New Nouveau Brunswick

Your Environmental Trust Fund at Work

MREAC

Real-Time Monitoring

Miramichi River Environmental Assessment Committee (MREAC)

Report 2020

Real-Time Monitoring

Report 2020

Vladimir King Trajkovic

Miramichi River Environmental Assessment Committee

PO Box 85, 21 Cove Road
Miramichi, New Brunswick
E1V 3M2

Phone: (506) 778-8591
Fax: (506) 773-9755

Email: mreac@nb.aibn.com
Website: www.mreac.org

February 4, 2021

Acknowledgements

The Miramichi River Environmental Assessment Committee (MREAC) would like to thank New Brunswick Environment and Local Government (ELG) for their continued support for the MREAC Real-Time Monitoring project. A special thank you is extended to Fisheries and Oceans Canada (DFO) without whose monetary contribution this project would have been limited in 2020. MREAC also appreciates the permission to install these stations on the Southwest Miramichi at the Miramichi Salmon Club, on the Little Southwest Miramichi at the Upper Oxbow Adventures, and on the Northwest Miramichi on the Sisk's property.

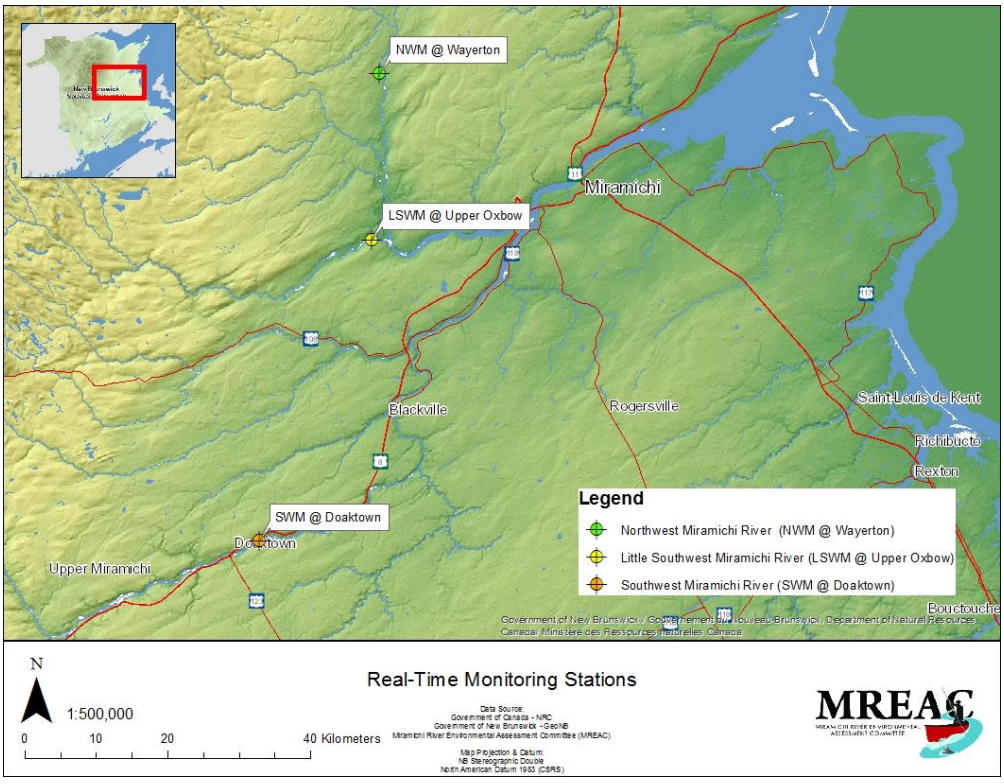
Table of Contents

1.0 Introduction & Background

Water temperatures are becoming more and more of a concern to river managers and especially those in areas with cold water fishes, such as Atlantic salmon and Brook trout. In recent years, the management regime on the Miramichi watershed has included closures of select pools during sustained warm water conditions that persist over several days. This "Warm Water Protocol", based on water temperature, has been agreed upon and implemented by Fisheries and Oceans Canada (DFO) and stakeholder organizations. Core to this management regime is accurate water temperature readings.

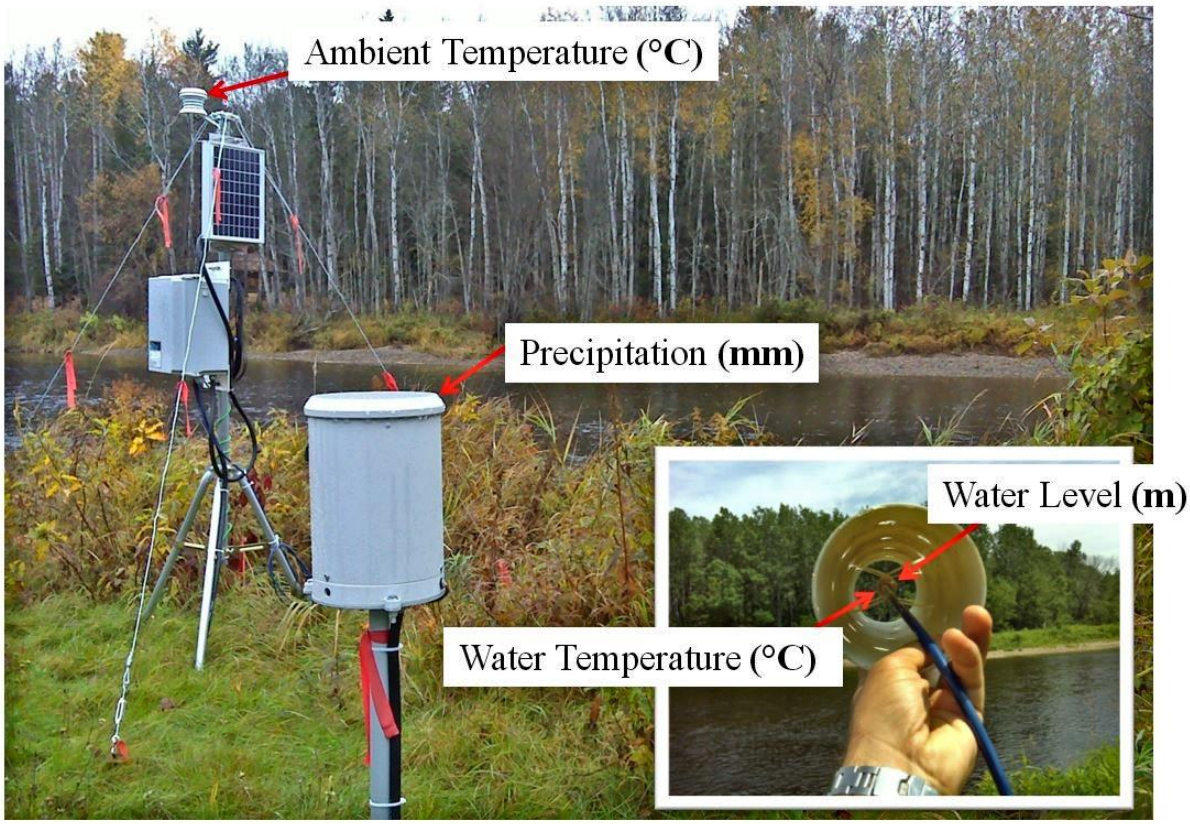
Starting in 2013, MREAC installed monitoring stations that operated much closer to real-time than formerly available, in that they provide readings every hour and these readings are posted in the public domain on the MREAC website mreac.org. These units were installed on the Southwest Miramichi River near Doaktown (SWM @ Doaktown), on the Little Southwest Miramichi River at the Upper Oxbow (LSWM @ Upper Oxbow), and on the Northwest Miramichi River near Wayerton (NWM @ Wayerton) (Figure 1).

Figure 1: MREAC Real-Time Monitoring Sites



Based on this available real-time monitoring data, DFO and stakeholder organizations were able to monitor and manage seasonal closures since 2013. Recreational fishers also came to appreciate this service that provides them information of river conditions (i.e., water temperature water level, air temperature, and precipitation) (Figure 2).

Figure 2: Real-Time Monitoring Station Parameters Monitored



2.0 Project Description

Three real-time water quality monitoring stations on the Miramichi tributaries provide information to DFO, river managers, and recreational fishers. These systems continue to generate considerable interest. The technology involves a solar powered web-based satellite telemetry real-time monitoring station (RTMS). The main components of the RTMS are an Onset Hobo Energy Logger, a Solar Stream Iridium transceiver, a solar battery, and other components all housed in a waterproof case (Figure 3), (Figure 4).

Figure 3: Main Components of the Real-Time Monitoring Station

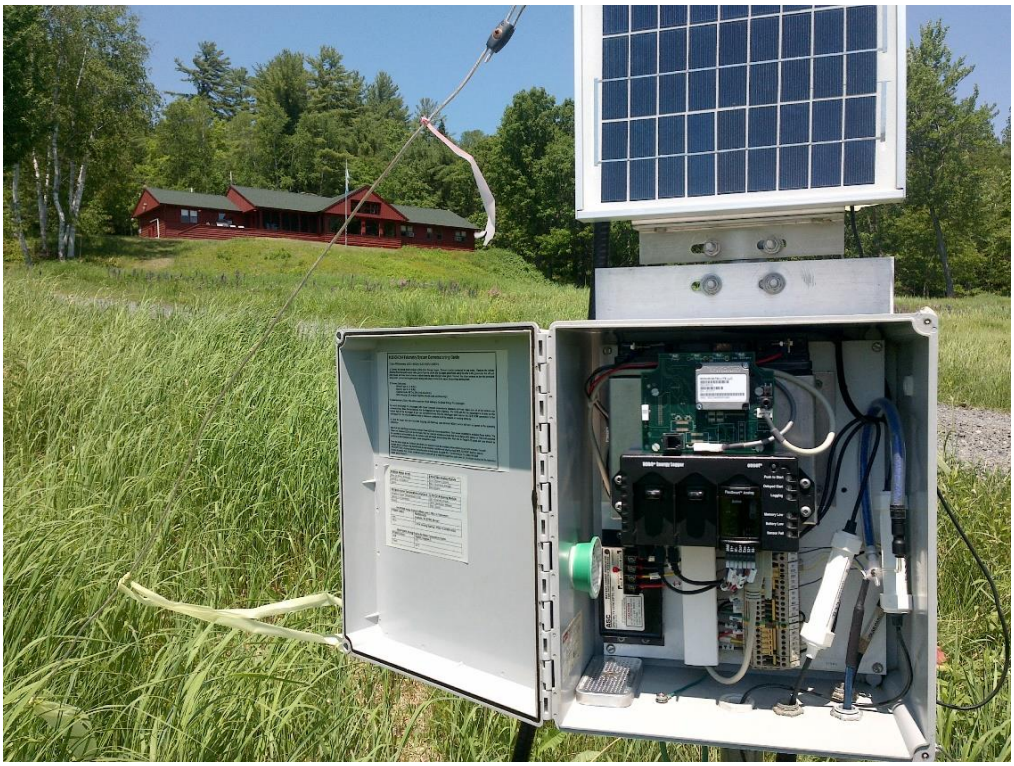
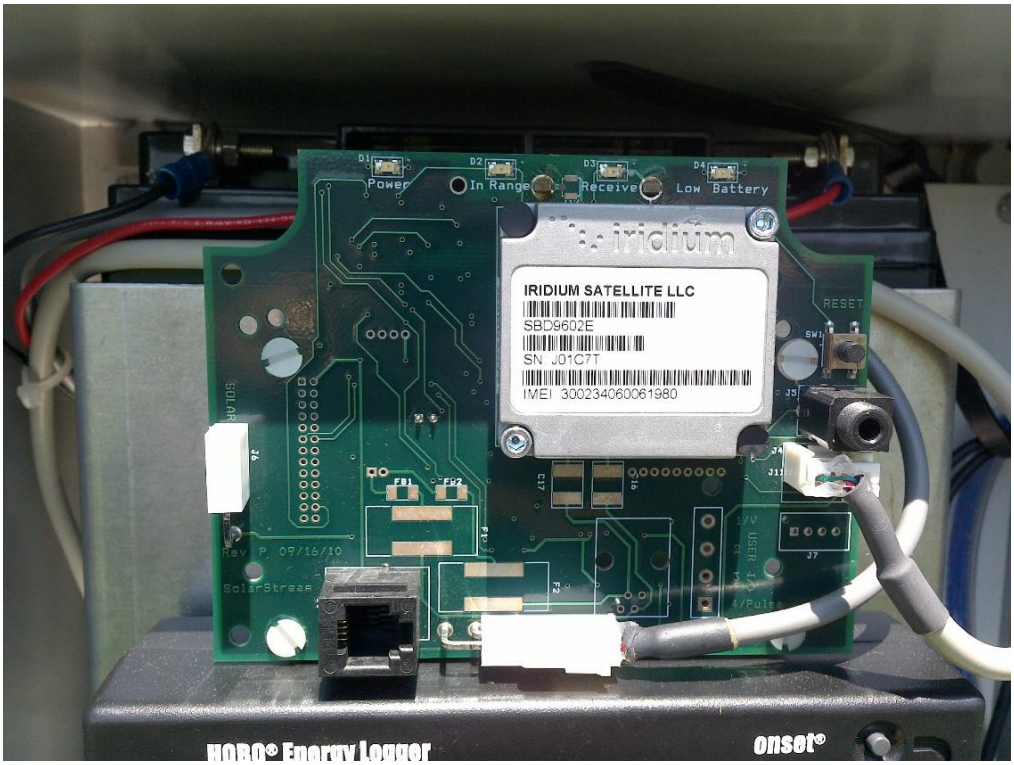


Figure 4: Iridium Satellite Telemetry Transceiver

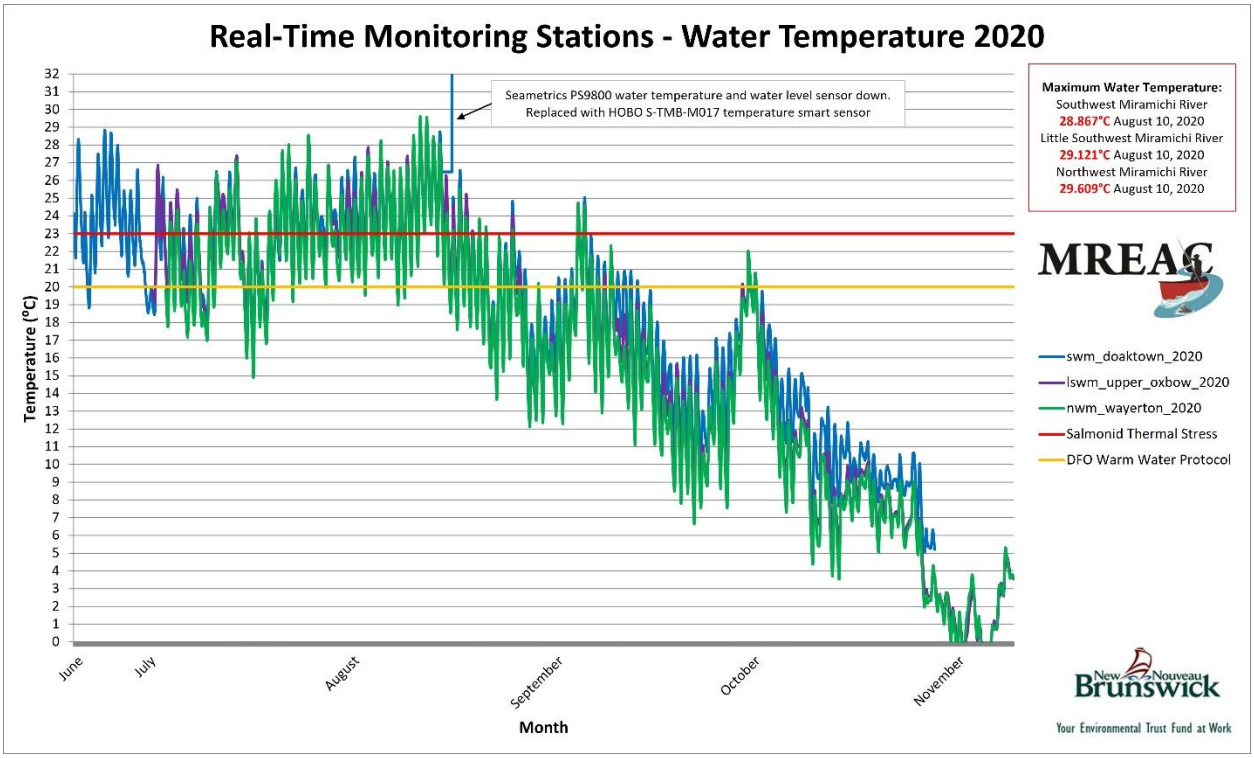


The satellite communications and data storage are made possible via a service contract with DataGarrison.

3.0 Results

The following figure illustrates the results of the water temperate for 2020 at the three MREAC real-time monitoring stations, (SWM @ Doaktown), (LSWM @ Upper Oxbow), and (NWM @ Wayerton) (Figure 5).

Figure 5: Real-Time Monitoring Stations – Water Temperature 2020



The Southwest Miramichi River real-time monitoring station (SWM @ Doaktown) was deployed on June 18, 2020 and extracted October 28, 2020. A total of 133 days of data was captured for this station (Figure 6). The peak water temperature was recorded on August 10, 2020 at 28.867ºC. On August 15, 2020, the Seametrics PS9800 water temperature and water level sensor (Figure 7) was replaced with the HOBO S-TMB-M017 temperature smart sensor. Just prior to August 15, 2020 it was noticed that the Seametrics PS9800 water level readings were inaccurate.

Figure 6: Southwest Miramichi River Water Temperature 2020

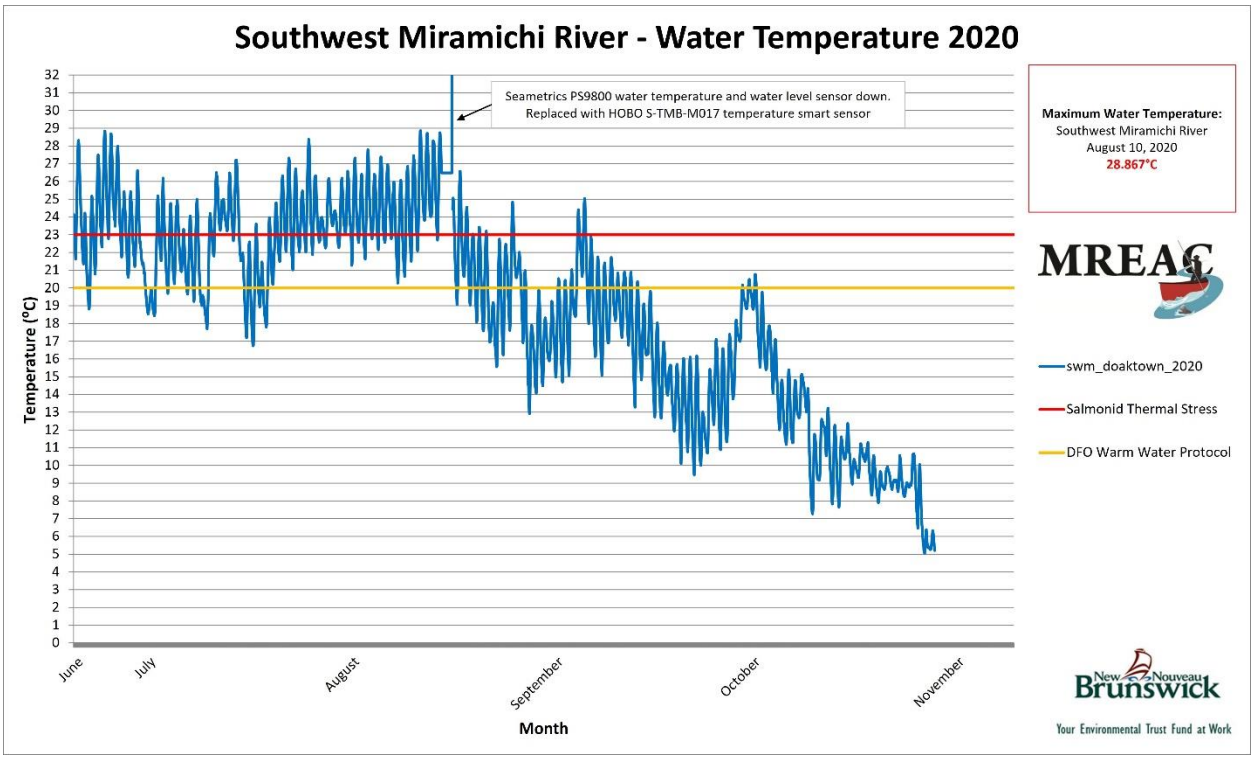
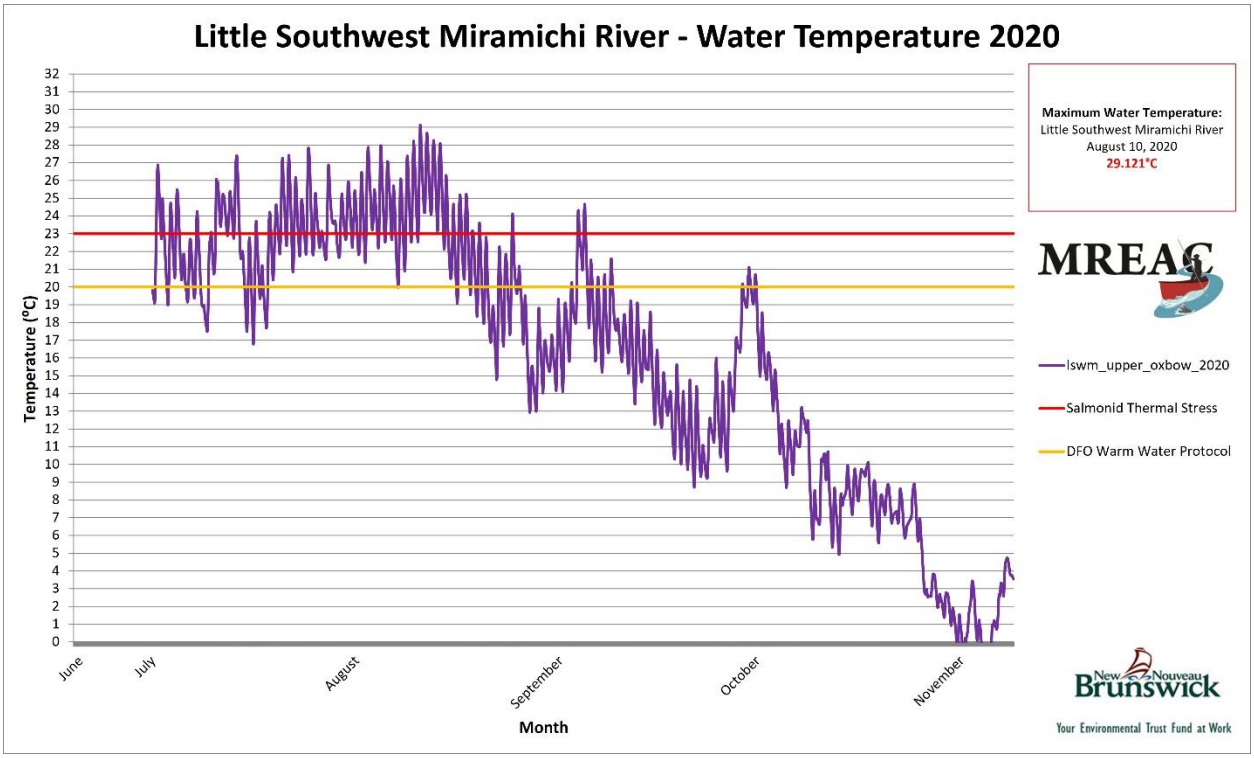


Figure 7: Seametrics PS9800 Water Temperature & Water Level Sensor

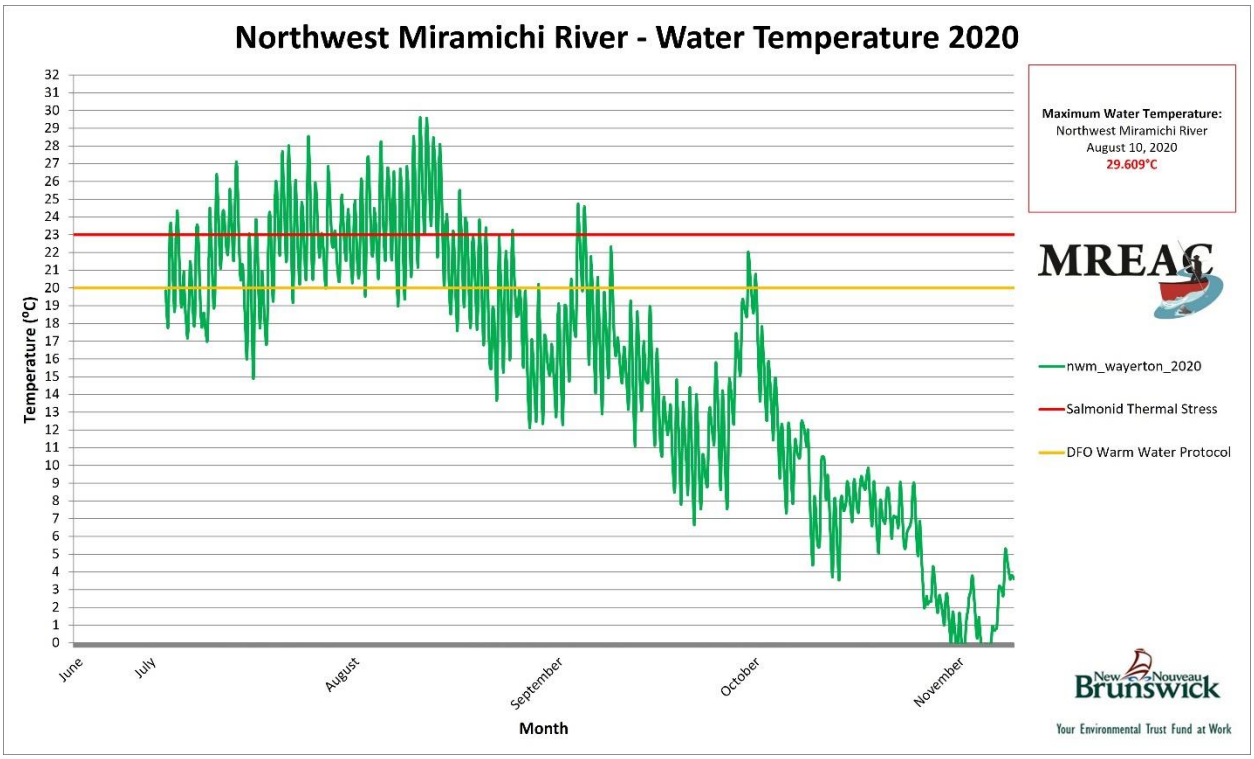
The Little Southwest Miramichi River real-time monitoring station (LSWM @ Upper Oxbow) was deployed on June 30, 2020 and extracted November 9, 2020. A total of 133 days of data was captured for this station (Figure 8). The peak water temperature was recorded on August 10, 2020 at 29.121ºC. This station functioned flawlessly for the 2020 monitoring season and only required routine maintenance.

Figure 8: Little Southwest Miramichi River Water Temperature 2020



The Northwest Miramichi River real-time monitoring station (NWM @ Wayerton) was deployed on July 2, 2020 and extracted November 9, 2020. A total of 131 days of data was captured for this station (Figure 9). The peak water temperature was recorded on August 10, 2020 at 29.609ºC. This station functioned flawlessly for the 2020 monitoring season and only required routine maintenance.

Figure 9: Northwest Miramichi River Water Temperature 2020



4.0 Discussion

The three real-time monitoring stations were installed when water levels allowed in mid-June to early July. Apart from a water level and water temperature sensor going down at the SWM @ Doaktown station, the three units functioned very well. The faulty sensor was reading inaccurate water level and replaced very quickly with almost no downtime.

MREAC has worked very hard with Hoskin Scientific and Upward Innovations to solve the problem where access to the real-time monitoring data that is viewed online would randomly, and quite frequently in 2018 and 2019, be restricted to the public. The temporary solution in the past was to be extra vigilant and when it was noticed that the online access to the data was not permitted to the public, MREAC would login to their DataGarrison account and allow public access again. MREAC is happy to report that this issue was resolved by Upward Innovations and during the entire 2020 monitoring season there was not a single restriction. The public had access to the data for the entire monitoring season.

The summer of 2021 was very warm over a sustained period throughout late June, July, and August, this resulted in significant pool closures. The Southwest Miramichi River (SWM @ Doaktown) station is used by DFO to initiate the "Warm Water Protocol" and close recreational fisheries on the Miramichi River system. There were three different closures in 2020, June 23rd reopened July 8th, July 10th reopened July 17th, and July 22nd reopened August 20th. Twenty-seven salmon fishing pools on the Miramichi River system were closed for a total of 52 days.

Hot weather conditions throughout the summer of 2020, coupled with limited rainfall, resulted in sustained high-water temperatures and low water levels which induced stressful conditions for Atlantic salmon and other cold-water fish.

Based on the Google Analytics report on page views for the mreac.org website, the service of providing 'real-time' monitoring to both institutions and the public continues to be the most popular service provided by MREAC.

5.0 Conclusion

The data continues to illustrate that there is challenging habitat conditions for cold-water fishes on the Miramichi and her tributaries. Water levels likewise are challenging due to extended periods of limited rainfall.

Based on the recognized value of this project, and presuming ongoing support from funding agencies, MREAC will continue to provide this service in 2021. We also hope that the current hosts of the three real-time monitoring stations on the Southwest Miramichi River, the Little Southwest Miramichi River, and the Northwest Miramichi River will continue to accommodate these units on their respective properties. It is expected that the Southwest Miramichi River real-time monitoring station will continue to be the data source that triggers the now well established DFO "Warm Water Protocol".