Government of
Northwest Territories

NWT Water Monitoring Bulletin – May 28, 2022: 11:00

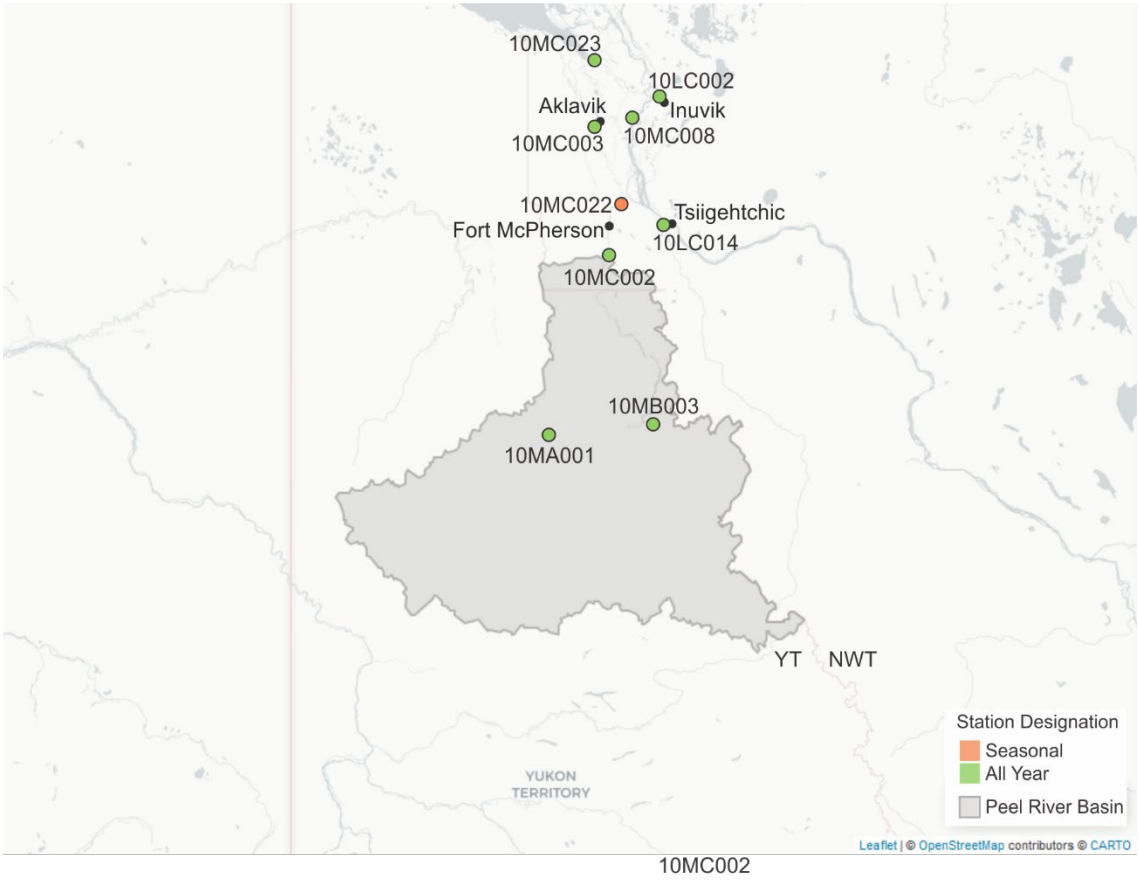
NWT break up reports will be published routinely as break up unfolds. These reports will focus on regions with active snowmelt and ice break up. The geographic focus of the report will shift as conditions change. Additional information about basin conditions can be found in the ENR Snow Survey Bulletin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

- Gauges, photos, and satellite imagery will continue to be monitored, as available, to track the progression of the ice front – no satellite radar imagery of ice conditions was available yet this morning;
- There have been reports of ice cracking and moving in various channels through the Delta;
- Water levels continue to steadily rise in the Mackenzie Delta;
    - Water levels at Aklavik are at 14.55 m (still lower than maximum from last year of 15.539 m and historic maximum of 16.191 m);
    - Water levels at Inuvik are 15.8 m (now higher than the maximum from last year of 15.561 m, but lower than the historic maximum of 16.559 m);
    - Water levels on the Mackenzie River (Middle Channel) below Raymond Channel are 16.06 m (now higher than the maximum from last year of 15.6 m, but lower than the historic maximum of 16.6 m);
    - Note: These values are relative to an arbitrary datum and **not** to each other. See technical note at the end of the bulletin for more information.

Contents

Peel River and Beaufort Delta



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.

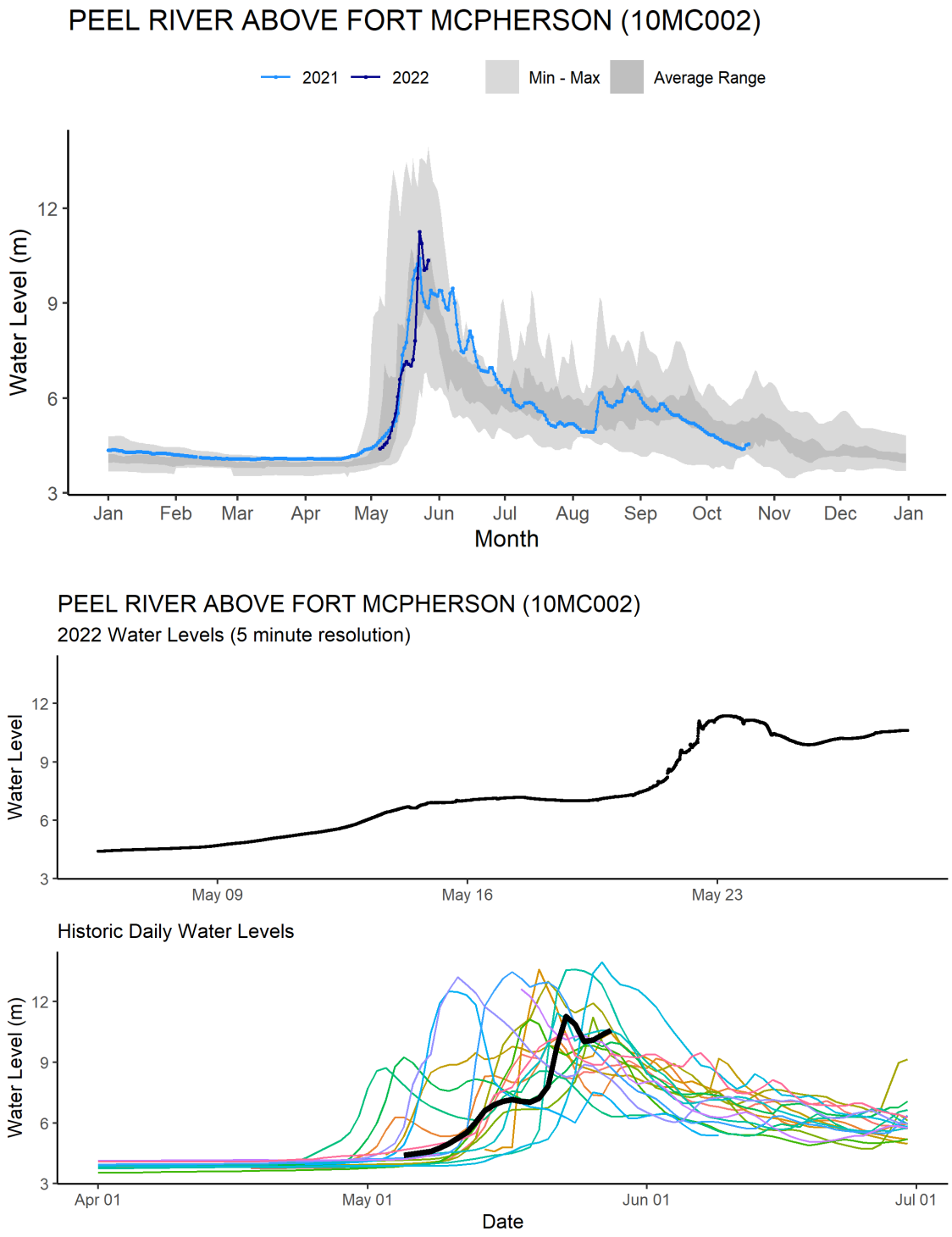
Hydrometric Data:

Mackenzie River at Arctic Red River [10LC014]:

Note: Ice has impacted the gauge and it is not currently producing accurate data.

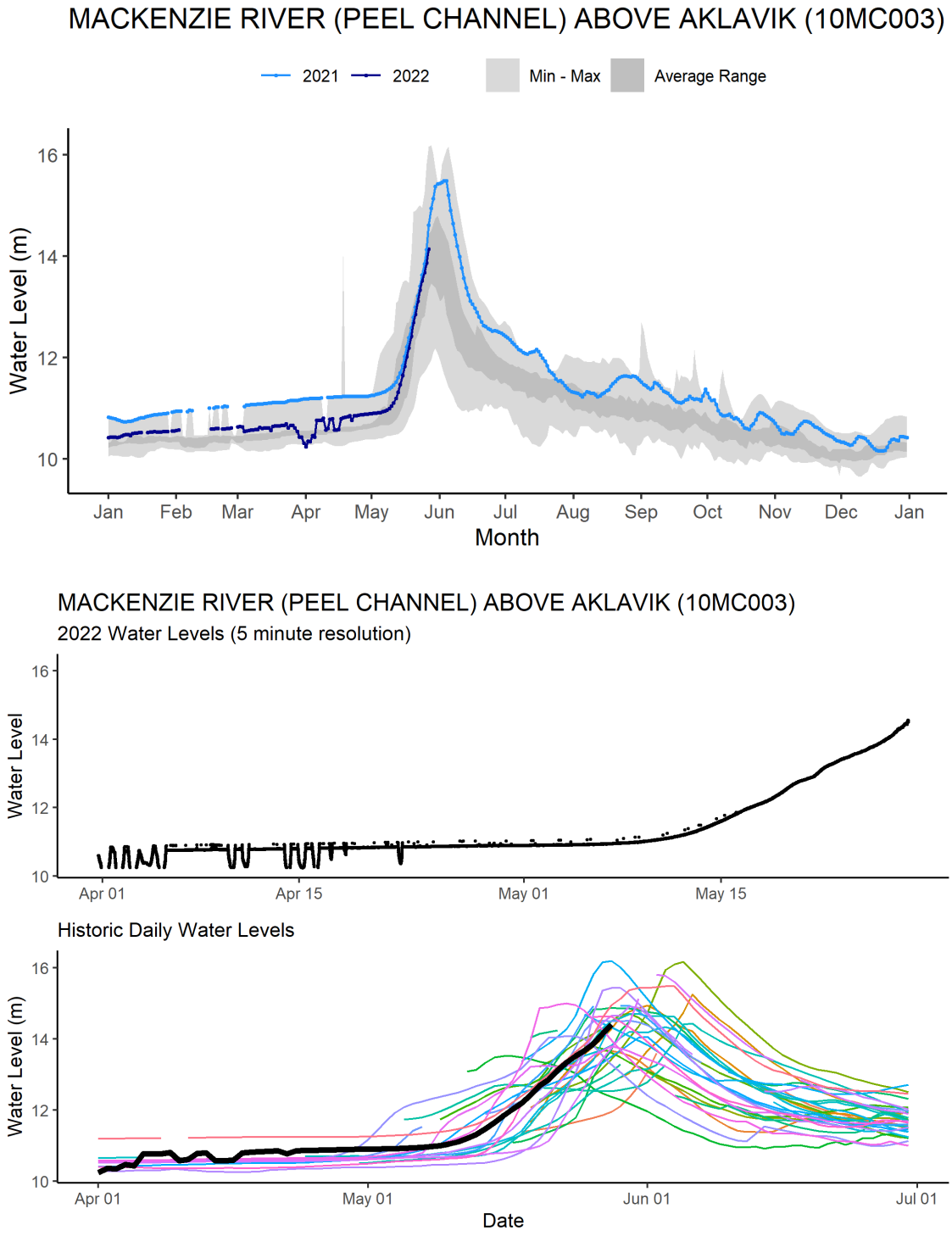
Above – Mackenzie River at Arctic Red River hydrometric gauge photo from May 28 at 09:00. Photo courtesy of Water Survey of Canada and GNWT.

Peel River at Fort McPherson [10MC002]:



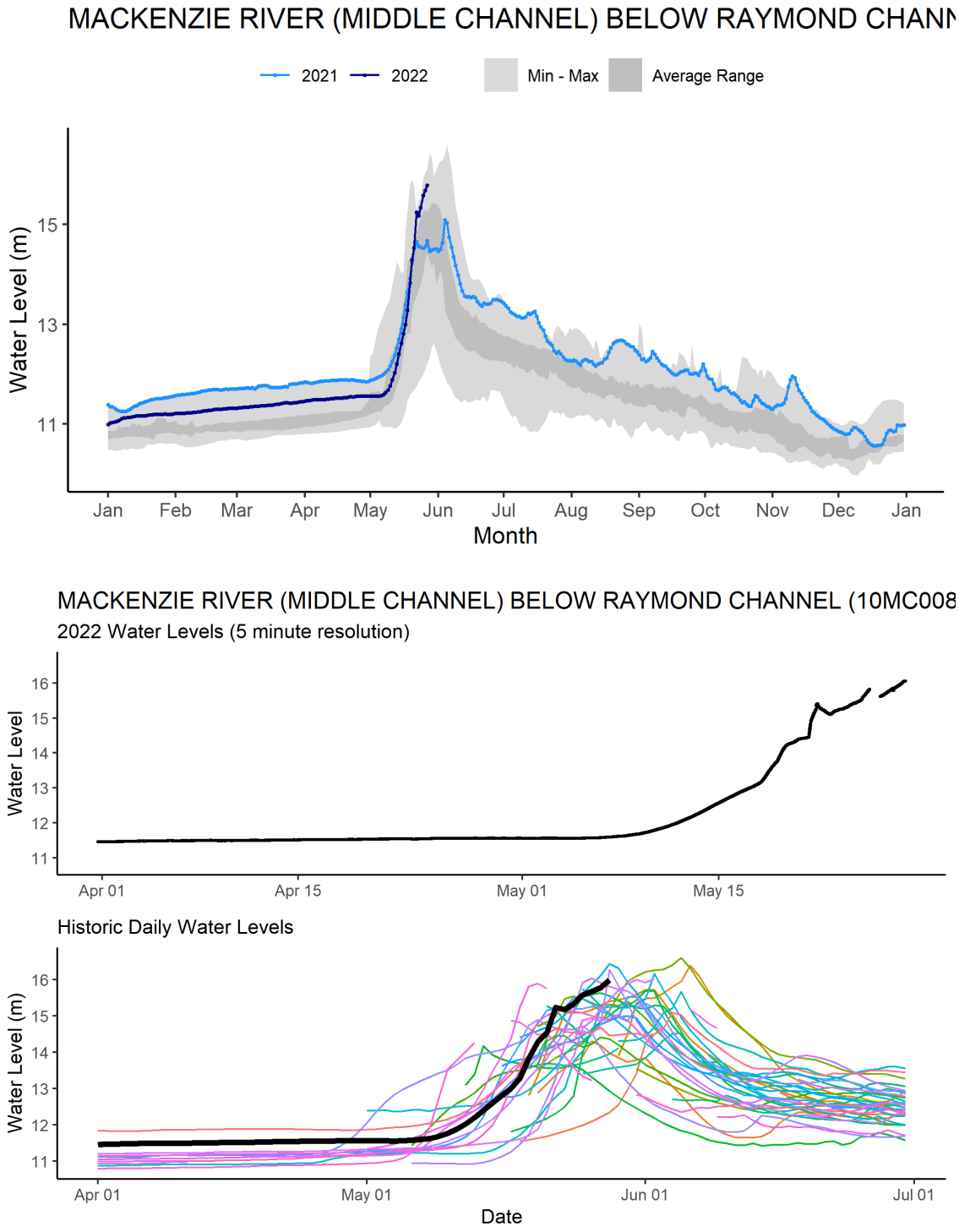
Above – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels are rising very slowly but remain below the ice-induced peak from last weekend.

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



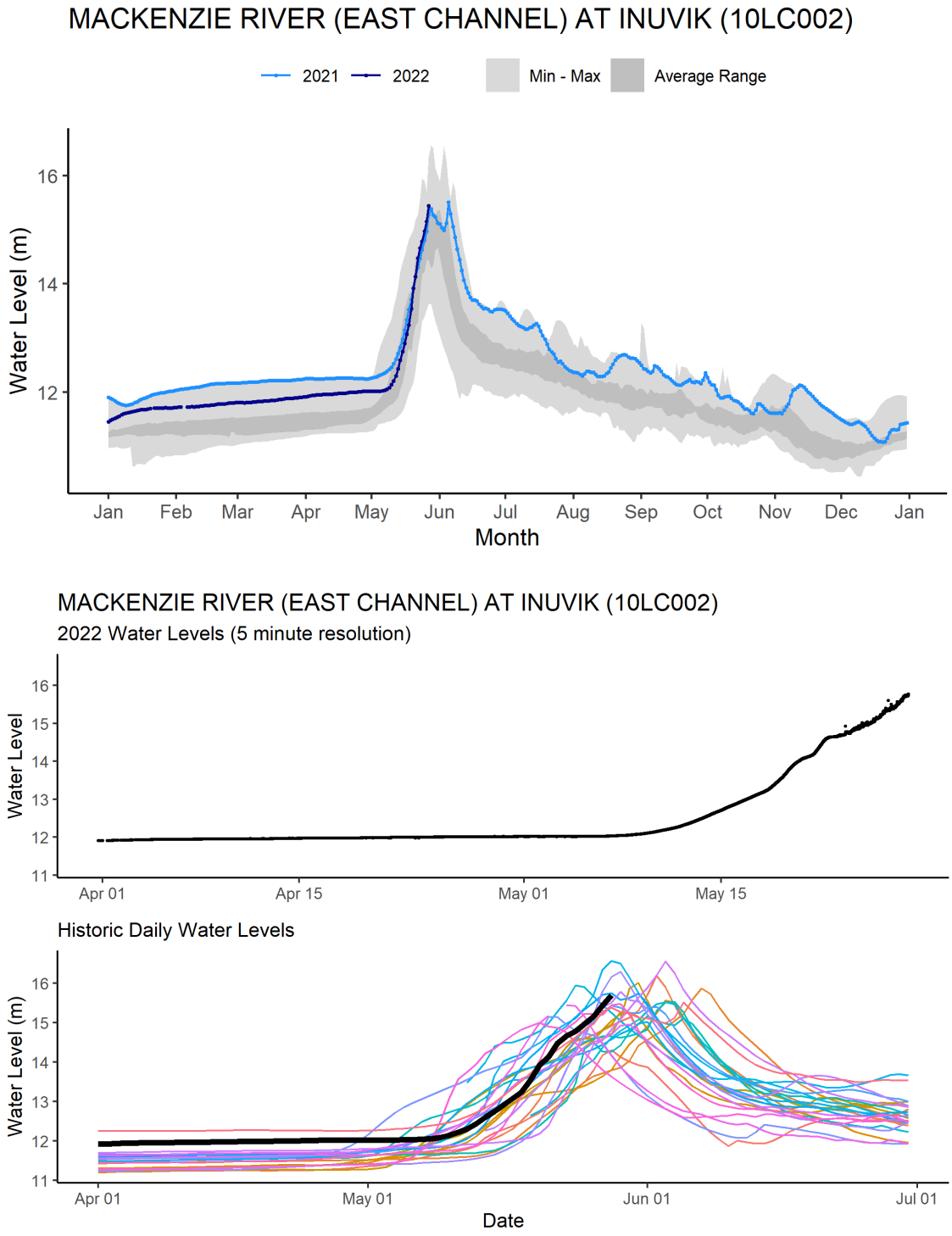
Above – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels in the Mackenzie Delta continue to rise at a normal rate for this time of year.

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



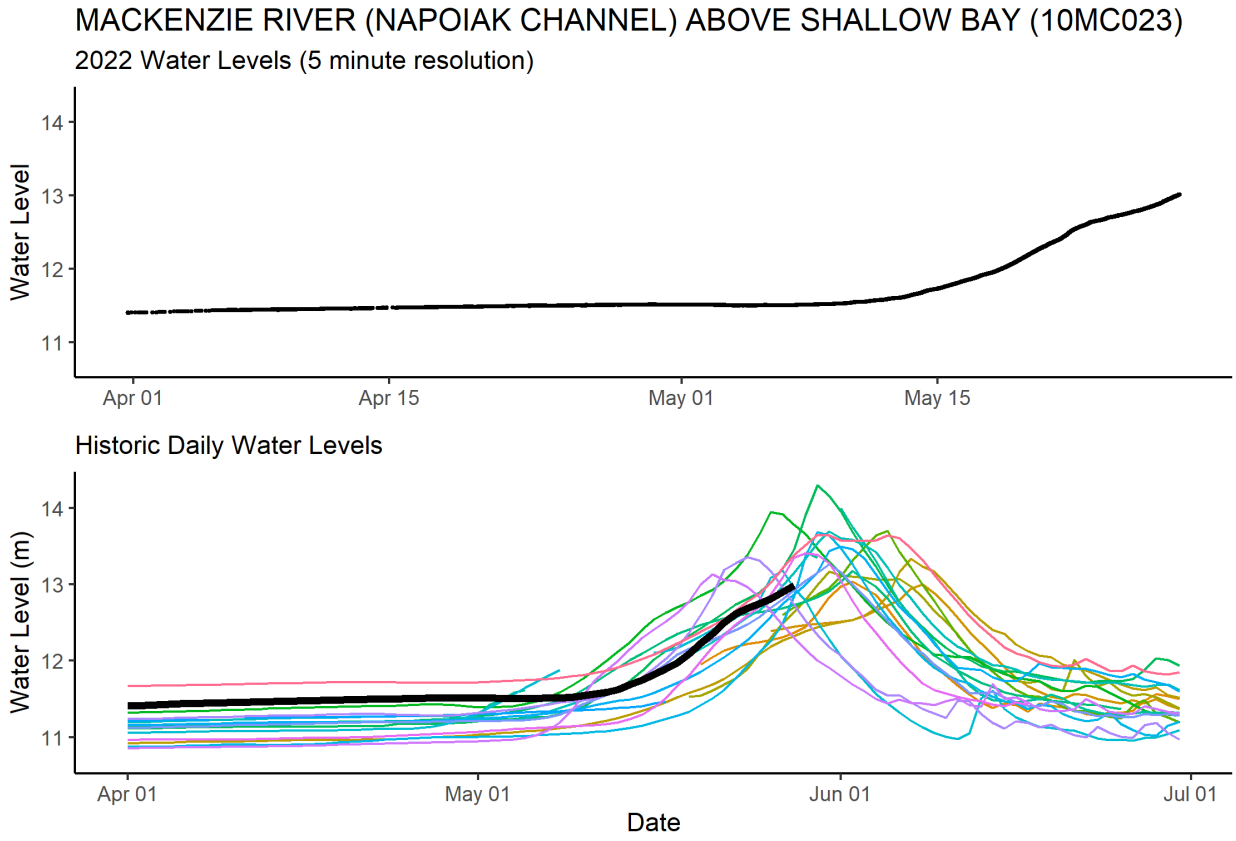
Above – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels at this location in the Mackenzie Delta are higher than normal for this time of year.

Mackenzie River (East Channel) at Inuvik [10LC002]:



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 continue to rise at normal rates for this time of year, but have reached above average levels at this location.

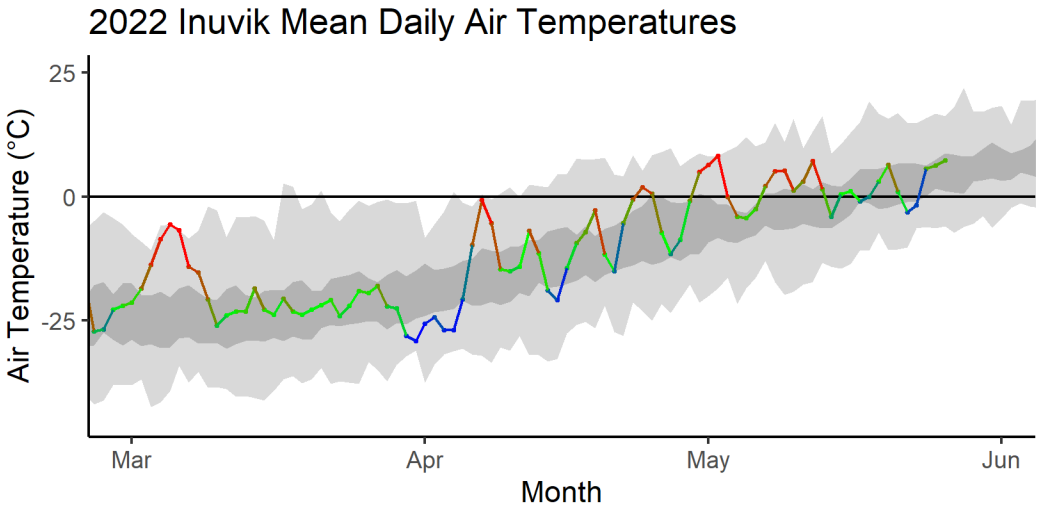
Mackenzie River (Napoiak Channel) above Shallow Bay [10MC023]:

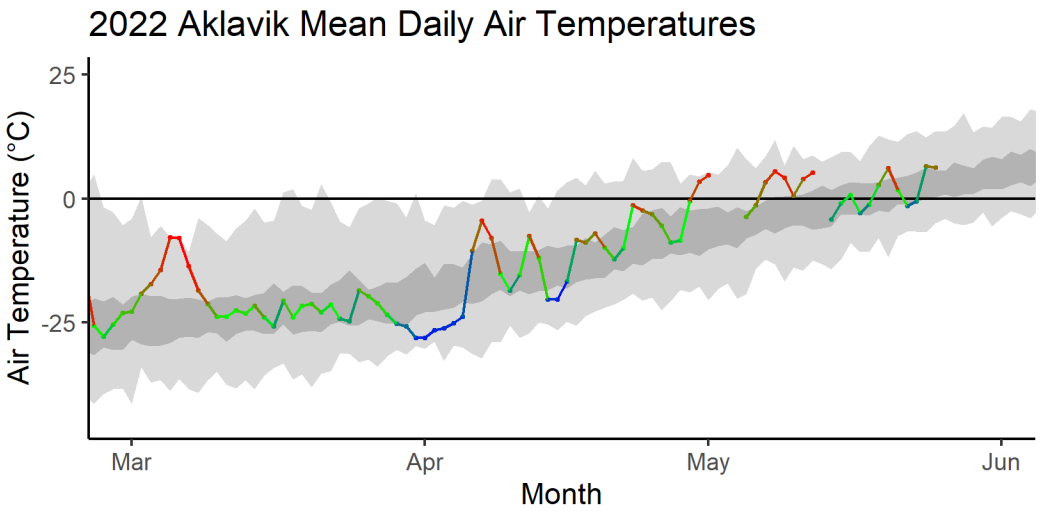


Above – The top graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels in the Mackenzie Delta continue to rise at normal rates for this time of year.

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.





Inuvik seven-day weather forecast:

Sat 28 May	Sun 29 May	Mon 30 May	Tue 31 May	Wed 1 Jun	Thu 2 Jun	Fri 3 Jun
 9°C 30% Chance of flurries	 8°C 30% Chance of flurries	 8°C Cloudy	 6°C Cloudy	 17°C Cloudy	 17°C Cloudy	 14°C A mix of sun and cloud
Tonight	**Night**	**Night**	**Night**	**Night**	**Night**	
 1°C 30% Chance of flurries	 1°C A mix of sun and cloud	 3°C 30% Chance of showers	 3°C Cloudy	 8°C Cloudy	 5°C Cloudy	

Aklavik seven-day weather forecast:

Sat 28 May	Sun 29 May	Mon 30 May	Tue 31 May	Wed 1 Jun	Thu 2 Jun	Fri 3 Jun
 7°C Cloudy	 6°C 30% Chance of rain showers or flurries	 6°C Cloudy	 6°C Cloudy	 16°C Cloudy	 11°C A mix of sun and cloud	 10°C A mix of sun and cloud
Tonight	**Night**	**Night**	**Night**	**Night**	**Night**	
 2°C 30% Chance of rain showers or flurries	 0°C A mix of sun and cloud	 2°C A mix of sun and cloud	 4°C Cloudy	 4°C A mix of sun and cloud	 3°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.