Ancaster Creek Biomonitoring
Assessing creek habitat health
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Project Overview

We began formal ecological monitoring of sections of the lower Ancaster Creek. This was done to promote enhancements to the McMaster Corridor, as well as evaluate the impacts of the newly created riparian zone in the University’s parking lot. The Ancaster Creek watershed incorporates four designated environmentally sensitive areas including Dundas Valley and Cootes Paradise. Ancaster Creek is an essential element of the “McMaster Corridor” that connects Dundas Valley to Cootes Paradise. Following the restoration projects at lot M the collected baseline data set will enable changes and tracking of water quality, aquatic life in the creek, and terrestrial life along its banks. Additionally, it will allow engagement and experiential opportunities with interested community members. It is critical to establish baseline ecological data for this series of restoration projects as a way to evaluate changes in biodiversity and to encourage other restoration efforts.

This project monitored 5 sites along Ancaster Creek for the full range of sampling methods and 11 sites along Ancaster Creek and its tributaries for water quality monitoring. Sampling methods conducted include; small mammal trapping (using sherman traps), plant sampling (through collection of species), tree canopy sampling, aquatic life in the creek, and terrestrial life along its banks. Additionally, it will allow conservation efforts. In this presentation we hope to showcase different human impacts, continuous testing for the rest of the sampling rounds. Within each index, average values that are followed with the same letter are not significantly different from each other (P > 0.05). Species diversity index used was the Shannon-Wiener diversity index.

• Species richness and percentage of tolerant fish species were found to be different between sites. Species richness increased from site 1 to site 3 and then decreased to site 6. The highest percentage of tolerant species were found at site 2. This has conservation implications as sites 1 and 2 are in highly urban areas. Site 2 is around many McMaster lead conservation efforts including the Lot M buffer and the proposed McMarsh.

• There were no significant differences between sites for species diversity, and number of native species.

• No brook trout (Salvelinus fontinalis) were caught at any of the sites. Brook trout was included because this species is frequently used as water quality and stream habitat indicator with greater abundance being an indicator for better water.

Water Quality Analysis

Figure 7: Depicted is the average dissolved oxygen percentage of all weeks for the course of the 2015 season for Ancaster Creek. These box and whisker plots show a slight decrease in dissolved oxygen percentage as you move upstream from site 1 towards site 6. Site CD was an outlier that had the lowest dissolved oxygen percentage, which supports field observations of stagnant water and algal growth. The first six weeks of data were removed due to faulty equipment.

Figure 8: Depicted is the average pH of all sites every week for the 2016 season. These box and whisker plots show a decreasing pH over the course of the 2016 season for Ancaster Creek.

Figure 9: Depicted is the average temperature of all sites every week for the 2016 season. These box and whisker plots show an increasing trend of the temperature of Ancaster Creek over the course of the summer season.

Fish Analysis

Total Number Natives
Presence of Brook Trout
Percentage Intolerant Species
Species Diversity

Site 1 Site 2 Site 3 Site 4 Site 5 Site 6
6 7.41 8.5 9.1 7.4 1.41 9.0 0.5 0.71 0.71
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
5.6 0.71 0.5 0.4 0.5 0.5 0.71 0.71
Table 1: Different indices tested at each of the 5 sites using data collected from electrofishing rounds. Within each index, average values that are followed with the same letter are not significantly different from each other (P > 0.05). Species diversity index used was the Shannon-Wiener diversity index.

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Methods

Electrofishing

Five of the six 100 meter sites were fully surveyed once over the course of the 2015 season and twice over the course of the 2016 season. The Hamilton Conservation Authority performed the electrofishing with a team of research assistants. Standard electrofishing gear was used and all safety measures were taken for both the crew and fish involved. Collected fish were measured, weighed and released. A sample of each new species was fixed in formalin then preserved in ethanol.

Water Quality

In 2015, five sites (S1,S2,S3,S4,S6) were sampled once a week using in-field water quality equipment whereas in 2016, 8 sites (S1,S2,S3,S4,S5,S6,CD,CDS) were sampled weekly and an additional 3 sites (CA,CS & CM) were sampled every other week. Field water quality equipment consisted of the YSI (model 556 MS) and the Turner AquaFluor fluorometer/turbidity meter. The YSI was used to measure conductivity (us/cm), dissolved oxygen (DO%), pH, and temperature (Co) while the fluorometer/turbidity meter was used to measure light attenuation (cm2), dissolved oxygen (DO%), pH, and temperature (Co) while the fluorometer/turbidity meter was used to measure light attenuation.

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Results

Future Steps

1. That this research continues over the span of the next few years until a complete species list has been formed, creating a significant baseline.

2. After a full species list has been documented, a follow up project should be ran every five years, to document any species deviation from the baseline.

3. This project may serve as monitoring for the “Lot M” restoration project and bioswale installation.

4. This project may serve as key information in the formation of a McMaster Marsh in the lot M area.

5. This data will be open to the public and may be used in local conservation efforts as well as any other future research in the area.

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Royal Botanical Gardens:
Colin Chapman and Nadia Cavallin


Site Overview

11 sites were chosen for water quality testing to sample different areas of the creek where different impacts depending on location. 5 sites were chosen for continuous testing for the rest of our sampling rounds. This project may serve as key information in the formation of a McMaster Marsh in the lot M area.

This data will be open to the public and may be used in local conservation efforts as well as any other future research in the area.

Figure 11: Aerial view map of all the sites along Ancaster Creek

Figure 12: Depicted is the average temperature of all sites every week for the 2016 season. These box and whisker plots show an increasing trend of the temperature of Ancaster Creek over the course of the summer season.