

Water Quality Report

2020 FIELD SEASON

OUR ORGANIZATION

The Nashwaak Watershed Association was established in 1995 as a not-for-profit organization. Our organization restores land that can protect river water quality and we engage people on the use of its importance.

Vision

We envision people caring for a clean, healthy, and beautiful Nashwaak River watershed that supports and connects people and wildlife for years to come.

Mission

To promote, conserve, and restore the Nashwaak ecosystem by using science-based methods, community collaboration, and advocacy for the watershed and its inhabitants.



OUR WATERSHED



Maintaining the quality of the surface water is extremely important for ensuring a healthy watershed. Clean water is one of New Brunswick's most important resources. We rely on it for drinking, growing food, manufacturing goods, producing electricity, and for recreational activities. The flora and fauna of the Nashwaak watershed also rely on clean water.

The NWAI resumed water quality monitoring in the summer of 2017. We monitor 12 standard sites monthly throughout the field season. Occasionally we sample other sites related to restoration project.

WHAT DO WE MEASURE?

Water Temperature

Water needs to be cold enough for some species (like salmon and trout) to survive

Dissolved Oxygen

Ecosystems need a minimum amount of oxygen in the water to support healthy aquatic life

Conductivity

This is the water's ability to transmit electricity - changes are due to dissolved solids, and may impair the survival of some species

Metals

Metals are introduced into water from weathering or erosion of soils or rocks either naturally or at an increased speed due to human activities

pH

This measures how acidic/basic the water is - neutral levels are best for fish. Changes to the natural pH might impact the nutrients or toxins in the water

Dissolved Solids

Dissolved solids can be anything from organic material, to minerals, to pollutants. Too many dissolved solids harm aquatic life and may indicate contaminated runoff.

Nutrients

While some nutrients are healthy, too many nutrients (like phosphorus and nitrogen) can cause algae and harm ecosystems. Nutrients often come from manure and fertilizer in runoff.

E. Coli

E. coli are bacteria that live in the digestive tract of warm blooded animals and are used to indicate the potential presence of harmful organisms.

THE WATER QUALITY INDEX



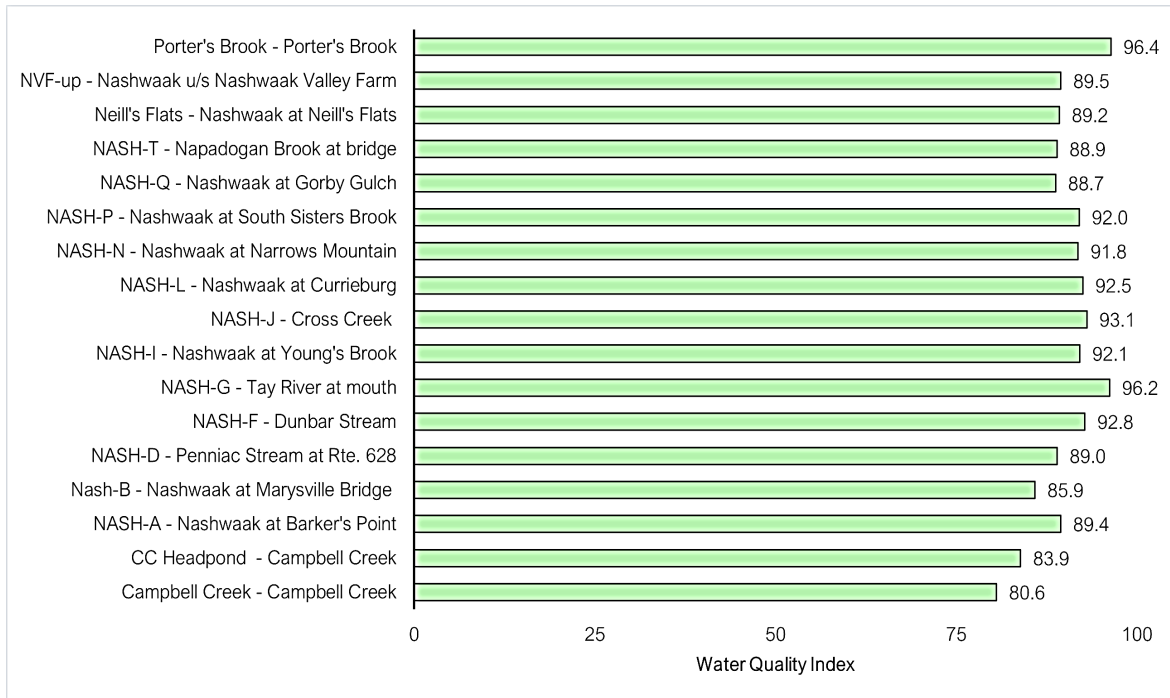
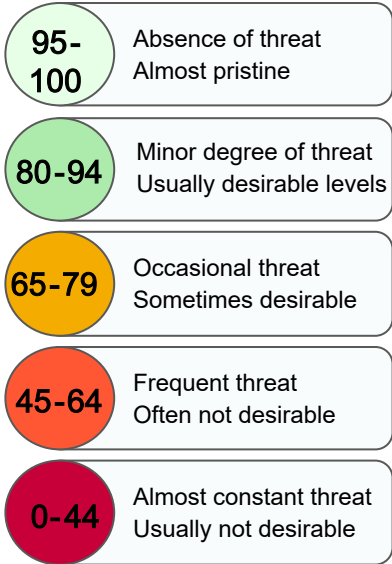
Using the Canadian Council of Ministers of the Environment water quality guidelines, the Water Quality Index (WQI) combines multiple parameters into a single value that summarizes water quality at a site. It is calculated based on:

- the number of parameters that exceed guidelines,
- the number of times guidelines are exceeded,
- and the amount by which they are exceeded.

For an accurate WQI, a site is required to have 4 samples per year with at least 4 variables measured.

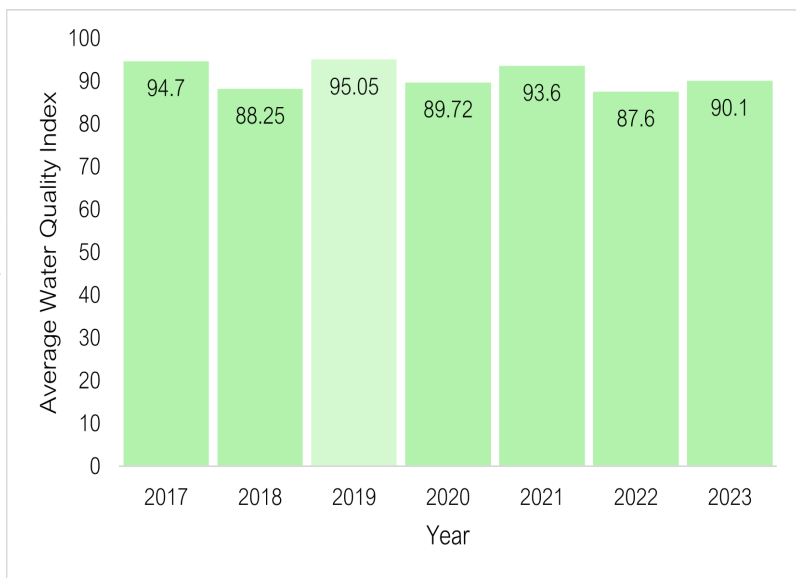
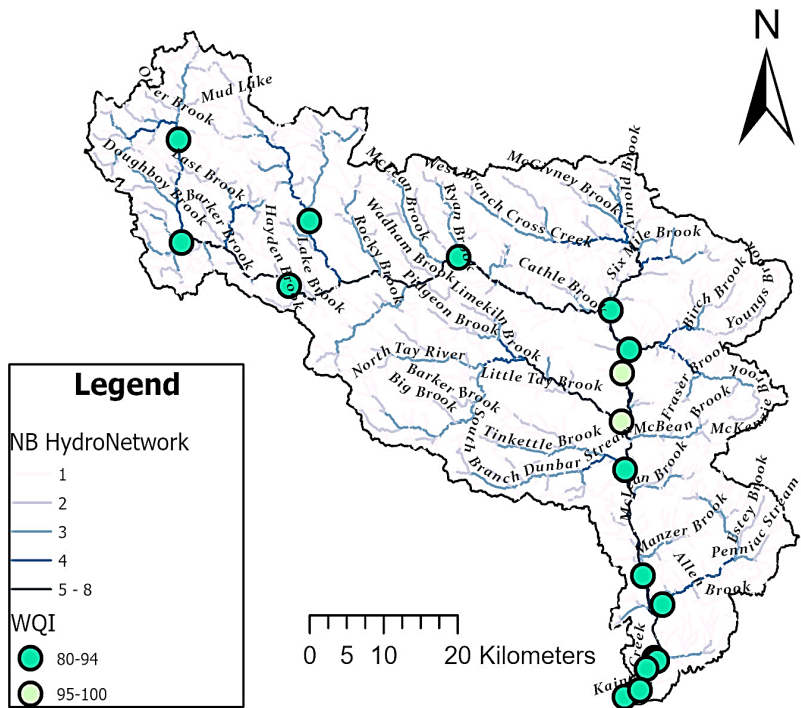
OUR WATER QUALITY INDEX SCORES

The WQI was calculated using: Aluminum, Ammonia, Arsenic, Cadmium, Chloride, Chromium, Conductivity, Copper, E.Coli, Fluoride, Iron, Lead, Manganese, Molybdenum, Nickel, Organic Carbon, Turbidity, Zinc



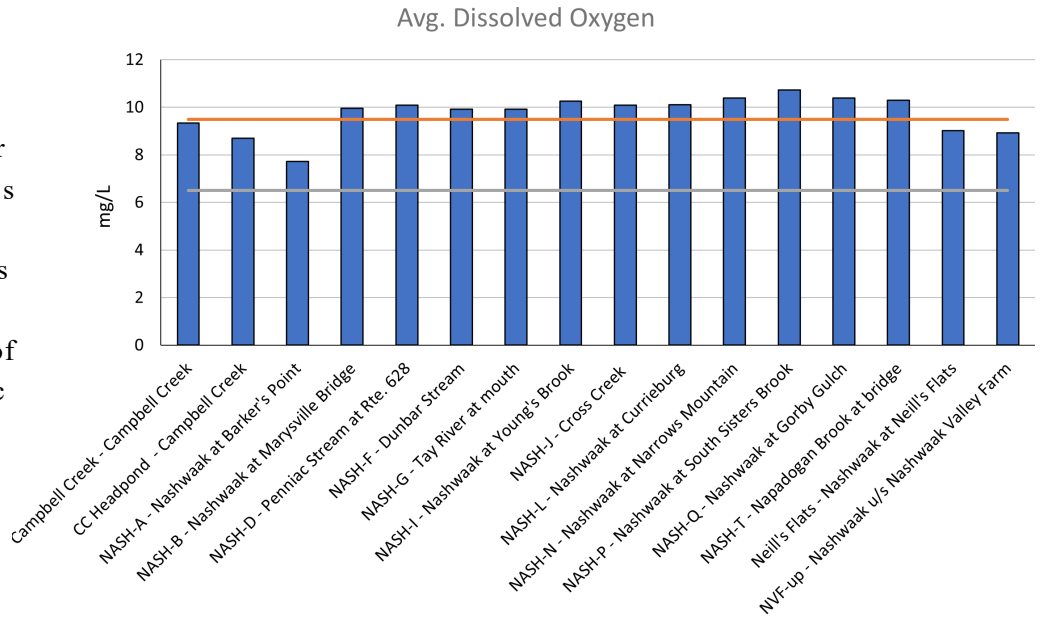
WQI SUMMARY

WQIs throughout the watershed improved slightly from the last 2 years. Guidelines exceedances were due most often to DO, phosphorus, and iron.

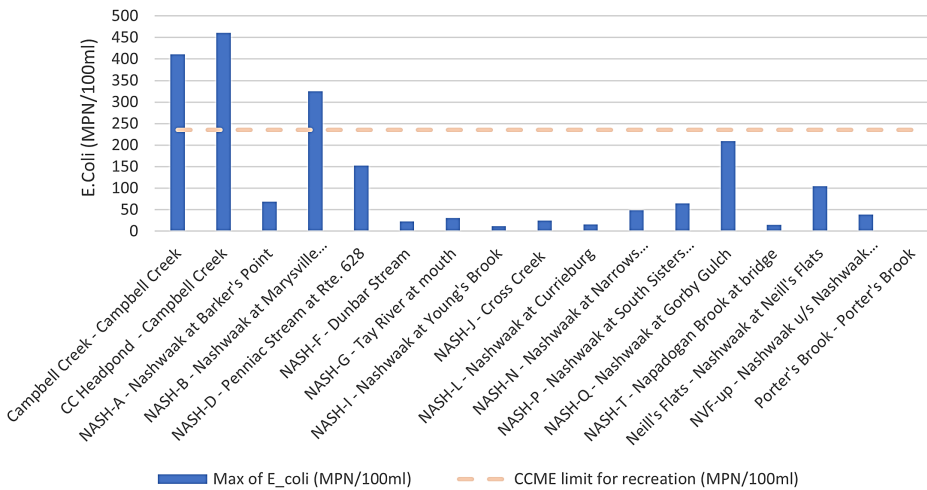


FURTHER ANALYSIS

Dissolved oxygen (DO) is a measure of the oxygen available in the water. Over the summer of 2023, the DO for all sites averaged above the CCME limit of 6.5 mg/l for the protection for all life stages of aquatic life (Grey line). 5 sites averaged below the CCME threshold of 9.5 mg/L for early life stages of aquatic life (Orange line).

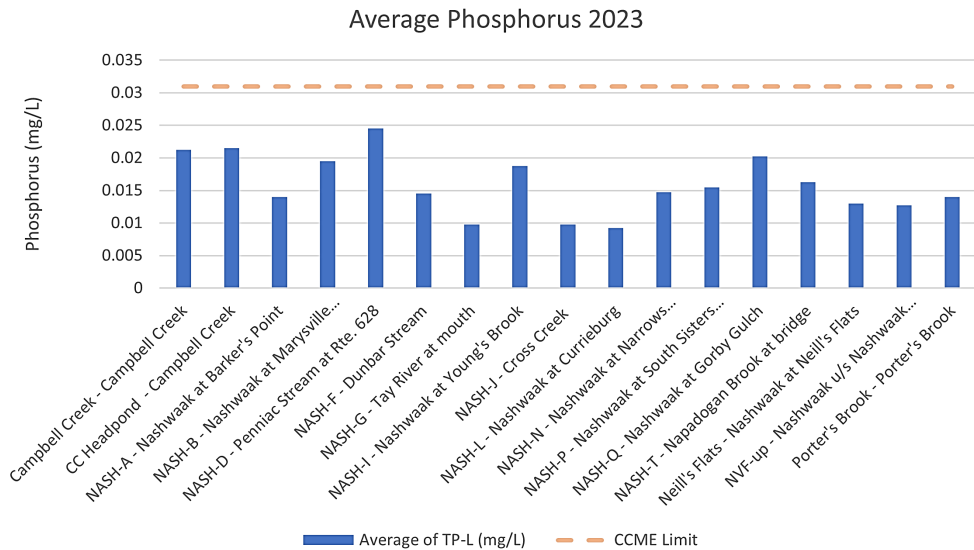


Maximum E. Coli Concentration 2023



2023 E. coli concentrations only exceeded the CCME limit at both Campbell Creek locations and in the Nashwaak at Marysville bridge throughout the summer. The average E.coli concentrations varied when comparing these results to the 2022 averages. At these locations, the average E.coli increased 58-71% at Campbell creek and decreased 9% at Marysville Bridge.

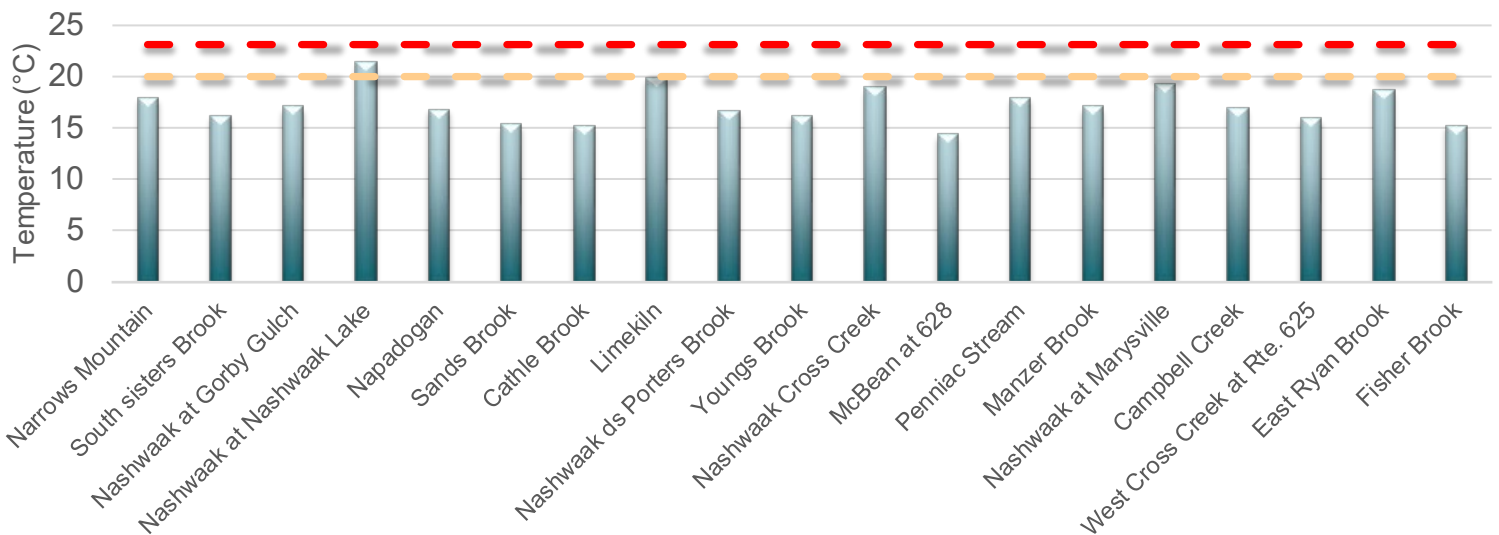
2023 phosphorus levels were mostly below the CCME limit of 0.031mg/L throughout the summer. The one exception was in Penniac stream which saw a concentration of 0.036 mg/L in July. Some notable differences from 2022 averages was increase of 36% at Marysville Bridge and a decrease of 131% in the Nashwaak river at Neill's Flats.



TEMPERATURE MONITORING

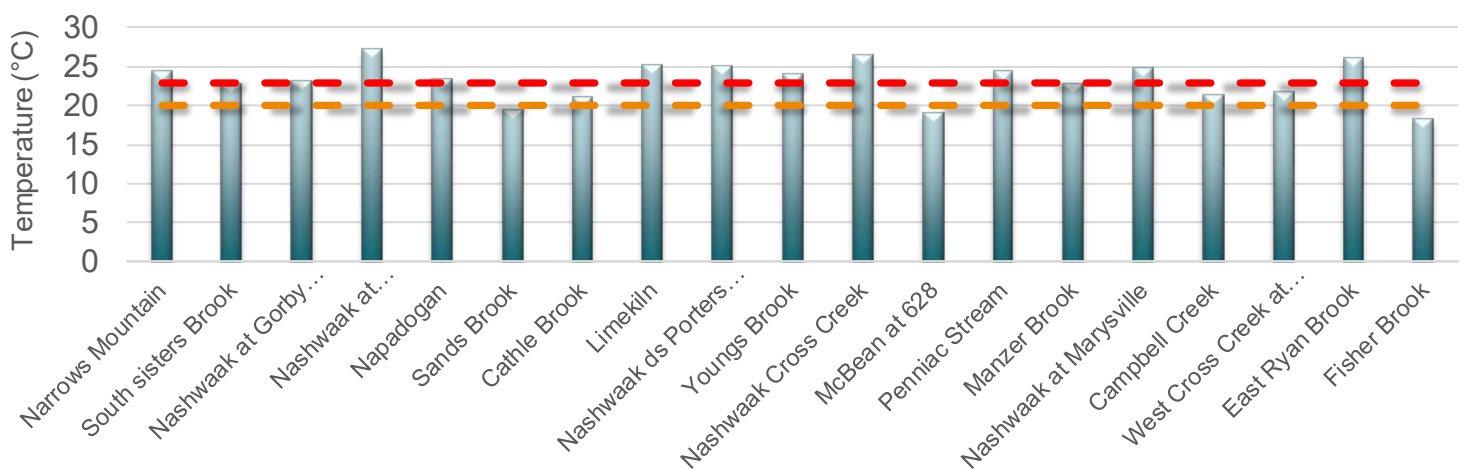
In 2023, 39 temperature loggers were deployed throughout the mainstem and several key tributaries. The loggers recorded hourly temperatures between May to October. Increased temperature monitoring of ecologically significant tributaries will help us to understand the source of thermal inputs and location of thermal refugia within the watershed. 20°C is considered the threshold minimum temperature for assessing physiological stress in salmonids and at 23°C, it has been shown that salmonids will seek refuge in cooler temperatures.

Average Summer Temperatures



2023 was a cool and wet summer. Some months showed the highest rainfall amounts in 15 years. This kept many of the mainstem sites and tributaries below 20°C. Nashwaak lake was the one location that had summer averages above 20°C .

Maximum Summer Temperature



Only 3 tributaries did not exceed temperatures of 20 °C this summer. Of those, McBean was on average, the coolest Tributary. Nashwaak Lake in the headwaters was the warmest point of the watershed with sustained temperatures above 20 °C for over 49 days.

GET INVOLVED IN YOUR WATERSHED!

How can you improve the water quality of the Nashwaak watershed?

1. *Green the shoreline:* Maintain & plant native vegetation along watercourses to provide homes for wildlife, shade the water, reduce erosion, & filter pollutants.
2. *Fence watercourses near farms:* Livestock are a major source of E. coli & can erode riverbanks. Fencing the watercourse is better for both the river & the animals.
3. *Keep sewage out of the river:* Ensure that your domestic septic tanks are regularly maintained.
4. *Reduce chemical inputs:* Use phosphate-free & biodegradable cleaning products & personal care products. Reduce the use of pesticides on lawns and gardens and clean up pet waste.
5. *Reduce impervious surfaces:* Use porous alternatives & collect runoff in a rain barrel or plant a rain garden.
6. *Learn more about your watershed & its issues.*



The Nashwaak Watershed Association relies on the support of its members & their generous contributions of both time and money to help promote & advocate the health of the Watershed. Membership is \$10, however any donation you choose to make helps support education & awareness programs, sustainability projects, & advocacy to protect & preserve this valuable resource. Your membership also gives you a voice in helping to shape the future of the Watershed. Join today!

Acknowledgements

Thank you to the Atlantic Water Network, the Environmental Trust Fund, and the Wildlife Trust Fund who helped make this work possible!

