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## MACKENZIE DELTA AND BEAUFORT COAST SPRING BREAKUP NEWSLETTER

Report **2018-10**

June 3, 2018

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### Welcome to Breakup 2018

Welcome to the 2018 Mackenzie and Beaufort breakup season! We are now into our 13th season of the breakup newsletter, which was started by Steve Solomon in 2006. Each year we think will be the last, but the feedback is positive and the annual spectacle of breakup is hard to resist. We hope this year will be good to everyone, without too much flooding. We will try to keep you posted on events as they unfold. As always, photos and on-the-ground reports are the really interesting pieces and we'll try to pass on any you can send us as we watch the gauges and the satellite imagery.

This year will be the third breakup season for the Mackenzie-Beaufort Breakup group on Facebook <https://www.facebook.com/groups/1745524288993851/>. Over time we hope this forum hosted in the ISR will take over as the main place to share observations and experience during breakup in the Delta and the coastal communities of the region. We need to start thinking about how observations can be archived to add to our collective knowledge of breakup timing and processes and there may be roles for many partners in doing this.



The original purpose of the newsletter was to document flooding over the outer Mackenzie Delta in support of various research programs. Over recent years, we have expanded the scope to consider all aspects of breakup and spring flooding in the ISR region and Gwich'in communities in and near the Delta. Funding for our current breakup monitoring activity is

from the Climate Change Geoscience Program of the Geological Survey of Canada, Natural Resources Canada.

This year, in addition to sharing the newsletter to our mailing list of 390 addresses, we are posting the newsletters on the CACCON (Circum-Arctic Coastal Communities Knowledge Network). Along with the 2017 reports, the reports so far this season can be found at: [www.caccon.org/mackenzie-beaufort-break-up-newsletter/](http://www.caccon.org/mackenzie-beaufort-break-up-newsletter/)

Please let us know if you do not wish to receive these reports (contact info above) and we will take you off the list. We hope you will feel free to pass this on to others and if they contact us we can add them to the list. For those of you living in the north, we welcome any observations of timing of events, extent of flooding, evidence of breakup, or anything out of the ordinary, and we thank you for all of the feedback received so far.

For those interested in conditions further south, we recommend that you contact Angus Pippy (Water Survey of Canada) in order to receive his very useful High Water Report: contact Angus at 867-669-4774 or [angus.pippy@ec.gc.ca](mailto:angus.pippy@ec.gc.ca).

Water level data presented in our newsletters are courtesy of Environment Canada (Water Survey of Canada) and are derived from their real-time hydrometric data website at [http://www.wateroffice.ec.gc.ca/index\\_e.html](http://www.wateroffice.ec.gc.ca/index_e.html), which we acknowledge with thanks. Particular thanks to colleagues in Inuvik for keeping so many of the delta gauges operating through the difficult breakup season. Weather reports and forecasts are also from Environment Canada (Meteorological Service of Canada) at <http://weather.gc.ca>. Ice road conditions are from the GNWT Department of Transportation road reports and travel alerts (@GNWT\_DOT). Daily MODIS imagery is courtesy of NASA Worldview at <https://earthdatnasa.gov/labs/worldview/>.

### ***Current Conditions***

The weather in the delta region is warm, hitting 20 °C in Inuvik today with a mix of sun and cloud. The forecast for Tuktoyaktuk is sunny for the next few days, with temperatures into the low teens. This will certainly promote more rapid snowmelt and advance the breakup. Paulatuk is similar but a little cooler, sunny with highs ranging from 7 °C on Monday to 4 °C on Tuesday and possibly up to 10 °C by Friday. Sachs Harbour, on the other hand, has sunny skies with highs reaching only +1 °C over the next two days. Ulukhaktok's weather is similar, although it may reach up to +5 °C there on Tuesday.

## Water levels

Water levels are now dropping throughout the Mackenzie Delta. The threat of community flooding has passed and we expect that most properties out in the delta are no longer at risk. Overall, it has been a relatively uneventful breakup in the delta.

Although the gauge in East Channel at Inuvik (10LC002) has been recording only intermittently, a steady recession of water levels is evident in the plot (Figure 1), with the level down to what it was on May 16. East Channel peaked at just under 15.0 m (arbitrary datum) very early on May 26. The situation is similar in Peel Channel above Aklavik (10MC003), with the level down to 12.4 m (Figure 2). Ignoring noise in the record, the peak level there was over 13.8 m (arbitrary datum) on May 24.

The daily means at Aklavik (Figure 3) show the recession well established at a rate comparable to other years, but the peak water level was one of the lowest of recent record, comparable to 2008.

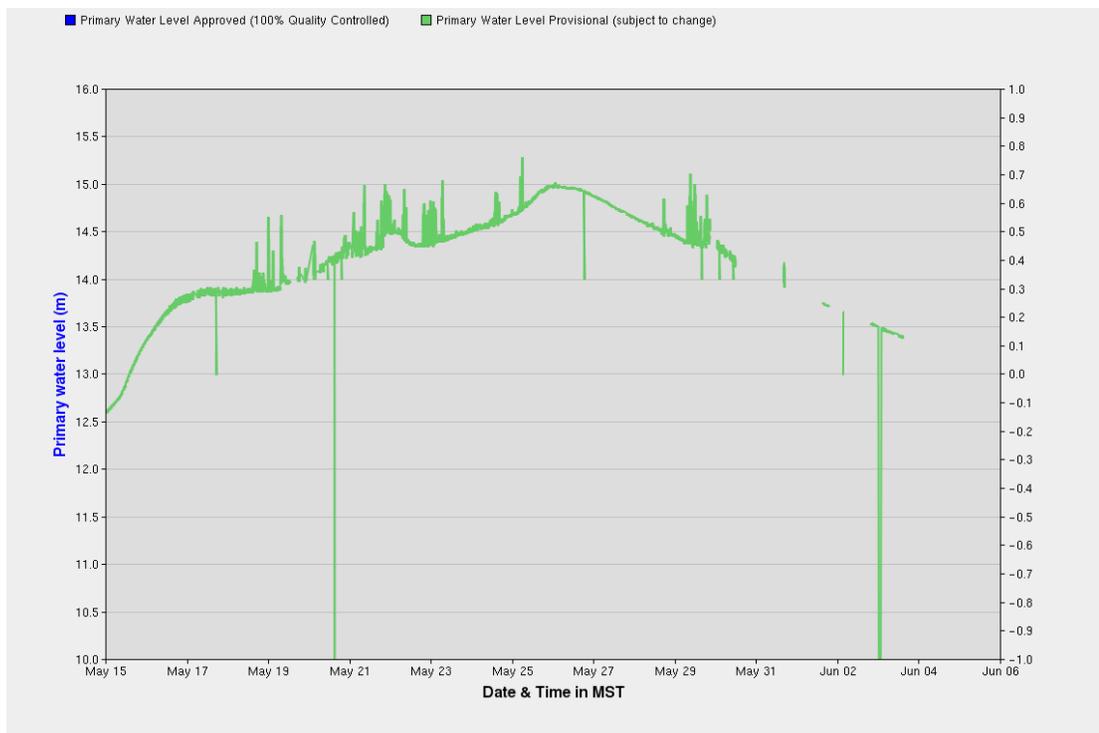


Figure 1. Provisional water level in East Channel at Inuvik (10LC002) since May 15 (courtesy Water Survey of Canada).

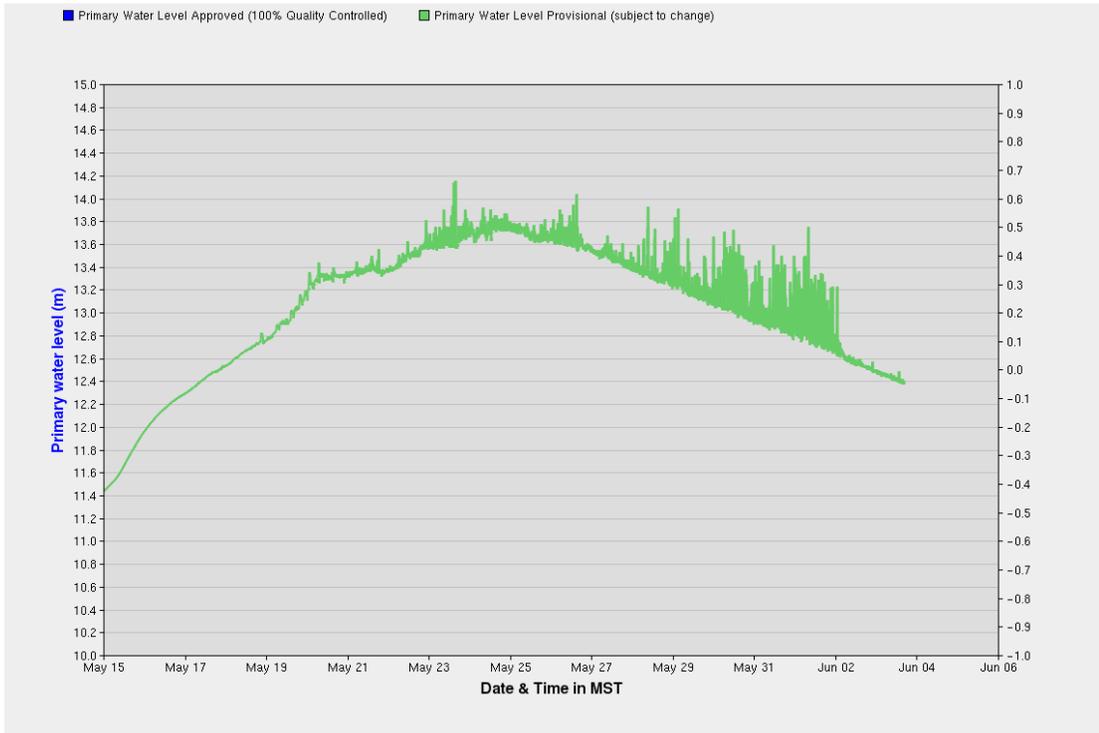


Figure 2. Provisional water level in Peel Channel near Aklavik (10MC003) since May 15 (courtesy Water Survey of Canada).

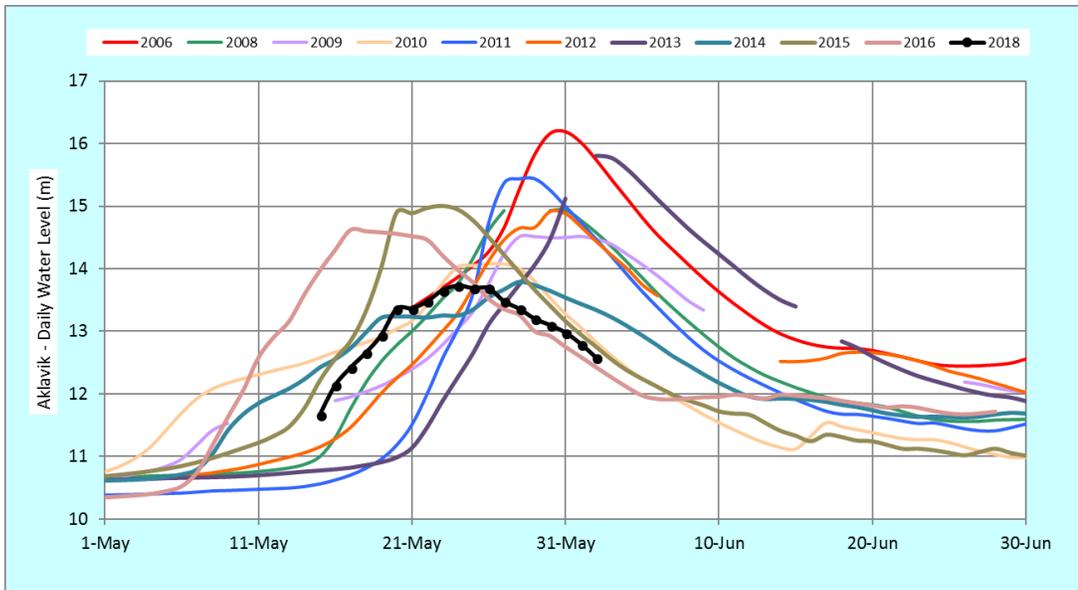


Figure 3. Daily mean water levels (provisional) in Peel Channel at Aklavik (10MC003) in selected years since 2006 and 2018 (black).

Napoiak Channel above Shallow Bay (10MC023) peaked quite abruptly at about 13.3 m (arbitrary datum) on May 28 (Figure 4). In the outer delta, the levels are all down. Middle Channel at Langley Island (10MC010) peaked at about 12.1 m (arbitrary datum) very late on May 28 (Figure 5). On the other hand, Reindeer Channel at Ellice Island (10MC011) peaked abruptly at 10.69 m (arbitrary datum), but not until the morning of May 30 (Figure 6). In the northeastern delta at Taglu Island, small Kuluarpak Channel showed much less range of water levels, as usual, but experienced two peaks, the first affected by ice motion and very noisy May 29-31, and the second discharge-driven, occurring in the late morning of June 2, reaching 9.96 m (arbitrary datum) (Figure 7).

The daily mean water levels in Reindeer Channel at Ellice Island (Figure 8) show the typical early plateau and a very peaky flood crest, close to the mean date for this part of the delta, but much lower than previous years (possibly in part affected by a datum offset). As at Aklavik, the recession rate is constant and very similar to the rate observed in most other years.

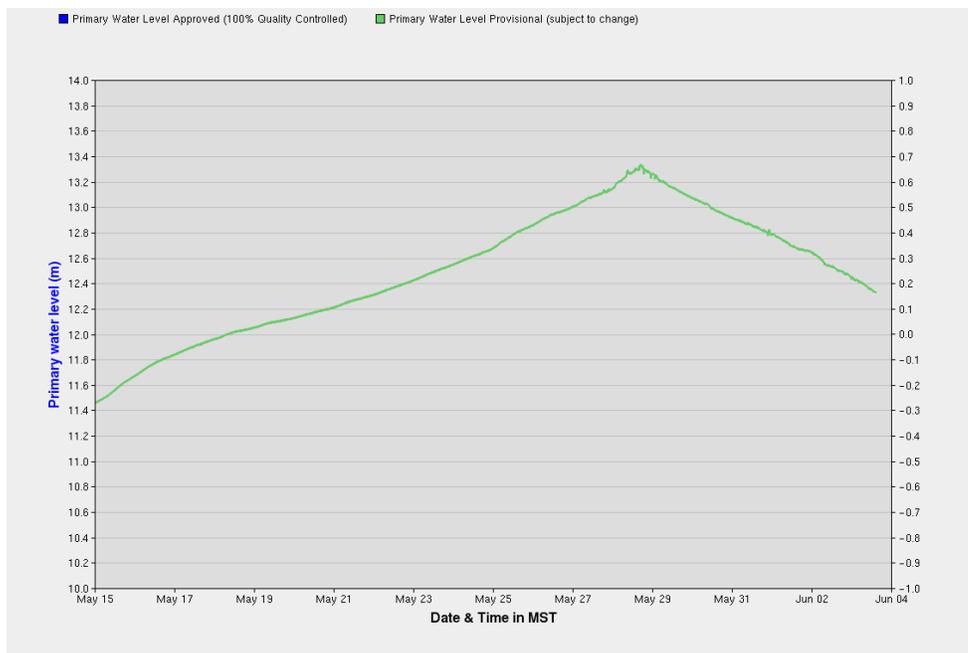


Figure 4. Provisional water level in Napoiak Channel above Shallow Bay (10MC023) since May 15 (courtesy Water Survey of Canada).

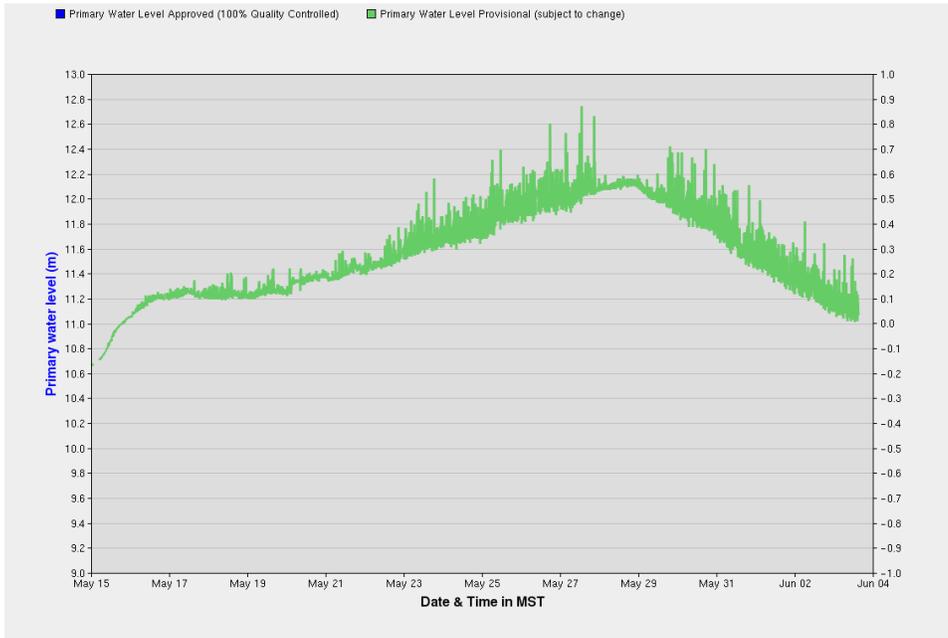


Figure 5. Provisional water level in Middle Channel at Langley Island (10MC010) since May 15 (courtesy Water Survey of Canada).

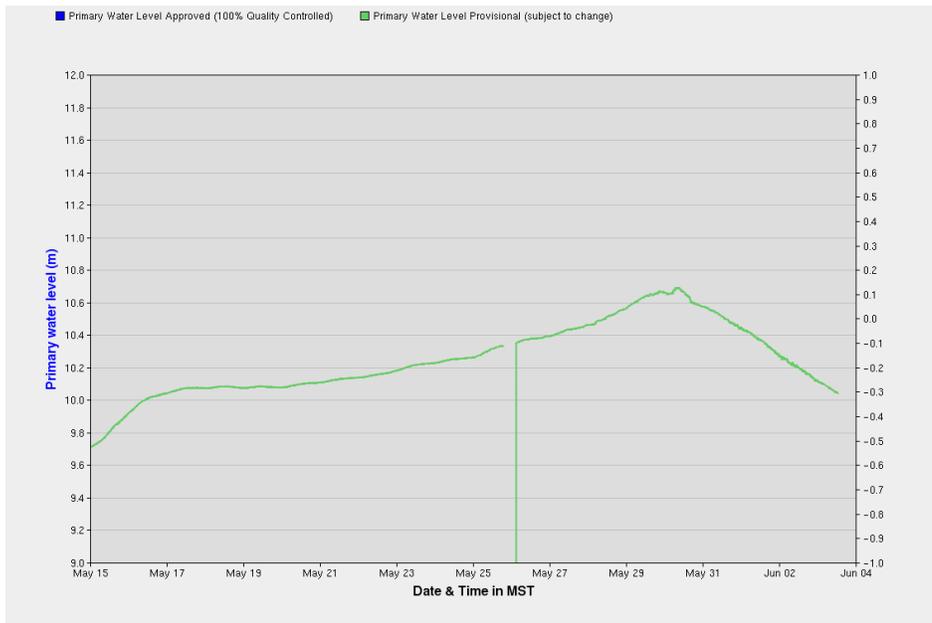


Figure 6. Provisional water level in Reindeer Channel at Ellice Island (10MC011) since May 15 (courtesy Water Survey of Canada).

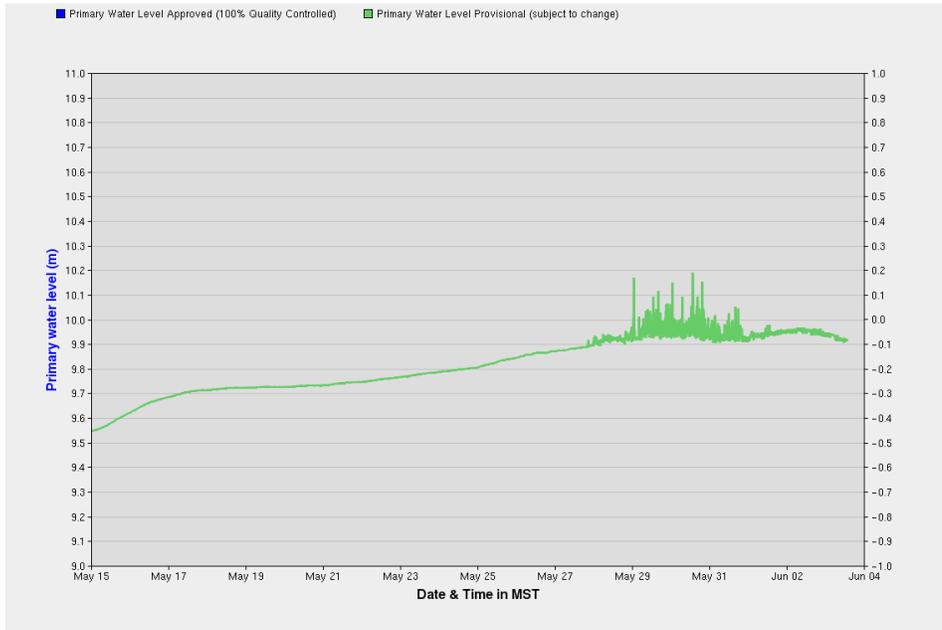


Figure 7. Provisional water level in Kuluarpak Channel at Taglu Island (10LC021) since May 15 (courtesy Water Survey of Canada).

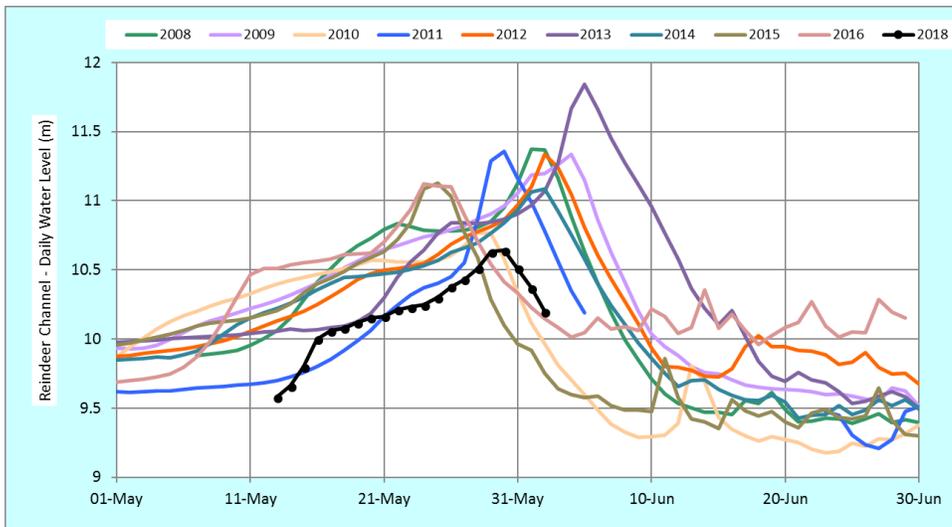


Figure 8. Daily mean water levels in Reindeer Channel at Ellice Island (10MC011) for the past decade.

**Satellite Imagery**

Skies were fairly clear on Saturday, giving good views of the whole region. Along the Yukon coast (Figure 9), landfast ice remains intact with limits close to those seen earlier. Some fraying of the outer edge may be occurring east of Herschel Island. The ice edge in much of Mackenzie Bay is obscured by cloud (note this part of the image is from an earlier satellite pass). There is fresh flow on the west side of the Firth River, some of which may be coming from the Malcolm. Previous overflow into Workboat

Passage seems to have drained (or refrozen). The Babbage is now in full flow, with the delta extensively flooded, overflow of ice in the lagoon extending halfway to Kay Point, and two amalgamated plumes of overflow extending out into Phillips Bay. Floating ice of the main channel can be seen forming an arc across the estuary at the south end (Figure 9). The mouth of the Blow shows little water beyond the arcuate delta front, suggesting that outflow may be going beneath the ice. The northwestern corner of the Mackenzie Delta is visible within this image.

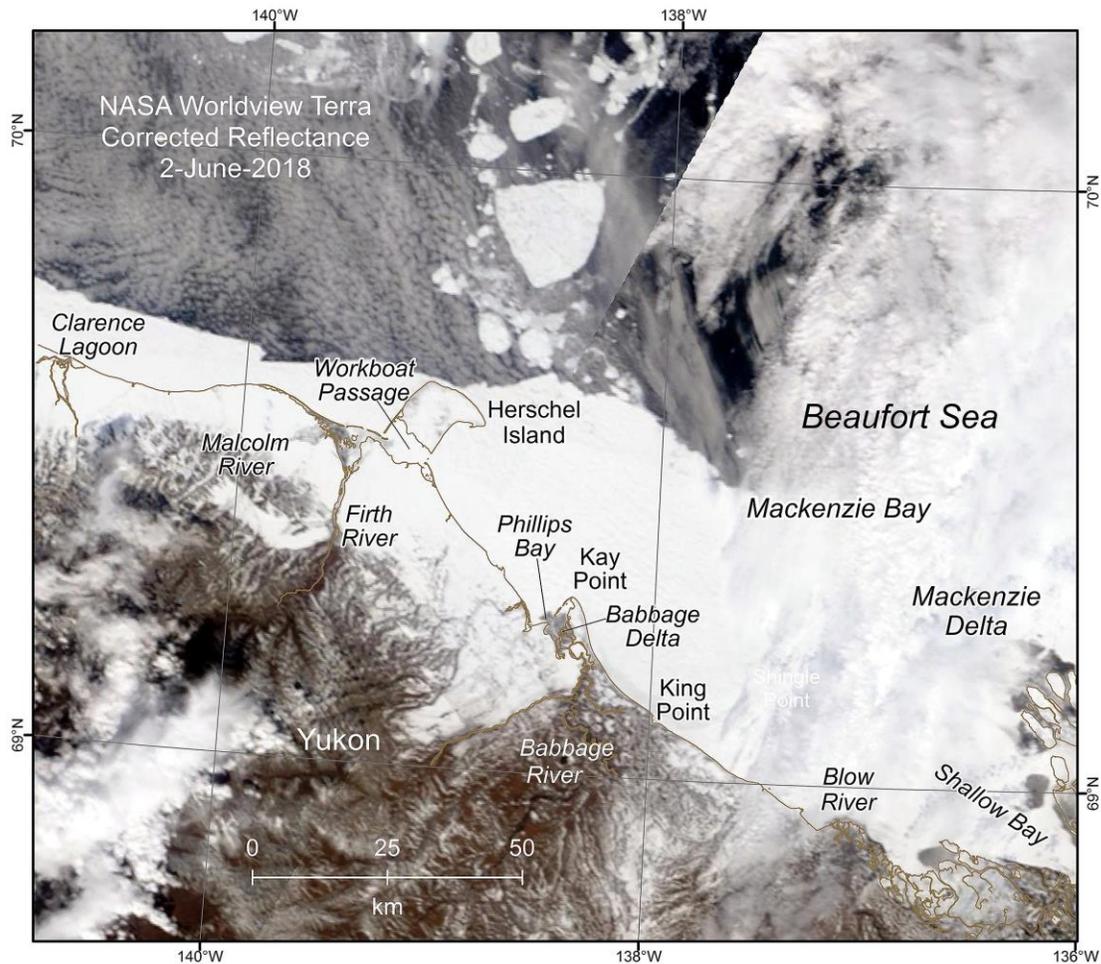


Figure 9. NASA Worldview Corrected Reflectance from the Terra satellite for 2 June 2018, showing the Yukon coast.

Channels in the north-central delta (Napoiak, Middle, and East channels) in the lower part of Figure 10 appear to be running free of ice. There is extensive overbank flooding near the head of Reindeer Channel and east of Ellice Island. Taglu Island and northwestern parts of the delta (Ellice Island and vicinity) do not seem to have had much flooding and may not now, with the low peak in Reindeer and Kuluarpak channels and the drop in water levels now well underway across the outer delta.

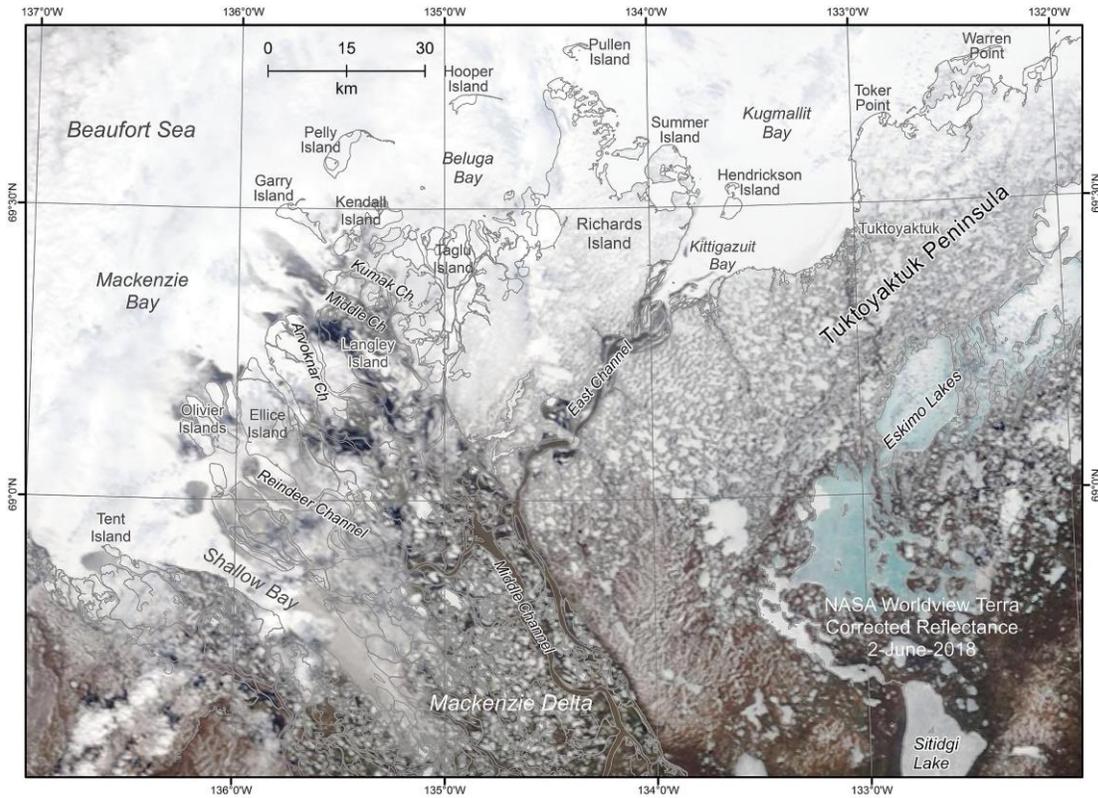


Figure 10. NASA Worldview Corrected Reflectance from the Terra satellite for 2 June 2018, showing the northern Mackenzie Delta, Kugmallit Bay, western Tuktoyaktuk Peninsula, and the Eskimo Lakes.

Earlier overflow into Beluga Bay seems to have drained (or is obscured by cloud) and we can see that the earlier outer extent of overflow west of Garry Island off Middle Channel has drained back considerably over the last couple of days (compare May 31 imagery in the last report), but there is still water over the ice nearer the delta front. The same applies to the long finger of overflow, which has since drained, extending to the northwest off Arvoknar Channel. Much of the overflow out of Reindeer Channel in the area of the Oliviers and eastern Shallow Bay has receded (drained) and the ice is beginning to rot. The head of Shallow Bay is now ice-free. There is extensive overbank flooding west of Shallow Bay, except in the outermost part of the delta, where there is still extensive outflow, probably over ice, west of Tent Island.

Along East Channel to Kugmallit Bay, there is extensive valley flooding, and fingers of water (overflow or melting) extending out into Kittigazuit Bay (Figure 10). In previous years, we have seen these develop along the alignment of submarine channels that carry discharge beneath the ice. Landfast ice is still intact in Kugmallit Bay and along the outer Tuk Peninsula coast within this view. Parts of the inner Eskimo Lakes have very blue ice, indicating that the snow has melted and the ice is allowing deep absorption of light.