New Nouveau Brunswick

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MREAC

Lake Monitoring

Miramichi River Environmental Assessment Committee (MREAC)

Report 2020

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Water Temperature Profile

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1.0 Introduction & Background

In 2020 The Miramichi River Environmental Assessment Committee (MREAC) continued its ongoing monitoring of four Miramichi River watershed lakes; Kennedy Lake, Miramichi Lake, Mullin Stream Lake, North Renous Lake. The temperature loggers used were either Hobo Tidbits or Hobo Pendants.

With support from the New Brunswick Environmental Trust Fund, MREAC lake monitoring began in 2013 on the Main Kennedy Lake. There is now seven years of data from this project (monitoring was not supported in 2018). Additional lakes were added over the years, currently Miramichi Lake, Mullin Stream Lake and North Renous Lake in addition the Main Kennedy Lake. In previous years monitoring was completed on Guagus Lake. Smith Lake and Tuadook Lake. (Figure).

Some lakes in New Brunswick are showing signs of stress related to anthropogenic impacts. The New Brunswick Department of Environment and Local Government (DELG) along with community-based organizations, including lake associations, are exploring these issues. Enrichment appears to pose the greatest threat to these lakes and the degree of the problem is often related to the scale of shoreline development. Warmer waters due to climate change are felt to be exacerbating the issue. Of note, lake monitoring on the Miramichi watershed serves to provide reference conditions, those expected to be found in undeveloped or only moderately developed lakes. The selected lakes for the Miramichi watershed monitoring have few to no camps or cottages along their shorelines. None of the four lakes MREAC monitored in 2020 have year-round residents along their shoreline. While relatively little impact is expected on these “wilderness’ lakes they are not exempt from extensive forest harvesting nearby and the growing impacts of a changing climate.

Monitoring takes place during the open water season by installing the temperature loggers in late spring or early summer after ice-out and extracting them in the fall before freeze-up. The watershed setting and monitoring results for 2020 are reflected in the maps and graphs that follow.

Temperature was the main parameter of interest in undertaking this project. Other parameters were taken in the field during site visits using hand-held monitoring equipment. Each of the lakes have been samples for water chemistry analysis. The RPC laboratory in Fredericton was used for this work.

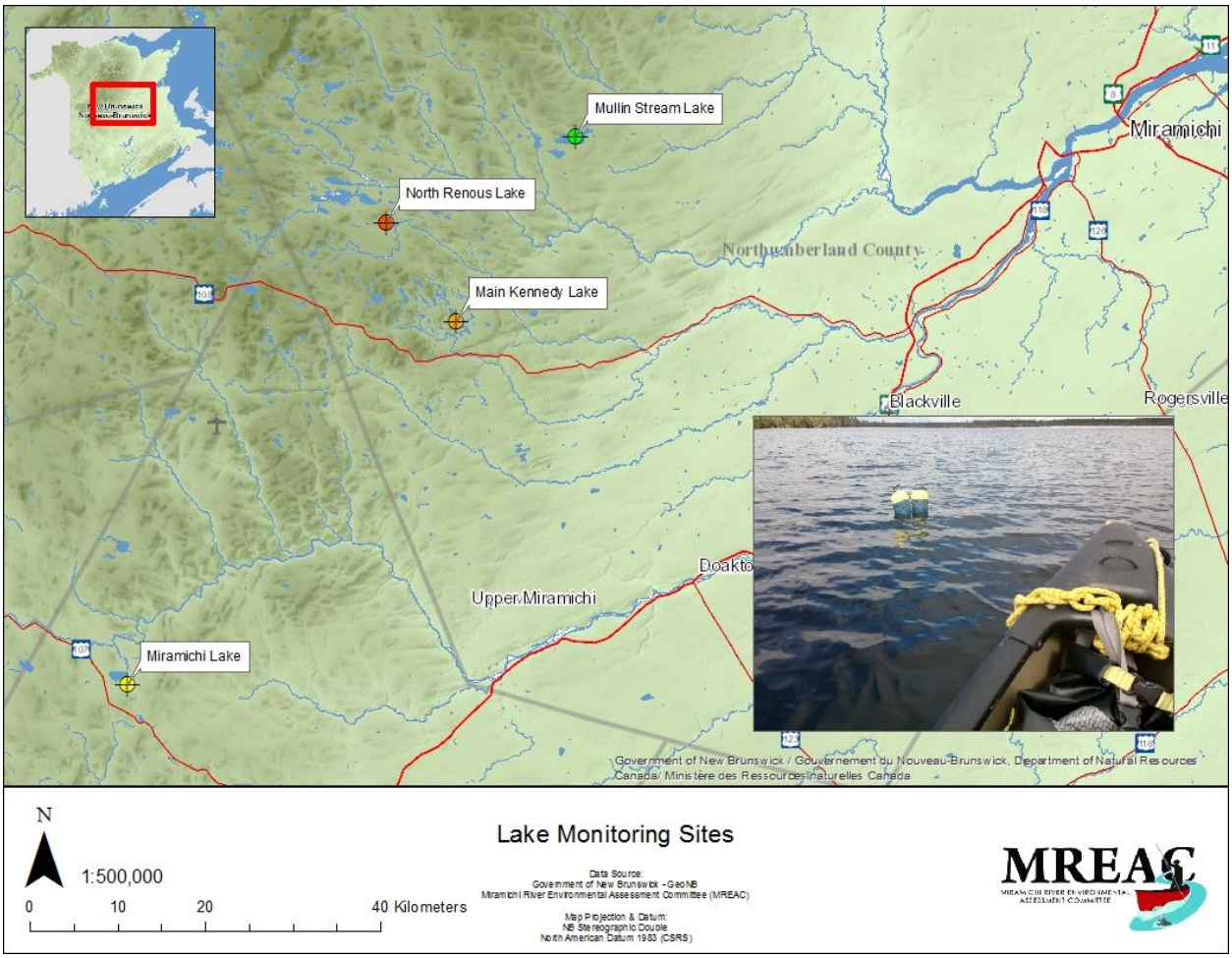

Figure 1 MREAC Lake Monitoring Sites 2020

MREAC staff and volunteers installed lines of Hobo (Tidbits or Pendant) temperature loggers in four Miramichi watershed lakes (Figure 2). Site selection of the deep spot on the four larger lakes was made possible from bathymetry maps produced by the province. The string of temperature loggers is spaced along a single line, top to bottom and anchored with a rock bag. Final adjustments are made to the line on site as needed with two buoys situated on the surface.

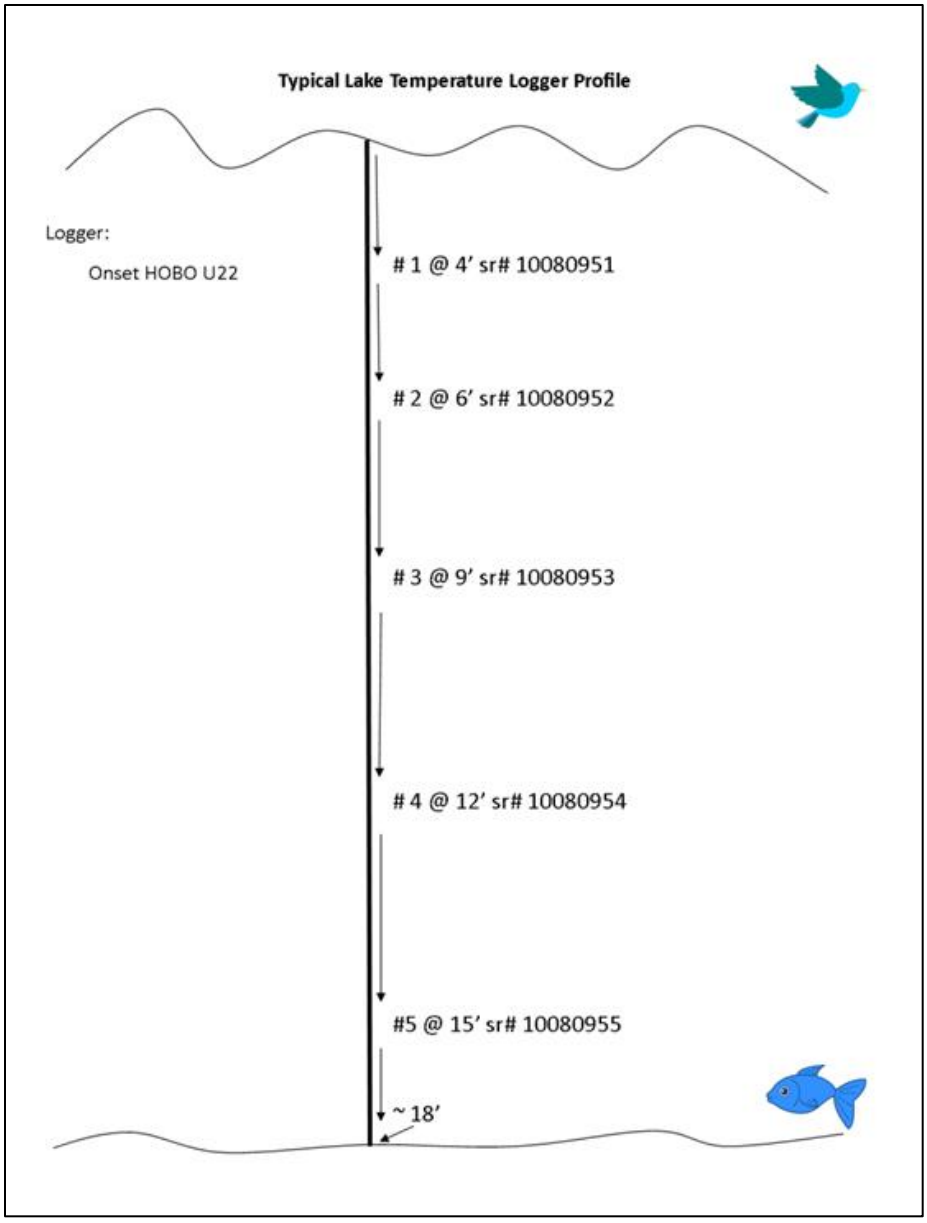

Figure 2 Typical Lake Temperature Logger Profile

The top of the line was flagged with an identification tag as a "Science" project and provides MREAC coordinates for those coming across the station. All the lines were recovered successfully in 2020.

Figure 3 North Renous Lake Data Logger Extraction

2.0 Discussion

It is noteworthy that the lakes monitored in on the Miramichi watershed have distinct differences from lakes elsewhere in the province. As a reflection of the geology and topography, the Miramichi lakes monitored are all relatively small and shallow. Each is also located in a relatively remote location with limited land use and shoreline development. Miramichi Lake. North Renous and Mullin Stream lakes have a small number of seasonal dwellings (camps or cottages). Timber harvesting is the largest potential land-use impact with clear cutting normally completed on a rotational basis as outlined in a long-term management plan. Due to its location within the Kennedy Lakes Protected Natural Area, Main Kennedy Lake is now exempted from any future impacts from nearby forest harvesting. Some recreational activities occur on each of the lakes, mostly recreational fishing or hunting.

Figure 4 Rock Bag Anchor

Figure 5 Onset HOBO Pendant Water Temperature Logger

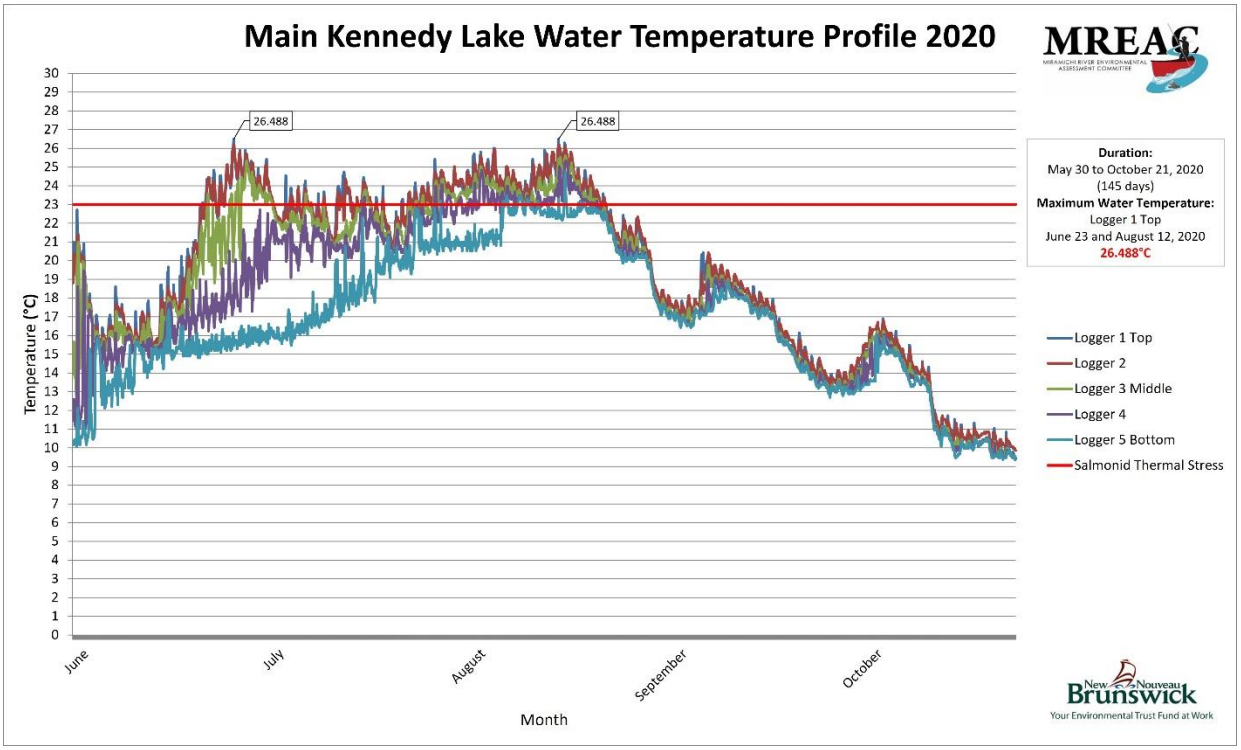

Figure 6 Main Kennedy Lake Water Temperature Profile 2020

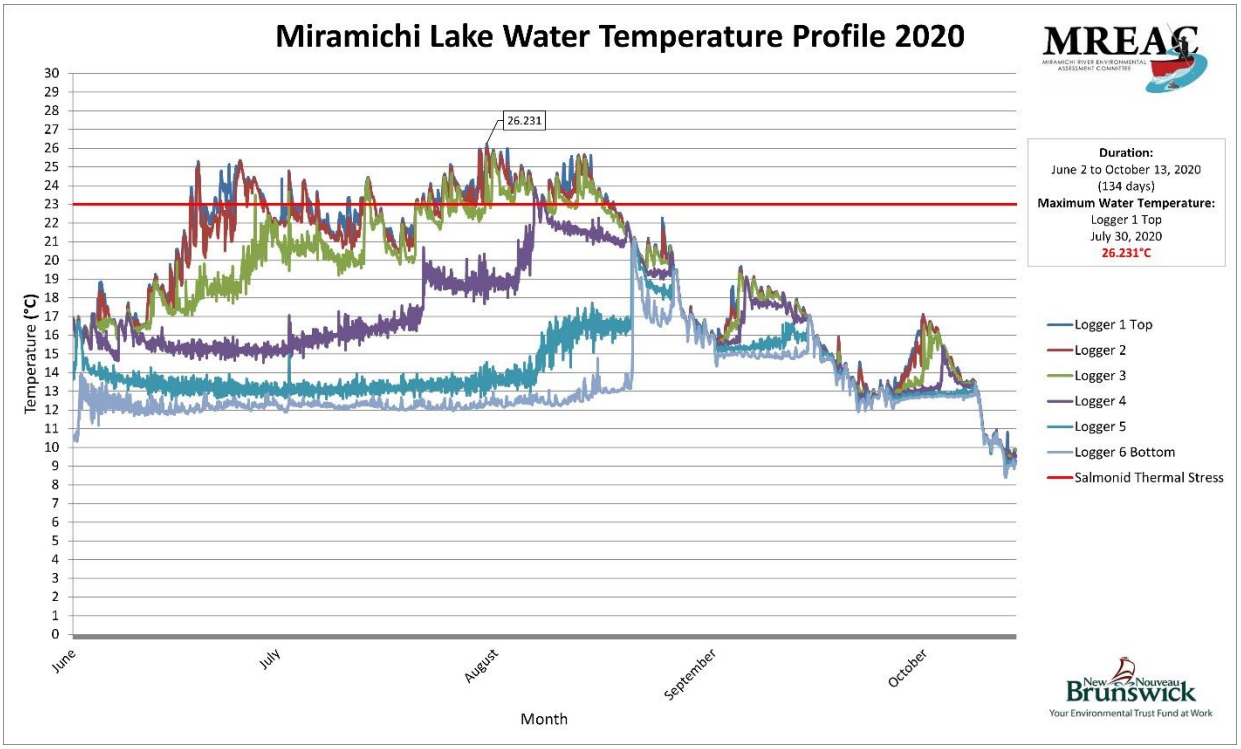

Figure 7 Miramichi Lake Water Temperature Profile 2020

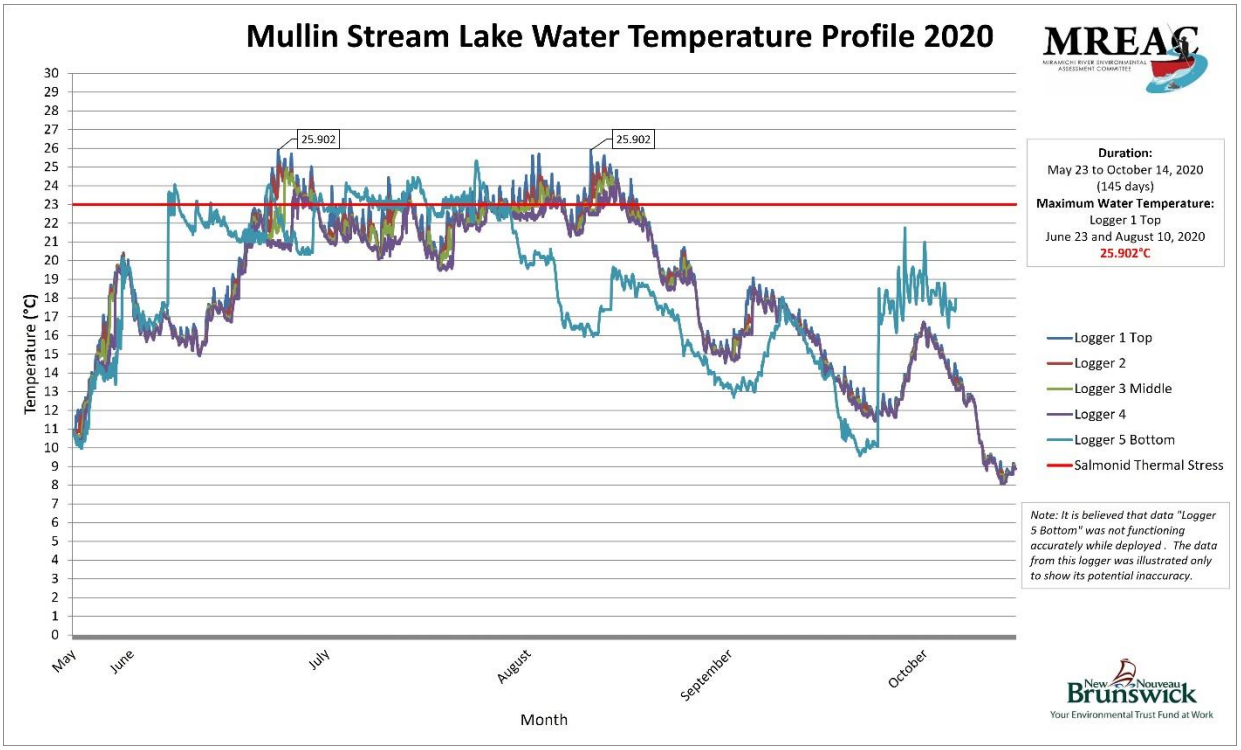

Figure 8Mullin Stream Lake Temperature Profile 2020

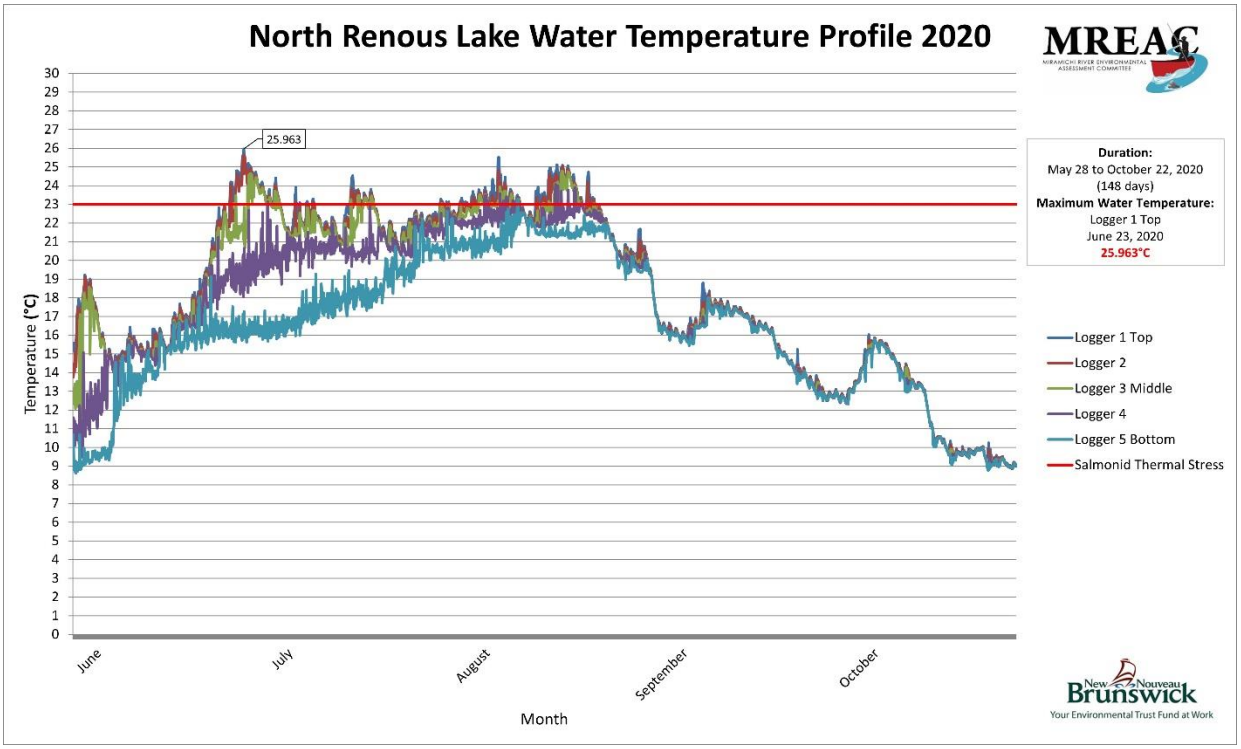

Figure 9 North Renous Lake Water Temperature Profile 2020

3.0 Conclusion

The remoteness and limited access of this series of lakes on the Miramichi watershed provide a significant measure of protection from anthropogenic impact. In 2020 MREAC staff and volunteers collected data from the Main Kennedy Lake for the seventh year. Mullin Stream Lake was sampled for a fifth year. Miramichi Lake has four years of data collected. North Renous Lake was added in 2019 as the fourth lake, now with two year of data.

The record breaking hot, dry summer of 2020 is reflected in the profiles reflected in the Figures presented above. The graph of each lake highlights the 23-temperature line, a threshold at which salmonids (Brook trout and Atlantic salmon) are temperature stressed. It is noted that the surface water at all lakes reached this threshold over the summer of 2020.

MREAC staff hopes to continue lake monitoring into future years with value accruing as the status of the lakes becomes clearer and potential trends, (e.g., climate change and other ecological stresses) are noted. We leave further analysis of this data to DELG hydrologists.