

Companion Document

Region of Durham - Investigative Upstream Monitoring Report for Cawkers Creek and Williams Creek



**KAWARTHA
CONSERVATION**

Discover • Protect • Restore

During the 2004-2008 Lake Scugog Environmental Management Plan, it was identified that Cawkers Creek and Williams Creek were streams of concern due to higher levels of nutrients and pollutants found. This launched the Region of Durham's Investigative Upstream Monitoring program, where Kawartha Conservation's Integrated Watershed Management (IWM) staff monitored multiple locations along both creeks to find specific hot spots, where increased levels of nutrients and pollutants could be found.

At each location IWM staff collected water samples for total phosphorus, nitrogen, chloride and suspended solids, and took observations of water temperature, water pH, conductivity, turbidity and dissolved oxygen. Samples were processed at an accredited laboratory with results then compared against the Ontario Provincial Water Quality Objectives and the Canadian Water Quality Guidelines for the Protection of Aquatic Life. In addition to collecting the water sample, staff also took discharge measurements at each location to help determine how much water was moving through the site. This helps calculate the total mass of pollutants moving through the system and targets needed to reduce water quality impacts.

Kawartha Conservation staff conducted the project study over the course of 3 years, monitoring monthly during the spring, summer and fall. Staff sampled at total of 7 sites, 4 sites along Cawkers Creek and 3 sites along Williams Creek. Both creeks are located within the Town of Port Perry in the Region of Durham. Of the two creeks, Cawkers is larger with land cover predominantly agriculture, while William's creek is predominately urbanized. This is not surprising as much of Port Perry is found within the small watershed of Williams Creek.

At the conclusion of our 3 years study the following results were determined.

Observations of Dissolved oxygen in this study was found to be lower than previously reported by Kawartha Conservation in 2019. This difference may be a result of different timing of observation where those reported in 2019 were during the springtime, where water temperatures are colder and have a higher capacity to hold oxygen, whereas observation for this study were taken during the early summer – early fall period where higher water temperatures resulted in lower dissolved oxygen levels.

Total Phosphorous was found to be consistently above the provincial objective for streams and rivers across most of the sites. Levels of phosphorus above the objectives can help excessive growth of aquatic plants. Result showed us that total phosphorus concentrations were generally higher in Williams Creek.

A variety of nitrogen forms were tested at each location. Some forms of nitrogen showed higher levels than those found in natural waterbodies, indicating that all tributaries are being influenced by human activity.

Ammonia levels across all sites, showed to be consistently higher in Williams Creek. When compared to the Provincial Water Quality Objectives, none of those sites were found to be higher than those guidelines. When comparing those sites to the Canadian Water Quality Guidelines for the Protection of Aquatic Life, those sites ultimately did not meet those set guidelines.

For this study, high Chloride levels were found in both streams due to de-icing (application of road salts). Once dissolved, chloride flows easily from roads and urban areas into streams and rivers, where it contributes to higher conductivity levels. Both short term and long-term exposure thresholds from the Canadian Water Quality Guidelines for the protection of Aquatic Life were looked at across all locations. Throughout this study, observations of Chloride were higher than long-term guideline 77% of the time. We also found two observations that were higher than short-term exposure threshold, which can result in lethal impacts to aquatic organism in less than 24hrs.

Total Suspended Solids can affect the clarity of the water. For this study we found that both creeks had higher than average total suspended solid concentrations than the proposed reference condition for Southern Ontario but also more concerning, these levels were much higher than the Ecological Reference condition which aims to protect the most sensitive aquatic bugs, i.e., Mayflies, Stoneflies and Caddisflies. As these sensitive aquatic bugs reduce it can lead to further collapse of the biological community, especially fish communities.

For each of the site locations, contaminant loadings were calculated to determine how much (weight) of a specific nutrient was entering the stream within a given amount of time. To achieve the targets that would align with the provincial objectives, the reduction targets were calculated for Chloride and Total Phosphorous. Based on our seven locations we sampled, reduction targets have

been set for all sites for total phosphorous while only five locations required reduction targets to be set for Chloride. From each of the sampling locations the most concerning nutrient has been highlighted below:

- CC2 – Totals suspended solids
- CC3 – Total phosphorus
- CC4 – Dissolved Oxygen, Ammonia, and Chloride
- CC5 – Nitrate
- WC1 – Dissolved Oxygen
- WC2 – Nitrate, Total Phosphorus, and Chloride
- WC3 – Total suspended solids

In addition, we also found that there was no information on “background” concentrations of total suspended solids for these streams.

Using the information provided from this study, specifically focusing on those ‘hot spot’ locations, Kawartha Conservation’s Stewardship staff will now look for willing landowners close to those ‘hot spot’ locations to implement nutrient and contaminant reduction projects.

As landowners are secured and implementation projects get underway, Kawartha Conservation’s IWM team will continue to conduct monitoring during and after each project to determine whether the nutrient and contaminant reduction projects were a success.

Furthermore, to better understand background information on total suspended solids, a separate study will be proposed to help determine background levels in the Kawartha watershed.

The continuation of monitoring at those locations will be proposed to be integrated into our current LSEMP monitoring program, so that we can access ongoing trends.

Acknowledgements

We would like to acknowledge that many Indigenous Nations have longstanding relationships, both historic and modern, with the territories upon which we are located. Today, this area is home to many Indigenous peoples from across Turtle Island. We acknowledge that our watershed forms a part of the treaty and traditional territory of the south-eastern Anishinaabeg. It is on these ancestral and Treaty lands that we live and work. To honour this legacy, we commit to being stewards of the natural environment and undertake to have a relationship of respect with our Treaty partners.

The region of Kawartha Lakes was referred to as *Gau-wautae-gummauh*, a glistening body of water, in anishinaabemowin. We are thankful to have an opportunity to work with Indigenous Peoples in the continued stewardship and care of this beautiful region.

This companion document was written by Tanner Liang, Water Quality Specialist. Peer editors include Ian McRae, Environmental Communications, Robert Stavinga, Watershed Resource Technician, and Nancy Aspden, Acting Manager, Integrated Watershed Management.

Others who have contributed to the development of this project include:

Deborah Balika, Source Water Protection Manager	Conservation Ontario
John Chambers, Marketing and Communications Specialist	Kawartha Conservation
Galen Yerex, Floodplain GIS/Mapping Technician	Kawartha Conservation
Laura Culp, Environmental Field Technician	Kawartha Conservation
Sandip Cruz, Environmental Field Technician	Kawartha Conservation

Funding for this project was provided by the Region of Durham.