# Baxter Creek Benthos Survey

## Background

The **Baxter Creek Watershed Alliance (BCWA)** prioritizes education and engagement within the community to protect and care for a clean, healthy watershed. **Benthic macroinvertebrates** are excellent bioindicators for water quality as they have recognized community responses. The **Baxter Creek Watershed** is exposed to a variety of **land uses**. To determine water quality, samples were collected to provide a **baseline assessment**.

## Research Questions

- What is the baseline composition of the benthic communities of the Baxter Creek Watershed?
- What insights do benthic communities provide about water quality in the Baxter Creek Watershed?
- What are the external factors influencing stream quality?

## Methodology

- Sampling and data collection in the field were based on the **OBBN protocols.**
- Sampling took place on October 23, 2023, and November 5, 2023, at four sites along Baxter Creek.
- The **traveling kick-and-sweep transect method** was used to collect 3 subsamples from each site.
- In the lab, Organisms were tallied and sorted using the **teaspoon-bucket method**.

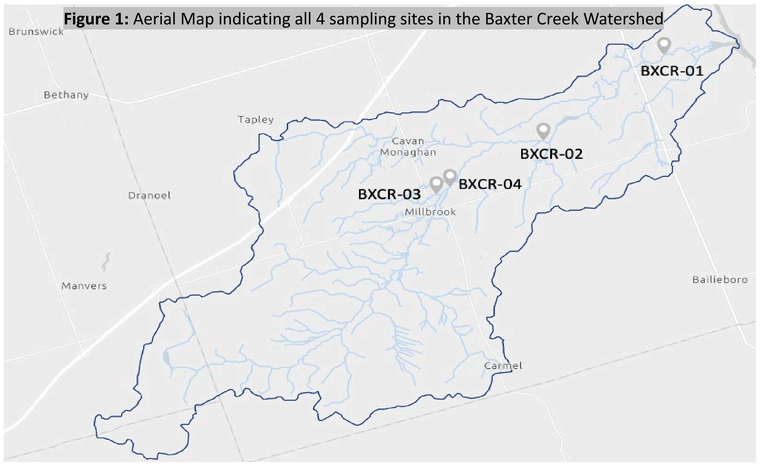


**Figure 1:** Aerial Map indicating all 4 sampling sites in the Baxter Creek Watershed

**Figure 2:** Researcher collecting samples using the Kick and Sweep method

**Figure 3:** Researcher identifying and processing samples using a microscope

## Data Analysis

- % EPT, % Composition, HBI, Hill Numbers, Simpson's Diversity Index were calculated.
- These **biotic indices** are used to summarize the biological condition of the stream and may reveal if pollution is present.

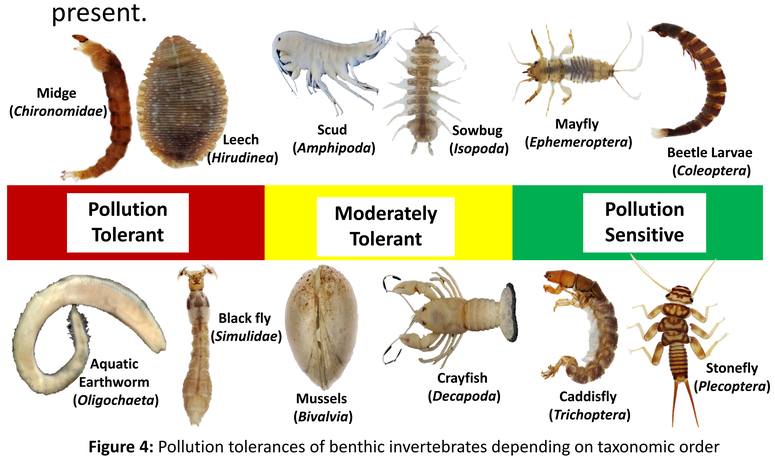


**Figure 4:** Pollution tolerances of benthic invertebrates depending on taxonomic order

## Key Terms

**Benthic macroinvertebrates:** Small aquatic organisms that live at the bottom of water bodies.
**OBBN:** Ontario Benthos Biomonitoring Network.
**%EPT:** Percent of Ephemeroptera, Plecoptera, Trichoptera.
**HBI:** Hilsenhoff Biotic Index.

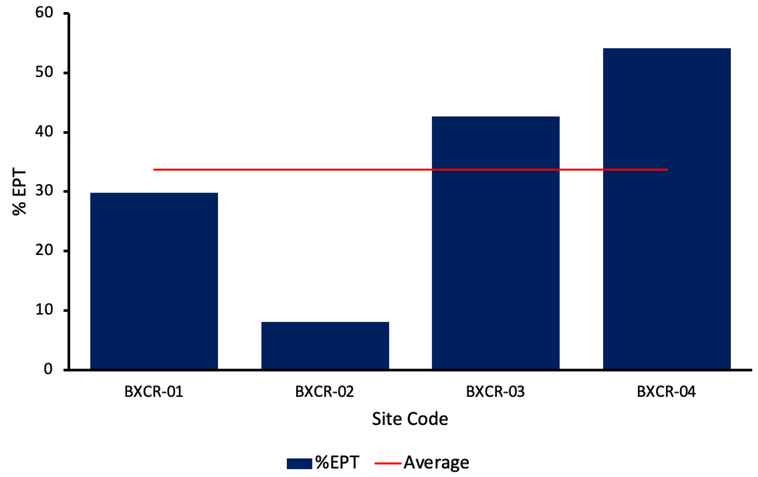


**Figure 5:** % EPT (Ephemeroptera, Plecoptera, Trichoptera) plotted for each of the four sites selected. The red line indicates the average % EPT of Baxter Creek across the sites. As benthos are considered to be highly sensitive to pollution, a higher value of EPT indicates good environmental conditions.

## Preliminary Results

**% EPT** were excellent in each site except in BXCR-02. This was reflected in pollution tolerant benthos found at BXCR-02 and high number of pollution sensitive benthos found at BXCR-01, BXCR-03, BXCR-04 . While most of the sites had healthy **% Composition**, **HBI** and **Simpson Diversity Indices**, the biotic indices measured at BXCR-02 were low. The sampling sites selected may reflect the impact **of anthropogenic land use** on stream quality from recent subdivision developments in Millbrook, the Water Treatment Plant, agricultural fields, and the Baxter Creek golf course.

## Recommendations

- Based on the baseline data collected in this study, we recommend that sampling of Baxter Creek Watershed should occur annually in the spring for at least 5 years.
- Future sampling should occur at a variety of sites throughout the watershed in addition to the four sites in this study. This will allow for the observation of patterns and trends in the benthic communities.
- Comparing this data to different watersheds in the area may also be a priority as further analysis between watersheds can occur.


Researcher: Mariah Shaw
Faculty Supervisor: Kaitlyn Fleming, TCRC Coordinator: Brittany Finigan
Host Supervisor: Craig Onafrychuk
2023/2024 ERSC 4830Y


BCWA

Trent Community Research Centre

TRENT UNIVERSITY