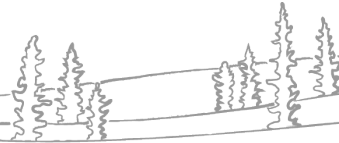




NWT Water Monitoring Bulletin

– May 13, 2022: 13:00



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.

Current Status:

- Provisional water levels at the Hay River near Hay River gauge (just upstream of town) reached a maximum yesterday morning;
 - Ice has started to clear from Town and water levels are receding;
 - According to provisional data, water levels at the gauge site have dropped almost 5 m since the peak yesterday morning;
- The ice jam on the Liard River at Fort Liard has cleared and there is now open water;
- Ice remains relatively stationary at Jean Marie River, extending from the Trout River to the Rabbitskin River;
- Ice continues to move well on the Mackenzie River downstream of Fort Simpson;
- Ice remains stationary on the Mackenzie River at Tulita;
- Water levels under ice are slowly increasing further downstream on the Mackenzie River, as is normal for this time of year.

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Hay River:

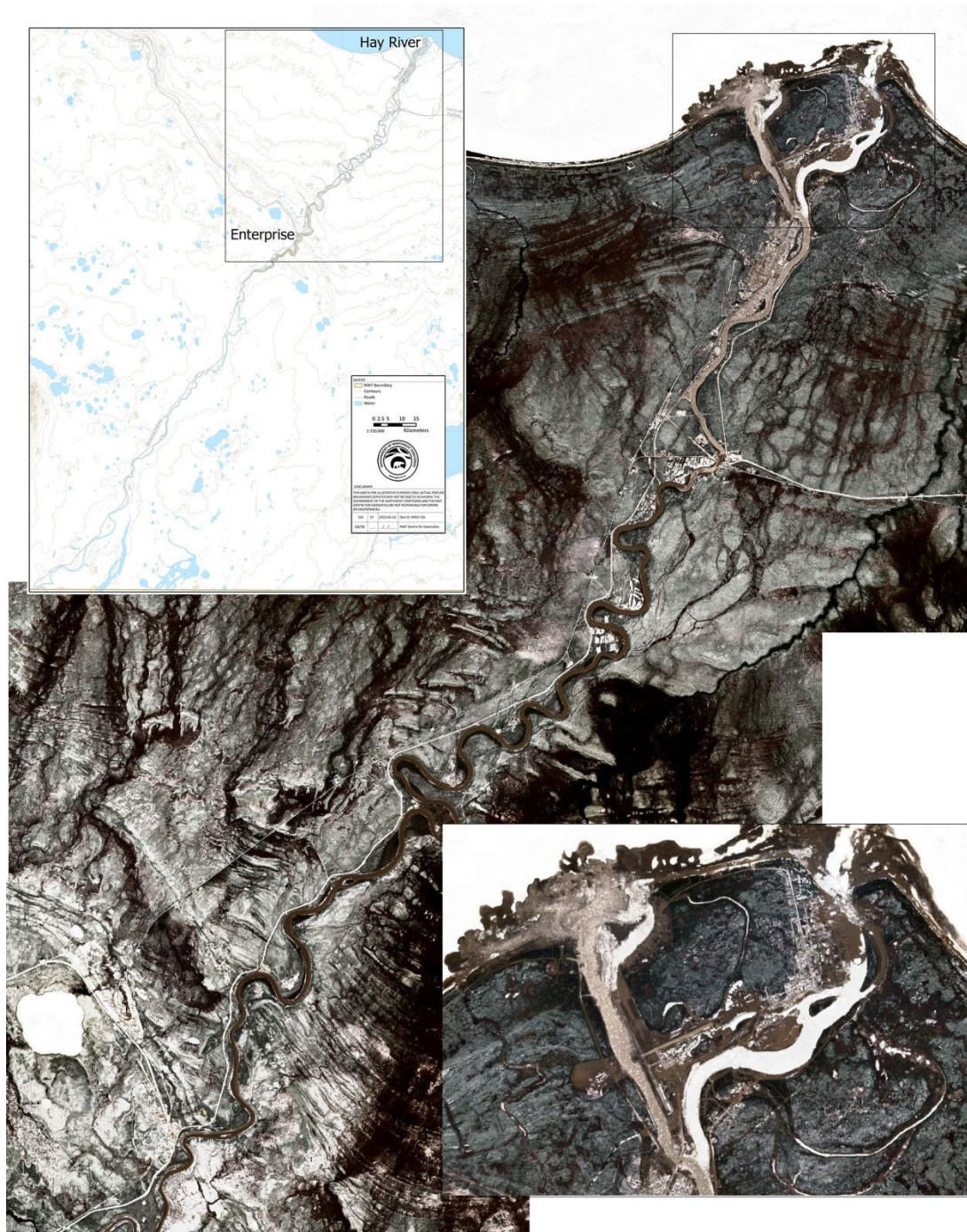
Current Status:

- Provisional water levels at the Hay River near Hay River gauge (just upstream of town) reached a maximum yesterday morning;
 - The **provisional** maximum water level of 12.854 m was recorded at 06:50
 - The previous maximum water level at the gauge was 10.538 m in 1989
 - This does not include the 1963 flood (gauge was installed in the summer of 1963);
 - According to provisional data, water levels at the gauge site have dropped almost 5 m since the peak yesterday morning of 11:00 today;
- Upstream water levels on the main stem of the Hay River (NT-AB border and Meander River) are continuing to rise as snowmelt water moves through the basin;
 - Water levels on smaller Alberta tributaries are receding as the snow melt peak has passed;
- The Alberta portion of the basin near Hay River is expected to receive some precipitation this weekend (5-10 mm);
 - This precipitation is not expected to lead to further or continued flooding at the Town of Hay River and K'at'l'odeeche First Nation, as long as flow out of the East and West channels is not impeded by ice;
- 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:

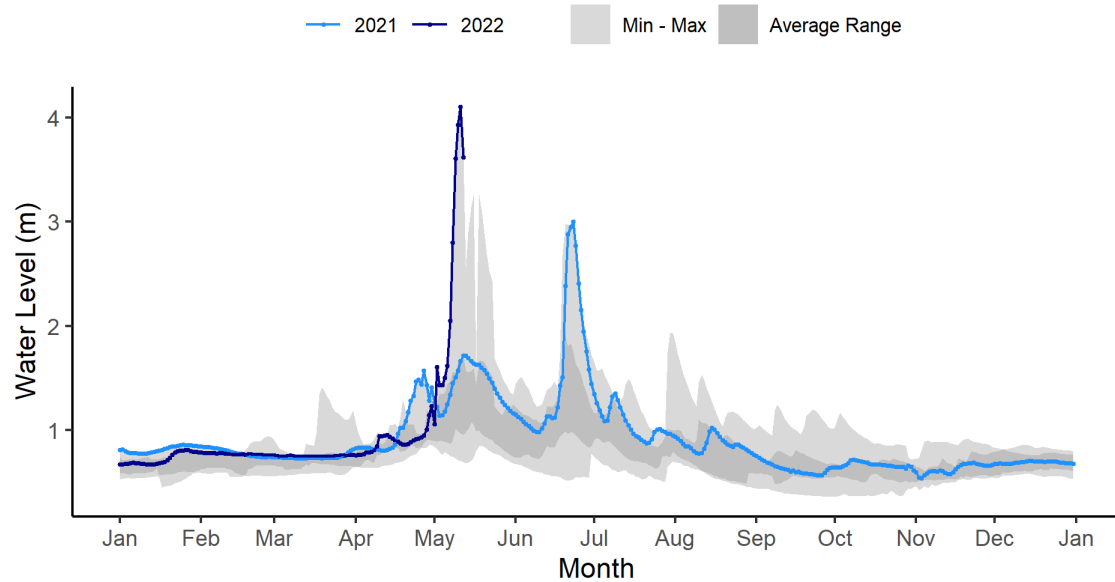


Above – Sentinel-2 satellite imagery taken on May 12th for the Hay River, between the town of Hay River and K’atl’odeeche First Nation, and Enterprise.

Hydrometric Data:

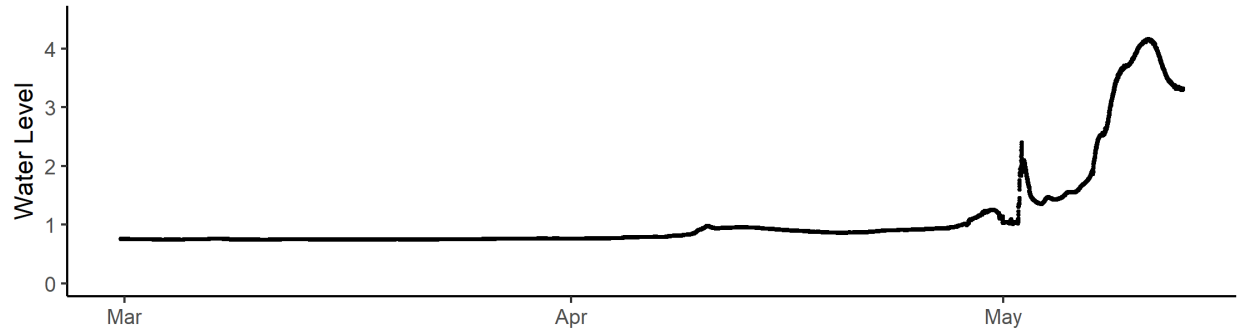
Chinchaga River near High Level (Alberta) [07OC001]:

CHINCHAGA RIVER NEAR HIGH LEVEL (07OC001)

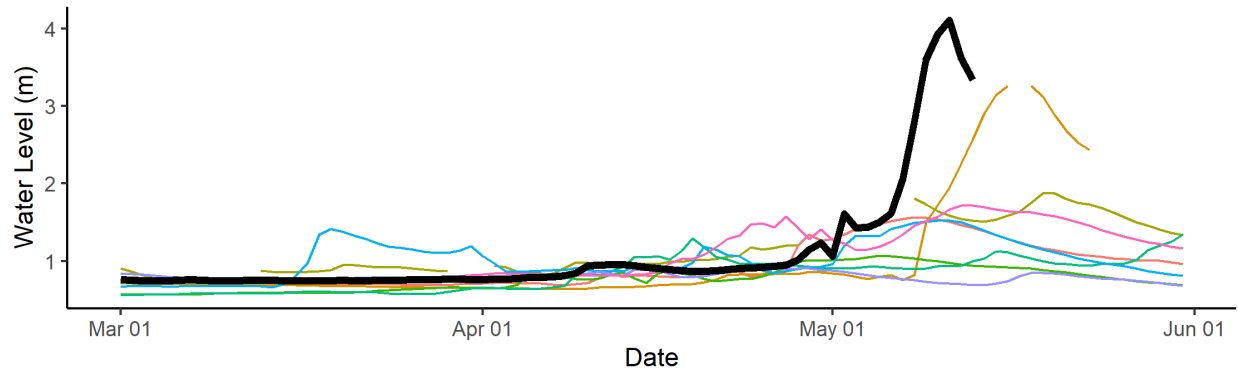


CHINCHAGA RIVER NEAR HIGH LEVEL (07OC001)

2022 Water Levels (5 minute resolution)

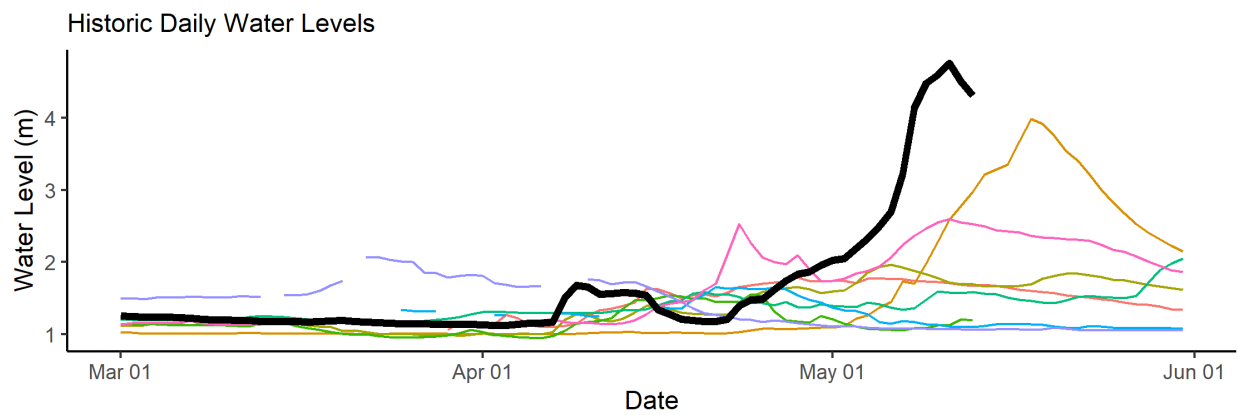
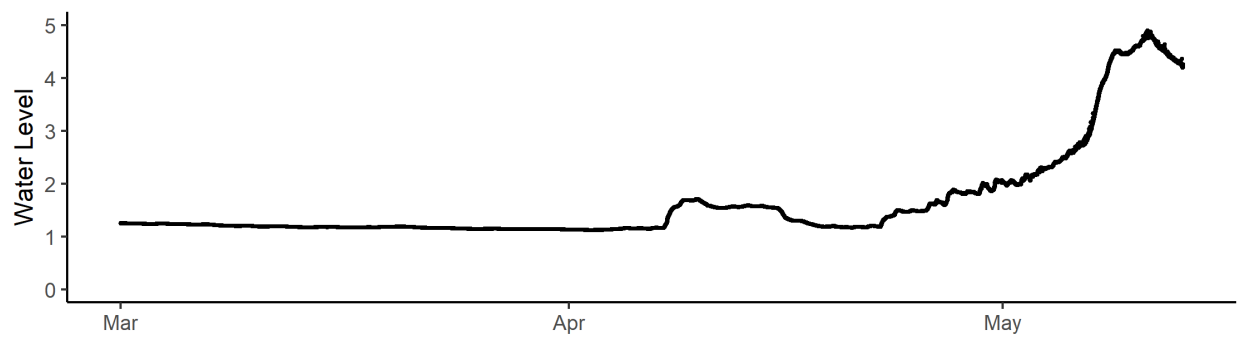


Historic Daily Water Levels



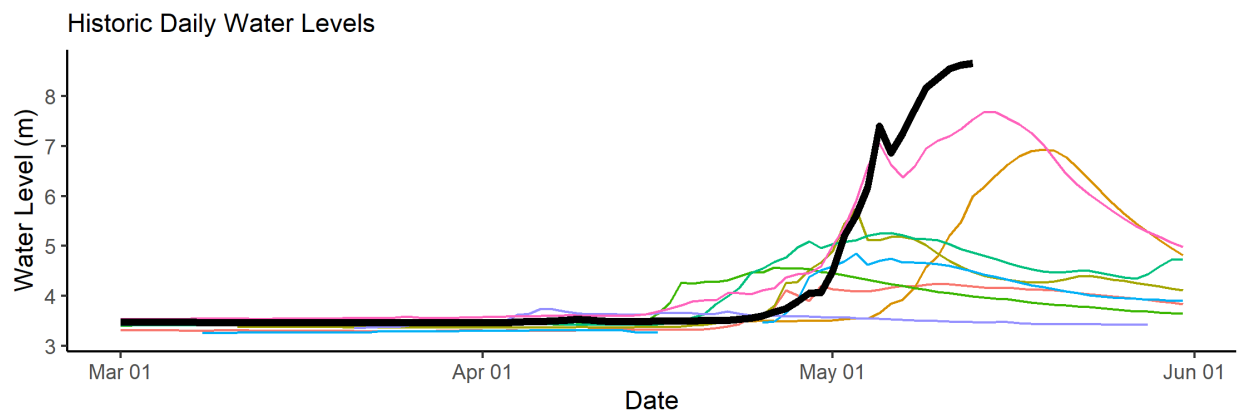
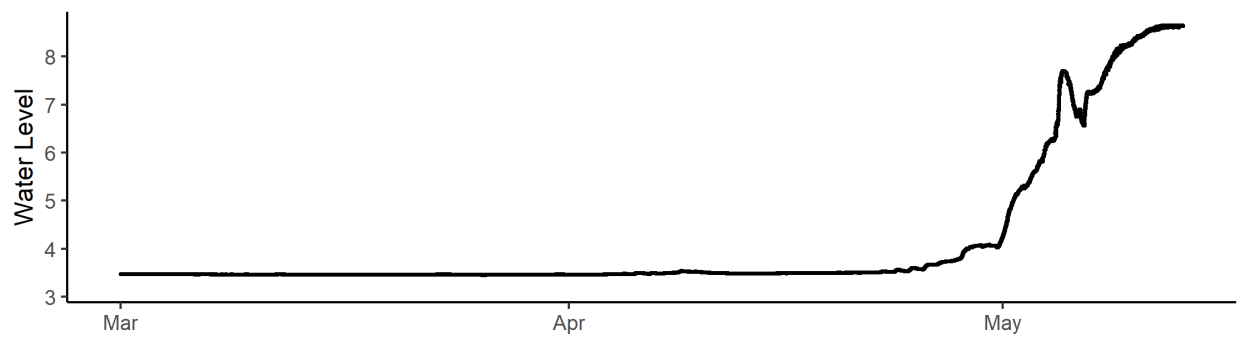
Above – Water level data at the Chinchaga River near High Level, AB. This plot shows high resolution (5 minute) water level data in the middle, and daily average data on the bottom. Water levels are now receding from their peak.

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



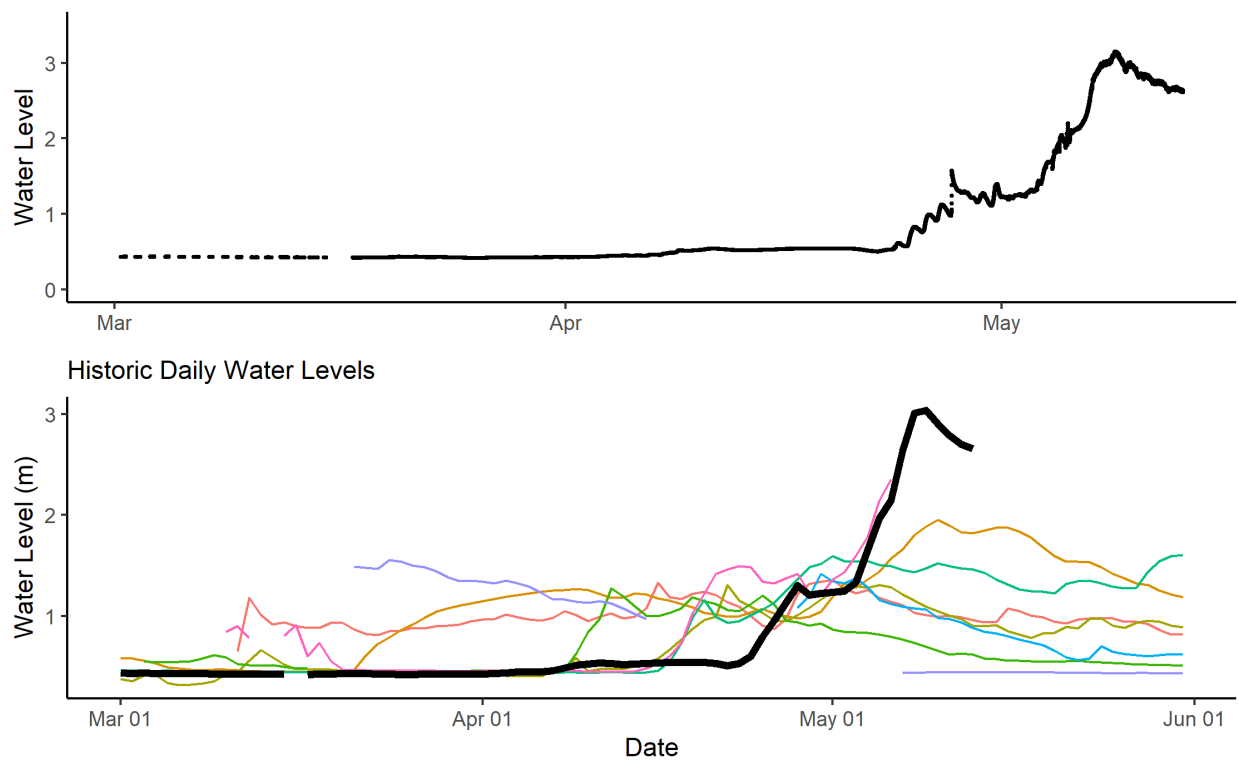
Above – Water level data on Sousa Creek near High Level, AB. The Sousa River is a small tributary to the Hay River. Water levels are now receding from their peak.

Steen River near Steen River (Alberta) [070B004]:
 STEEN RIVER NEAR STEEN RIVER (070B004)
 2022 Water Levels (5 minute resolution)



Above – Water level data on the Steen River near Steen River, AB. The Steen River is a tributary to the Hay River. Water levels are now levelling off as snowmelt water moves through the basin.

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

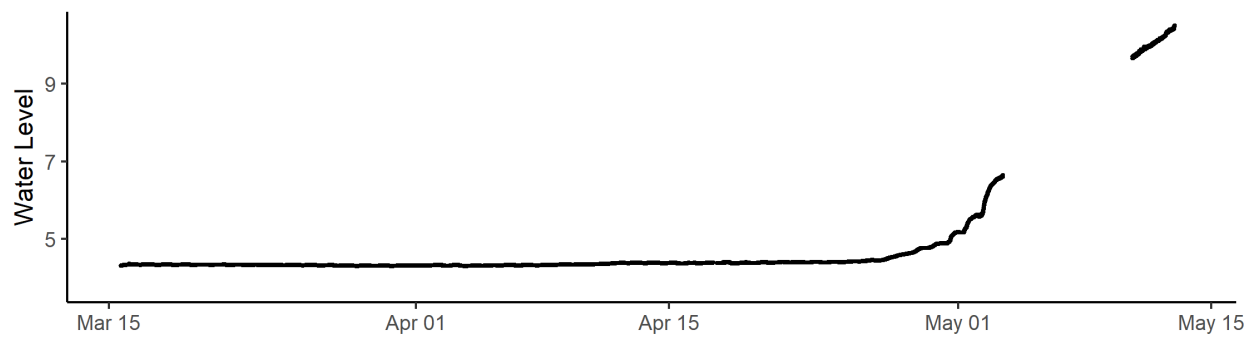


Above – Water level data on Lutose Creek near Steen River, AB. Lutose Creek is a small tributary to the Hay River. Water levels are now receding from their peak.

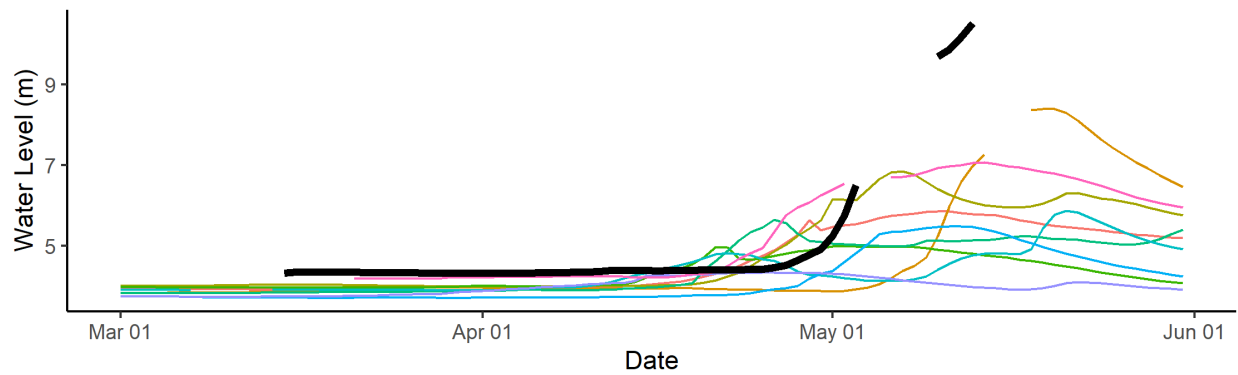
Hay River near Meander River [07OB003]:

HAY RIVER NEAR MEANDER RIVER (07OB003)

2022 Water Levels (5 minute resolution)



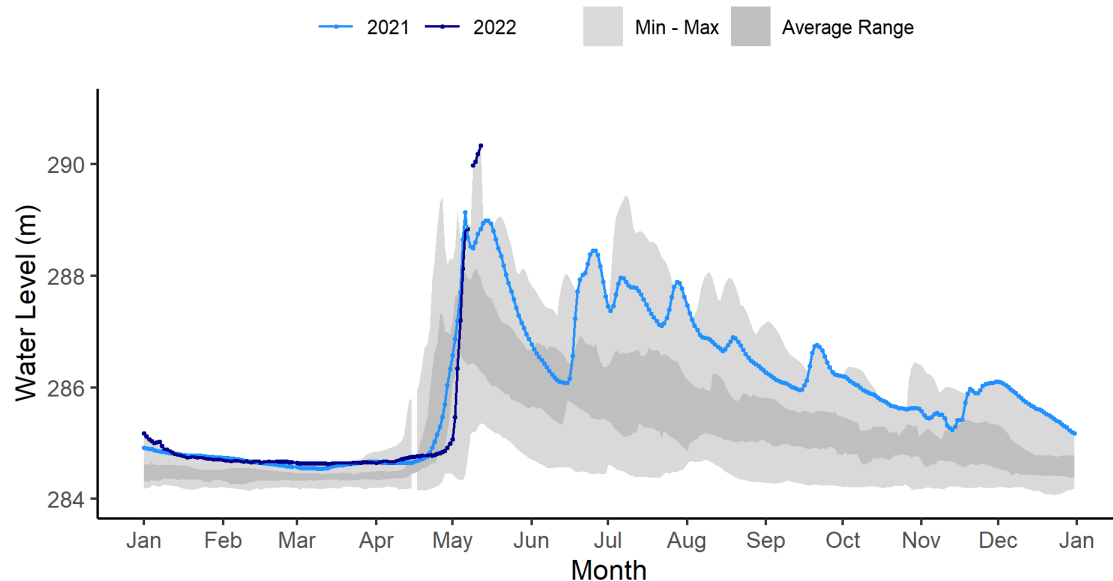
Historic Daily Water Levels



Above – Water level data on the Hay River near Meander River, AB. Water levels continue to steadily rise in response to snowmelt.

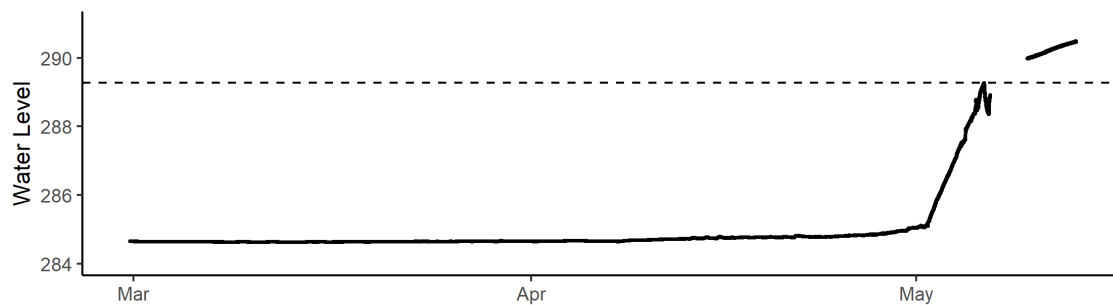
Hay River near the border [07OB008]:

HAY RIVER NEAR ALTA/NWT BOUNDARY (07OB008)

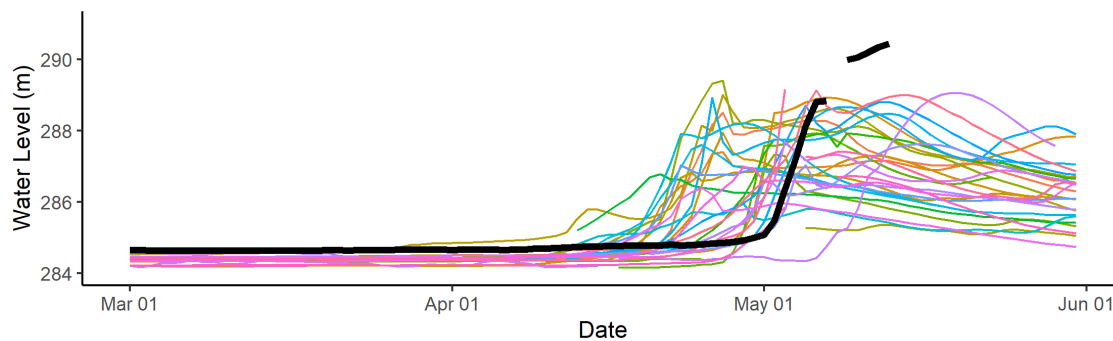


HAY RIVER NEAR ALTA/NWT BOUNDARY (07OB008)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels

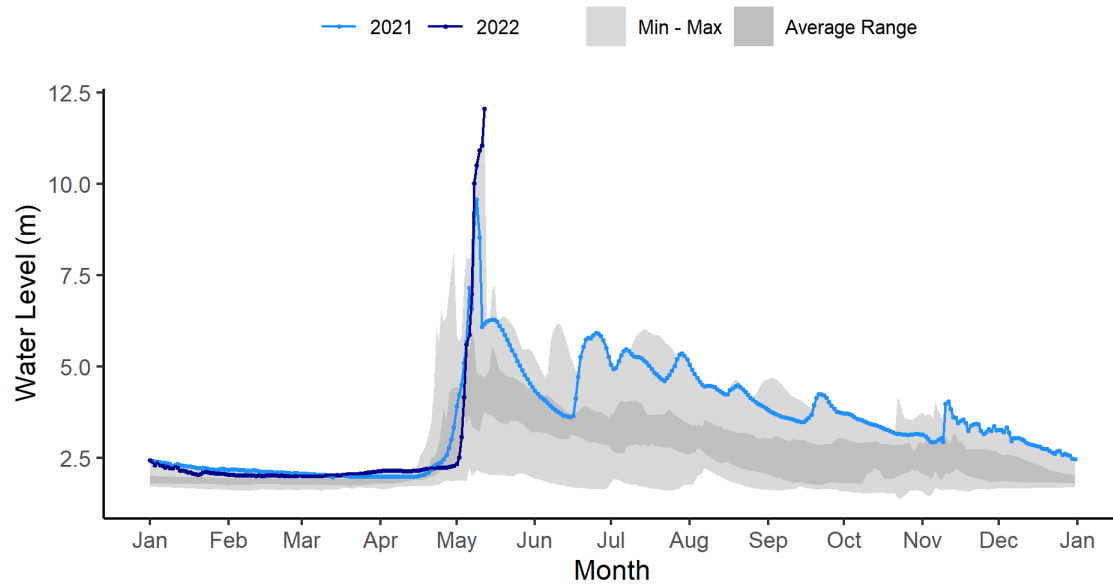


Above - The middle graph in this figure presents real time water level data at 5-minute resolution with the dashed line representing the peak water level from last year (2021). The lower graph shows daily average levels relative to the previous 20 years. Water levels continue to slowly rise as snowmelt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

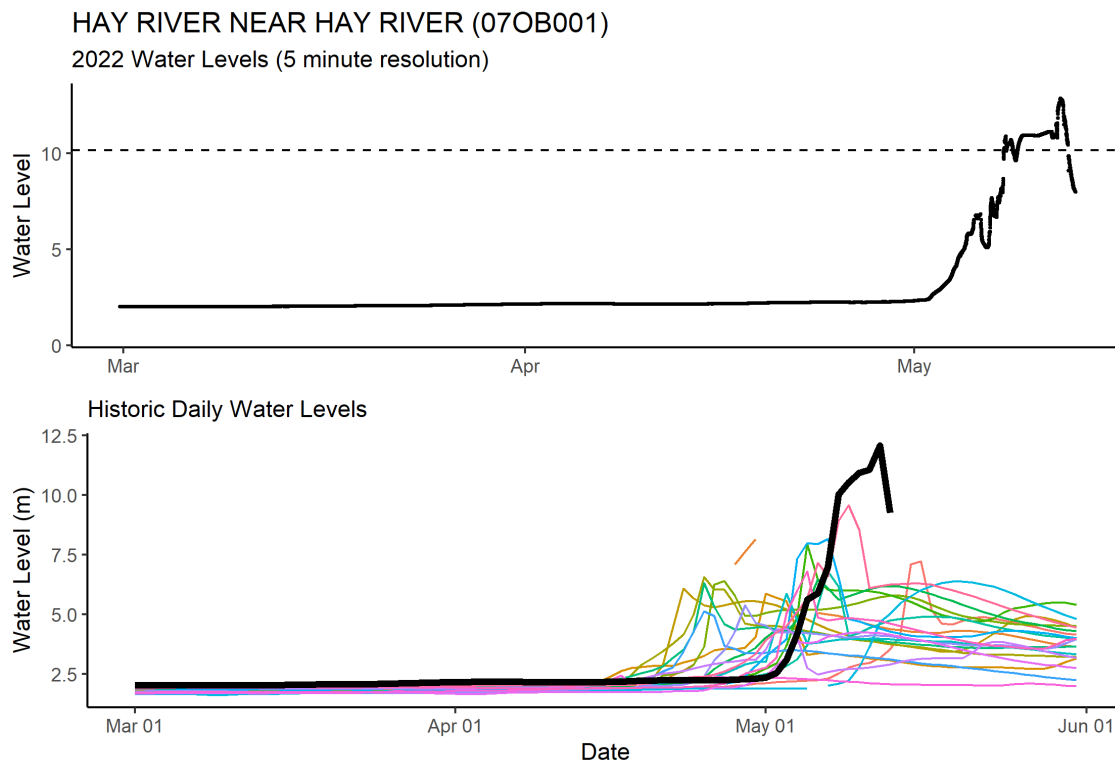


Above – Hay River near the border hydrometric gauge photo on May 13 at 13:00. Photo courtesy of Water Survey of Canada and GNWT.

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



Above – hydrograph of daily average levels for the previous two years.



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.



Above – Hay River near the Town of Hay River hydrometric gauge photo on May 13 at 13:00. Photo courtesy of Water Survey of Canada and GNWT.

Liard River:

Current Status:

- Water levels on the Liard River at Fort Liard have receded since flooding was reported on May 10;
 - Ice has pushed past Fort Liard and there is now open water at the community;
- 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 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 13 at 13:00. 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.

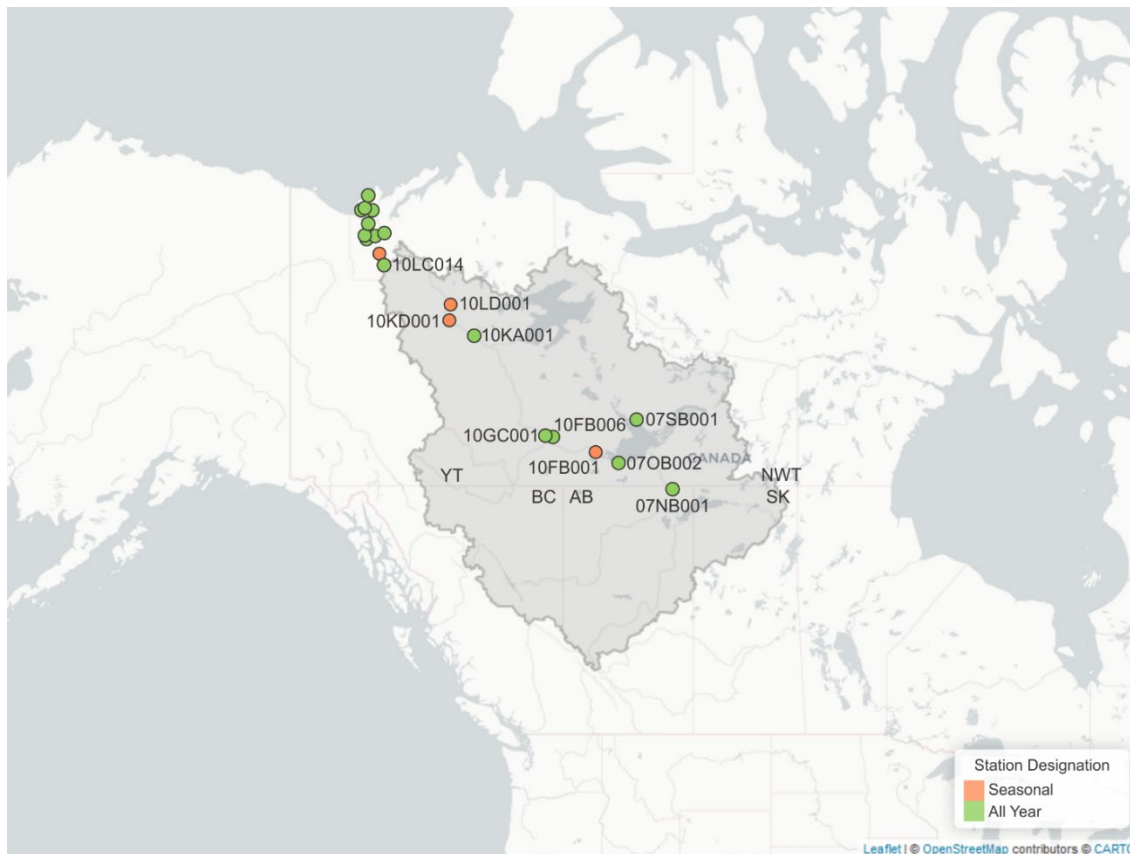


Above – Liard River near the mouth hydrometric gauge photo from May 13 at 13:00. Photo courtesy of Water Survey of Canada and GNWT.

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

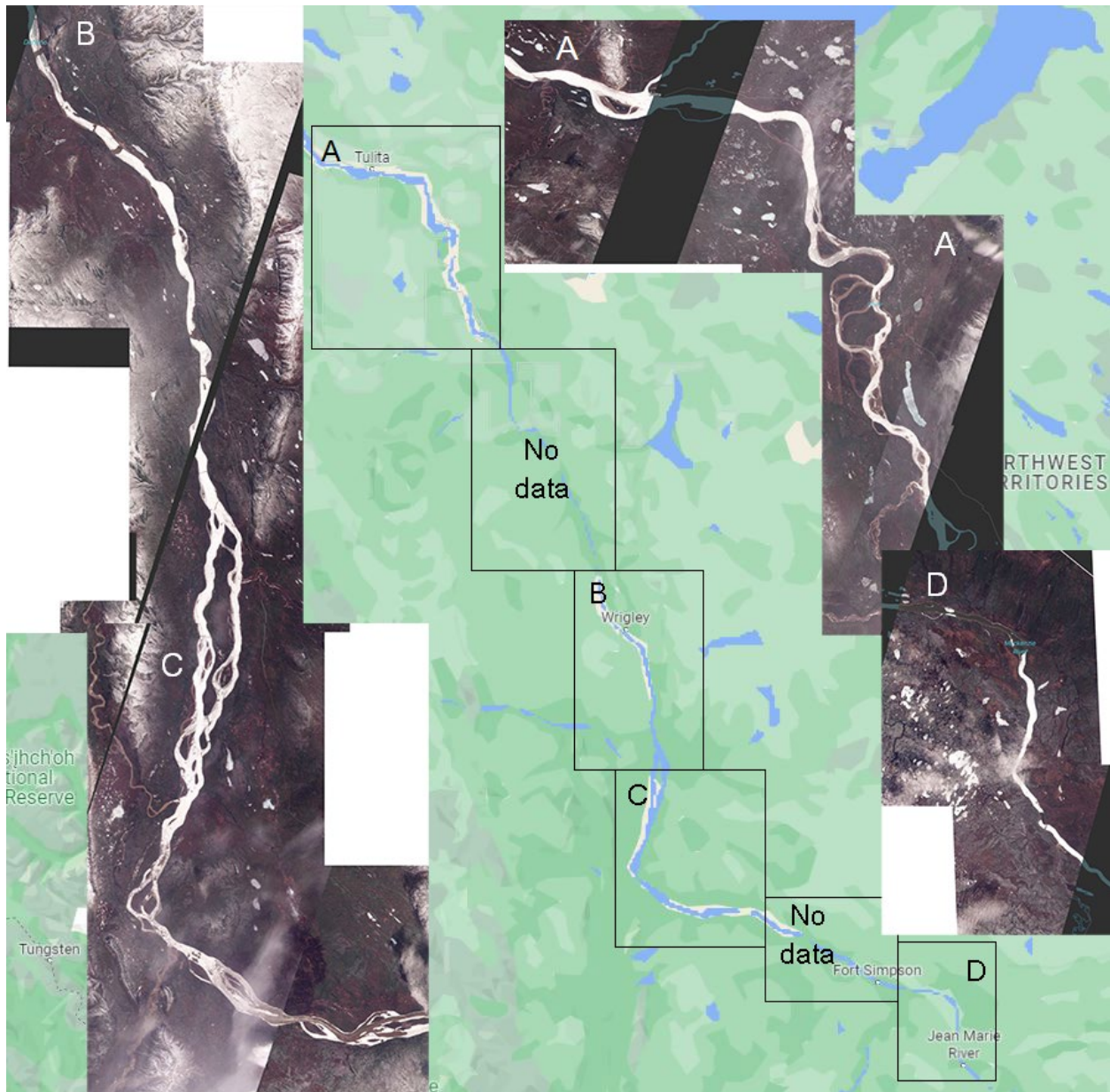
Current Status:

- Break up continues to progress along the Slave River;
- Ice remains mostly stationary on the Mackenzie River from Trout River to the mouth of the Rabbitskin River;
 - According to Jean Marie River First Nation, the Jean Marie Creek is free of ice and moving freely;
- The Mackenzie River at Fort Simpson is open and small amounts of ice continue to move well;
- Ice was reported to be moving on the Mackenzie River at Wrigley as of yesterday;
- Mackenzie River ice is still stationary at Tulita;
- Under ice water levels downstream on the Mackenzie River (Norman Wells and beyond) are slowly starting to rise, as is normal for this time of year.



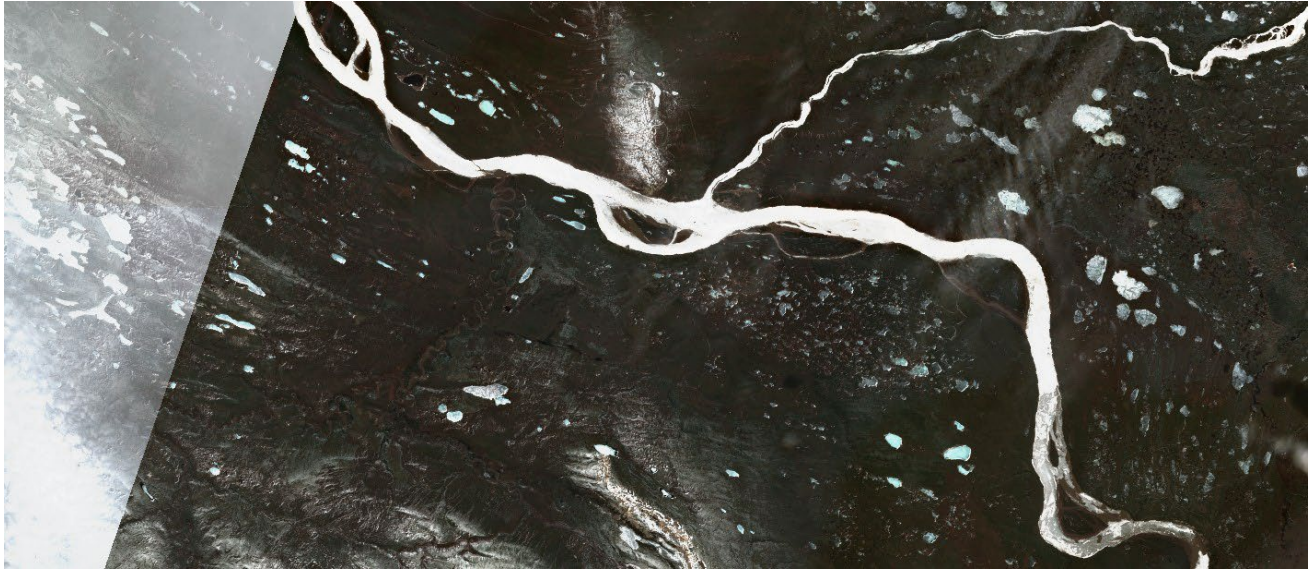
Above – Map of hydrometric stations in the Dehcho (Mackenzie River) basin. The station numbers are referenced in the water level plots below.

Imagery:



Above – Optical imagery taken between 12:30-13:00 MDT on May 12th for stretches of the Mackenzie River from Tulita to Jean Marie River. Obtained from Planet Explorer.

Imagery:

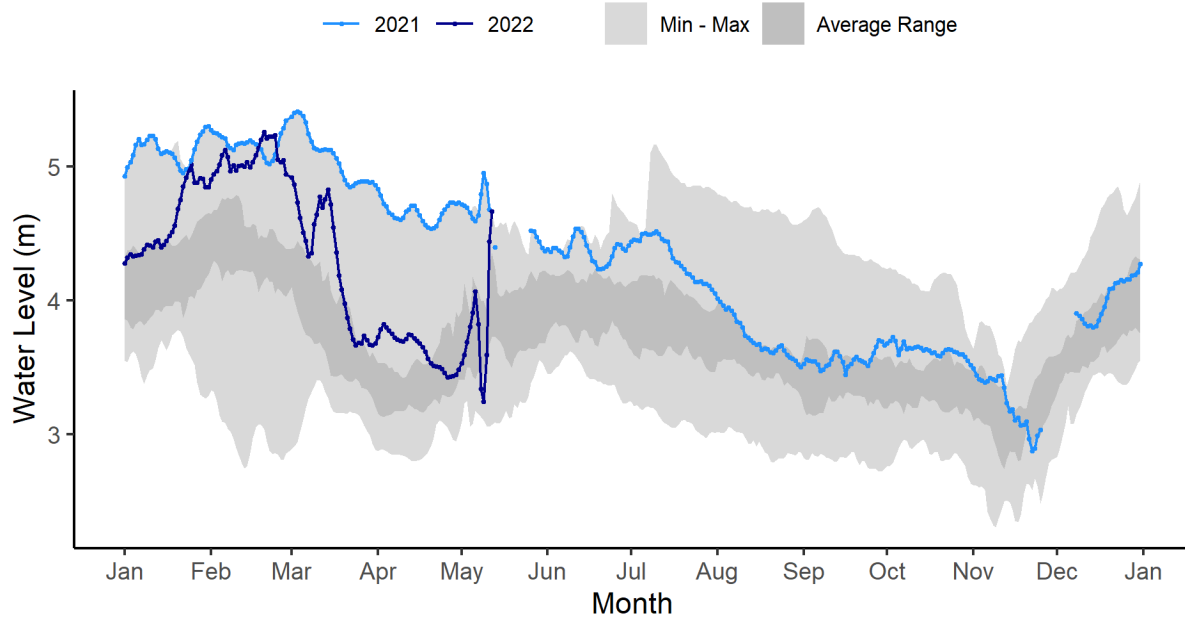


Above – Sentinel-2 satellite imagery taken on May 12th over Tulita.

Hydrometric Data:

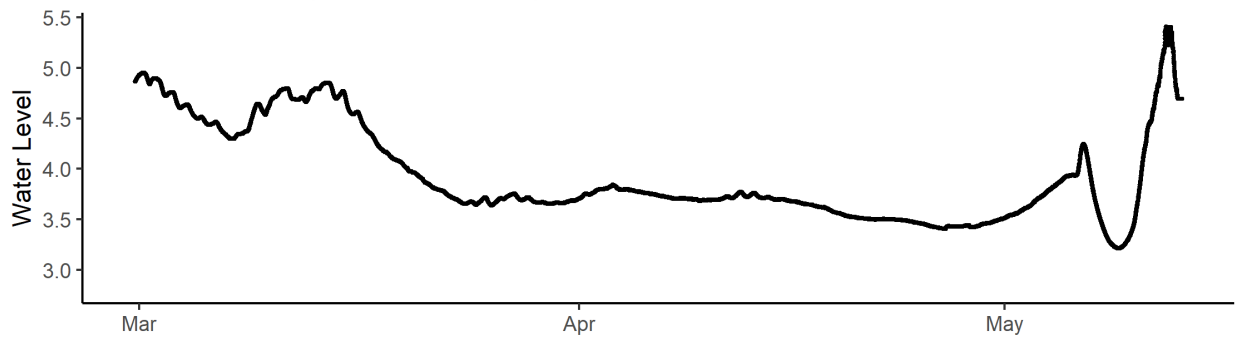
Slave River at Fitzgerald (Alberta) [07NB001]:

SLAVE RIVER AT FITZGERALD (ALBERTA) (07NB001)

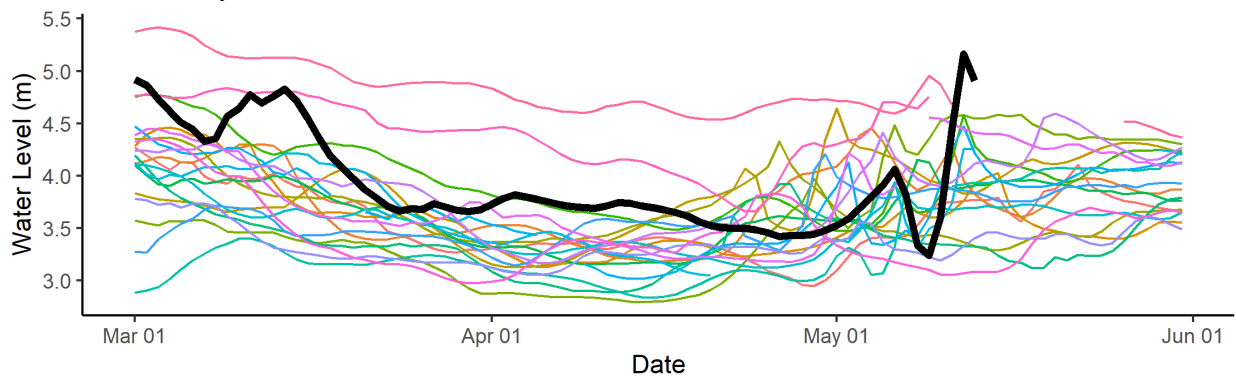


SLAVE RIVER AT FITZGERALD (ALBERTA) (07NB001)

2022 Water Levels (5 minute resolution)

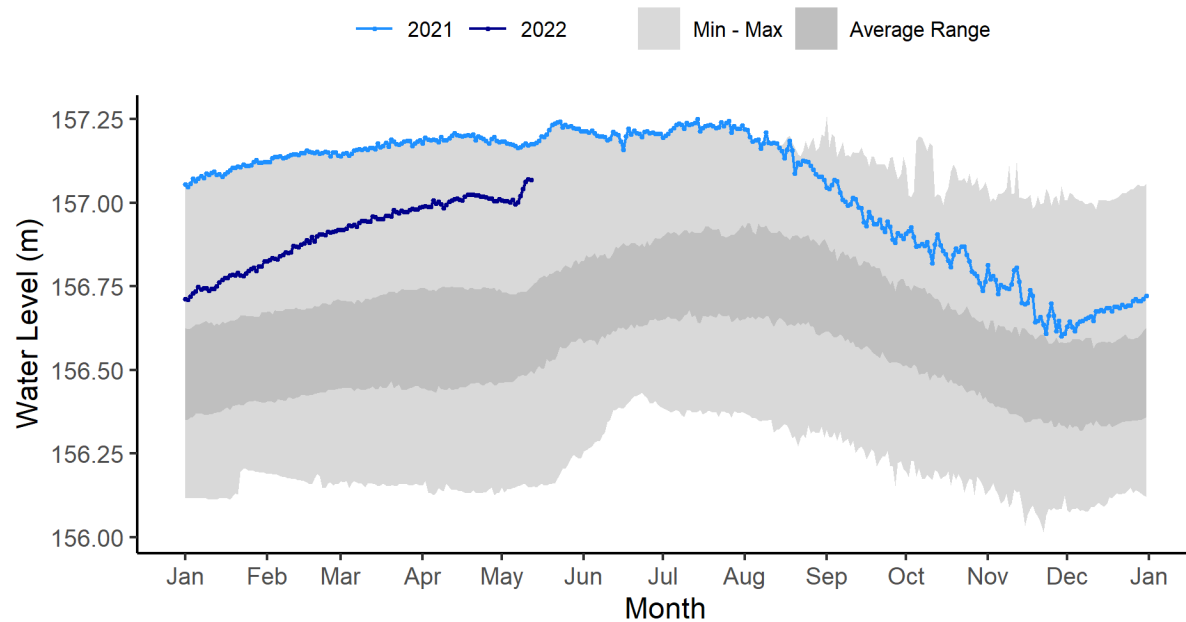


Historic Daily Water Levels



Great Slave Lake at Yellowknife Bay [07SB001]:

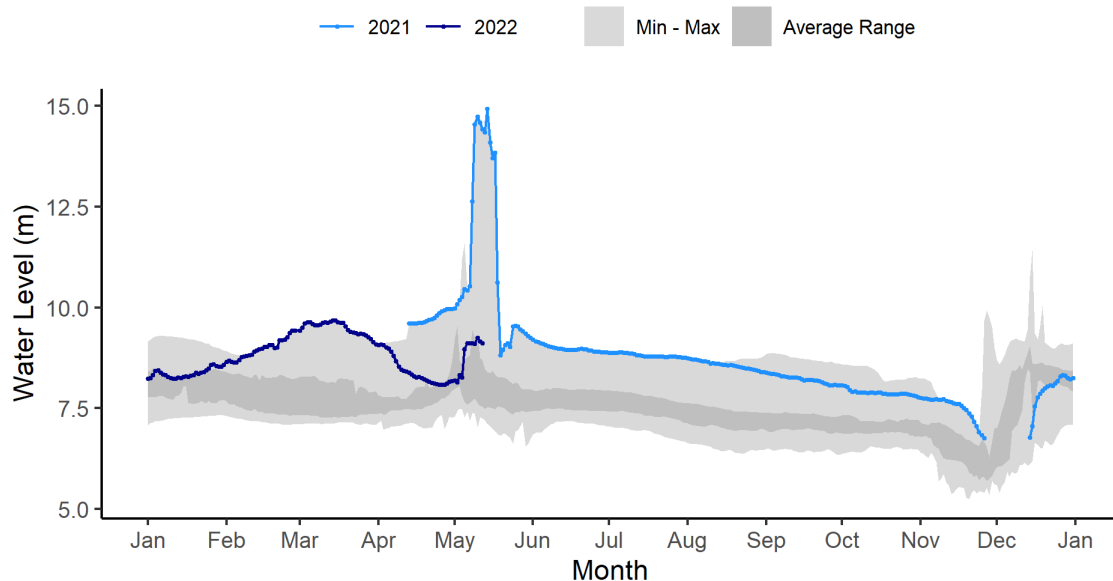
GREAT SLAVE LAKE AT YELLOWKNIFE BAY (07SB001)



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]:

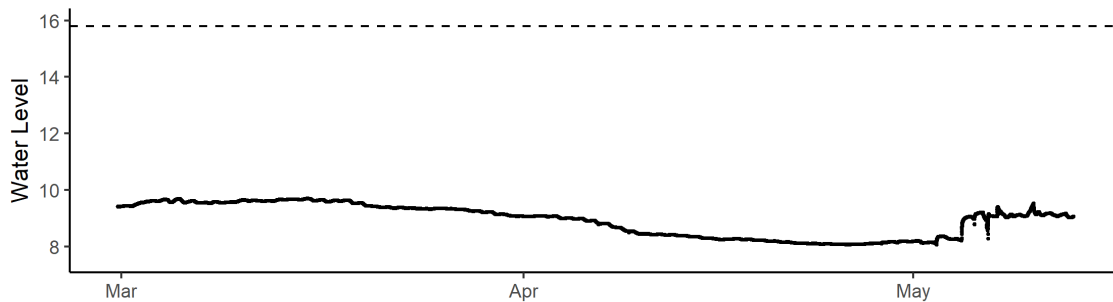
MACKENZIE RIVER AT STRONG POINT (10FB006)



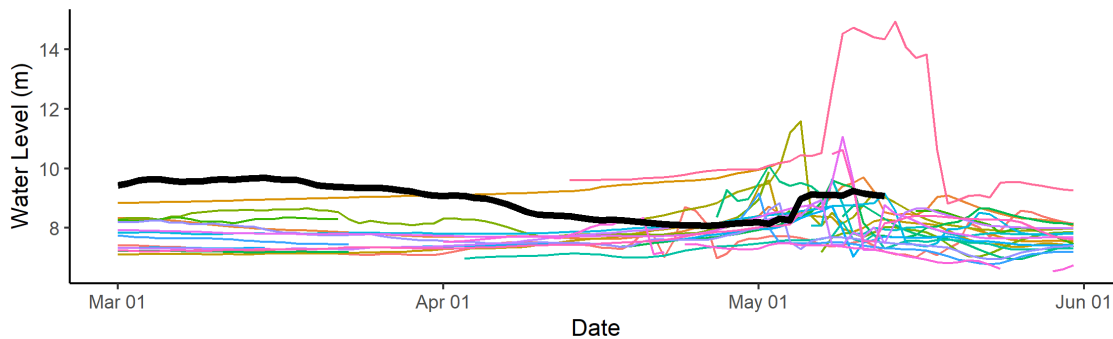
Above – hydrograph of daily average levels for the previous two years. Note that the most recent point on this graph shows the **daily average level from May 12** (yesterday).

MACKENZIE RIVER AT STRONG POINT (10FB006)

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 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 13 at 13:00. Photo courtesy of Water Survey of Canada and GNWT.

Mackenzie River at Fort Simpson [10GC001]:

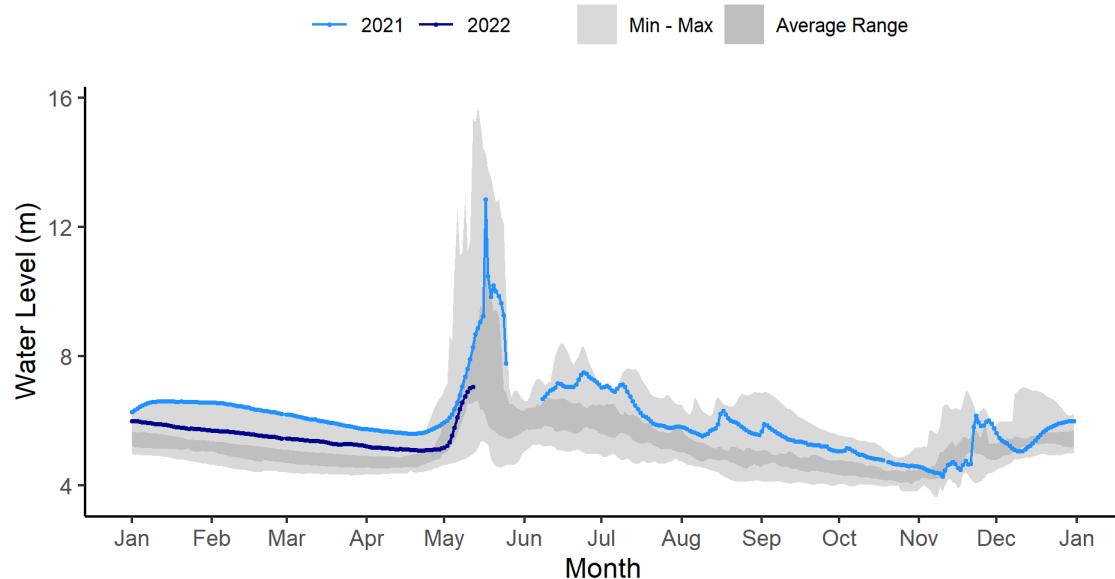
Note: The sensor is not currently producing data. The river is open at Fort Simpson and small amounts of ice are moving well.



Above – Dehcho (Mackenzie River) at Fort Simpson hydrometric gauge photo from May 13 at 14:00. Photo courtesy of Water Survey of Canada and GNWT.

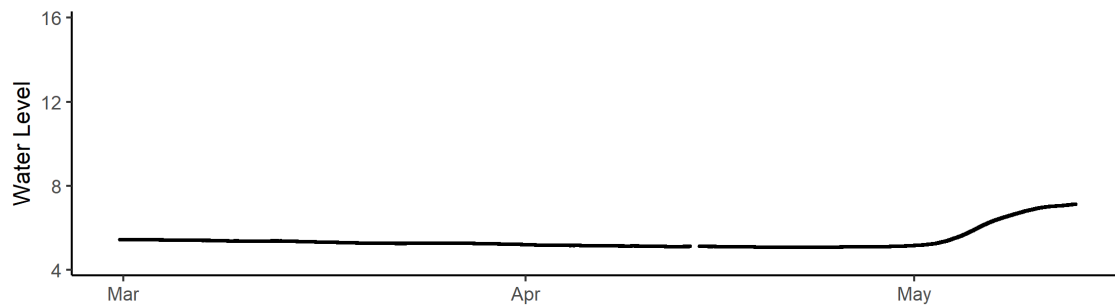
Mackenzie River at Norman Wells [10KA001]:

MACKENZIE RIVER AT NORMAN WELLS (10KA001)

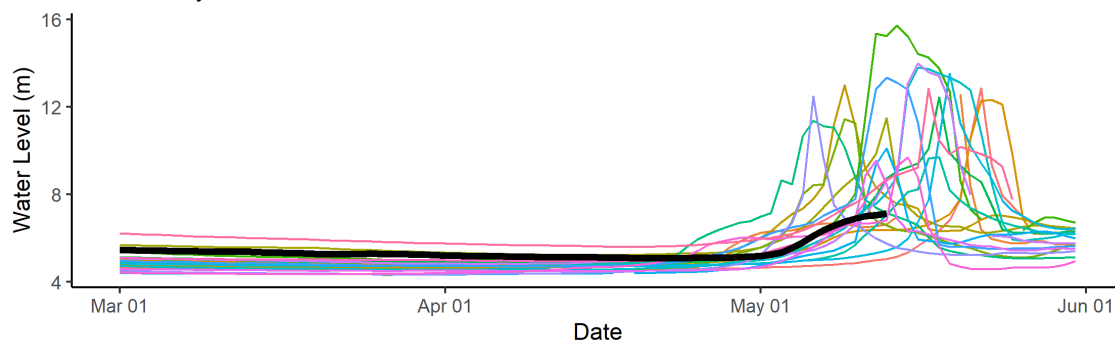


MACKENZIE RIVER AT NORMAN WELLS (10KA001)

2022 Water Levels (5 minute resolution)



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.



Above – Mackenzie River at Norman Wells hydrometric gauge photo from May 13 at 14:00. Photo courtesy of Water Survey of Canada and GNWT.

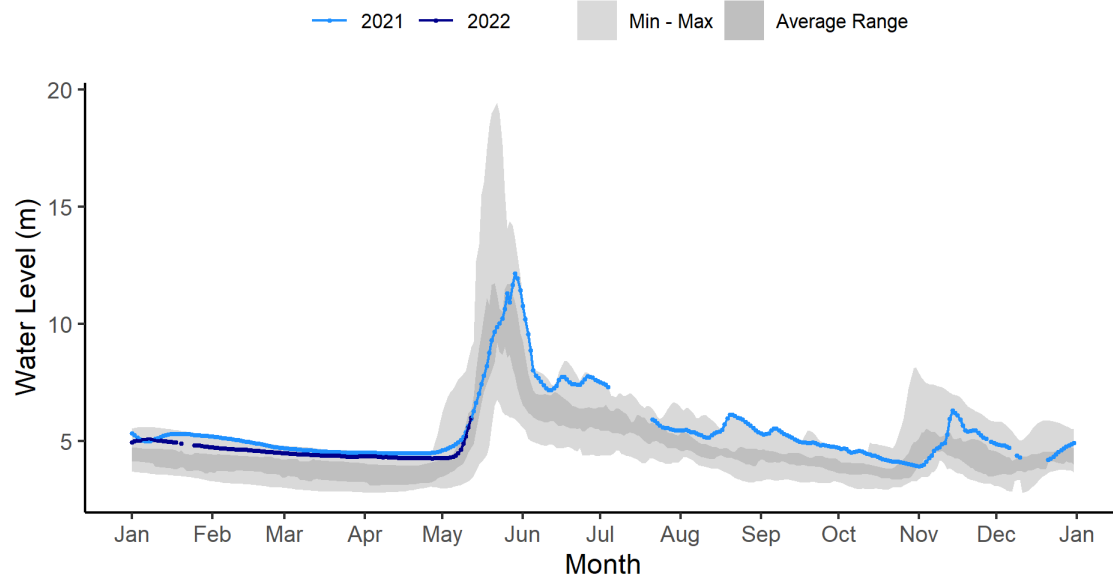
Mackenzie River at Fort Good Hope [10LD001]:



Above – Mackenzie River at Fort Good Hope hydrometric gauge photo from May 13 at 13:00. Photo courtesy of Water Survey of Canada and GNWT.

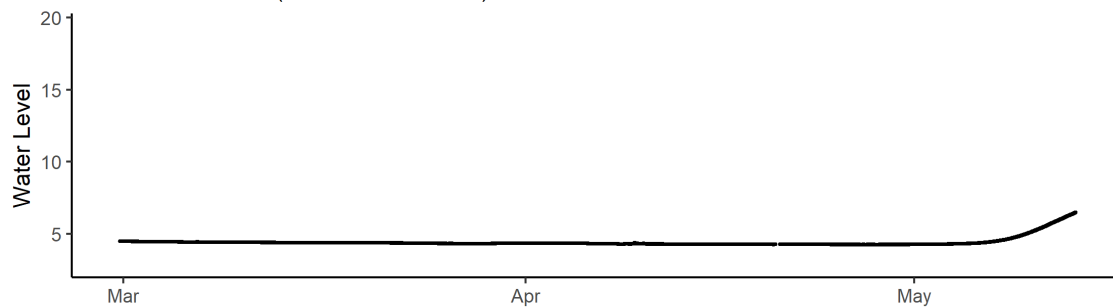
Mackenzie River at Arctic Red River [10LC014]:

MACKENZIE RIVER AT ARCTIC RED RIVER (10LC014)

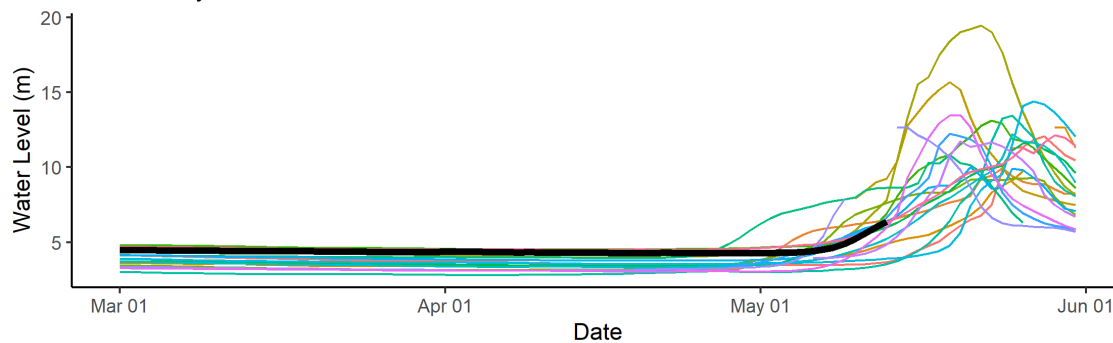


MACKENZIE RIVER AT ARCTIC RED RIVER (10LC014)

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 on the Mackenzie River at Arctic Red River have slowly begun to rise, with the timing being approximately average to previous years.

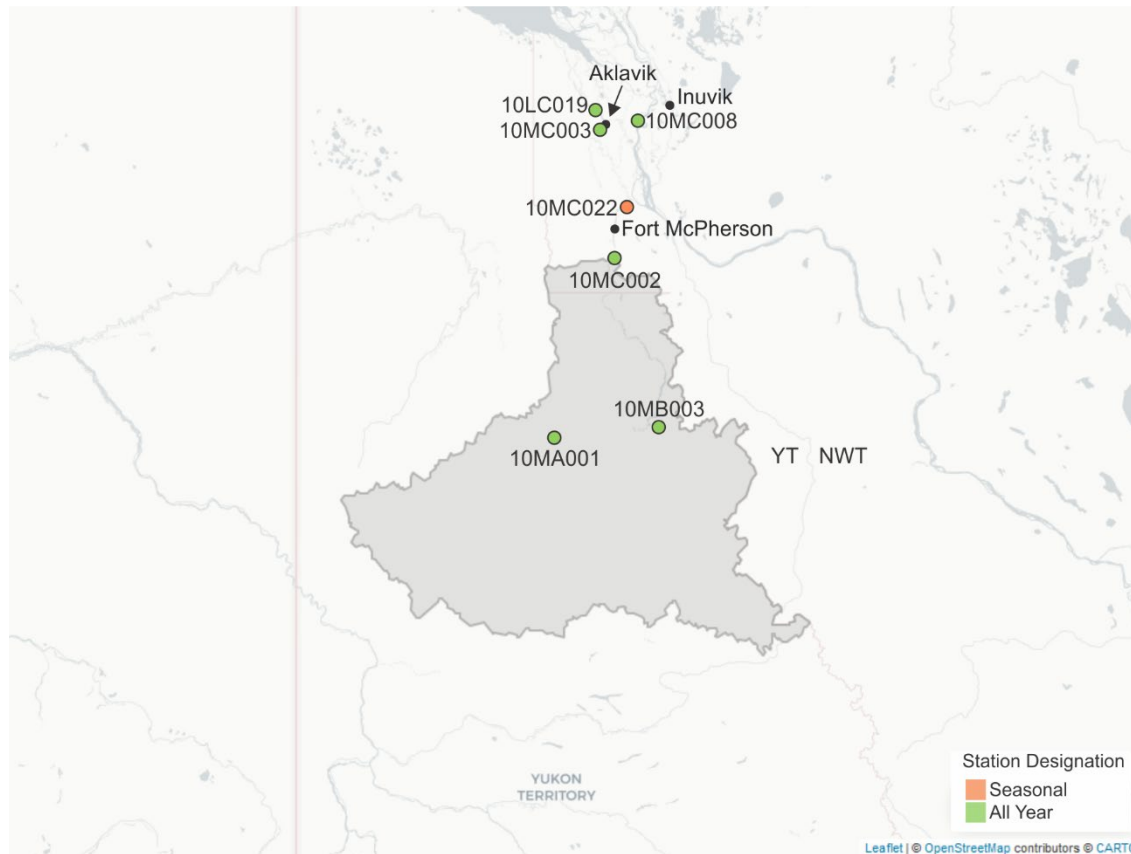


Above – Mackenzie River at Arctic Red River hydrometric gauge photo from May 11 at 13:00 (last available image). Photo courtesy of Water Survey of Canada and GNWT.

Peel River and Beaufort Delta

Current Status:

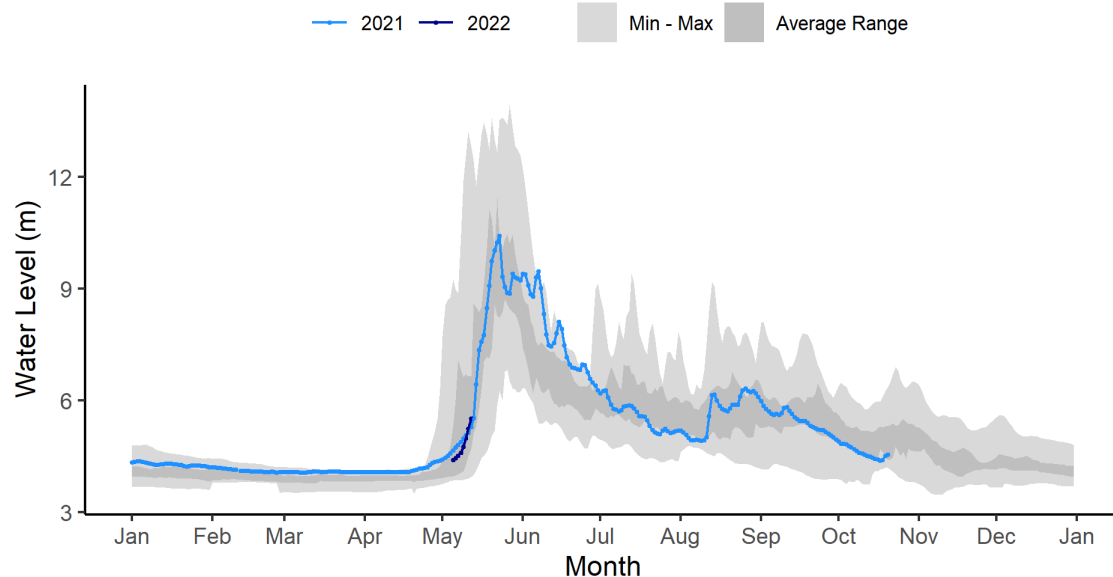
- Water levels are beginning to increase on the Peel River, as is usual for this time of year;
- Water levels in the Mackenzie Delta have slowly started to increase;
 - Water levels were much higher than average over winter, but lower than last year.



Above – Map of select hydrometric stations in the Peel River basin and the Beaufort Delta. The station numbers are referenced in the water level plots below.

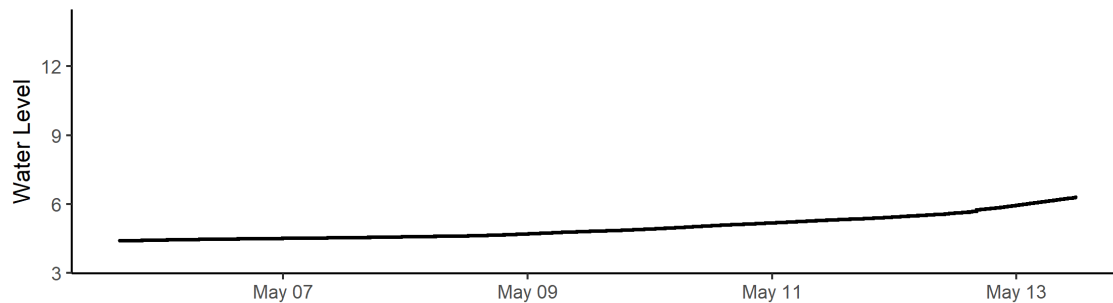
Peel River at Fort McPherson [10MC002]:

PEEL RIVER ABOVE FORT MCPHERSON (10MC002)

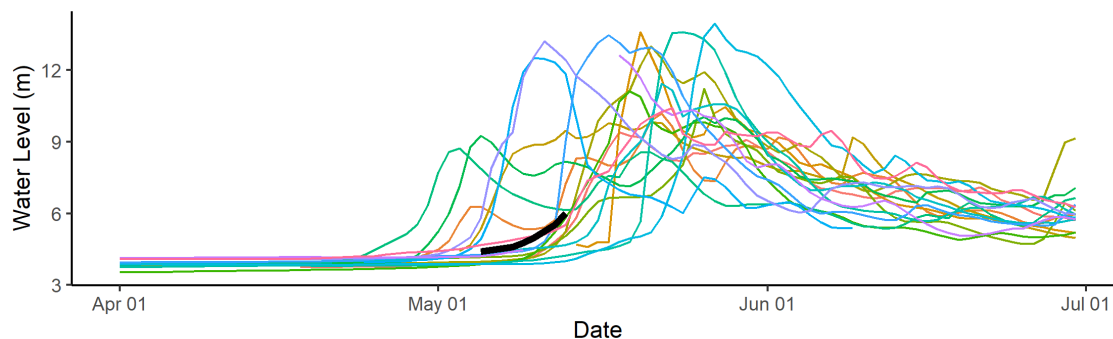


PEEL RIVER ABOVE FORT MCPHERSON (10MC002)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels



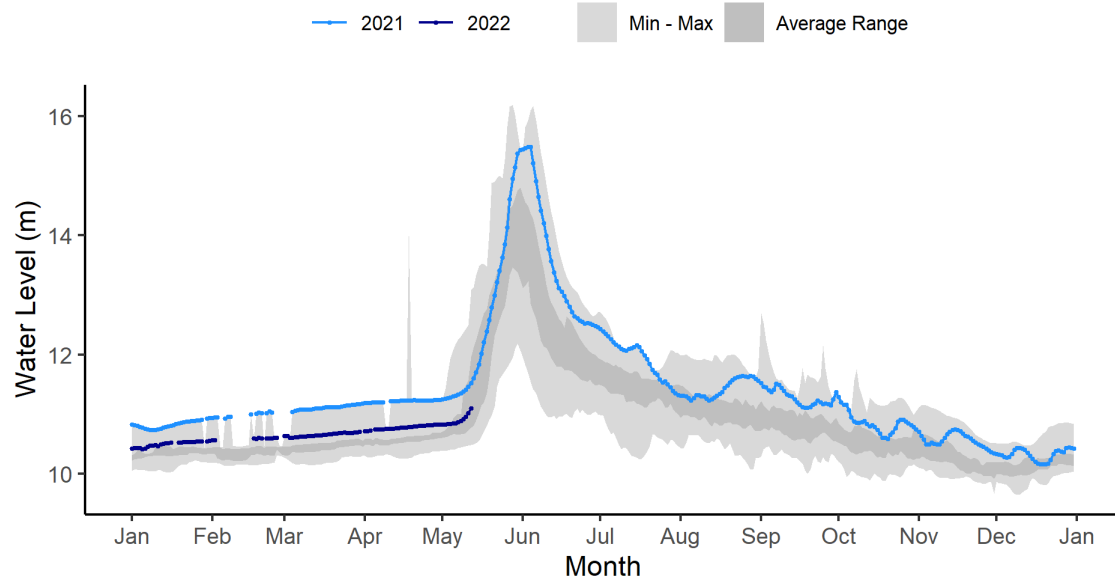
Above – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels on the Peel River at Fort McPherson have slowly begun to rise, with the timing being approximately average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



Above – Peel River at Fort McPherson hydrometric gauge photo from May 12 at 14:00. Photo courtesy of Water Survey of Canada and GNWT.

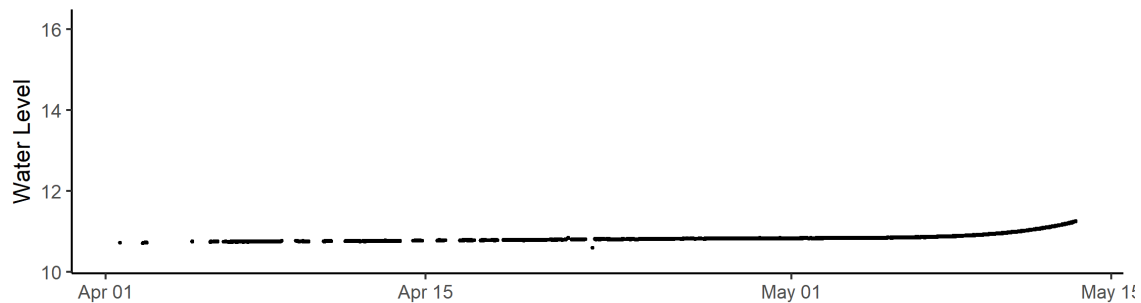
Mackenzie River (Peel Channel) at Aklavik [10MC003]:

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

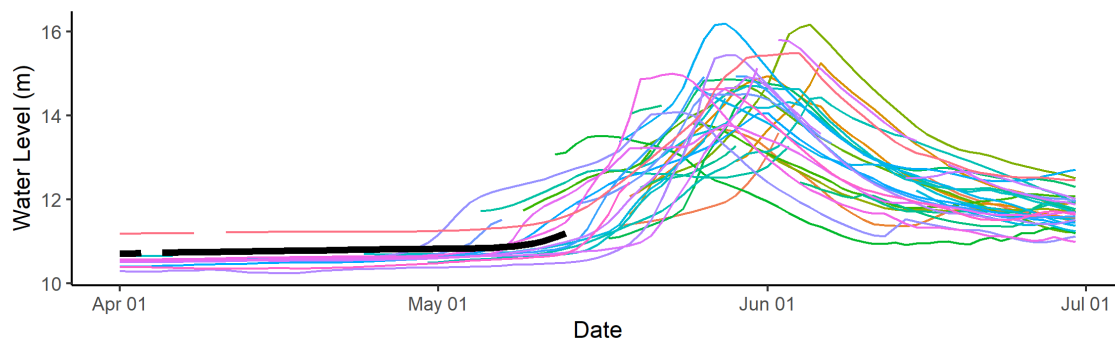


MACKENZIE RIVER (PEEL CHANNEL) ABOVE AKLAVIK (10MC003)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels

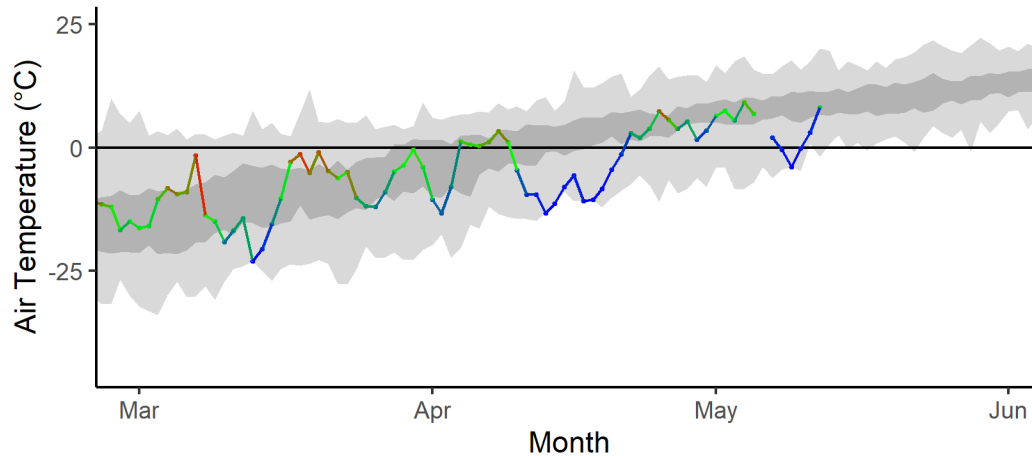


Above – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels in the Mackenzie Delta are slowly beginning to rise. Water levels are lower than last year but have been higher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

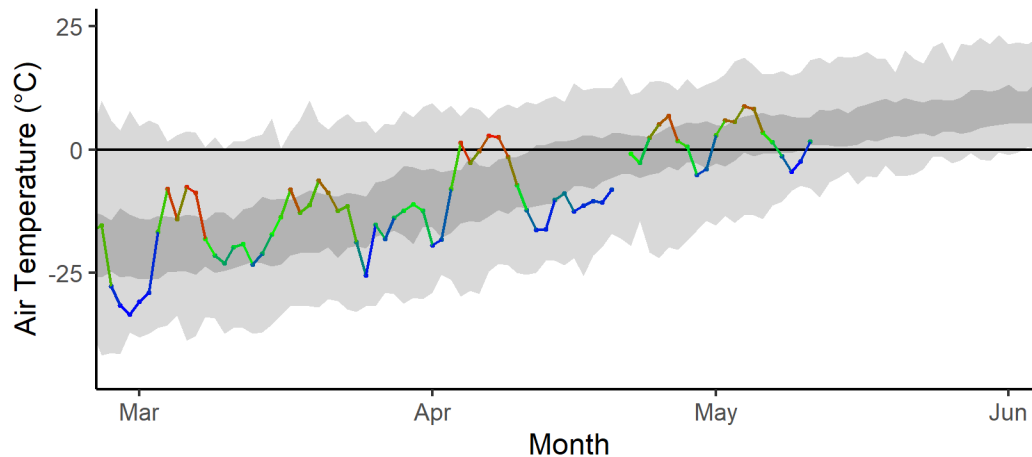
Weather Data:

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.

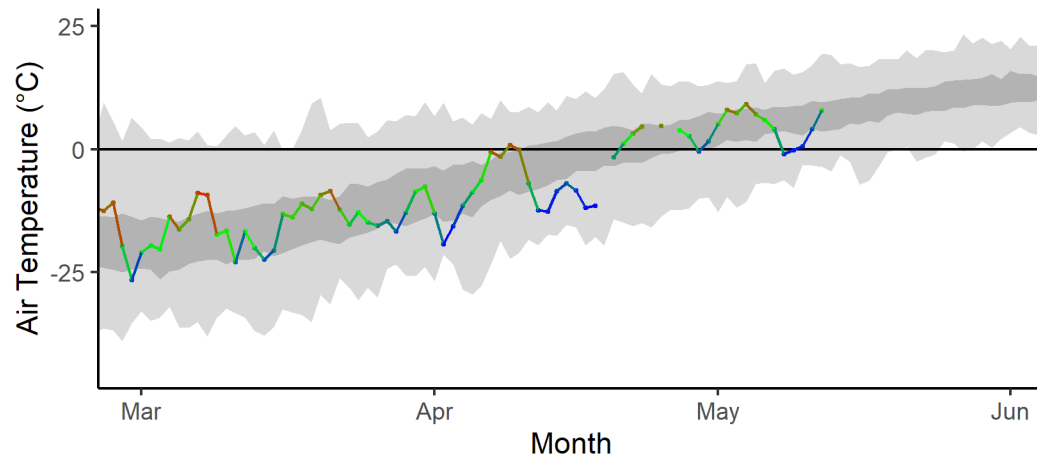
2022 High Level Mean Daily Air Temperatures



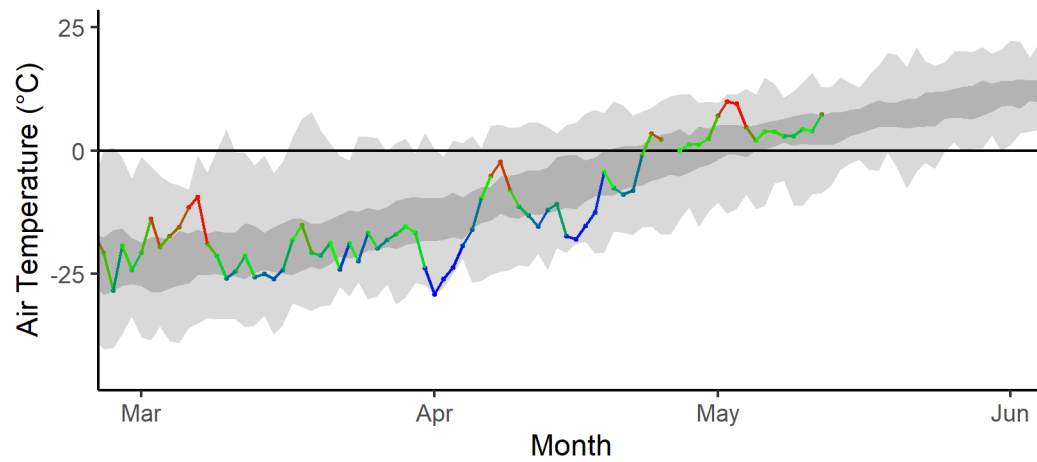
2022 Hay River Mean Daily Air Temperatures



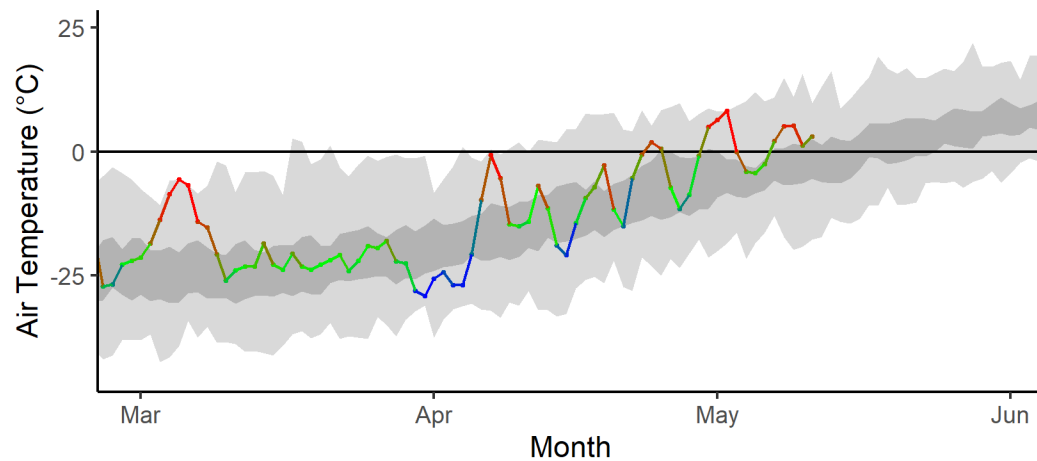
2022 Fort Simpson Mean Daily Air Temperatures
















2022 Norman Wells Mean Daily Air Temperatures
















2022 Inuvik Mean Daily Air Temperatures
















High Level seven-day weather forecast:

Fri 13 May	Sat 14 May	Sun 15 May	Mon 16 May	Tue 17 May	Wed 18 May	Thu 19 May
 19°C 30% Chance of showers	 12°C Showers	 17°C Sunny	 13°C Cloudy	 14°C Cloudy	 14°C A mix of sun and cloud	 15°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 7°C 30% Chance of showers	 6°C Cloudy	 5°C Cloudy periods	 7°C Cloudy	 2°C 60% Chance of showers	 2°C Cloudy periods	














Hay River seven-day weather forecast:

Fri 13 May	Sat 14 May	Sun 15 May	Mon 16 May	Tue 17 May	Wed 18 May	Thu 19 May
 12°C A mix of sun and cloud	 13°C Mainly sunny	 14°C A mix of sun and cloud	 15°C Sunny	 14°C A mix of sun and cloud	 8°C A mix of sun and cloud	 9°C Sunny
Tonight	Night	Night	Night	Night	Night	
 0°C 30% Chance of showers	 6°C Cloudy periods	 3°C Clear	 6°C Cloudy periods	 2°C Cloudy periods	 1°C Cloudy periods	














Fort Simpson seven-day weather forecast:

Fri 13 May	Sat 14 May	Sun 15 May	Mon 16 May	Tue 17 May	Wed 18 May	Thu 19 May
 19°C A mix of sun and cloud	 19°C 40% Chance of showers	 17°C Sunny	 16°C A mix of sun and cloud	 15°C Cloudy	 14°C A mix of sun and cloud	 13°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 5°C A few clouds	 7°C 70% Chance of showers	 7°C Clear	 9°C Cloudy	 3°C 60% Chance of showers	 2°C Cloudy periods	

Norman Wells seven-day weather forecast:

Fri 13 May	Sat 14 May	Sun 15 May	Mon 16 May	Tue 17 May	Wed 18 May	Thu 19 May
 18°C 30% Chance of showers	 10°C A mix of sun and cloud	 12°C Cloudy	 19°C A mix of sun and cloud	 8°C Cloudy	 9°C A mix of sun and cloud	 11°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 2°C 30% Chance of showers	 1°C Periods of rain	 1°C Clear	 4°C Cloudy periods	 0°C Cloudy	 0°C Cloudy periods	

Inuvik seven-day weather forecast:

Fri 13 May	Sat 14 May	Sun 15 May	Mon 16 May	Tue 17 May	Wed 18 May	Thu 19 May
 6°C* Light snow	 -2°C Light snow	 5°C Snow	 3°C Cloudy	 0°C 40% Chance of flurries	 4°C A mix of sun and cloud	 6°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 -6°C Snow	 -4°C Cloudy	 0°C Cloudy	 -2°C Cloudy	 -10°C Cloudy periods	 -5°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.