Government of
Northwest Territories

NWT Water Monitoring Bulletin – May 26, 2023 at 14:00

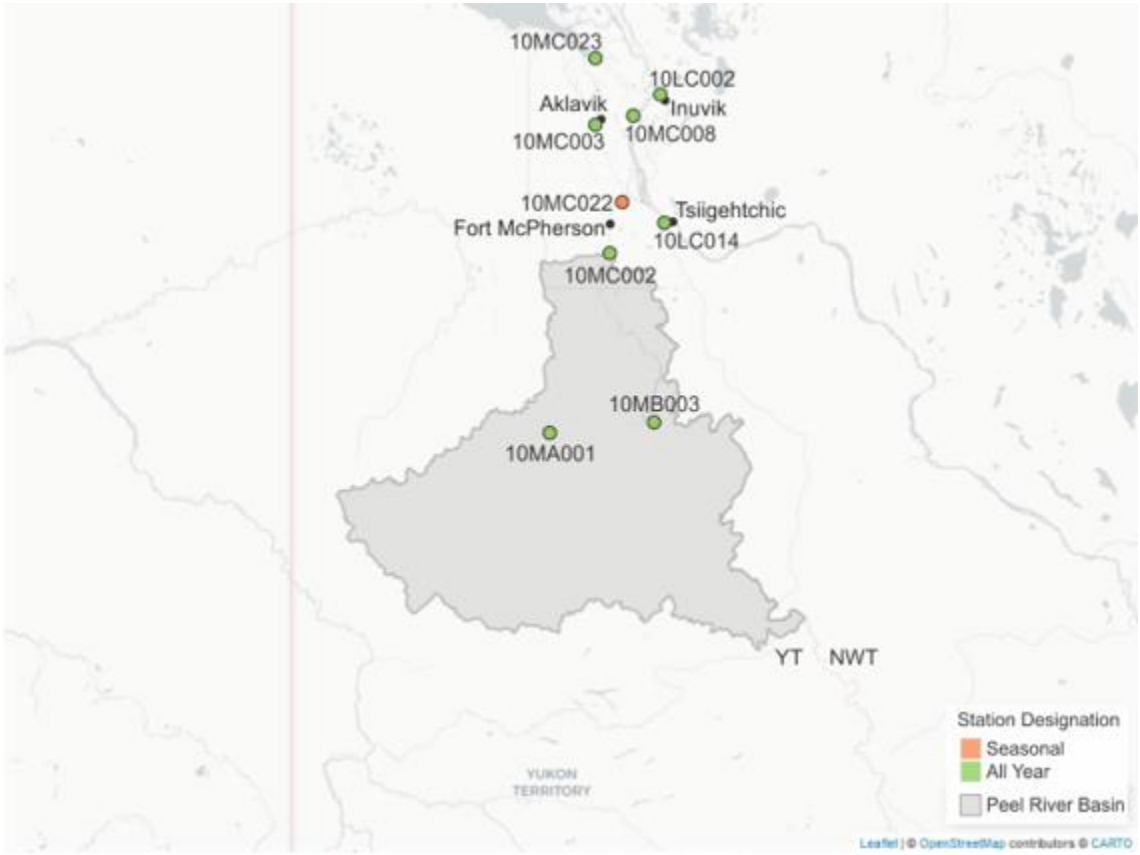
NWT break up reports will be published routinely as break up unfolds. These reports will focus on regions with active snowmelt and ice break up. The geographic focus of the report will shift as conditions change. Additional information about basin conditions can be found in the ECC Snow Survey Bulletin 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:

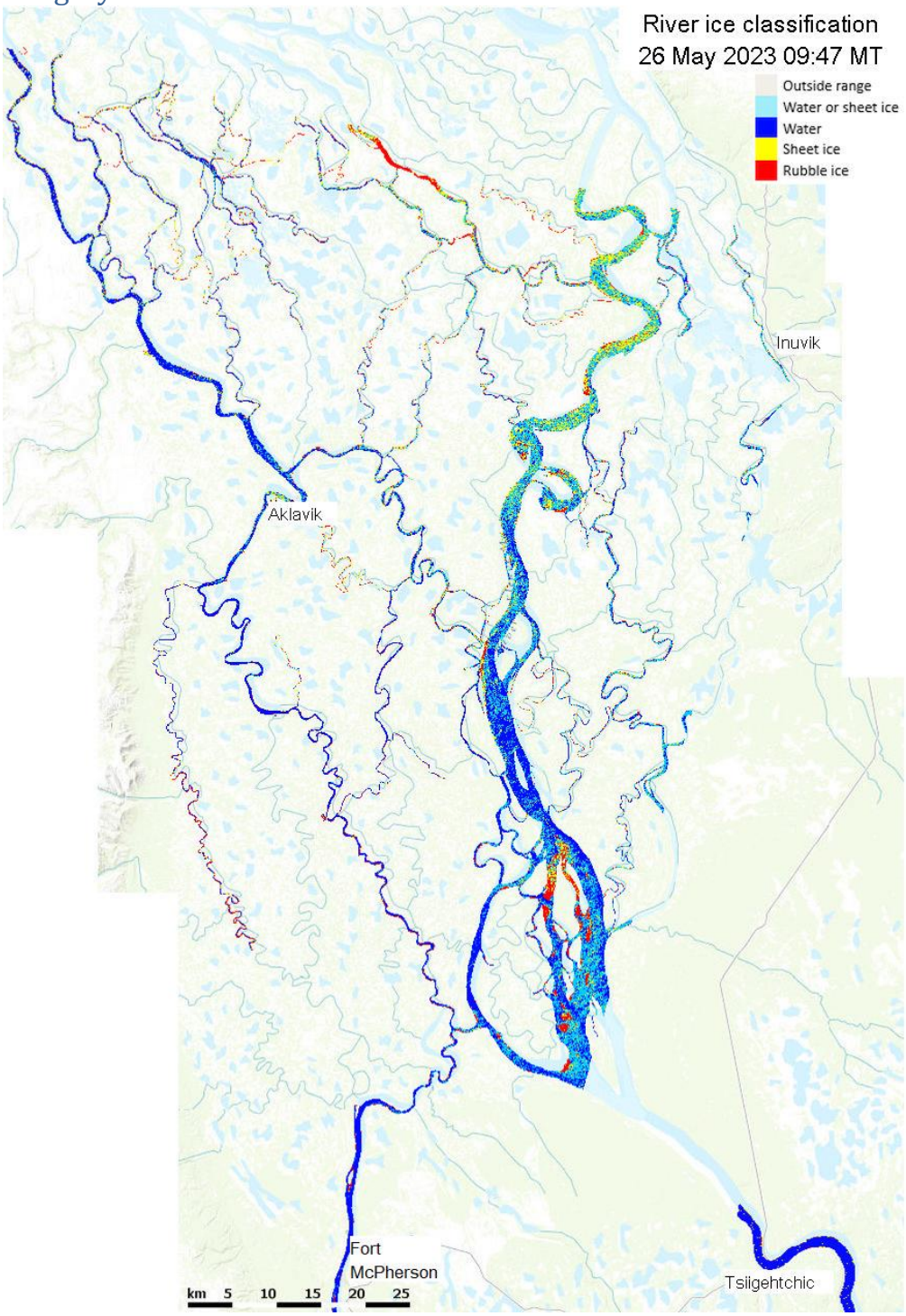
- Water levels at Aklavik and Inuvik remain high, but are slowly receding as ice continues to move through the Delta;
- The risk of ice-jam induced flooding for NWT communities has likely passed for the 2022-23 season;
- Cabin owners and land users are advised to continue to use caution when travelling throughout the Delta;
    - Residual ice continues to move through the Delta;
    - Ice jams may still form in the outer Delta causing localized water level fluctuations.

Contents

Beaufort Delta and Peel River:



Imagery:

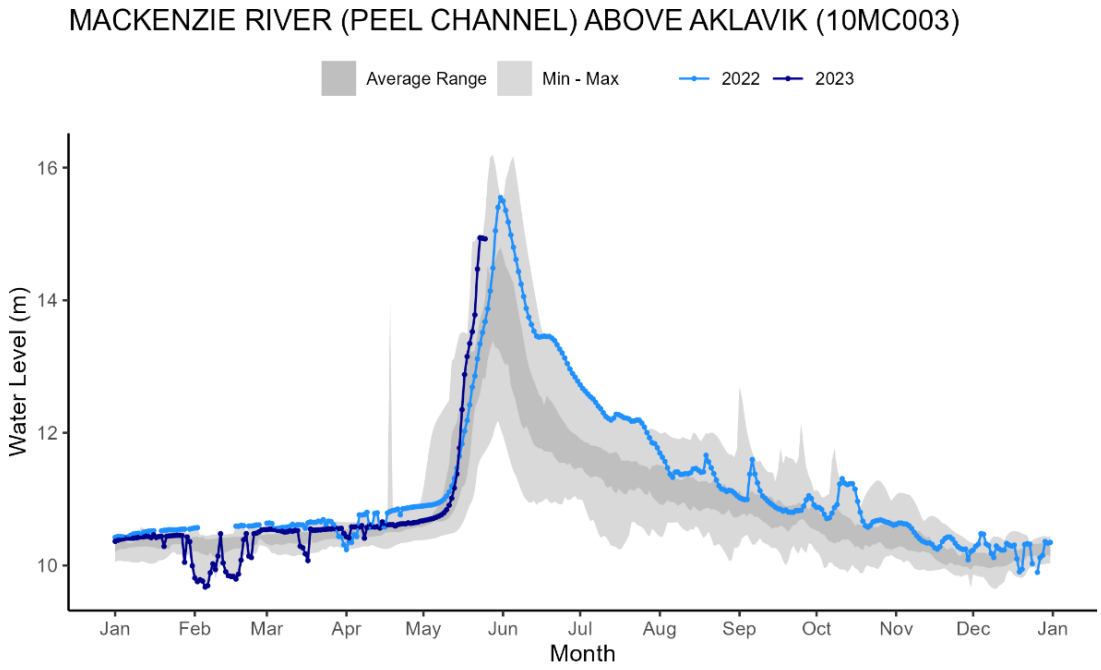


Above – Classified river ice image of the Mackenzie River Delta. The image was acquired this morning (26 May) at 09:47 and is courtesy of the federal government's Government Operations Centre. The river ice classification was completed using the IceBC algorithm.

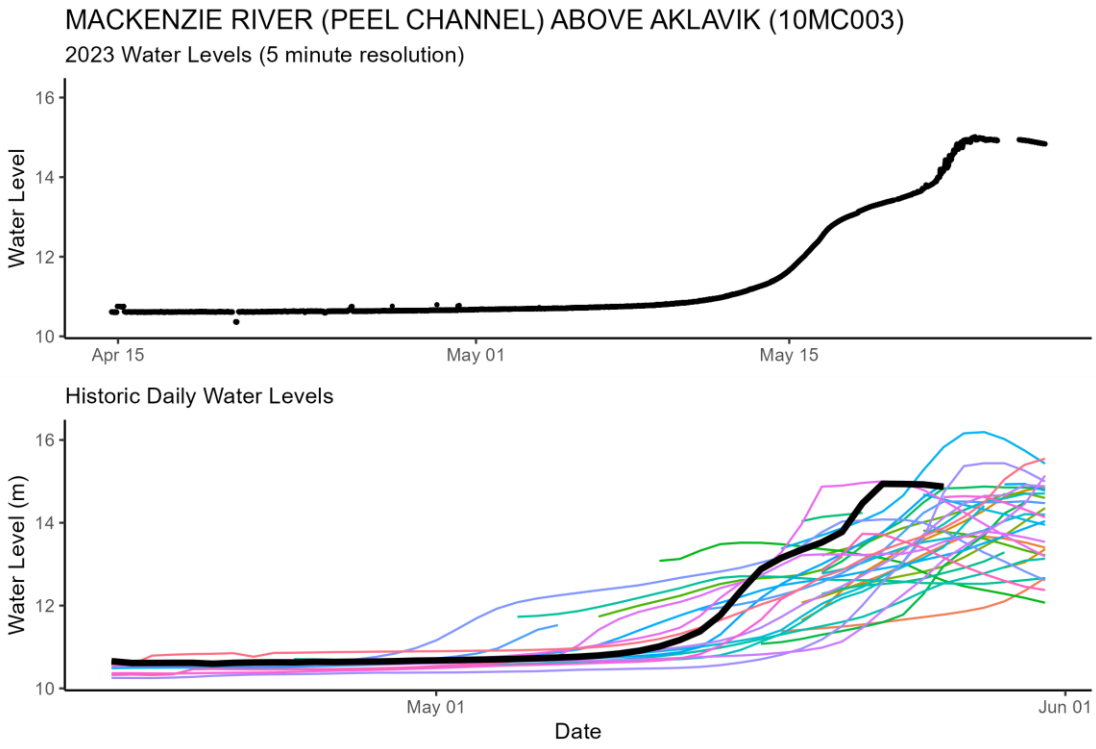
The image shows open water at Aklavik and downstream of the community. The image acquisition area does not cover the ice jam downstream of Inuvik, however the water levels at Inuvik and the ice classification upstream of the ice jam suggest that the ice jam has likely cleared or moved further downstream.

Hydrometric Data:

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

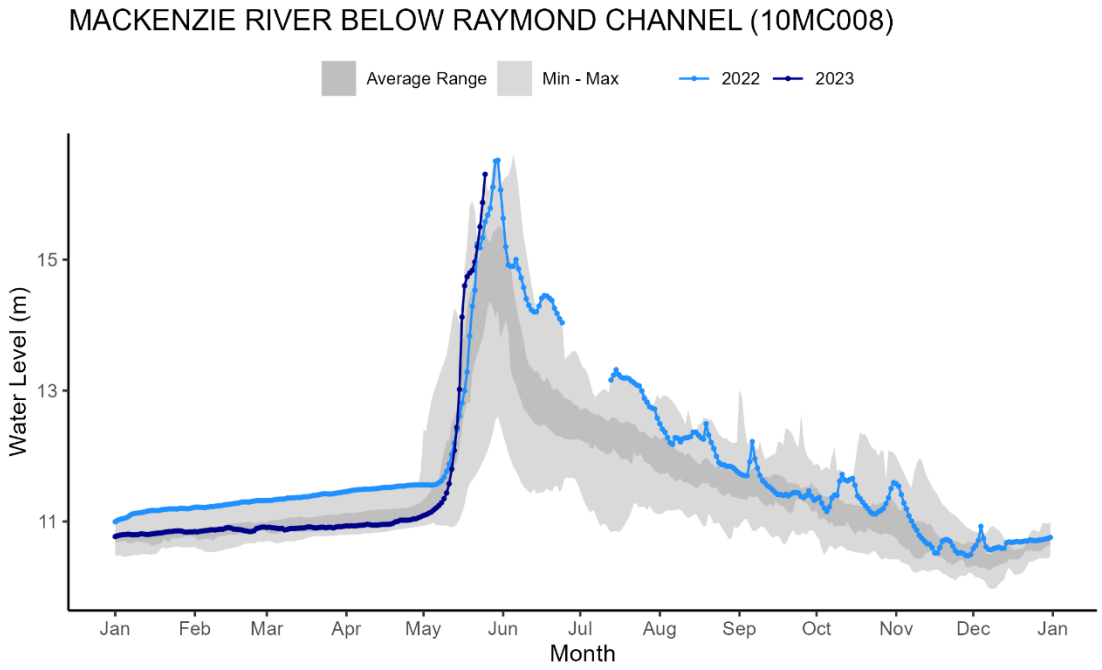


Above – Water level data for the Mackenzie River (Peel Channel) above Aklavik. Daily average levels for this year and the previous year are shown here.

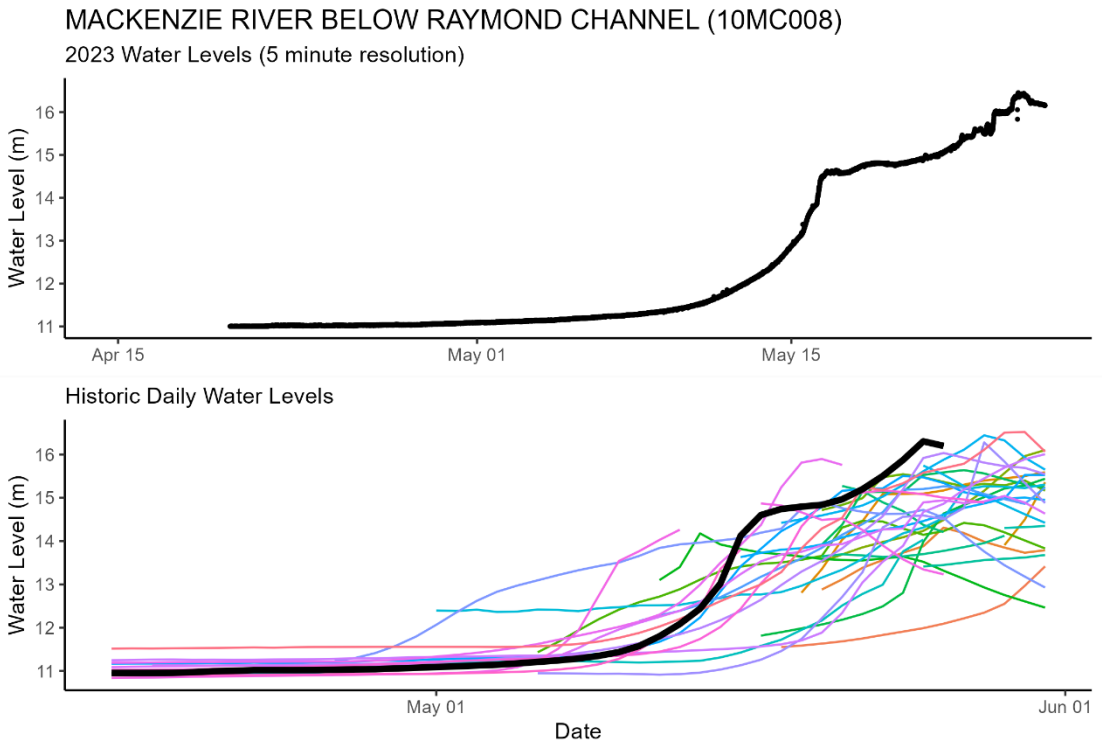


Above: The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.

Mackenzie River (Middle Channel) below Raymond Channel [10MC008]:



Above – Water level data for the Mackenzie River (Middle Channel) below Raymond Channel. Daily average levels for this year and the previous year are shown here.



Above: The upper graph in the figure presents real time water level data at 5-minute resolution. The lower graph shows daily average levels relative to the previous 20 years.

Above – Mackenzie River (Middle Channel) below Raymond Channel hydrometric gauge photo from May 26 at 13:00. Photo courtesy of Water Survey of Canada and GNWT.

Weather Data:

Current status and forecast:

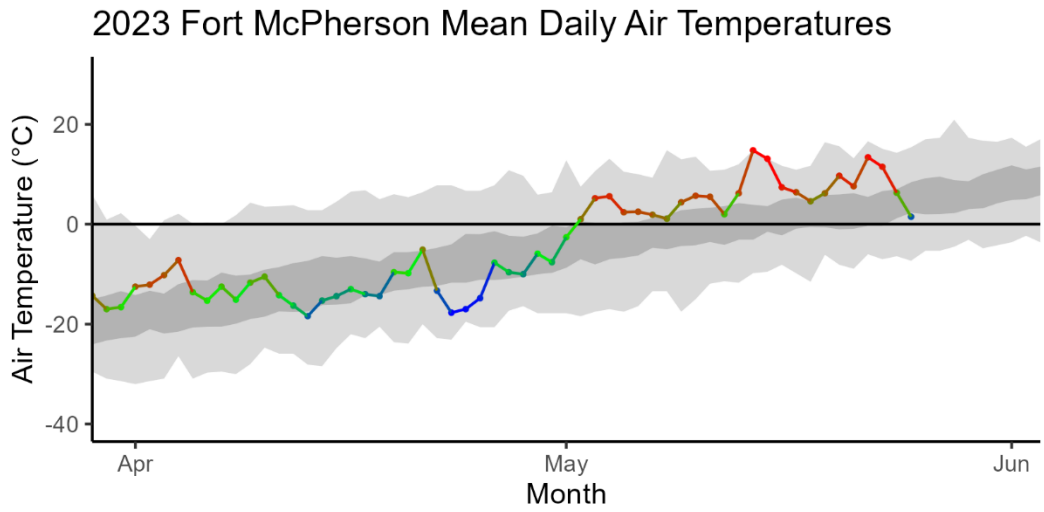
Weather in the Beaufort Delta is expected to be warmer than seasonal over the coming days which will help to continue to move ice through the Delta.

Background information and context:

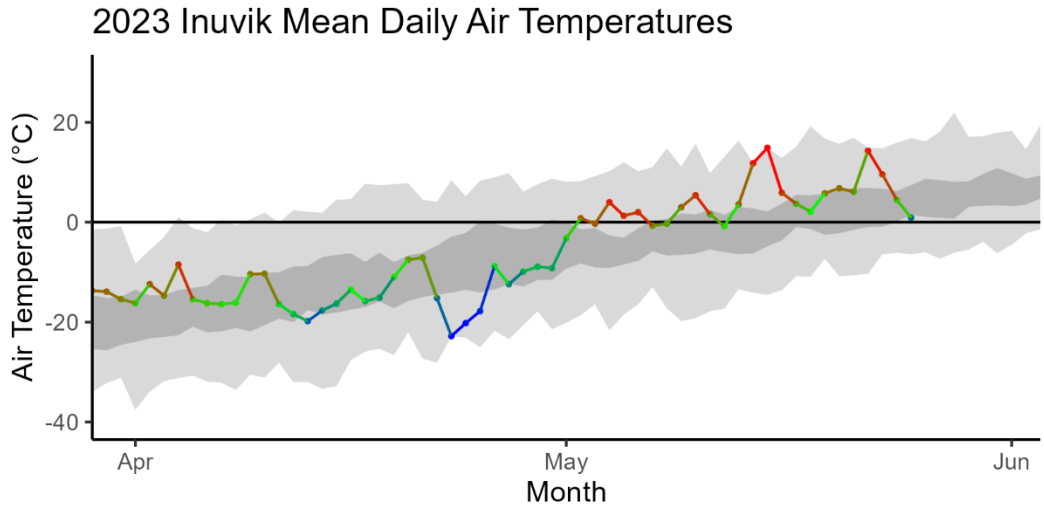
Weather information informs how snow and ice will melt and provides information about how this spring is unfolding relative to previous springs. Warmer than normal conditions early in the spring allow for additional energy to melt the snowpack and soften river ice. Rain-on-snow events can cause rapid melt of snowpacks and facilitate quick delivery of snowmelt water to rivers. Locations included here cover basin areas that feed into NWT rivers that are currently undergoing break up.

2023 spring temperatures to date:

Fort McPherson:



Inuvik:



Seven-day weather forecast:

Fort McPherson:

Fri 26 May	Sat 27 May	Sun 28 May	Mon 29 May	Tue 30 May	Wed 31 May	Thu 1 Jun
11°C 30% Chance of showers	10°C Rain	13°C Cloudy	17°C Cloudy	19°C Cloudy	8°C A mix of sun and cloud	9°C A mix of sun and cloud
Tonight	**Night**	**Night**	**Night**	**Night**	**Night**	
6°C Rain	3°C 60% Chance of showers	5°C Sunny	8°C Cloudy	0°C A mix of sun and cloud	0°C A mix of sun and cloud	

Inuvik:

Fri 26 May	Sat 27 May	Sun 28 May	Mon 29 May	Tue 30 May	Wed 31 May	Thu 1 Jun
13°C A mix of sun and cloud	7°C Rain	13°C A mix of sun and cloud	17°C Sunny	17°C A mix of sun and cloud	11°C A mix of sun and cloud	12°C A mix of sun and cloud
Tonight	**Night**	**Night**	**Night**	**Night**	**Night**	
6°C Rain	1°C Cloudy	6°C Sunny	9°C A mix of sun and cloud	0°C A mix of sun and cloud	1°C A mix of sun and cloud	

Aklavik:

Fri 26 May	Sat 27 May	Sun 28 May	Mon 29 May	Tue 30 May	Wed 31 May	Thu 1 Jun
14°C A mix of sun and cloud	8°C Rain	12°C A mix of sun and cloud	17°C A mix of sun and cloud	16°C A mix of sun and cloud	6°C A mix of sun and cloud	7°C A mix of sun and cloud
Tonight	**Night**	**Night**	**Night**	**Night**	**Night**	
7°C Rain	1°C Cloudy	8°C Sunny	9°C A mix of sun and cloud	-1°C A mix of sun and cloud	-1°C A mix of sun and cloud	

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.