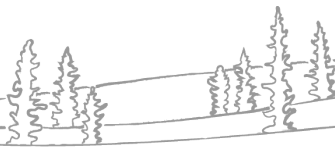




NWT Water Monitoring Bulletin – May 2, 2022



Break up reports will be published routinely as break up unfolds. The 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](#).

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Current Status:

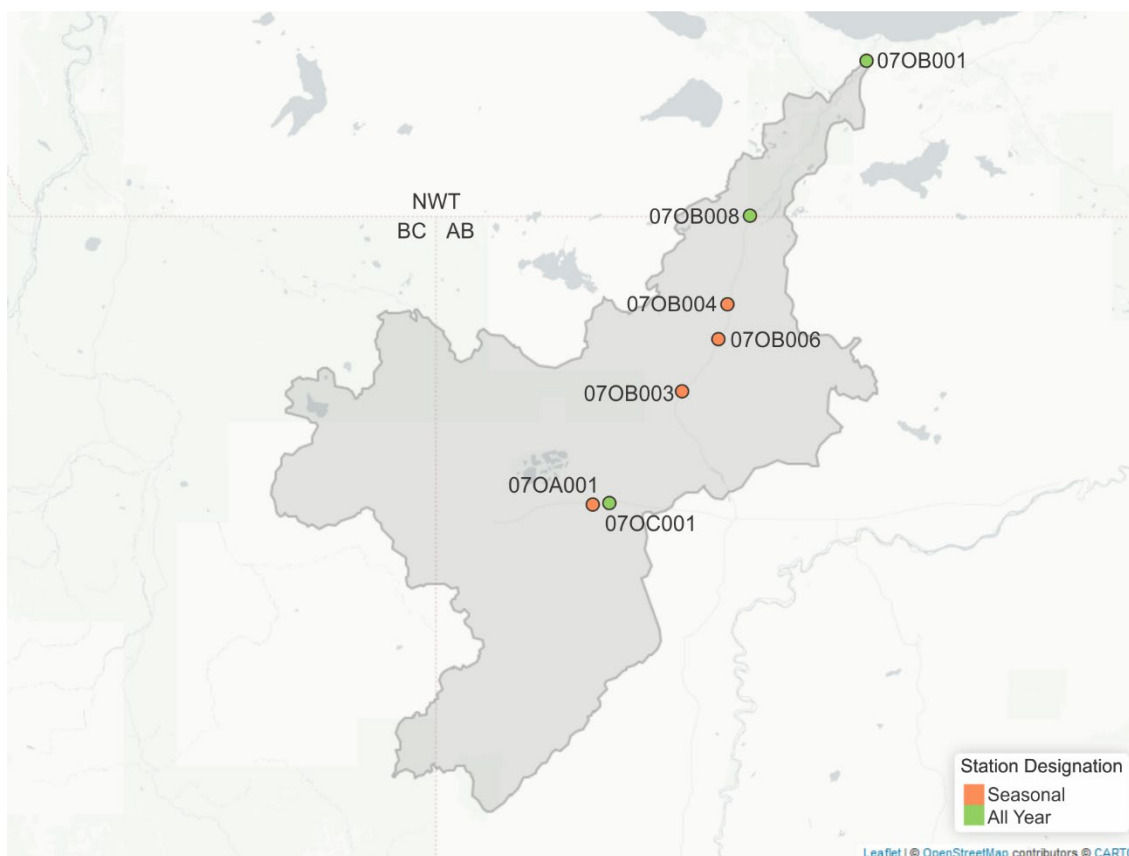
- The initiation of spring break up is delayed relative to average break up times due to cooler than normal spring temperatures;
- Snowmelt is ongoing throughout the basins in the south of the NWT;
- Break up has started in the upper Hay River basin with ice movement on the Chinchaga River;
- Water levels continue to rise slowly on the Liard River at Fort Liard;
- Environment and Climate Change Canada are forecasting warm weather in the southern NWT into the coming weekend. This warm weather will help to melt residual snowpacks and expedite the melt of river ice.



Hay River:

Current Status:

- Snowmelt is ongoing throughout the entire basin;
- The Chinchaga River [07OC001] (major tributary to the Hay River) has begun to break up. It looks like ice from the Chinchaga River has jammed on ice at the Hay River (as of the morning of May 02), causing water levels on the Chinchaga to rise;
- Water levels are beginning to rise further downstream on the Hay River, but the rate of increase is still relatively slow;
- Warm temperatures are forecast for this week with some models predicting rain events over the basin this coming weekend;
- Ice is still solid along the Hay River in the NWT.

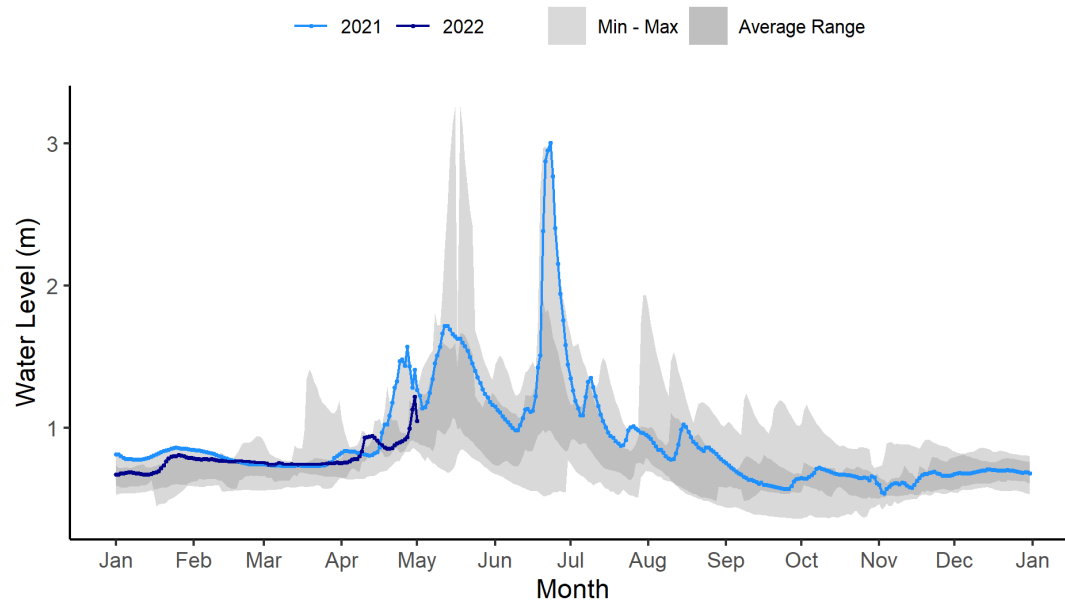




Hydrometric Data:

Chinchaga River near High Level (Alberta):

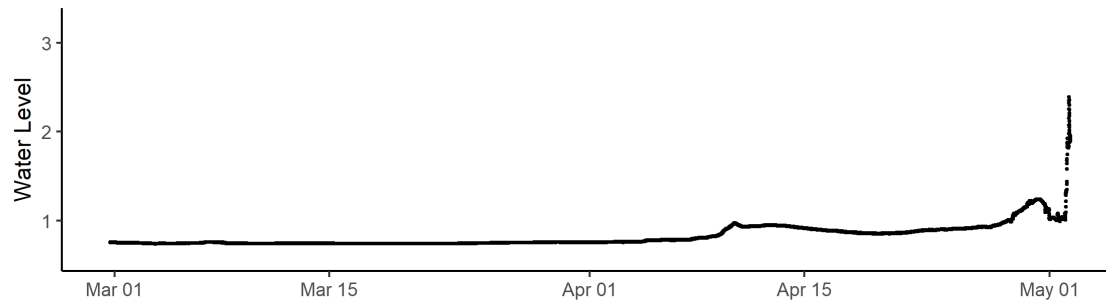
CHINCHAGA RIVER NEAR HIGH LEVEL (07OC001)



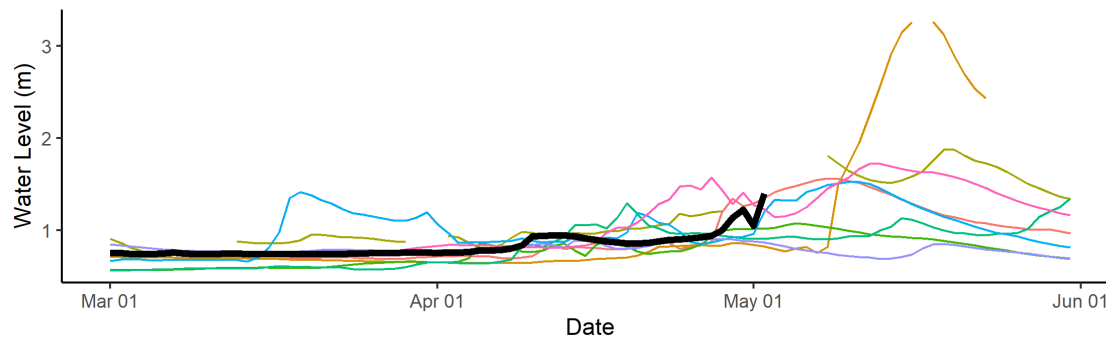


CHINCHAGA RIVER NEAR HIGH LEVEL (07OC001)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels

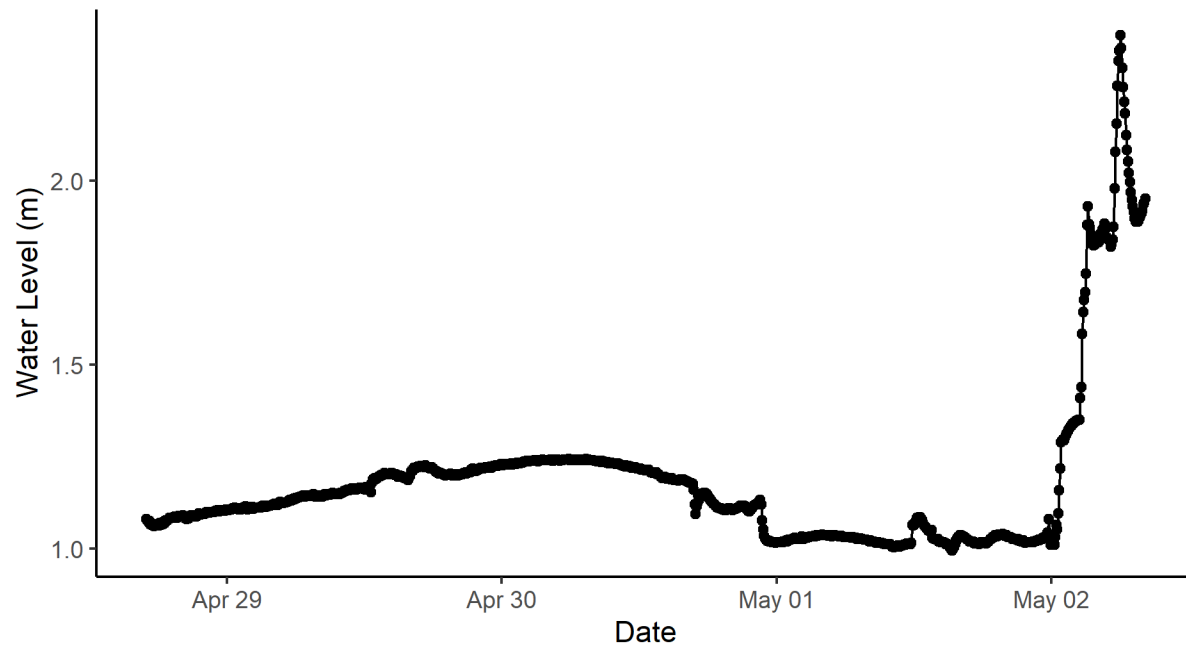


Water level data at the Chinchaga River near High Level, AB. This plot shows high resolution (5 minute) water level data in the middle, and daily average data on the bottom. Note that because the data are aggregated differently, the peak level on the middle graph of 2.4 m (instantaneous maximum) is higher than the bottom graph (daily average).



CHINCHAGA RIVER NEAR HIGH LEVEL (07OC001)

High Resolution Water Level Data



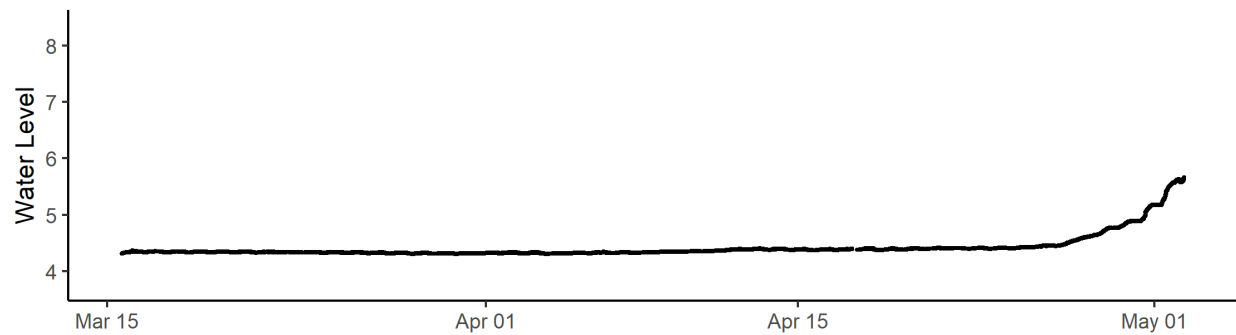
Water level data at the Chinchaga River near High Level, AB. This plot is a zoomed-in inset of the previous plot and depicts a rapid rise in water levels of about 1.2 m around midnight on May 02. This was likely caused by an ice jam. Water levels peaked at 2.4 m. The drop in level data around 06:00 on May 02 suggests that the jam may have started to push and that there was a small release.



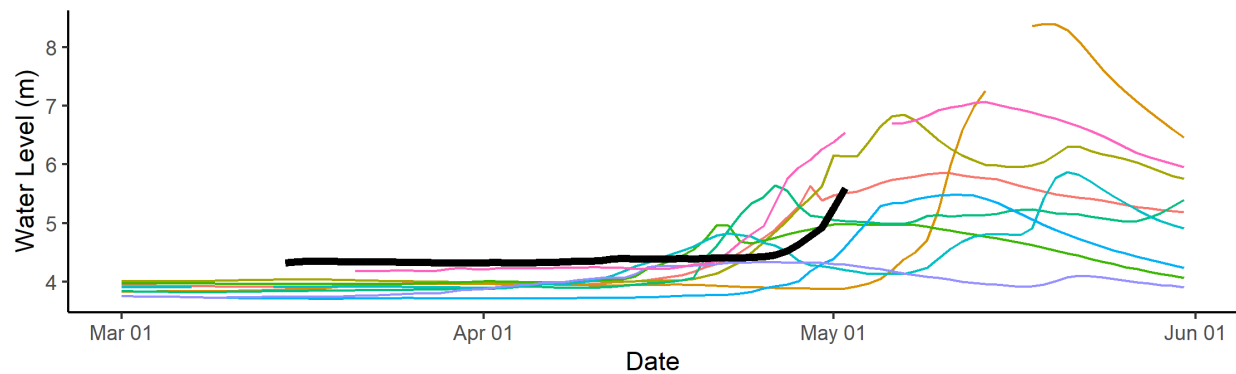
Hay River near Meander River (Alberta):

HAY RIVER NEAR MEANDER RIVER (07OB003)

2022 Water Levels (5 minute resolution)



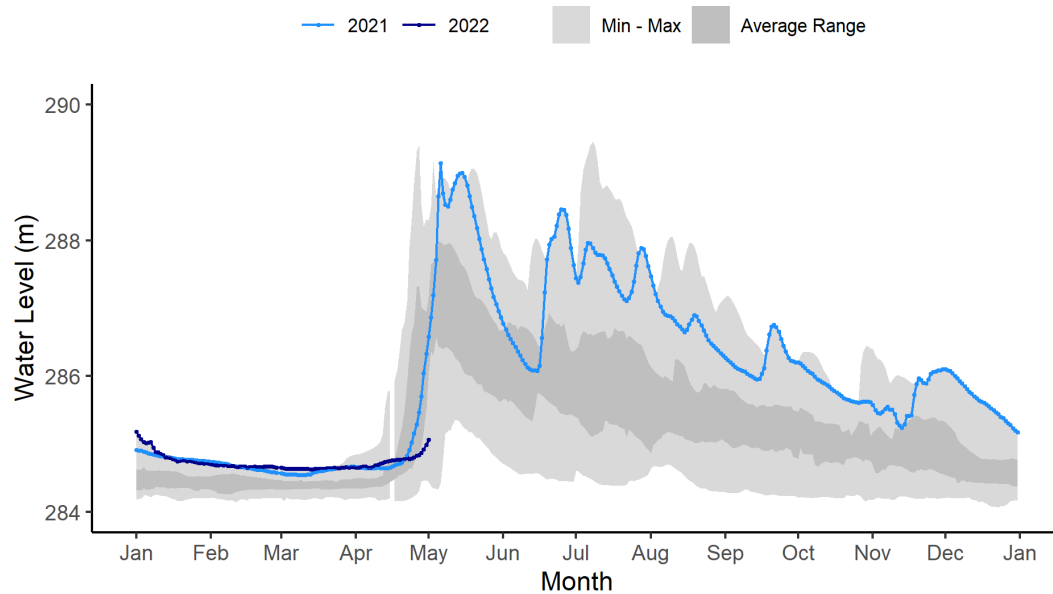
Historic Daily Water Levels





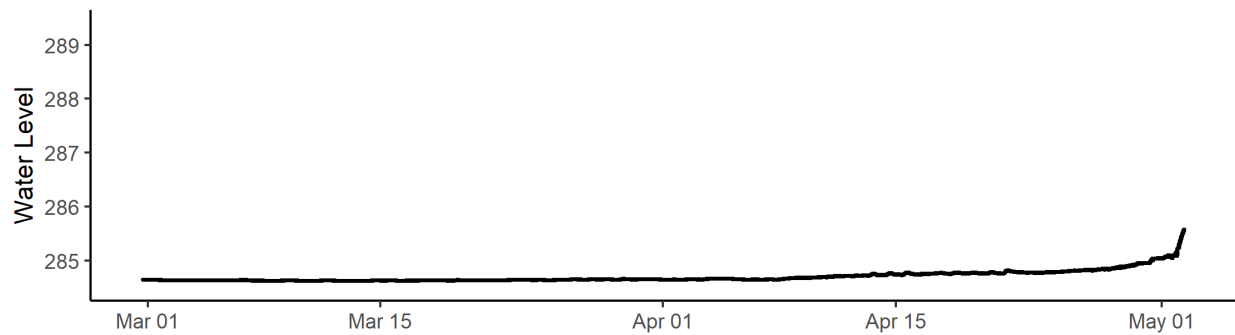
Hay River near the border:

HAY RIVER NEAR ALTA/NWT BOUNDARY (07OB008)

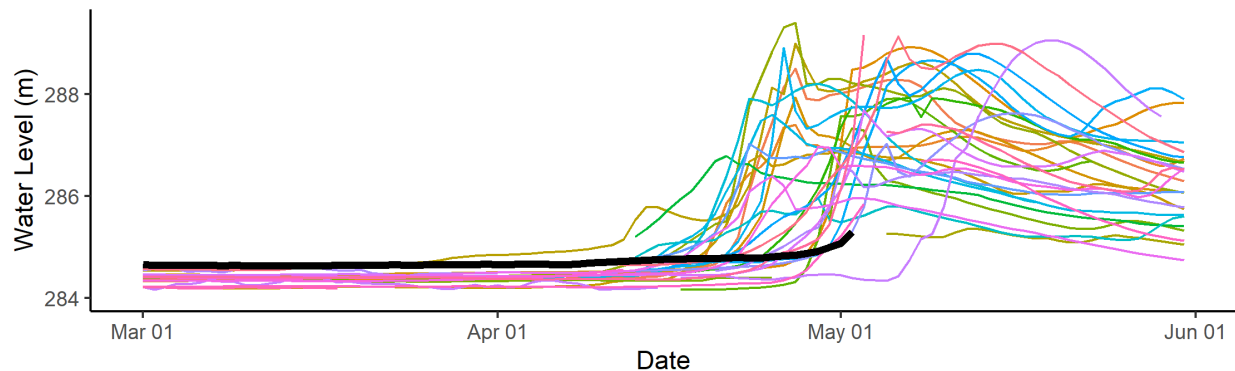


HAY RIVER NEAR ALTA/NWT BOUNDARY (07OB008)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels



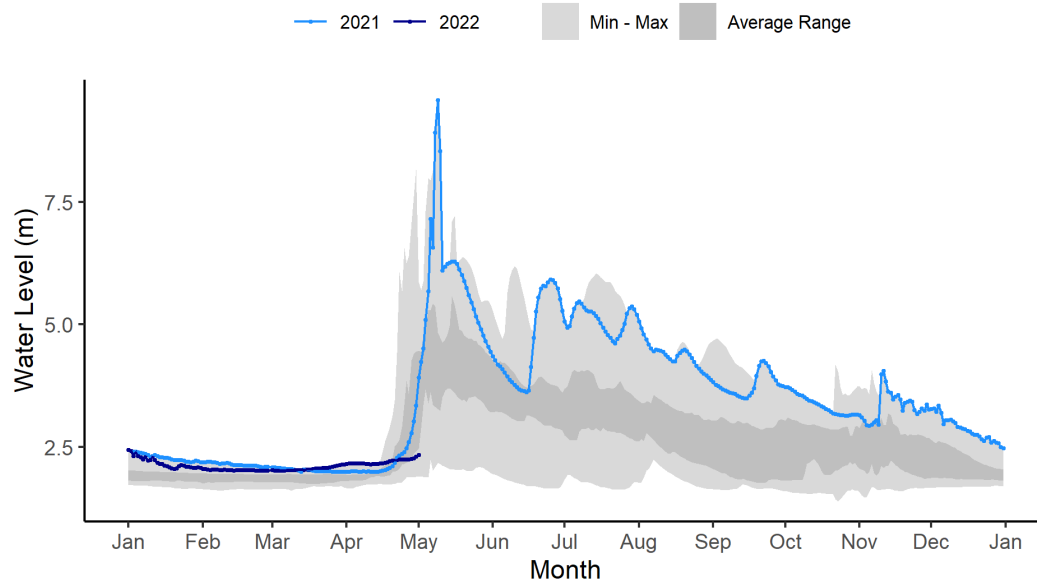


Hay River near the border hydrometric gauge photo. Photo courtesy of Water Survey of Canada and GNWT.



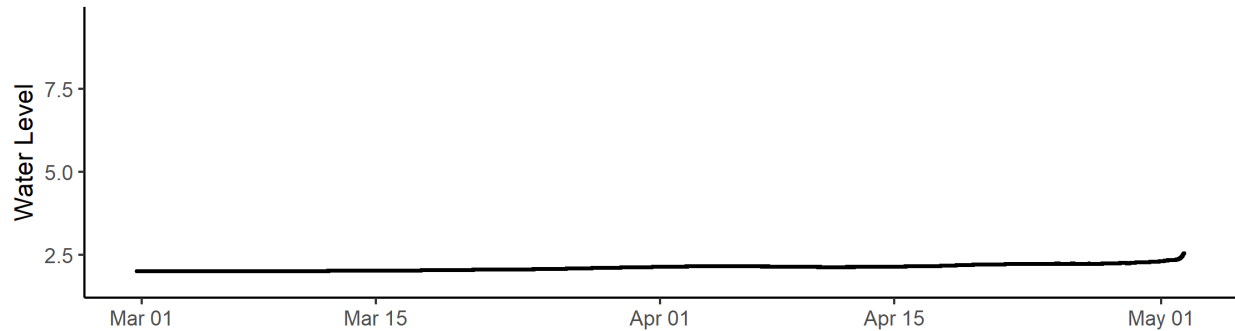
Hay River near Hay River:

HAY RIVER NEAR HAY RIVER (07OB001)

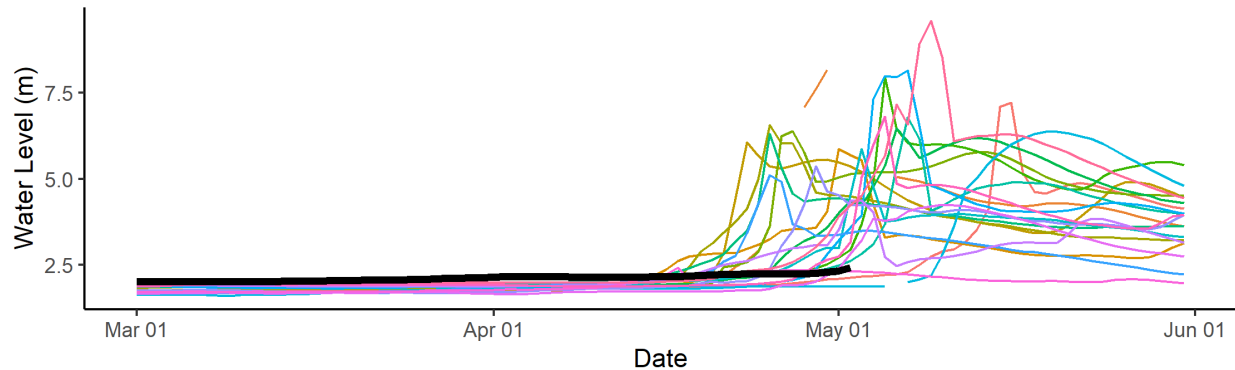


HAY RIVER NEAR HAY RIVER (07OB001)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels





Hay River near the Town of Hay River hydrometric gauge photo. 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), but has not yet started in the NWT;
- Warm temperatures and possible rain are forecast for this week.



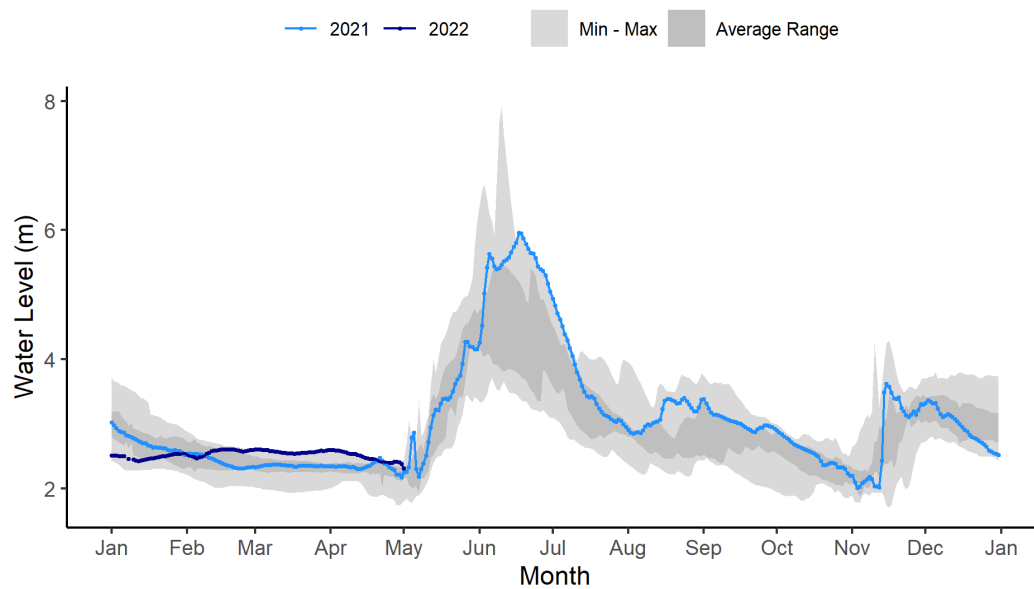
Map of hydrometric stations in the Liard River basin. The station numbers are referenced in the water level plots below.



Hydrometric Data:

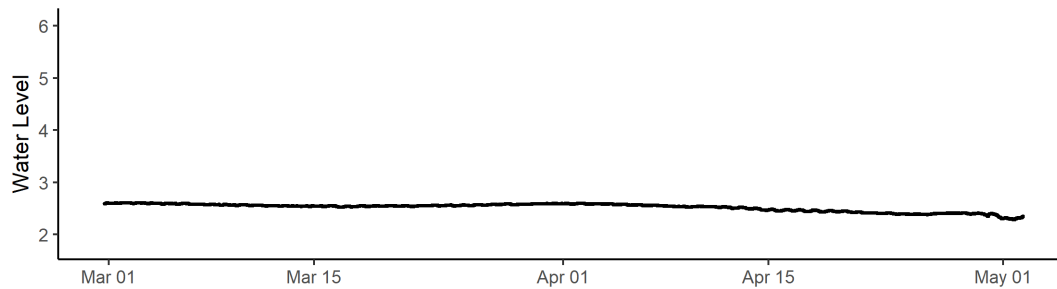
Liard River at Upper Crossing (Yukon):

LIARD RIVER AT UPPER CROSSING (10AA001)

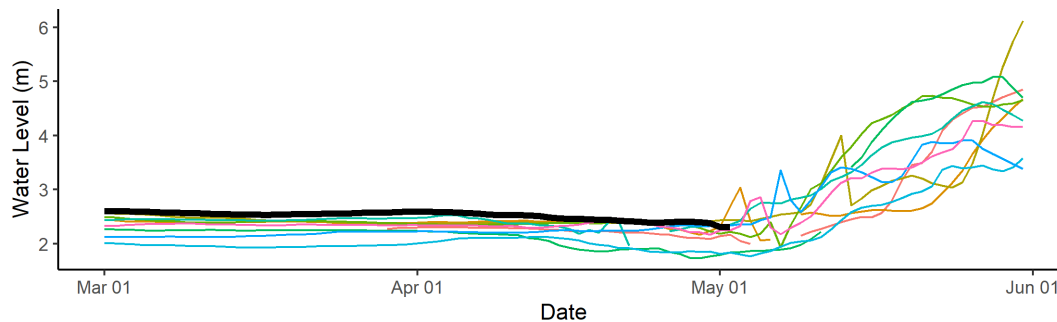


LIARD RIVER AT UPPER CROSSING (10AA001)

2022 Water Levels (5 minute resolution)



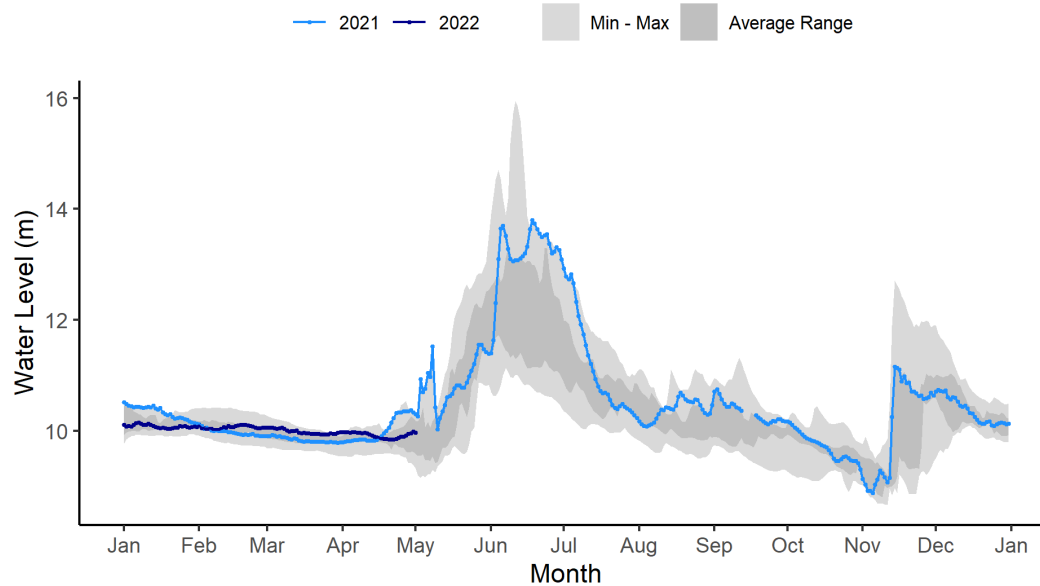
Historic Daily Water Levels





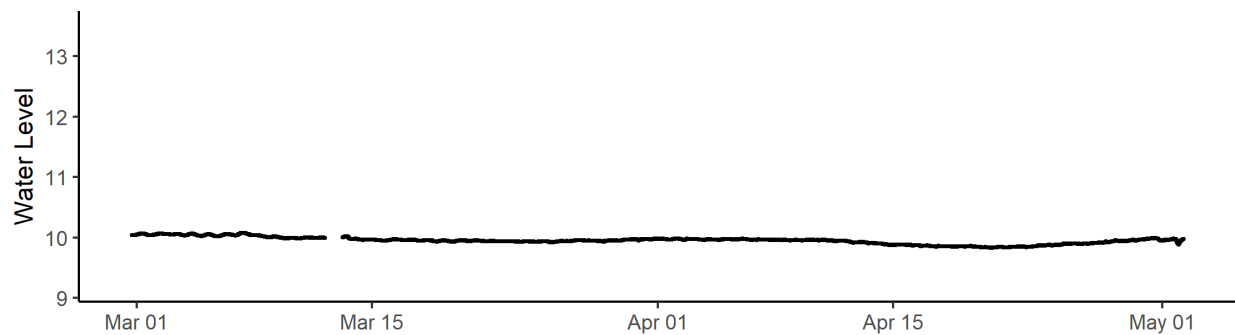
Liard River at Lower Crossing (British Columbia):

LIARD RIVER AT LOWER CROSSING (10BE001)

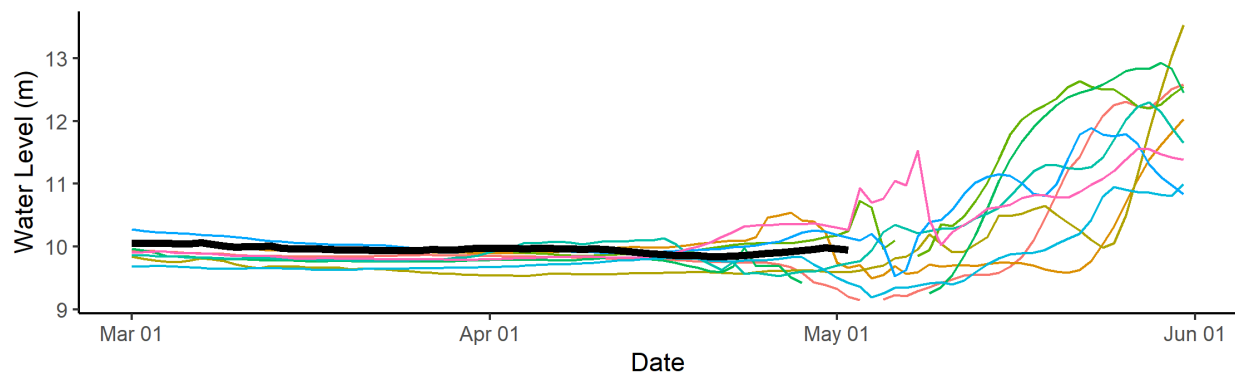


LIARD RIVER AT LOWER CROSSING (10BE001)

2022 Water Levels (5 minute resolution)



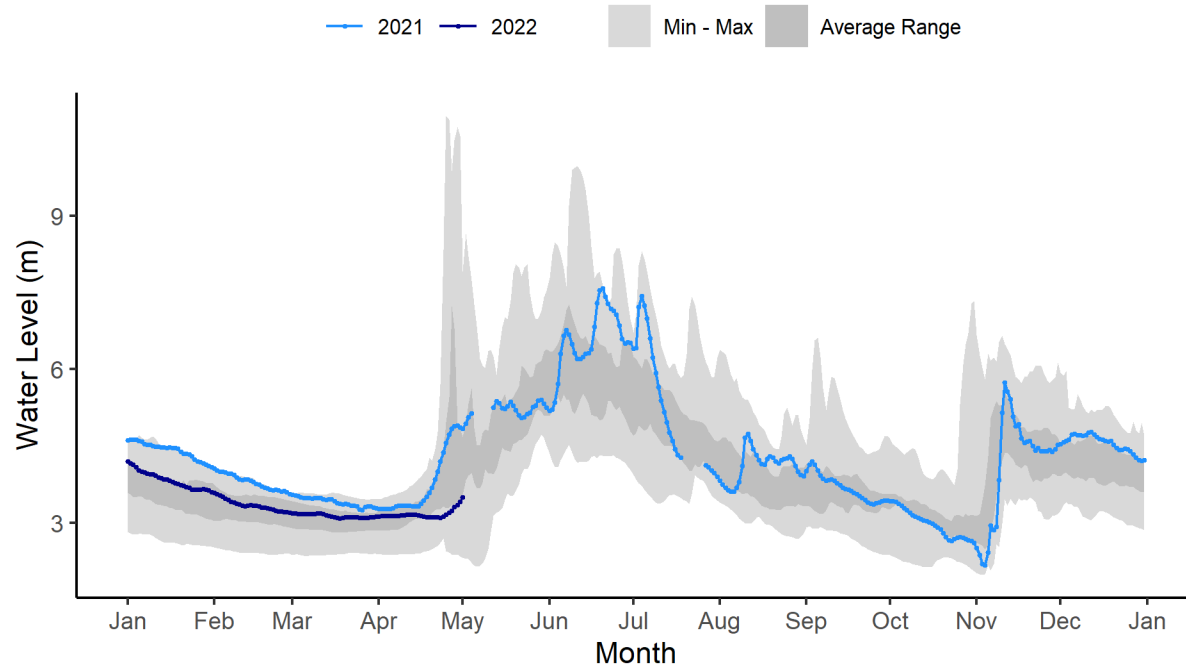
Historic Daily Water Levels





Liard River at Fort Liard:

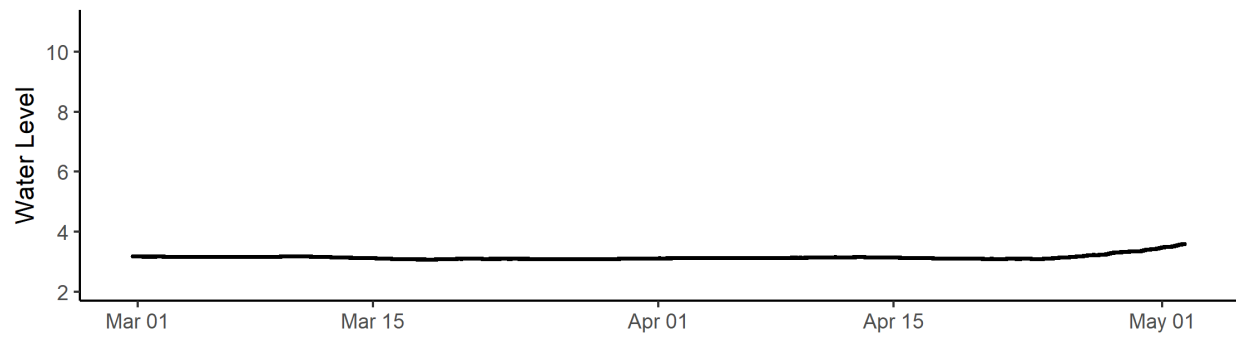
LIARD RIVER AT FORT LIARD (10ED001)



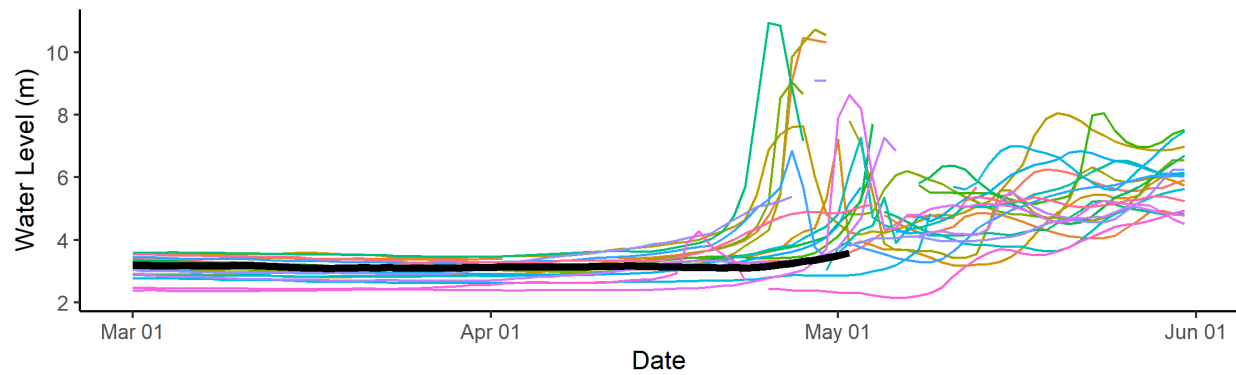


LIARD RIVER AT FORT LIARD (10ED001)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels



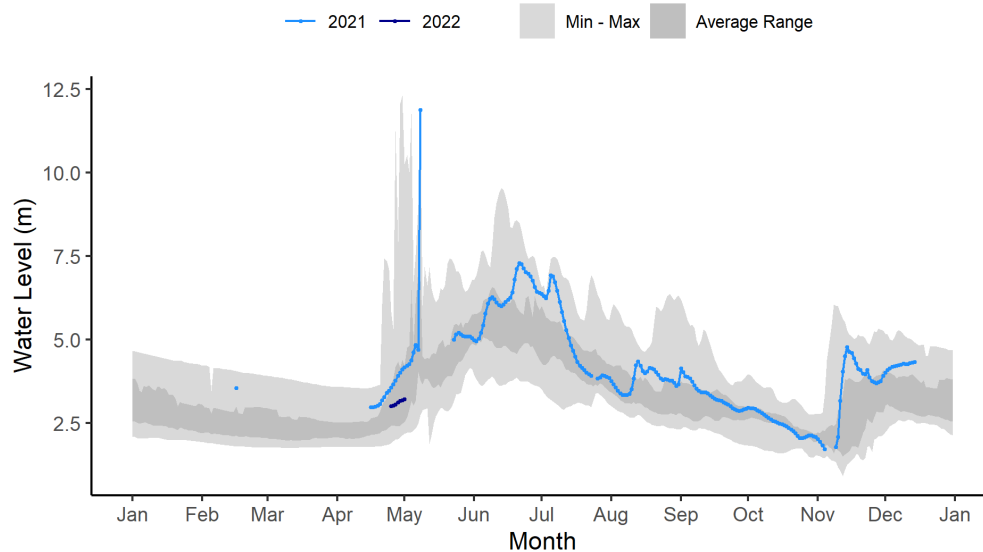


Liard River at Fort Liard hydrometric gauge photo. Photo courtesy of Water Survey of Canada and GNWT.



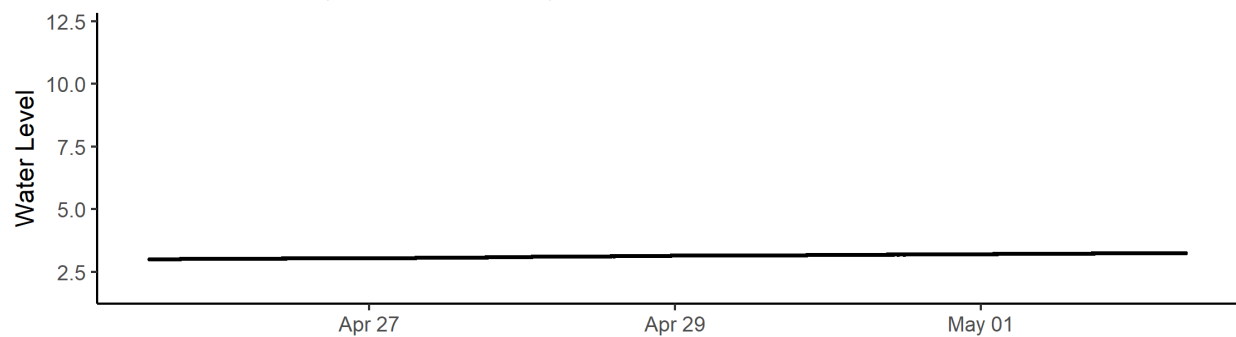
Liard River near the mouth:

LIARD RIVER NEAR THE MOUTH (10ED002)

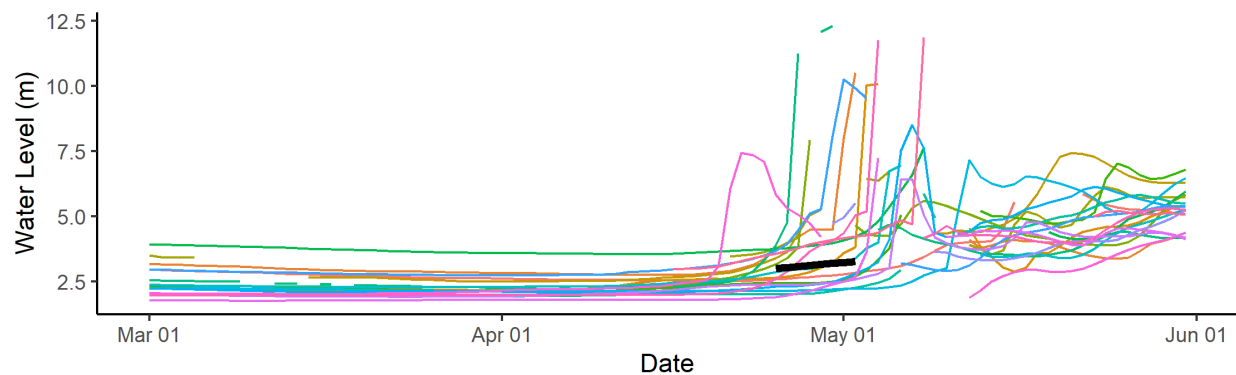


LIARD RIVER NEAR THE MOUTH (10ED002)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels





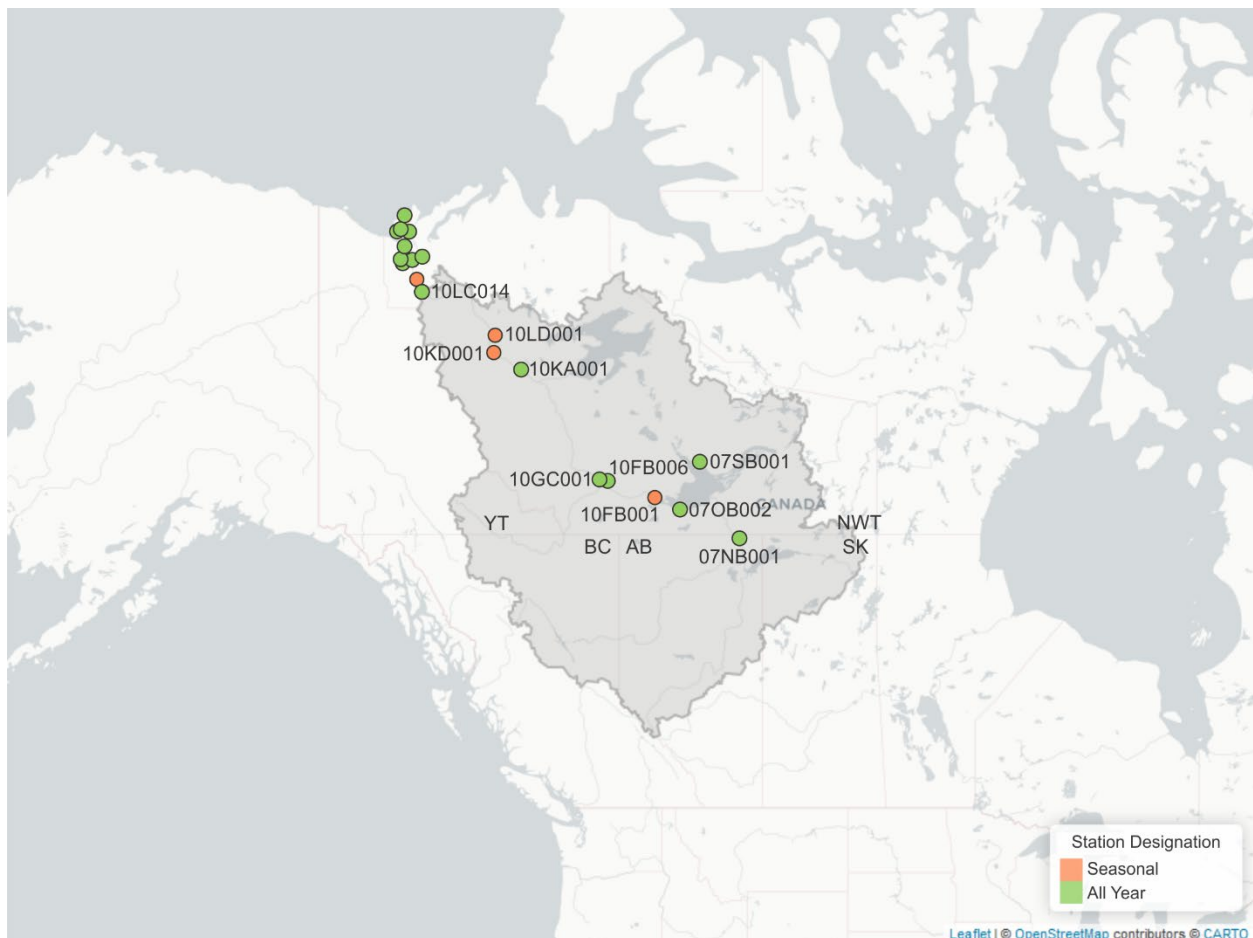
Liard River at Fort Liard hydrometric gauge photo. Photo courtesy of Water Survey of Canada and GNWT.



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 not yet commenced on the Dehcho.



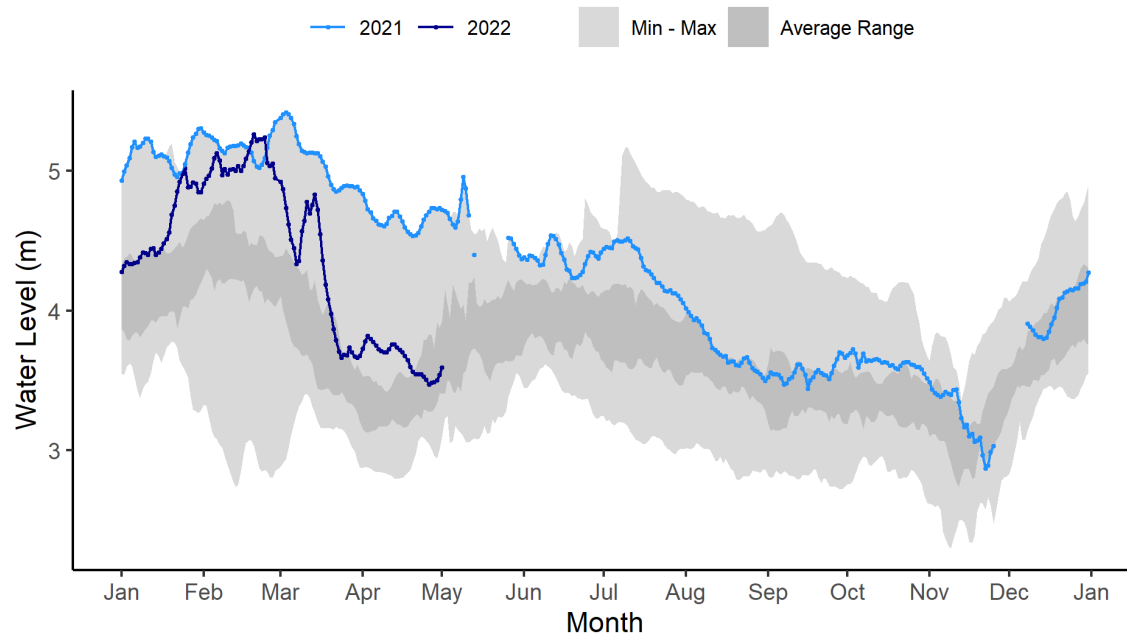
Map of hydrometric stations in the Dehcho (Mackenzie River) basin. The station numbers are referenced in the water level plots below.



Hydrometric Data:

Slave River:

SLAVE RIVER AT FITZGERALD (ALBERTA) (07NB001)

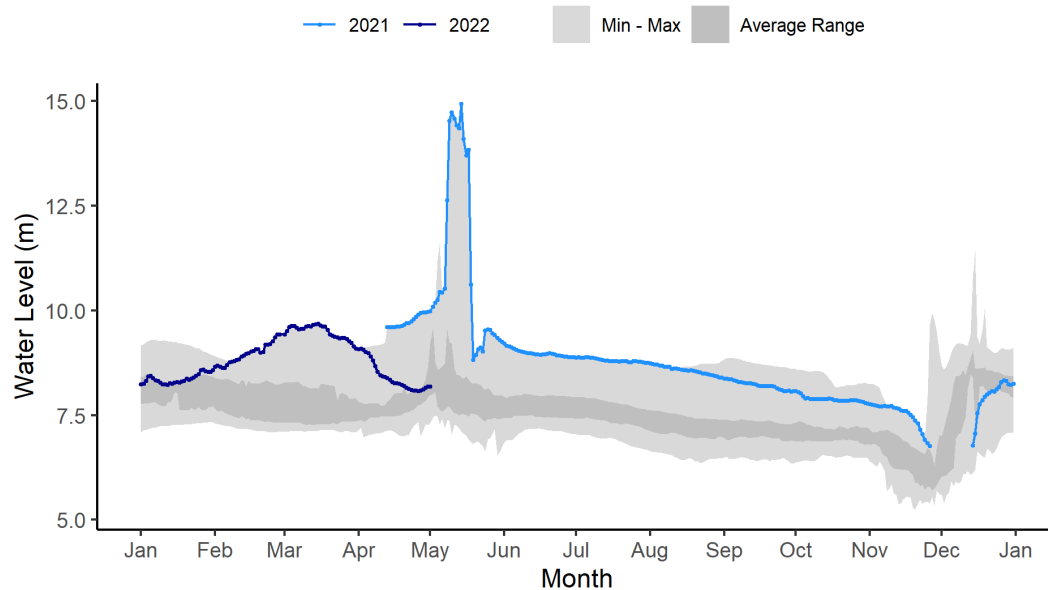


Slave River at Fitzgerald hydrometric gauge photo. Photo courtesy of Water Survey of Canada and GNWT.



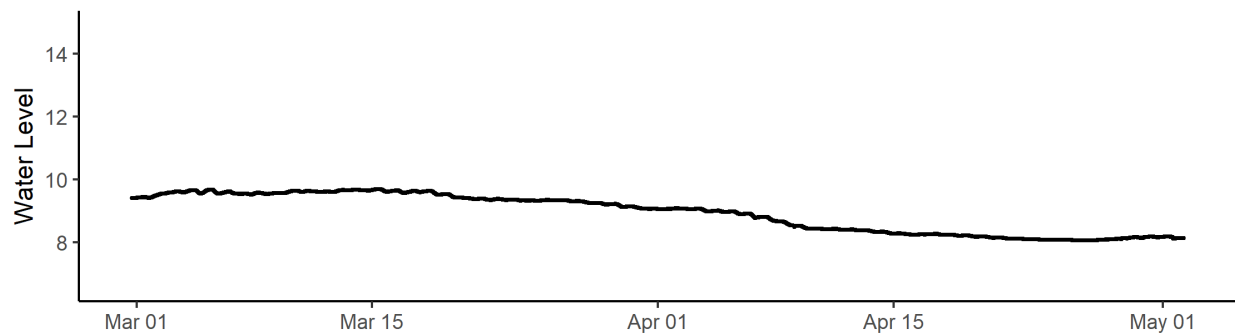
Mackenzie River at Strong Point:

MACKENZIE RIVER AT STRONG POINT (10FB006)

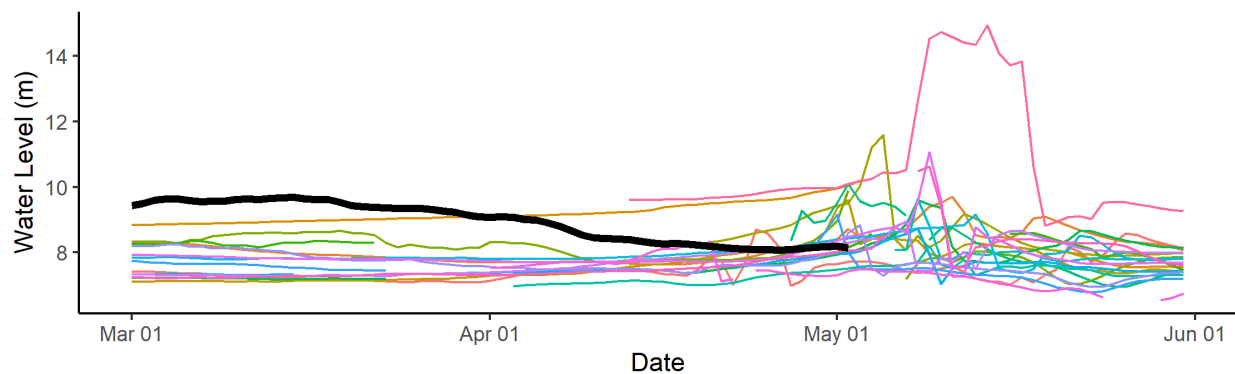


MACKENZIE RIVER AT STRONG POINT (10FB006)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels



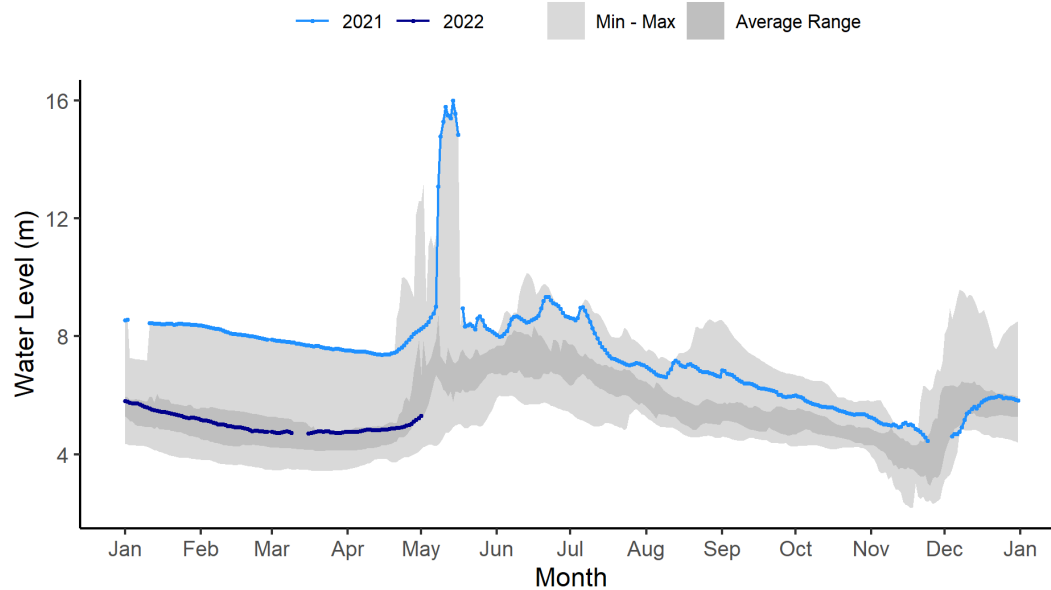


Mackenzie River at Strong Point hydrometric gauge photo. Photo courtesy of Water Survey of Canada and GNWT.



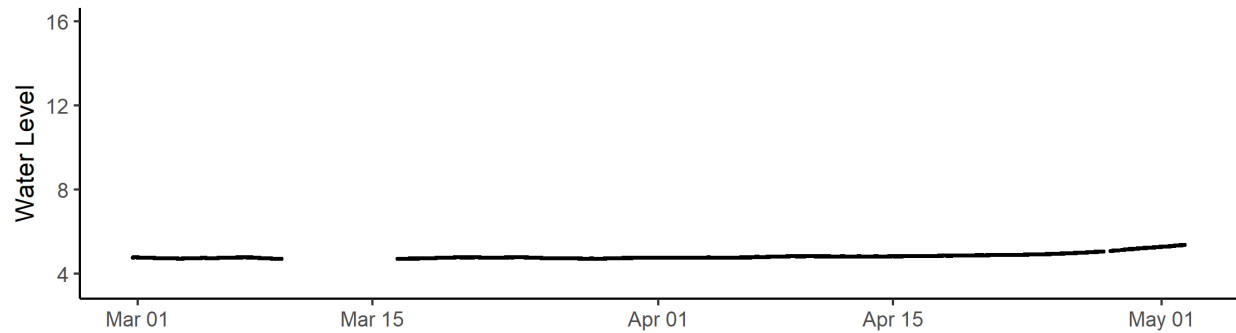
Mackenzie River at Fort Simpson:

MACKENZIE RIVER AT FORT SIMPSON (10GC001)

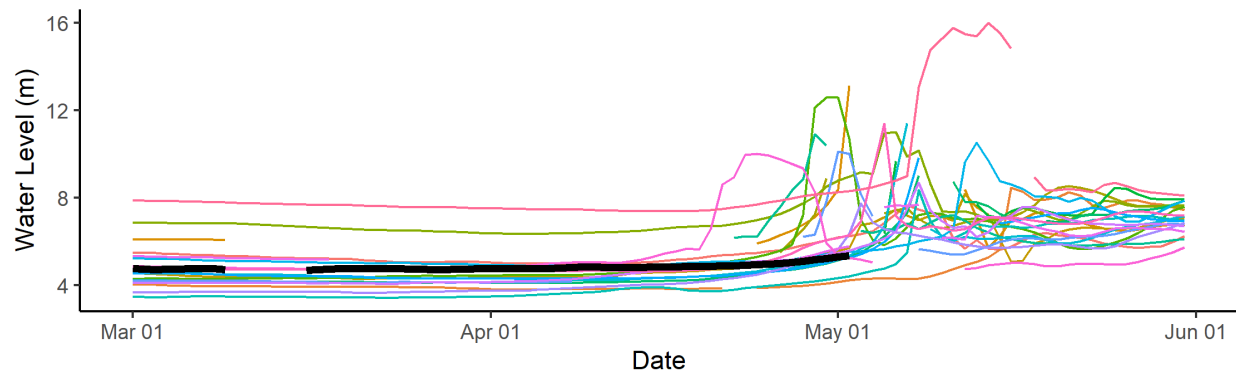


MACKENZIE RIVER AT FORT SIMPSON (10GC001)

2022 Water Levels (5 minute resolution)



Historic Daily Water Levels





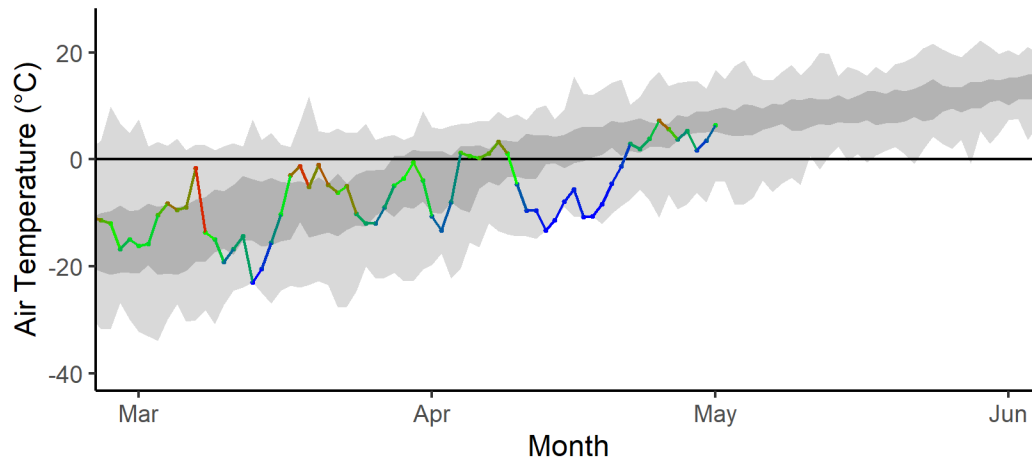
Mackenzie River at Fort Simpson hydrometric gauge photo. Photo courtesy of Water Survey of Canada and GNWT.



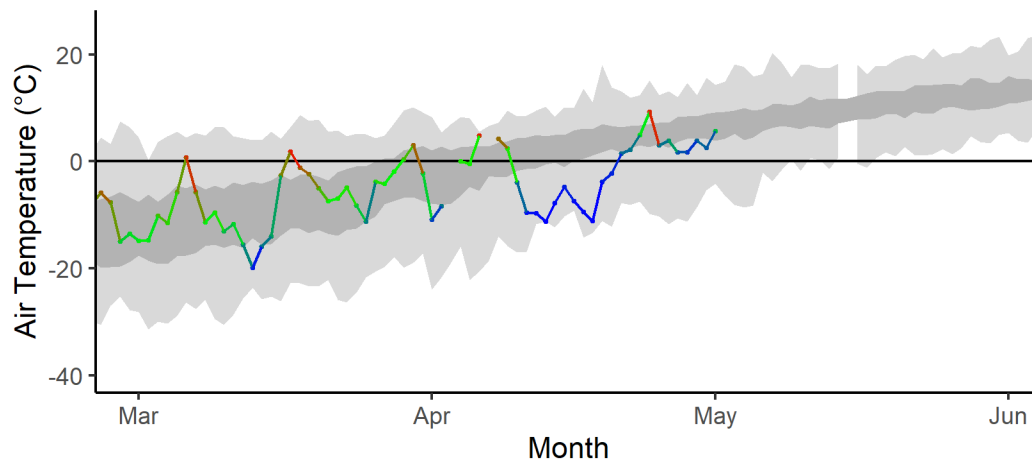
Weather Data:

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

2022 High Level Mean Daily Air Temperatures

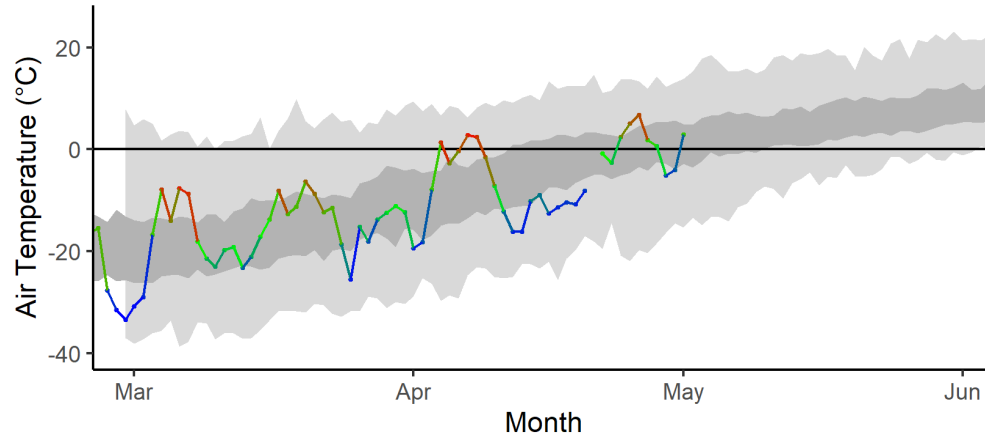


2022 Fort Nelson Mean Daily Air Temperatures

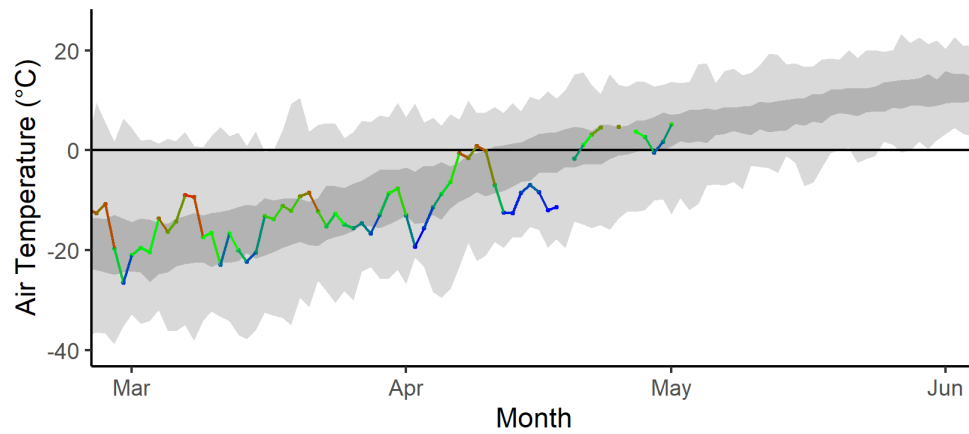




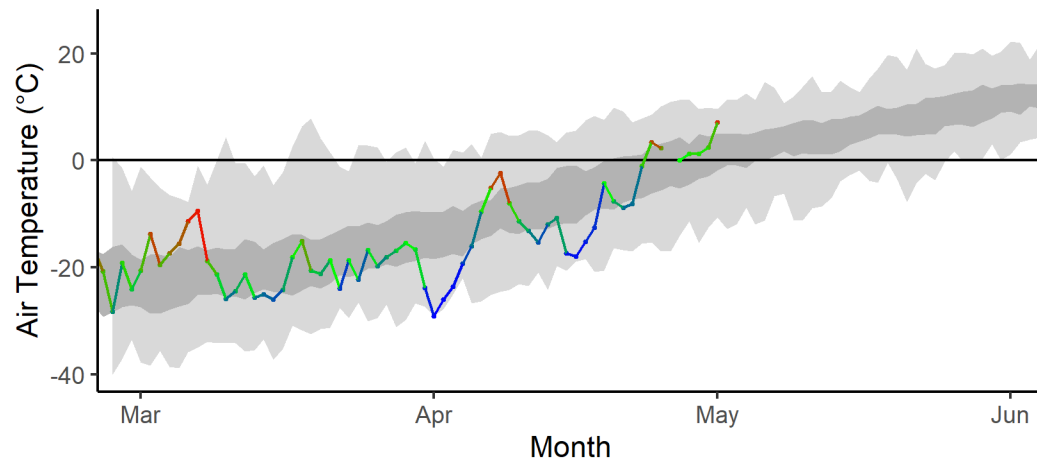
2022 Hay River Mean Daily Air Temperatures



2022 Fort Simpson Mean Daily Air Temperatures
















2022 Norman Wells Mean Daily Air Temperatures































High Level seven-day weather forecast:

Mon 2 May	Tue 3 May	Wed 4 May	Thu 5 May	Fri 6 May	Sat 7 May	Sun 8 May
 12°C A mix of sun and cloud	 12°C 40% Chance of showers	 16°C Sunny	 13°C Cloudy	 15°C Sunny	 14°C A mix of sun and cloud	 14°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 2°C 40% Chance of showers	 1°C 60% Chance of showers	 1°C Cloudy periods	 3°C Cloudy	 2°C Cloudy periods	 0°C Cloudy periods	

Fort Nelson seven-day weather forecast:














Mon 2 May	Tue 3 May	Wed 4 May	Thu 5 May	Fri 6 May	Sat 7 May	Sun 8 May
 11°C Mainly cloudy	 15°C A mix of sun and cloud	 14°C Sunny	 13°C A mix of sun and cloud	 12°C A mix of sun and cloud	 11°C 60% Chance of rain showers or flurries	 13°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 1°C A few showers	 0°C Clear	 -1°C Clear	 0°C Cloudy periods	 1°C Cloudy	 1°C Cloudy periods	

Hay River seven-day weather forecast:














Mon 2 May	Tue 3 May	Wed 4 May	Thu 5 May	Fri 6 May	Sat 7 May	Sun 8 May
 11°C Mainly sunny	 11°C A mix of sun and cloud	 14°C Sunny	 14°C Sunny	 8°C A mix of sun and cloud	 6°C A mix of sun and cloud	 6°C Sunny
Tonight	Night	Night	Night	Night	Night	
 2°C Partly cloudy	 4°C Periods of rain	 0°C Clear	 1°C Cloudy	 -1°C Cloudy periods	 -2°C Clear	



Fort Smith seven-day weather forecast:

Mon 2 May	Tue 3 May	Wed 4 May	Thu 5 May	Fri 6 May	Sat 7 May	Sun 8 May
 8°C Sunny	 6°C A mix of sun and cloud	 13°C 60% Chance of showers	 14°C Sunny	 8°C Rain	 11°C Sunny	 8°C Sunny
Tonight	Night	Night	Night	Night	Night	
 -4°C Clear	 1°C 60% Chance of showers	 0°C Cloudy periods	 4°C Periods of rain	 1°C Clear	 -1°C Clear	

Fort Simpson seven-day weather forecast:

Mon 2 May	Tue 3 May	Wed 4 May	Thu 5 May	Fri 6 May	Sat 7 May	Sun 8 May
 15°C A mix of sun and cloud	 11°C 30% Chance of showers	 14°C Sunny	 15°C Sunny	 12°C A mix of sun and cloud	 10°C A mix of sun and cloud	 10°C A mix of sun and cloud
Tonight	Night	Night	Night	Night	Night	
 4°C Increasing cloudiness	 2°C 30% Chance of showers	 2°C Clear	 0°C Clear	 -1°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.