Government of
Northwest Territories

NWT Water Monitoring Bulletin – June 01, 2022: 12:00

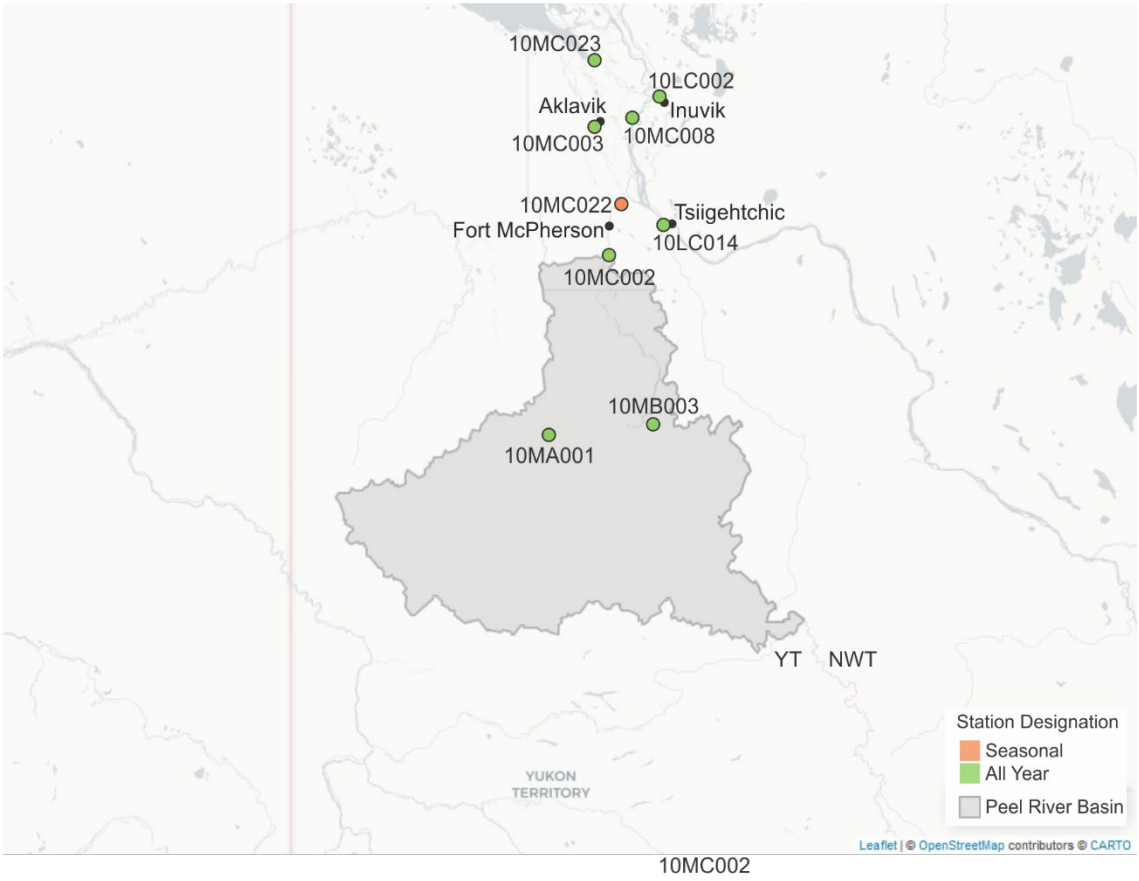
NWT break up reports will be published routinely as break up unfolds. These reports will focus on regions with active snowmelt and ice break up. The geographic focus of the report will shift as conditions change. Additional information about basin conditions can be found in the ENR Snow Survey Bulletin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

- According to available radar imagery, ice has cleared from Horseshoe Bend and has allowed for drainage to begin through the East and Middle channels;
- Radar imagery shows a small jam situated downstream of Aklavik on the West Channel;
    - Water levels at Aklavik have been very slowly dropping over the last 24 hours, but remain well above average;
- Water levels in Inuvik have dropped by ~ 0.5 m since reaching the peak on the evening of May 30;
- Water levels in the Middle Channel below Raymond Channel have dropped by ~ 1.1 m since May 29.

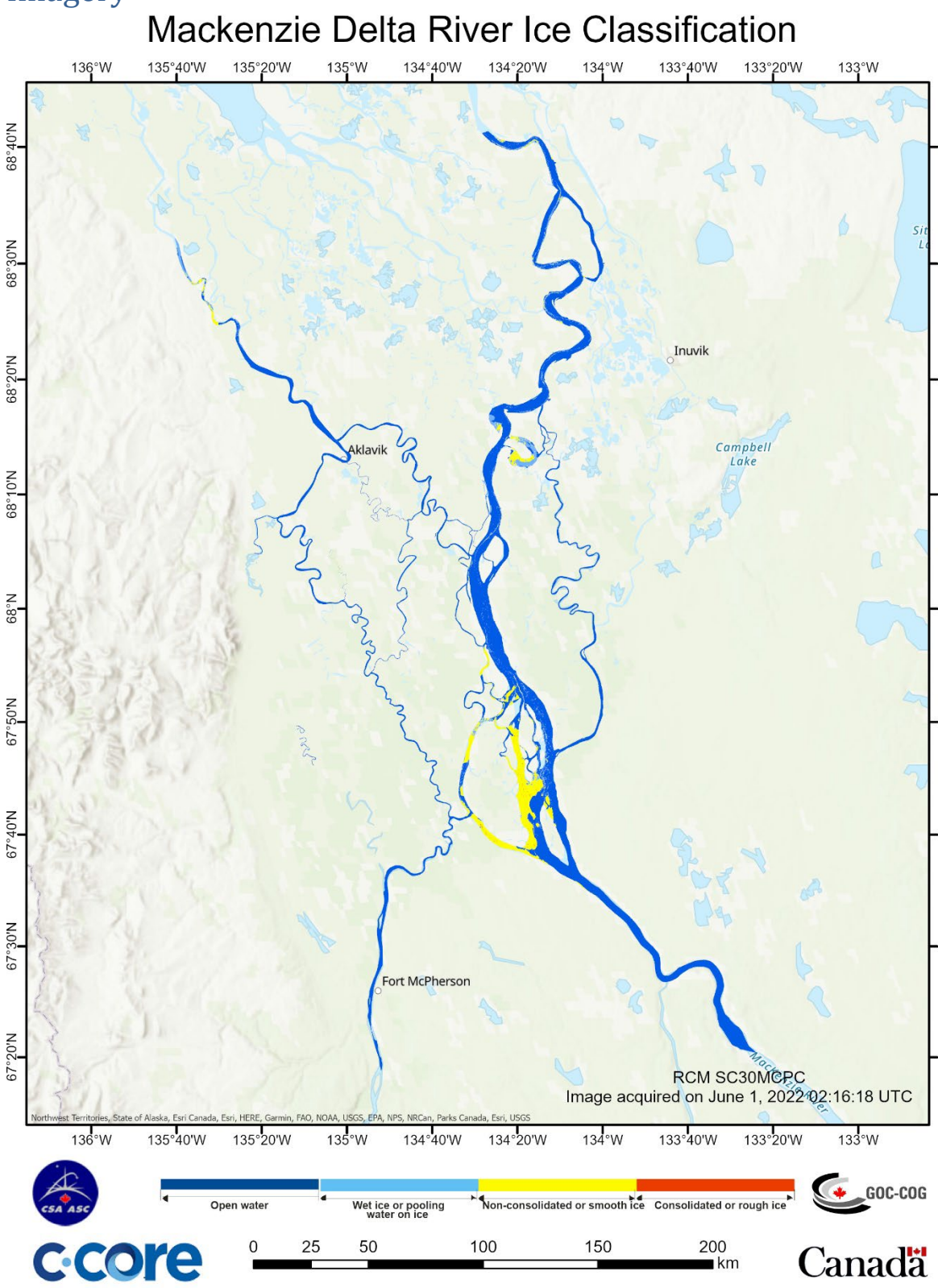
Contents

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.

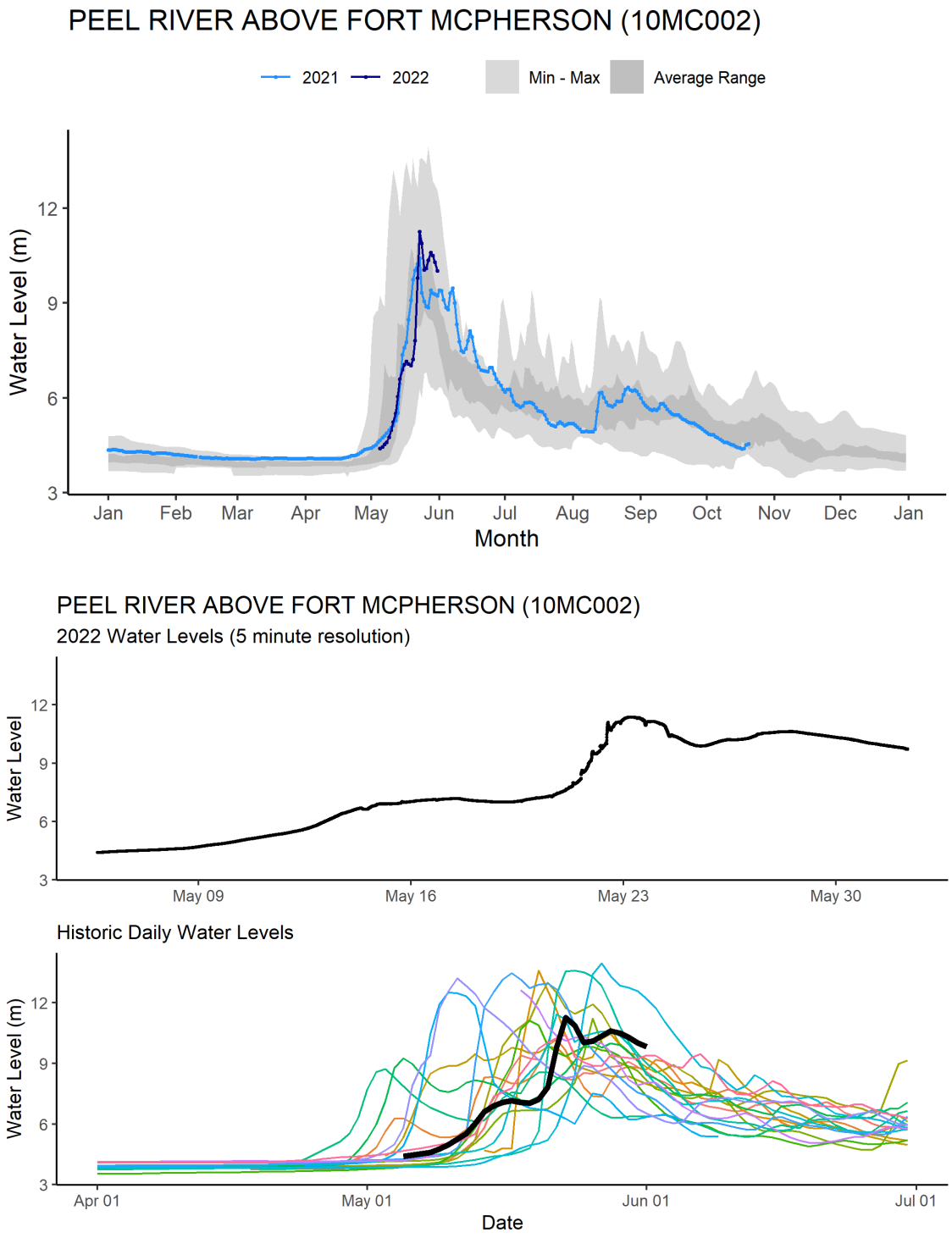
Imagery



Above – Radar ice classification imagery of the Mackenzie River Delta, acquired on May 31, 2022 at 20:16 MDT.

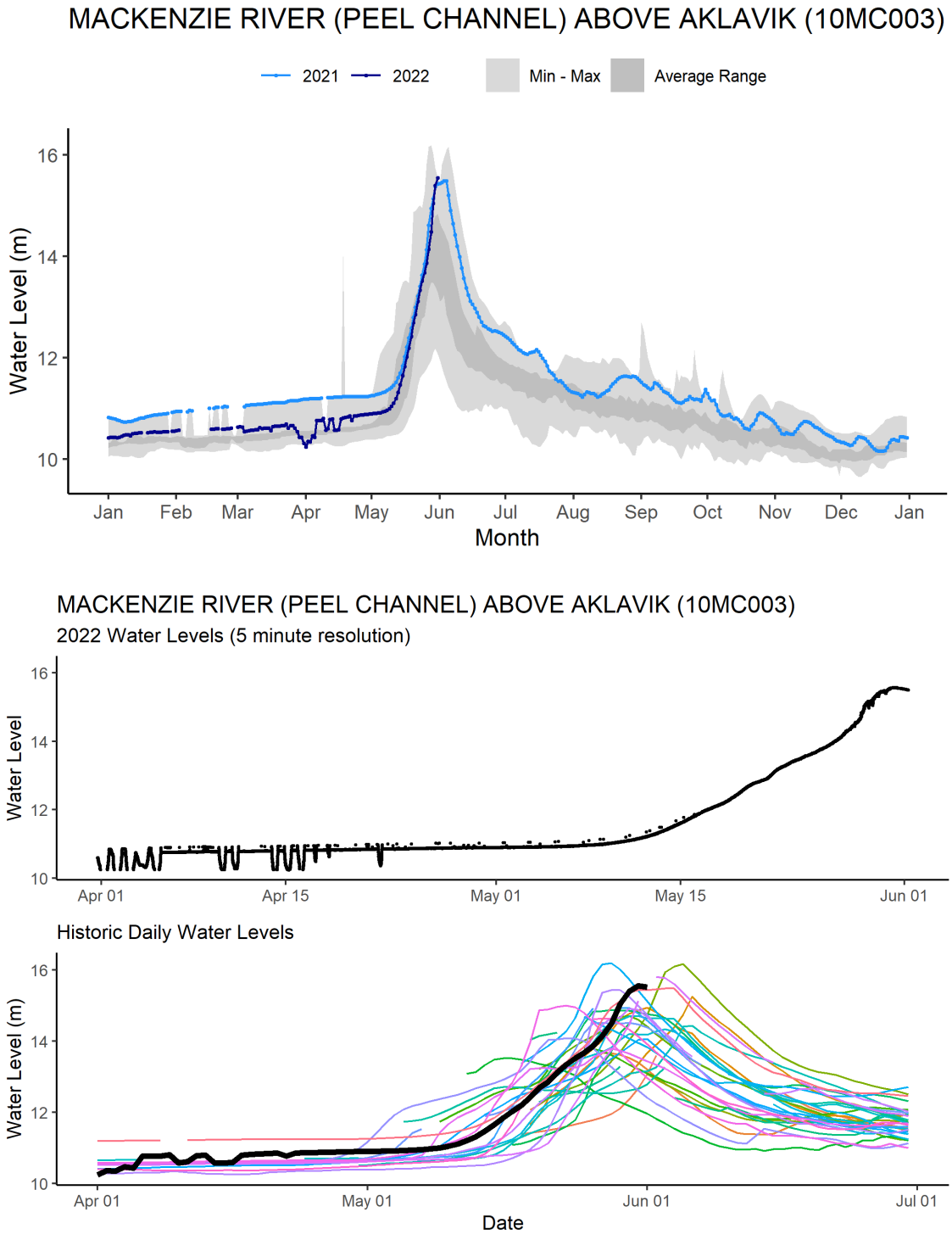
Hydrometric Data:

Peel River at Fort McPherson [10MC002]:



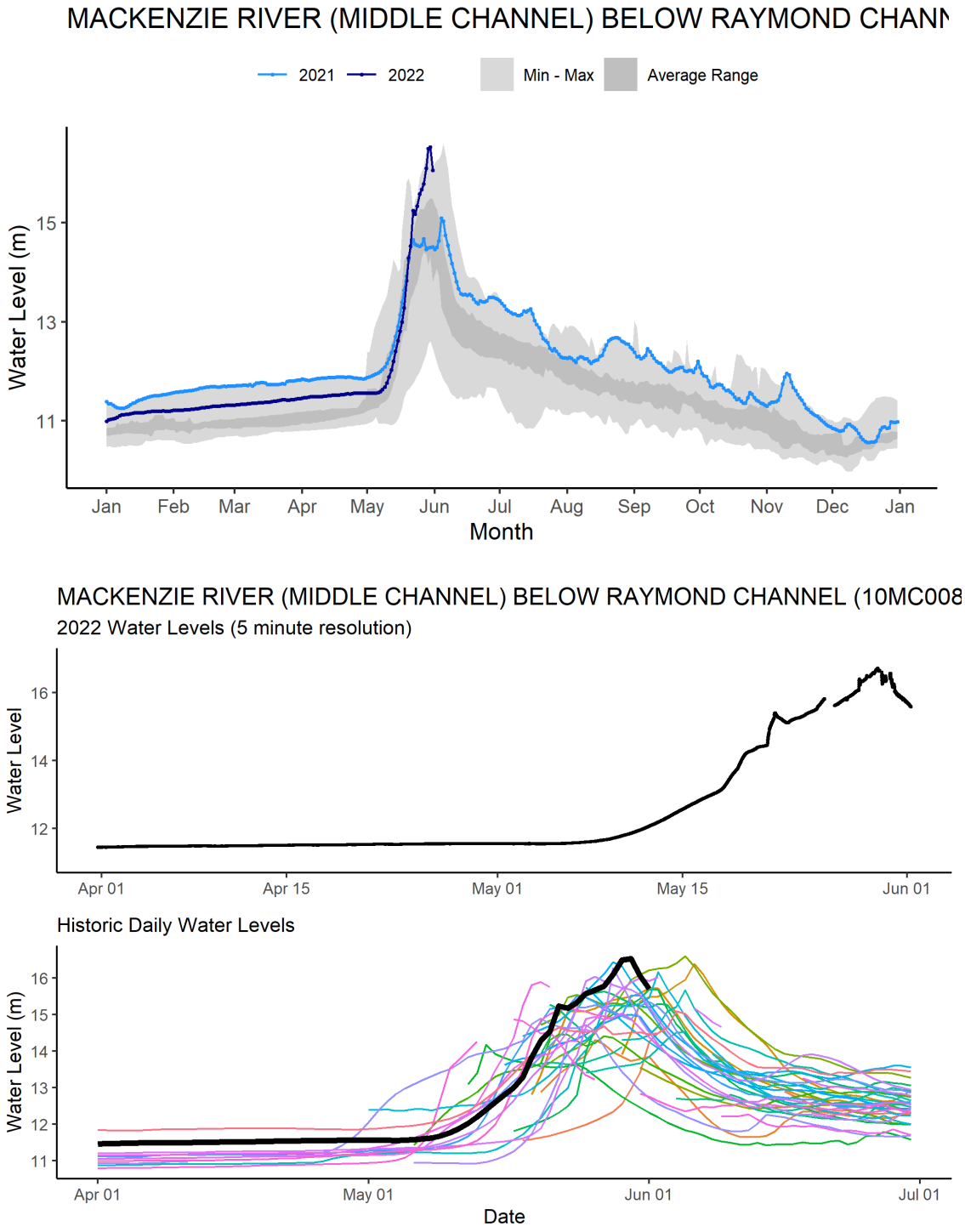
Above – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels remain steady with upstream snowmelt contribution, but are below the ice-induced peak from May.

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



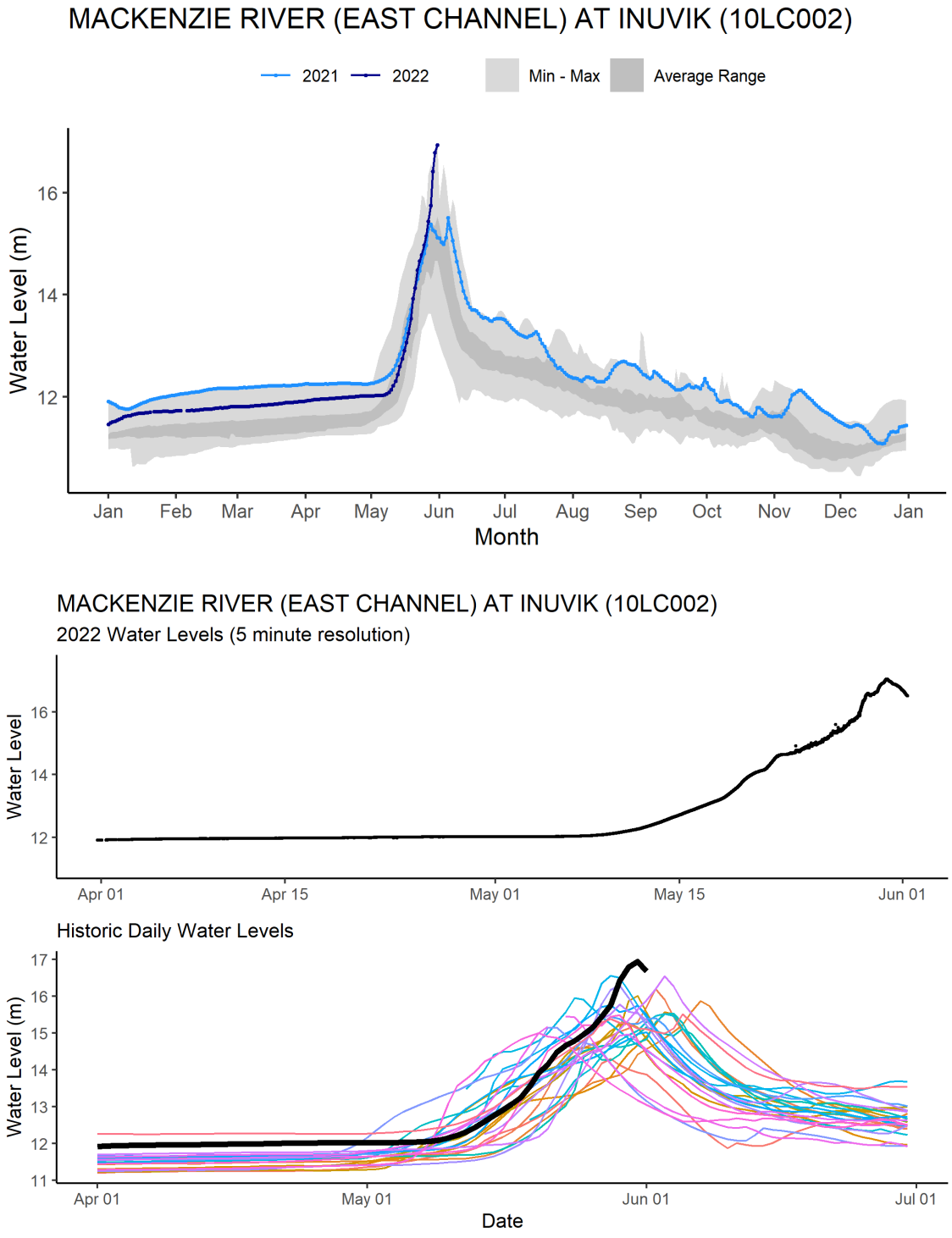
Above – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels at Aklavik remain affected by ice and ice movement, and remain well above average.

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



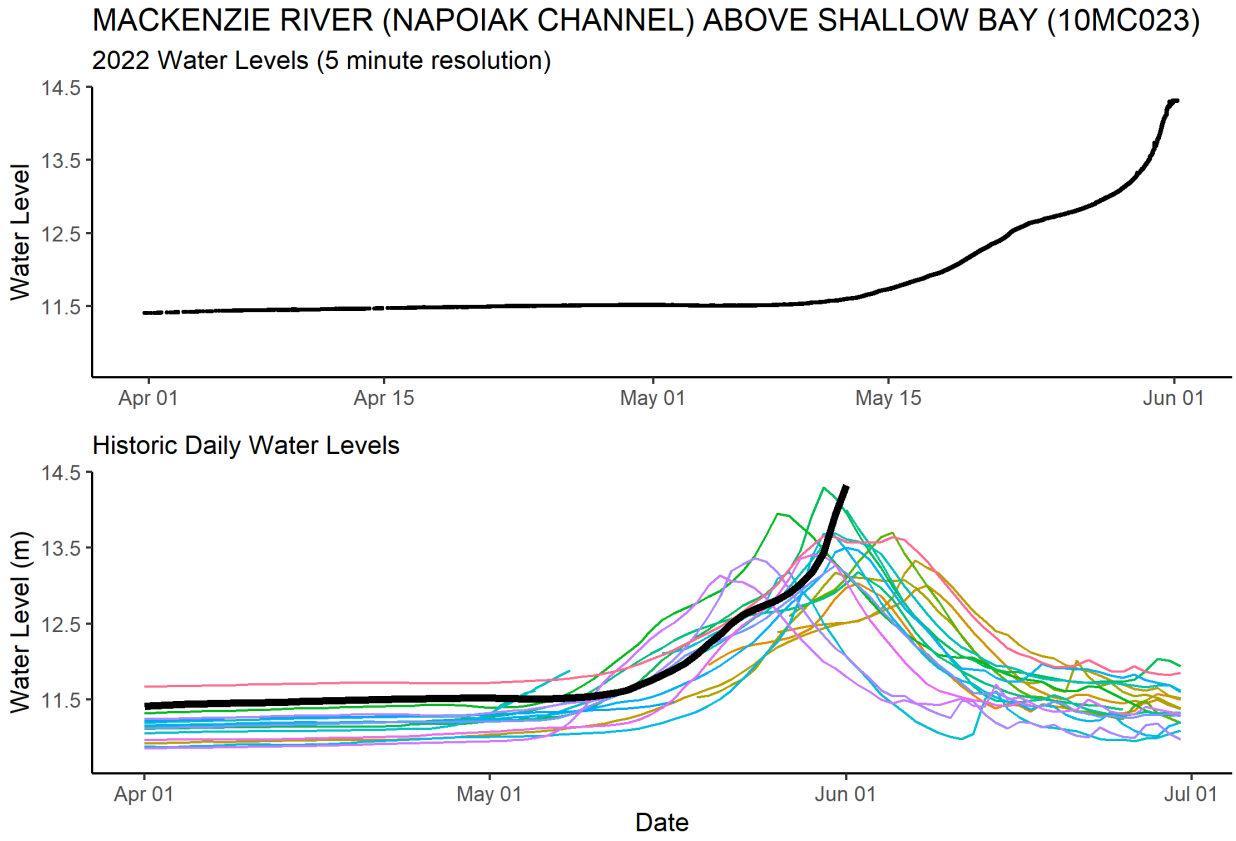
Above – The middle graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels at this location in the Mackenzie Delta remain well above average, but water levels have been dropping, reflecting the movement of ice downstream.

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 at Inuvik have begun to drop over the past 24 hours, as the ice jams have pushed through on the Middle Channel and elsewhere.

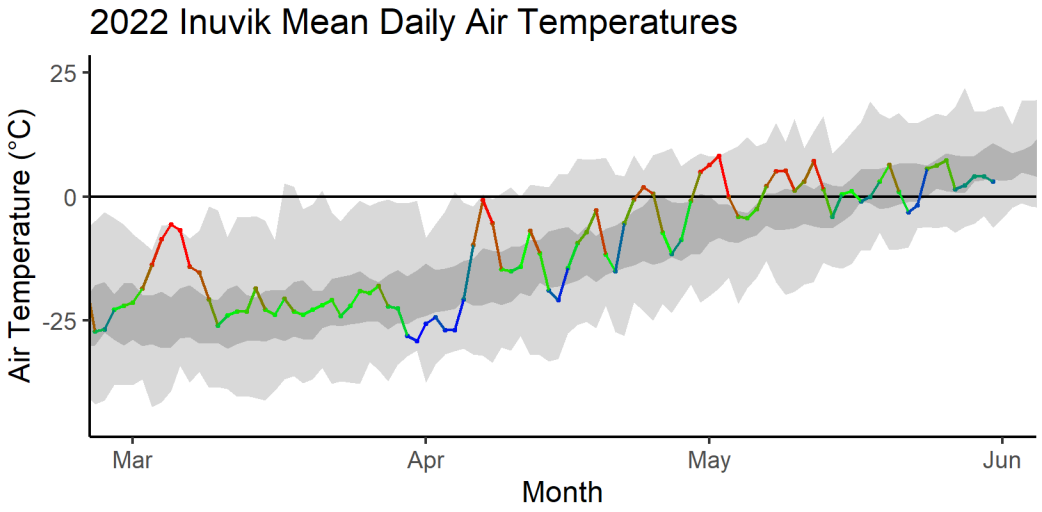
Mackenzie River (Napoiak Channel) above Shallow Bay [10MC023]:

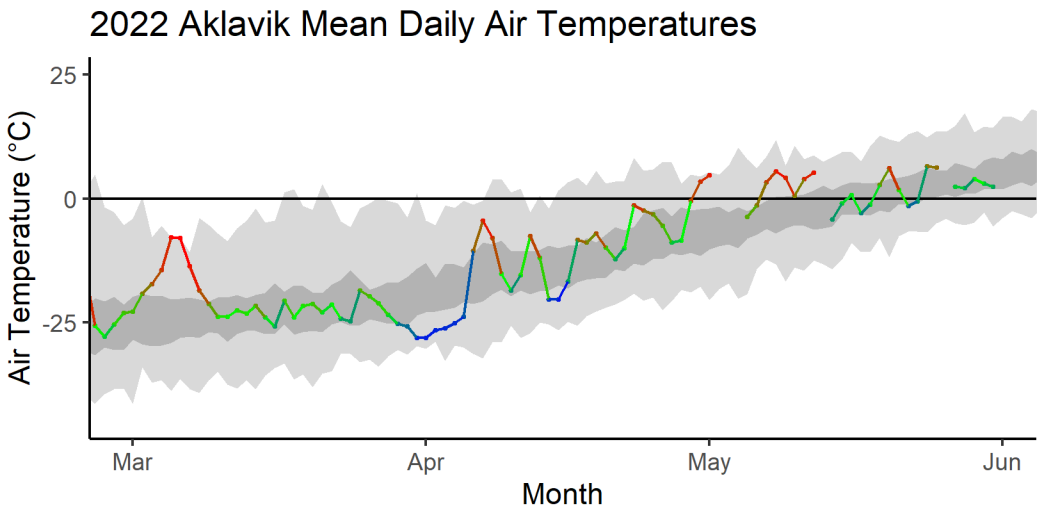


Above – The top graph in the figure presents real time water level data at 5-minute resolution while the lower graph shows daily average levels relative to the previous 20 years. Water levels at this location in the Mackenzie Delta continue to rise, and but ice conditions continue to change and water levels are susceptible to abrupt changes.

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:

Wed 1 Jun	Thu 2 Jun	Fri 3 Jun	Sat 4 Jun	Sun 5 Jun	Mon 6 Jun	Tue 7 Jun
19°C A mix of sun and cloud	8°C 30% Chance of showers	4°C Cloudy	5°C Cloudy	11°C Sunny	16°C A mix of sun and cloud	18°C A mix of sun and cloud
Tonight	**Night**	**Night**	**Night**	**Night**	**Night**	
4°C 60% Chance of showers	0°C Rain showers or flurries	0°C Cloudy	0°C A mix of sun and cloud	4°C Sunny	7°C A mix of sun and cloud	

Aklavik seven-day weather forecast:

Wed 1 Jun	Thu 2 Jun	Fri 3 Jun	Sat 4 Jun	Sun 5 Jun	Mon 6 Jun	Tue 7 Jun
19°C A mix of sun and cloud	6°C 30% Chance of showers	7°C Cloudy	5°C Cloudy	12°C A mix of sun and cloud	13°C A mix of sun and cloud	15°C A mix of sun and cloud
Tonight	**Night**	**Night**	**Night**	**Night**	**Night**	
6°C 60% Chance of showers	1°C Rain or snow	0°C Cloudy	1°C Cloudy	3°C A mix of sun and cloud	6°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.