THE NASHWAAK WATERSHED ASSOCIATION

Water Quality Report

2021 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 responsible use.

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 our restoration projects.

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:

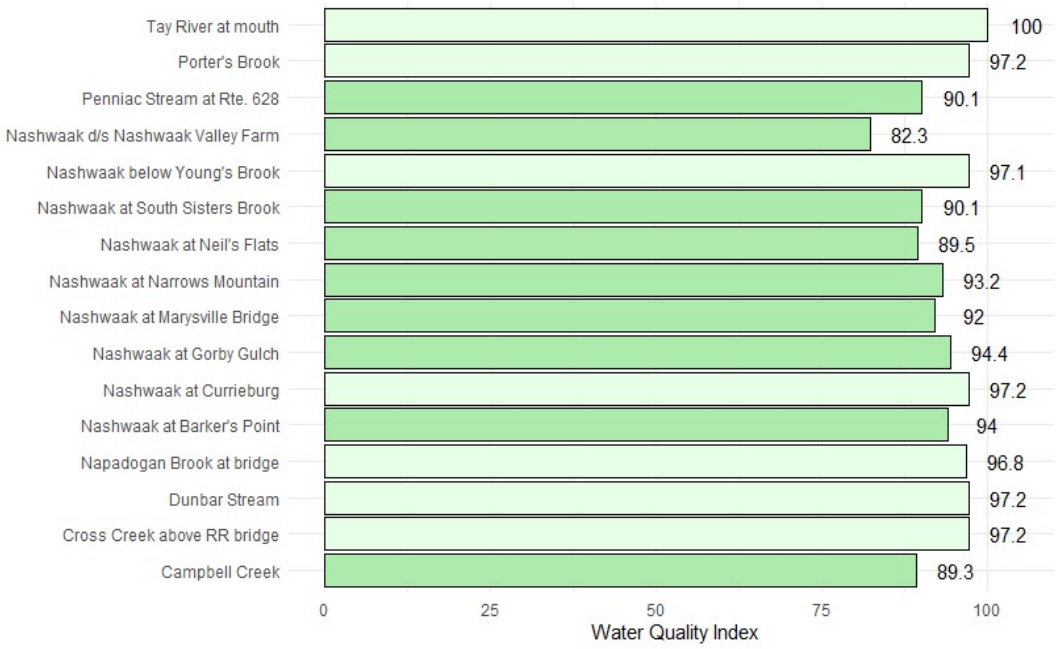
- the number of parameters that exceed guidelines,
- the number of times guidelines are exceeded,
- and the amount by which they are exceeded.

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

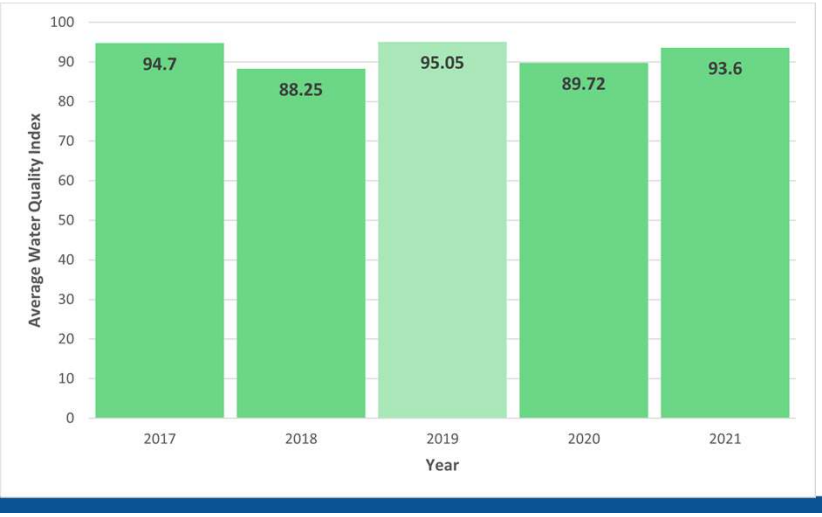
The WQI was calculated using: arsenic, cadmium, chloride, dissolved oxygen, E. coli, iron, ammonia, molybdenum, nitrite, nitrate, lead, pH, selenium, silver, thallium, total dissolved solids, temperature, phosphorus, turbidity, uranium, and zinc

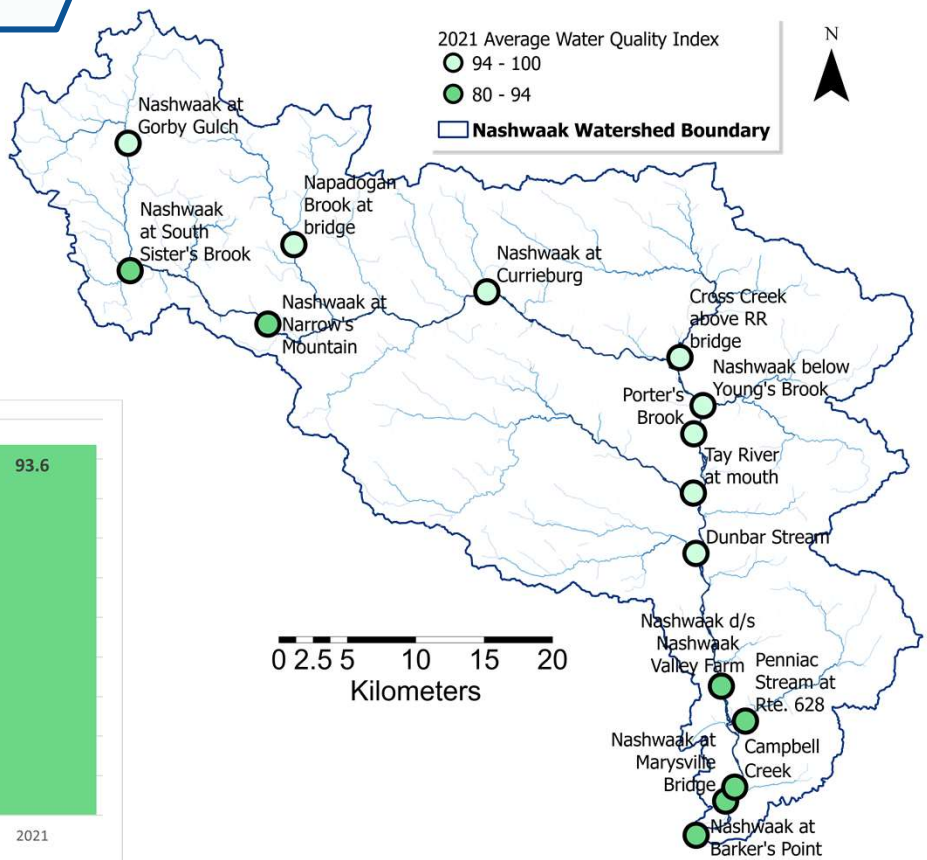
95-100	Absence of threat Almost pristine
80-94	Minor degree of threat Usually desirable levels
65-79	Occasional threat Sometimes desirable
45-64	Frequent threat Often not desirable
0-44	Almost constant threat Usually not desirable



WQI SUMMARY

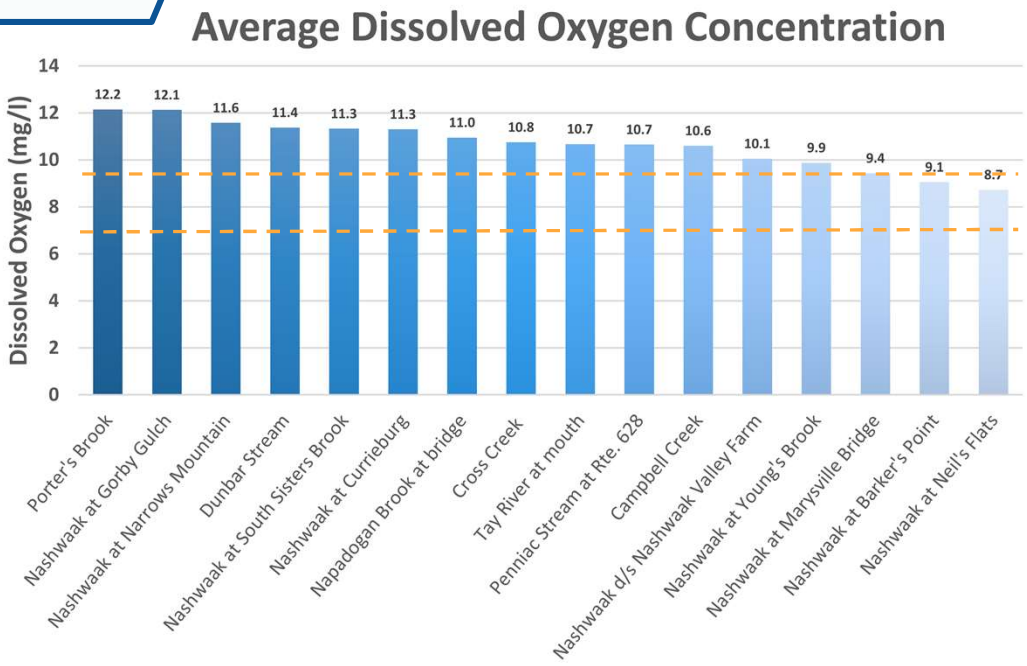
WQIs throughout the watershed have stayed relatively the same over the last 4 years. Guidelines exceedances were due most often to E. coli, DO, phosphorus, and iron. Overall in 2020, the water quality was considered excellent!



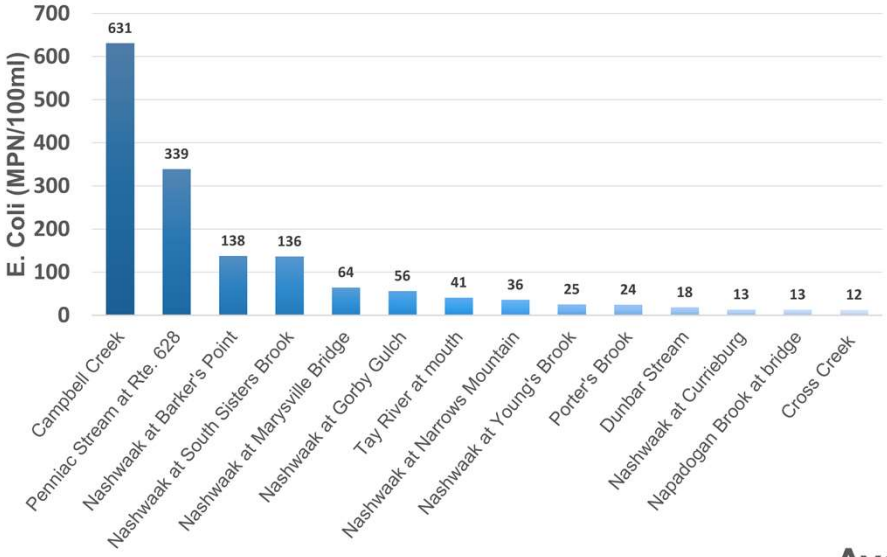


FURTHER ANALYSIS

Dissolved oxygen (DO) is a measure of the oxygen available in the water. Over the summer of 2021, the DO for all sites averaged above the CCME limit of 6.5 mg/l (protection for all life stages) but three sites in the lower watershed averaged below the CCME limit of 9.5 mg/l (protection of early life).



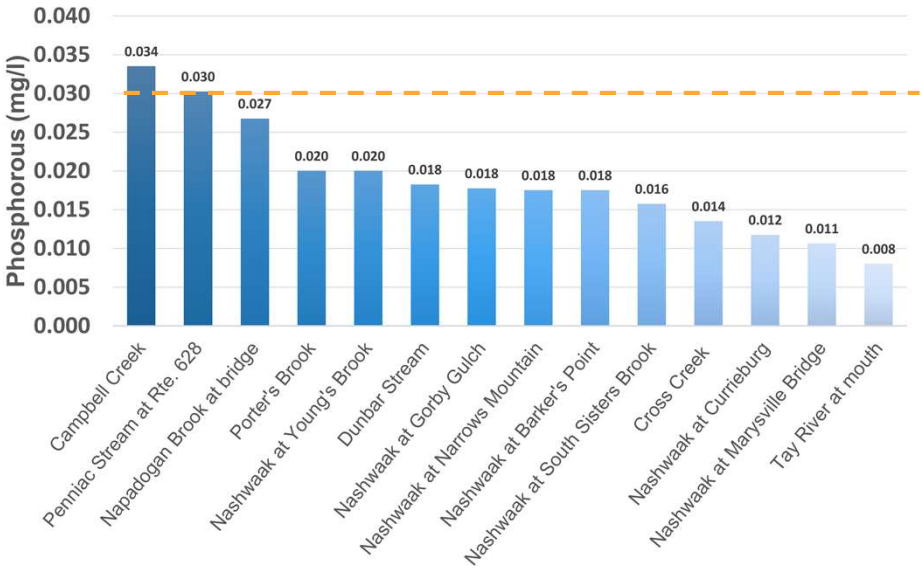
Average E.Coli Concentration



E. coli concentrations exceeded the CCME limit of 400 MPN/100 ml for a single grab sample twice in 2021. However, both of these exceedances occurred after a period of rainfall in August, which flushed accumulated bacteria into the river system. All other samples taken in the summer of 2021 were under 400 MPN/100 ml.

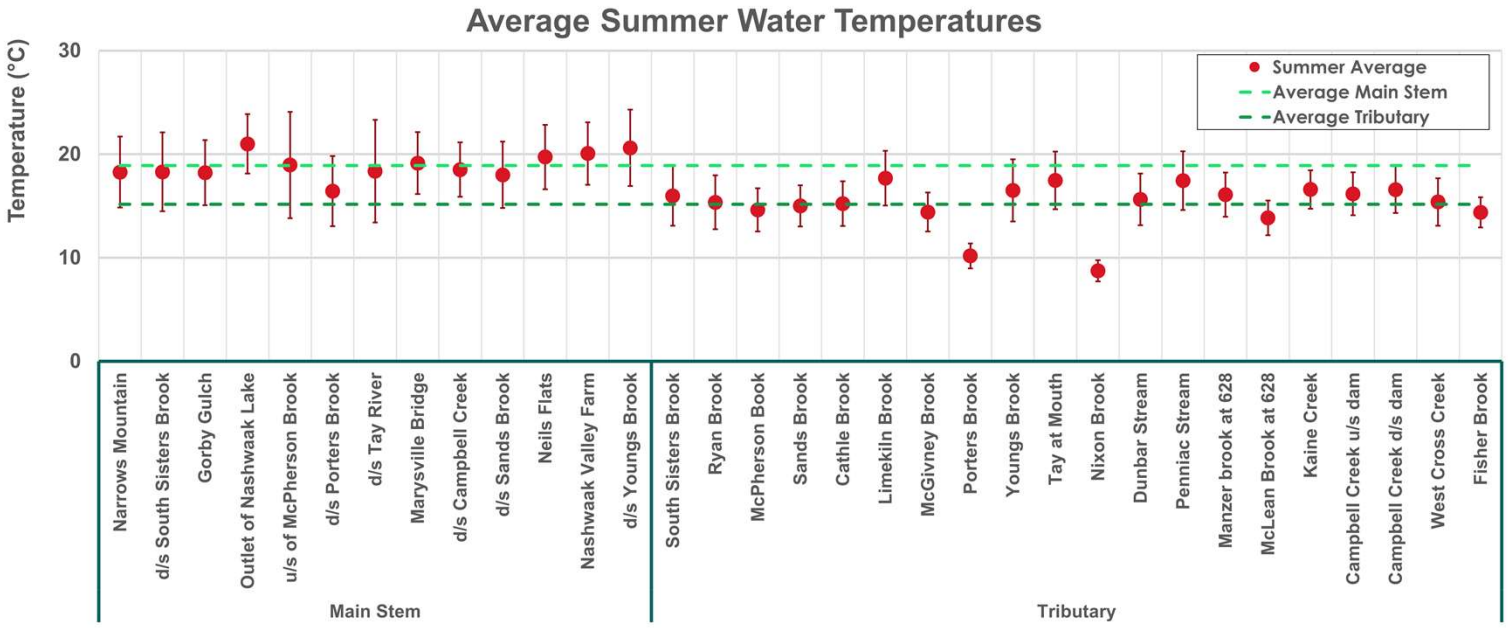
Average Phosphorous Concentration

Phosphorus levels were elevated above the 0.03 mg/L “limit of concern” in the lower watershed in Penniac and Campbell Creek. Concentrations were also elevated in Napadogan Brook. Most sites had higher concentrations of phosphorus on average compared to previous years. Sources of phosphorus include fertilizers, manure, sediment and organic wastes.

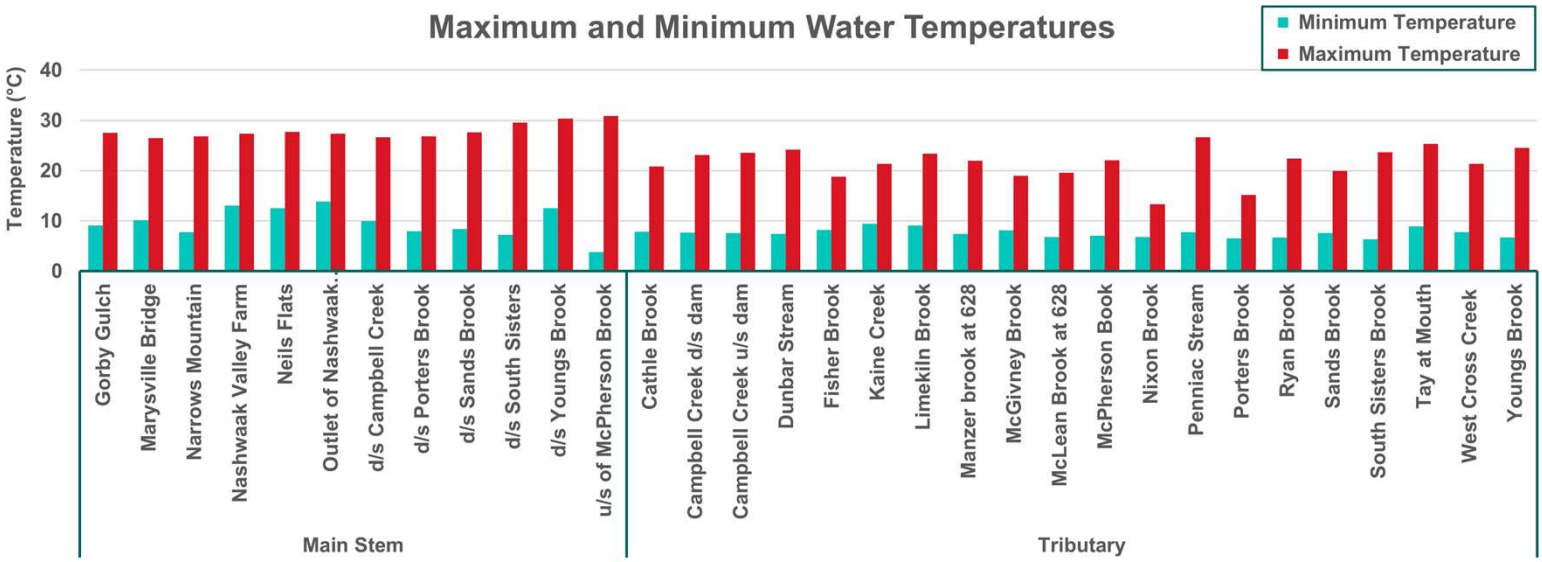


TEMPERATURE MONITORING

In 2021 we deployed 39 temperature loggers in both tributaries and along main stem to measure water temperature every six hours between May and October. Over time, the monitoring of temperature on our ecologically important tributaries will help us to understand the source of thermal inputs and the location of more thermal refuges within the watershed.



2021 was a warm, wet summer, with an unusually cold July. The average temperature over the summer in the monitored tributaries was 15.6 °C while in the main stem it was 19.0 °C.



Six tributaries remained below 20 °C all summer this year. Maximum temperatures were observed in the main stem with the warmest temperatures observed downstream of MacPherson Brook (30.9 °C) and downstream of Young's Brook (30.4 °C). Penniac Brook also reached 26.7 °C, making it the warmest tributary in the watershed.

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!

NB Wildlife Trust Fund / Fonds de Fiducie de la Faune du Nouveau-Brunswick
New Nouveau Brunswick
Your Environmental Trust Fund at Work
Votre Fonds en fiducie pour l'environnement au travail

Acknowledgements

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