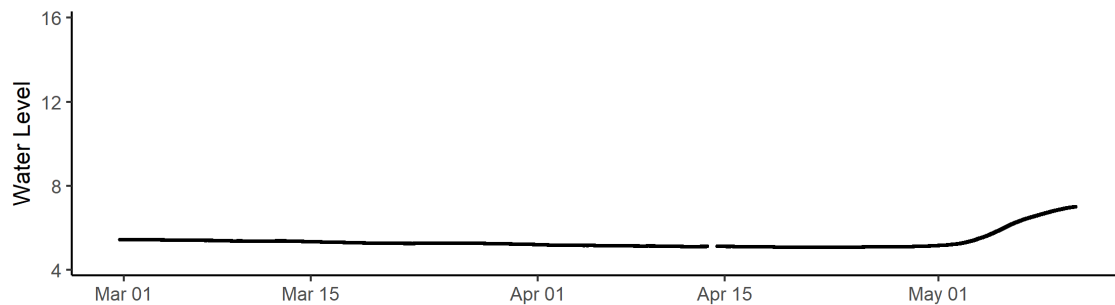
Mackenzie River at Norman Wells [10KA001]:

MACKENZIE RIVER AT NORMAN WELLS (10KA001)



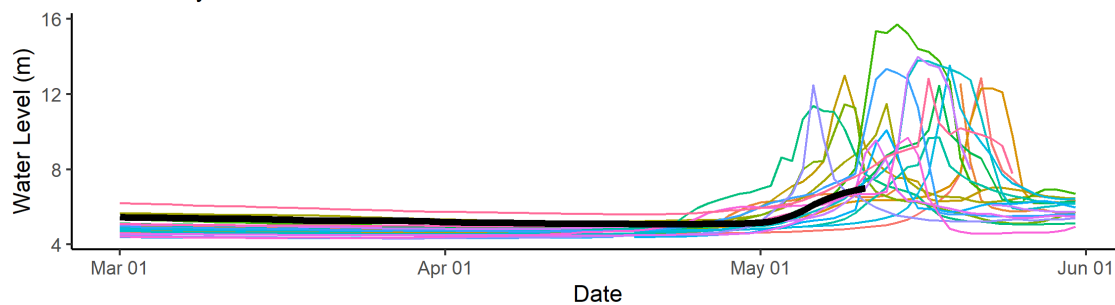
MACKENZIE RIVER AT NORMAN WELLS (10KA001)

2022 Water Levels (5 minute resolution)



MACKENZIE RIVER AT NORMAN WELLS (10KA001)

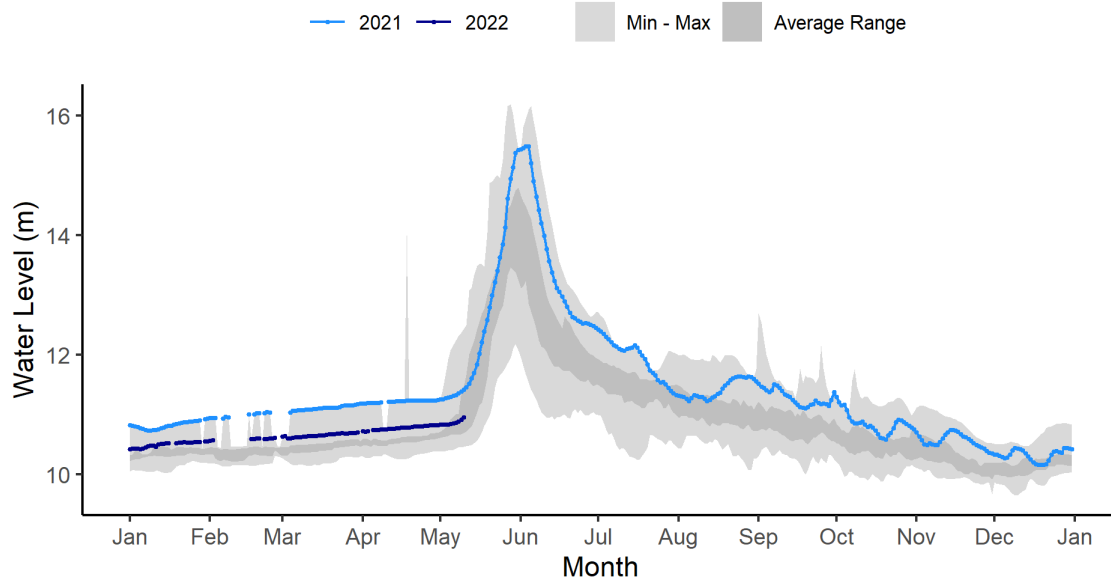
Historic Daily Water Levels



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 on the Mackenzie River at Norman Wells have begun to rise, with the timing being approximately average to previous years.

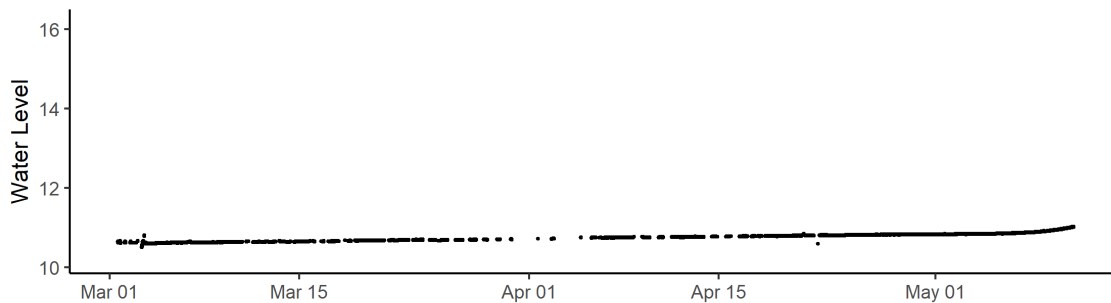
Mackenzie River (Peel Channel) at Aklavik [10MC003]:

MACKENZIE RIVER (PEEL CHANNEL) ABOVE AKLAVIK (10MC003)



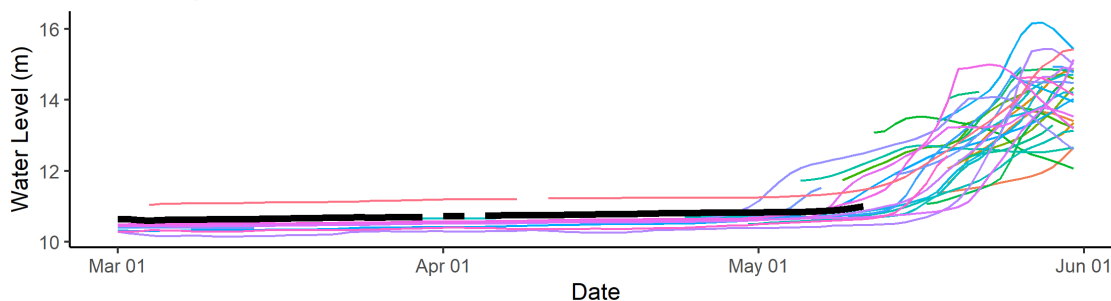
MACKENZIE RIVER (PEEL CHANNEL) ABOVE AKLAVIK (10MC003)

2022 Water Levels (5 minute resolution)



MACKENZIE RIVER (PEEL CHANNEL) ABOVE AKLAVIK (10MC003)

Historic Daily Water Levels



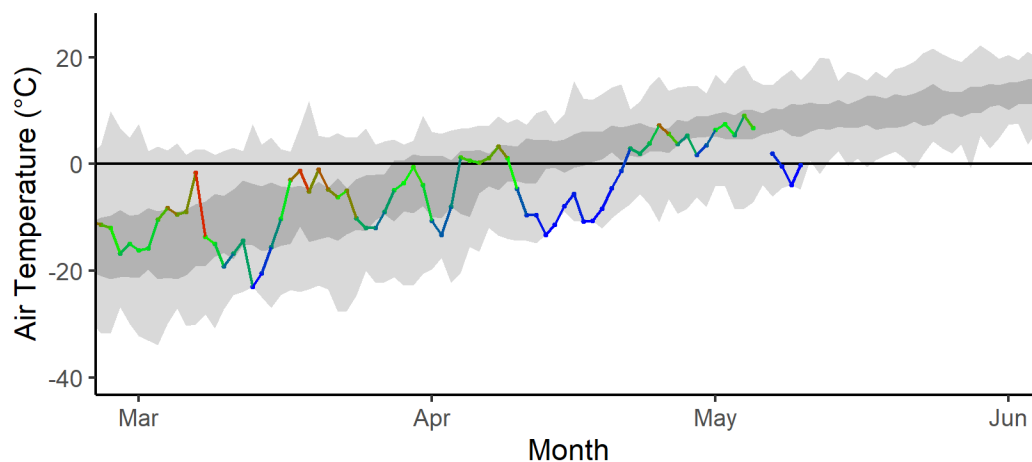
Above – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels in the Delta are slowly beginning to rise. Water levels are lower than last year but have been higher than average throughout the winter.

Weather Data:

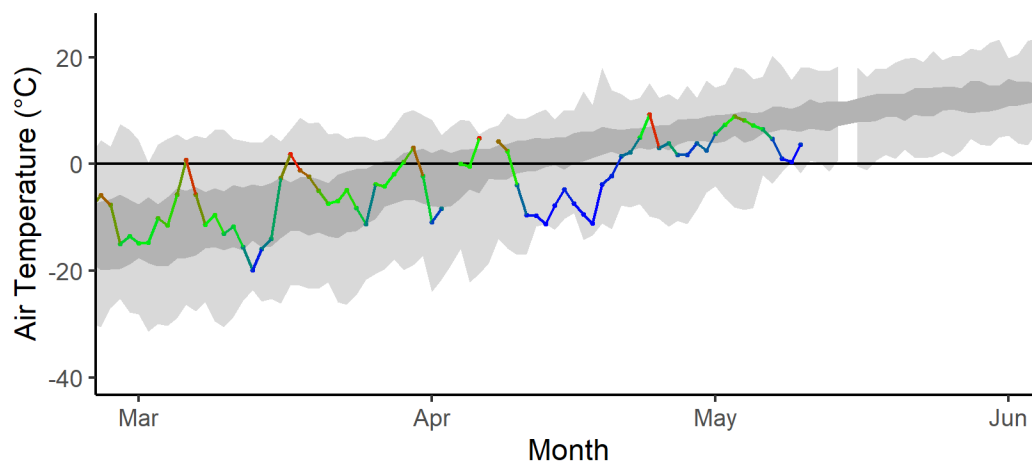
Weather information informs how snow and ice will melt and provides information about how this spring is unfolding relative to previous springs. Locations included here cover basin areas that feed into NWT rivers that are currently undergoing break up. The first set of plots show how temperatures have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

Temperatures are expected to return to normal over the next few days with no significant precipitation event forecast over the southern NWT.

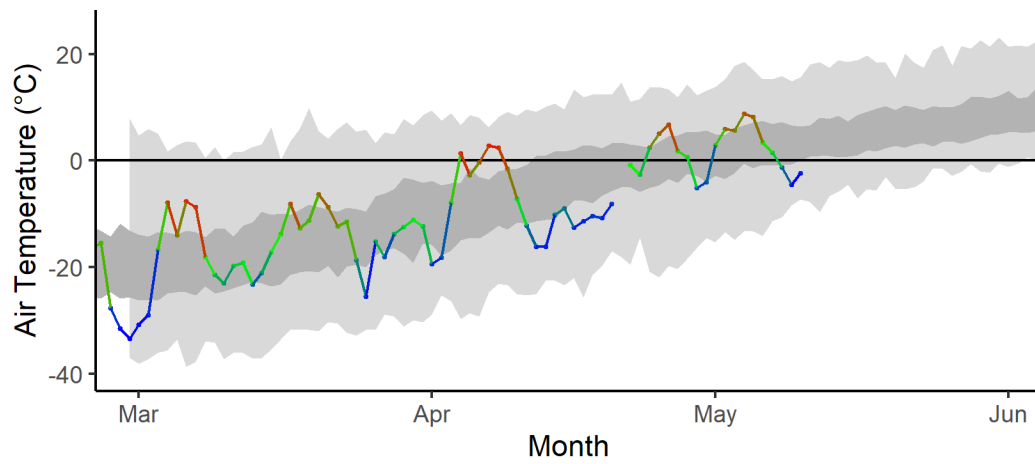
2022 High Level Mean Daily Air Temperatures



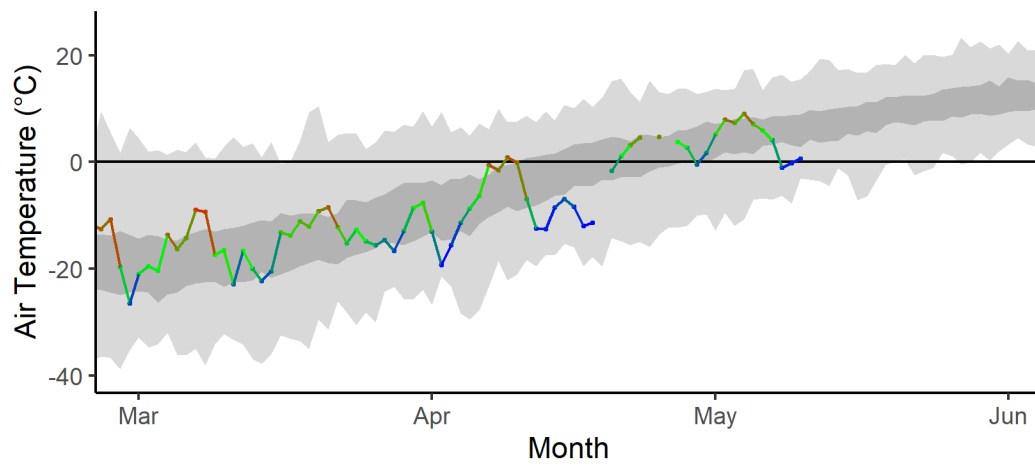
2022 Fort Nelson Mean Daily Air Temperatures



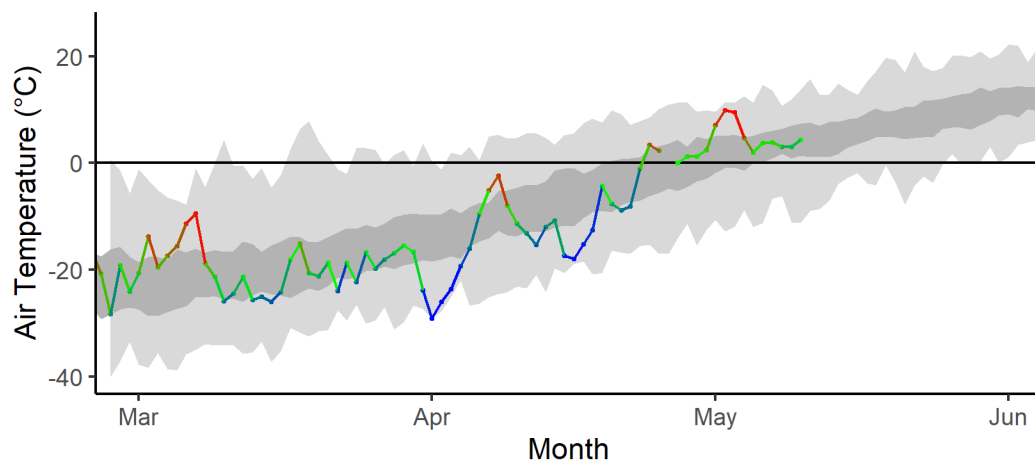
2022 Hay River Mean Daily Air Temperatures
















2022 Fort Simpson Mean Daily Air Temperatures
















2022 Norman Wells Mean Daily Air Temperatures
















High Level seven-day weather forecast:

<u>Wed</u> 11 May	Thu 12 May	Fri 13 May	Sat 14 May	Sun 15 May	Mon 16 May	Tue 17 May
 12°C 30% Chance of showers	 15°C 30% Chance of showers	 18°C Sunny	 13°C Periods of rain	 16°C Sunny	 17°C A mix of sun and cloud	 12°C 60% Chance of showers
Tonight	Night	Night	Night	Night	Night	
 -2°C 30% Chance of rain showers or flurries	 1°C Clear	 6°C Cloudy periods	 4°C Cloudy periods	 3°C Clear	 4°C Cloudy periods	














Fort Nelson seven-day weather forecast:

<u>Wed</u> 11 May	Thu 12 May	Fri 13 May	Sat 14 May	Sun 15 May	Mon 16 May	Tue 17 May
 12°C 30% Chance of flurries	 15°C 30% Chance of showers	 15°C Cloudy	 15°C A mix of sun and cloud	 14°C A mix of sun and cloud	 14°C 60% Chance of showers	 13°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 1°C 30% Chance of showers	 2°C 30% Chance of showers	 4°C Showers	 4°C Cloudy periods	 4°C Cloudy	 3°C 60% Chance of showers	














Hay River seven-day weather forecast:

<u>Wed</u> 11 May	Thu 12 May	Fri 13 May	Sat 14 May	Sun 15 May	Mon 16 May	Tue 17 May
 4°C 30% Chance of flurries	 8°C Sunny	 12°C Sunny	 7°C A mix of sun and cloud	 10°C Periods of rain	 12°C A mix of sun and cloud	 12°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 -7°C Clear	 0°C Clear	 -2°C Clear	 3°C Cloudy	 2°C Cloudy periods	 4°C Cloudy periods	

Fort Simpson seven-day weather forecast:

<u>Wed</u> 11 May	Thu 12 May	Fri 13 May	Sat 14 May	Sun 15 May	Mon 16 May	Tue 17 May
 10°C Mainly sunny	 15°C Sunny	 18°C Sunny	 15°C Cloudy	 16°C 60% Chance of showers	 14°C A mix of sun and cloud	 11°C 60% Chance of showers
Tonight	Night	Night	Night	Night	Night	
 -1°C A few clouds	 3°C Clear	 6°C Clear	 8°C Periods of rain	 3°C Cloudy periods	 3°C Cloudy	

Norman Wells seven-day weather forecast:

▼ Forecast							Hourly Forecast	Air Quality	Alerts	Jet Stream
<u>Wed</u> 11 May	Thu 12 May	Fri 13 May	Sat 14 May	Sun 15 May	Mon 16 May	Tue 17 May				
 11°C A mix of sun and cloud	 14°C Mainly sunny	 17°C Sunny	 17°C Sunny	 13°C Cloudy	 11°C A mix of sun and cloud	 6°C A mix of sun and cloud				
Tonight	Night	Night	Night	Night	Night					
 -2°C A few clouds	 0°C Clear	 1°C Clear	 3°C 60% Chance of showers	 2°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.

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.