

# Water Quality Report

2022 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 NWA resumed water quality monitoring in the summer of 2017. We monitor 16 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 and 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

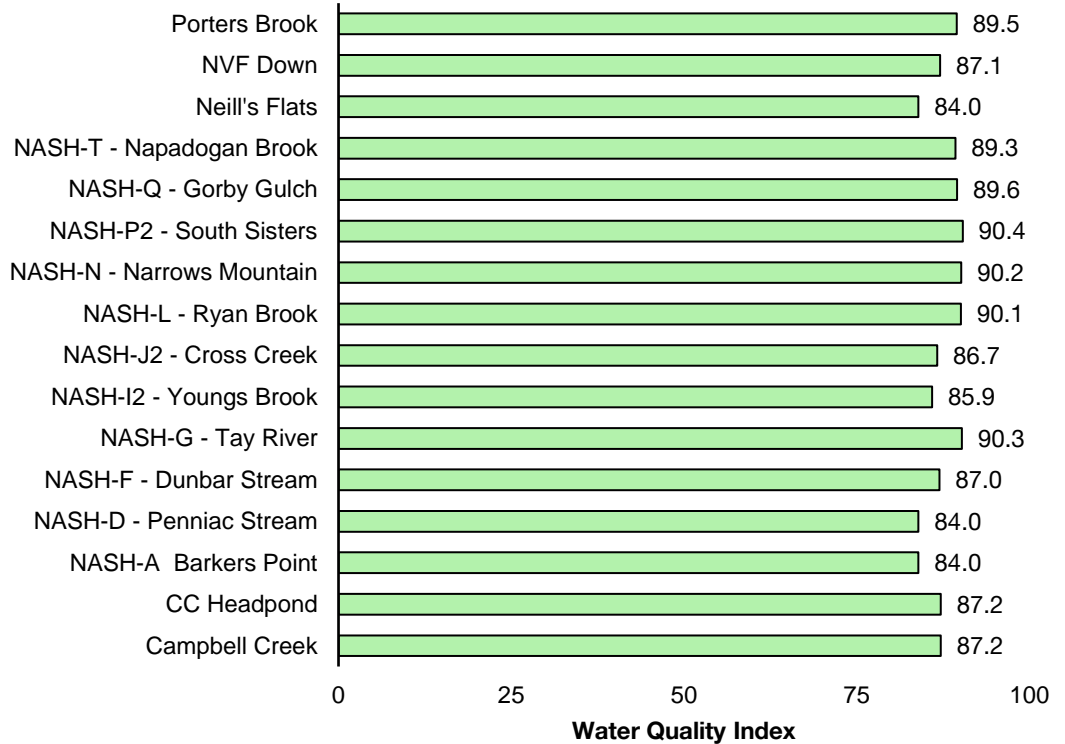
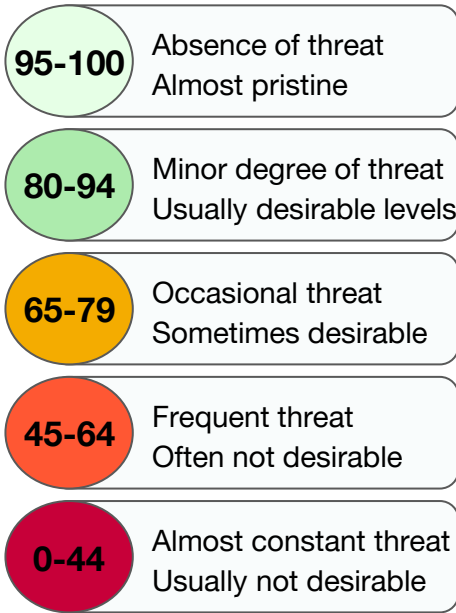
Using the Canadian Council of Ministers of the Environment water quality guidelines, the Water Quality Index (WQI) combines multiple parameters into a single value that summarizes water quality at a site. It is calculated based on:

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

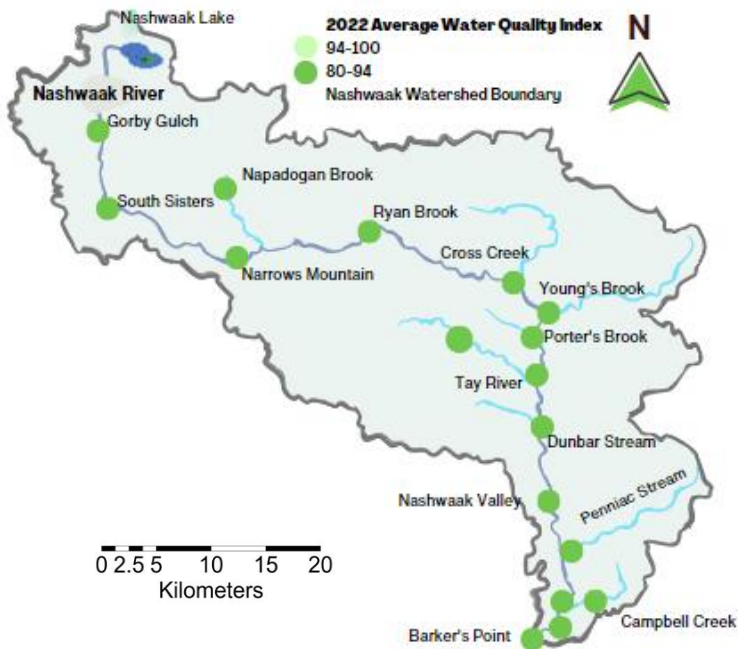
For an accurate WQI, a site is required to have 4 samples per year with at least 4 variables measured.

# OUR WATER QUALITY INDEX SCORES

The WQI was calculated using: aluminum, ammonia, arsenic, chloride, copper, cadmium, fluoride, iron, lead, molybdenum, nitrate, dissolved oxygen, pH, temperature, turbidity, zinc, suspended sediment, and e. coli.



## WQI SUMMARY



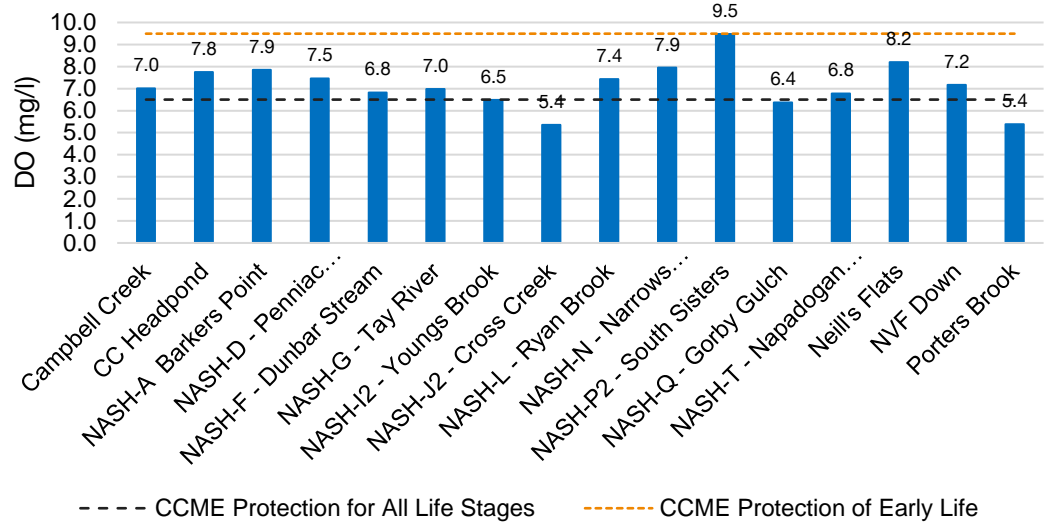
WQIs throughout the watershed have stayed relatively the same over the last five years. Guideline exceedances were most often due to aluminum, iron, dissolved oxygen, and suspended sediment.



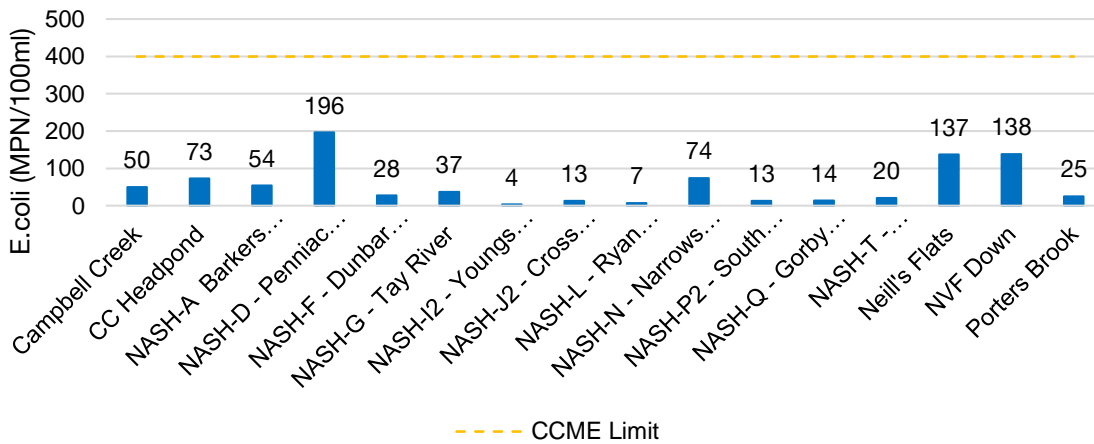
# FURTHER ANALYSIS

Dissolved oxygen (DO) is a measure of the oxygen available in the water. Over the 2022 field season, the DO for three sites averaged below the CCME limit of 6.5 mg/l (protection for all life stages), and most sites in the lower watershed averaged below the CCME limit of 9.5 mg/l (protection of early life).

## Average Dissolved Oxygen Concentration

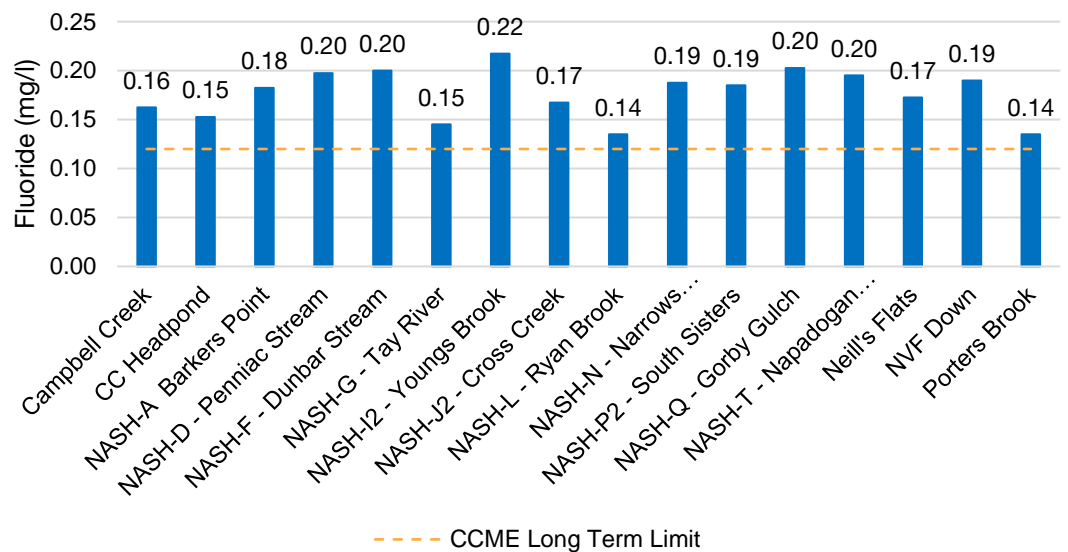


## Average E.coli Concentration



E. Coli concentrations did not exceed the CCME limit of 400 MPN/100 ml for a single grab sample in 2022. While there were several samples exceeding 300 MPN/100 ml, all samples were under 400 MPN/100 ml.

## Average Fluoride Concentrations



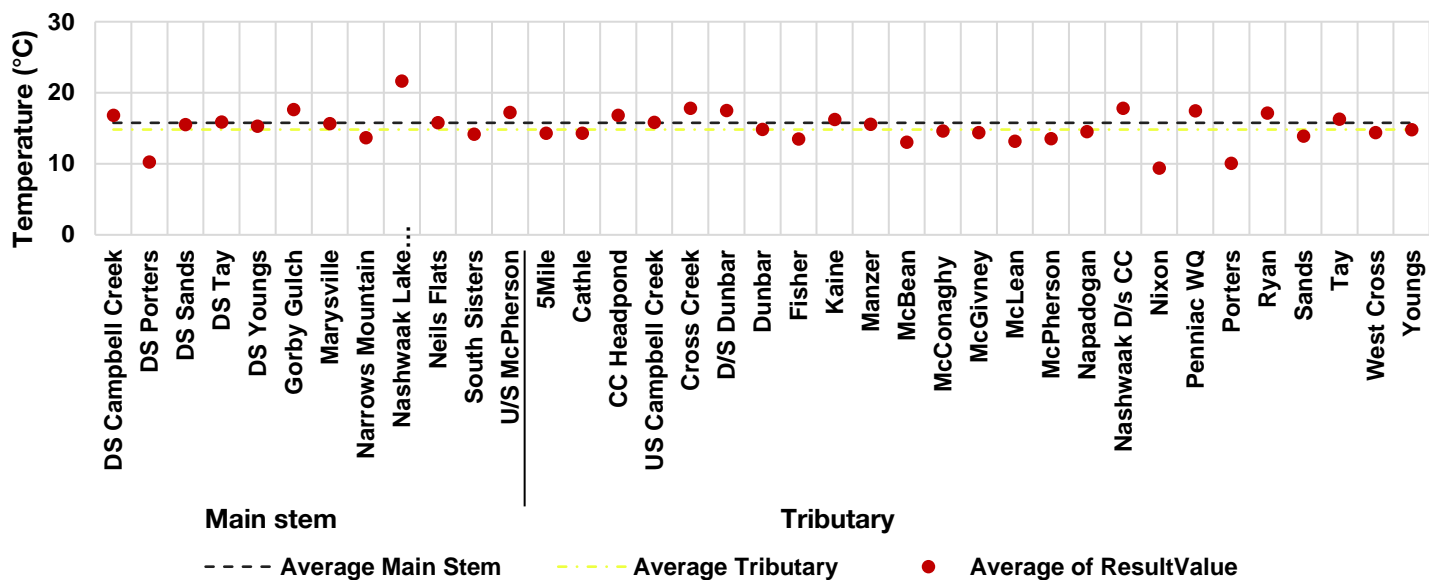
Fluoride levels at all sites were above the long-term average of 0.12 mg/l. Fluoride can have negative effects on aquatic life. Sources of fluoride include groundwater, spring water, and inputs from drinking water.



# TEMPERATURE MONITORING

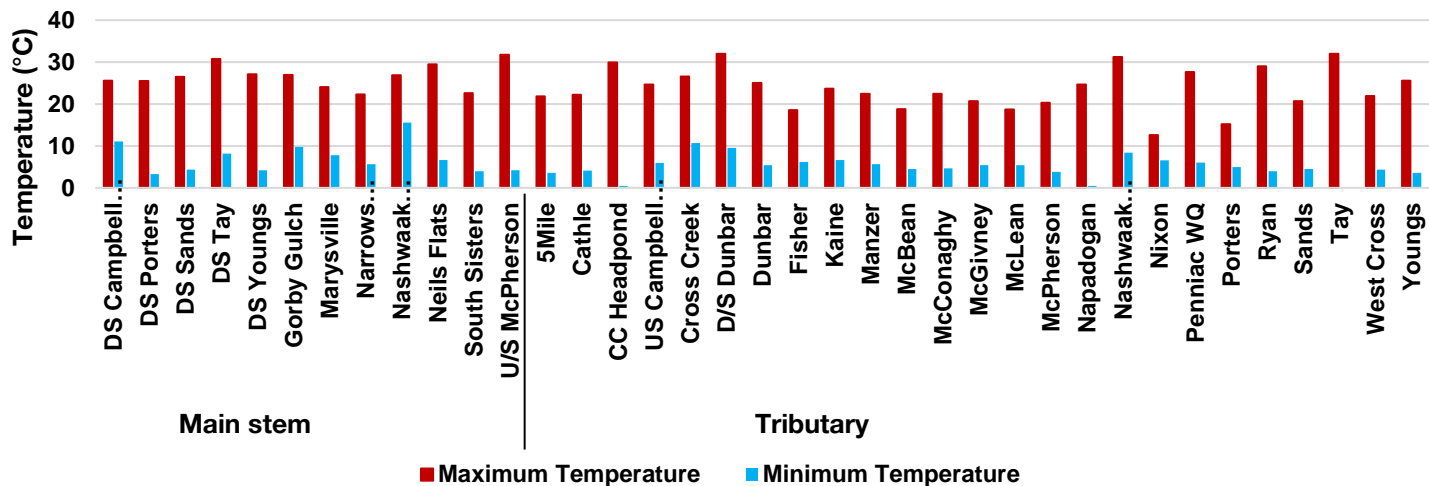
In 2022, we deployed 39 temperature loggers both in tributaries and along the main stem to measure water temperature every six hours between June and October. Over time, the monitoring of temperature on our ecologically important tributaries will help us to understand the source of thermal inputs and the location of more thermal refuges within the watershed.

## Average Summer Water Temperature



2022 was a warm, wet summer, with June and August being warmer and drier than usual, and July cooler and wetter. The average temperature over the summer in the monitored tributaries was 14.8°C while in the main stem it was 16.3°C, both values which were much lower than in previous years.

## Maximum and Minimum Water Temperatures



Five tributaries remained below 20°C all summer in 2022. Maximum temperatures were observed in the main stem with the warmest temperatures observed at the mouth of the Tay River (31.9°C), upstream of MacPherson Brook (31.8 °C) and downstream of Cross Creek (31.3°C). Penniac Brook also reached 27.7°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 and their generous contributions of both time and money to help promote and advocate the health of the Watershed. Membership is \$10, however any donation you choose to make helps support education and awareness programs, sustainability projects, and advocacy to protect and 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 Environmental Trust Fund and the Wildlife Trust Fund who helped make this work possible! And to the Atlantic Water Network for providing the report template.*



**New Brunswick**  
Your Environmental Trust Fund at Work  
Votre Fonds en fiducie pour l'environnement au travail

