Effects on Macrophyte & Macroinvertebrate Abundance Due to Eurasian Milfoil Treatments in Cazenovia Lake

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INTRODUCTION:

Eurasian watermilfoil, *Myriophyllum spicatum*, has a large presence in our lakes as an invasive freshwater plant. The species has quickly spread and creates dense stands that then compete with and crowd out native plants. Cazenovia Lake has been undergoing treatment to combat and control the plant. Renovate OTF™, with the active chemical Triclopyr, is being used as a treatment to combat the Eurasian watermilfoil. This chemical has been known to be toxic to aquatic insects and control plant growth. According to Maloney, multiple macroinvertebrate taxa were seen to have been affected over time from treatments of triclopyr (1995).

We observed samples from treated & non-treated areas of the lake to determine if there are any possible effects from the treatment on macroinvertebrates and macrophytes within the lake.

Hypothesis: Overall, we expected to see a decline in the abundance and diversity of macrophytes and macroinvertebrates due to the treatment. In particular, we expected to see less density of Eurasian watermilfoil and other susceptible plant species in the lake

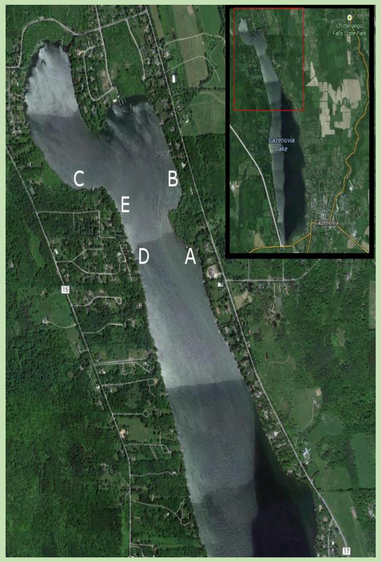
Dragonfly naiad

Midge Larvae

Bivalves

Methods:

Macrophytes and invertebrates were sampled from a total of five sites: two from areas treated in 2014 (Site A & B), two treated in 2012 (Sites C and D), and one that was untreated. Macrophytes were gathered using a rake and quadrat at a depth of one meter. Each sample was sorted by taxa and dry massed to find relative abundances. Macroinvertebrates were collected at each site by using a petite ponar and removing them from collected macrophytes.



Results:

Site A + B – 2014 Treatment
Site C + D – 2012 Treatment
Site E - Untreated

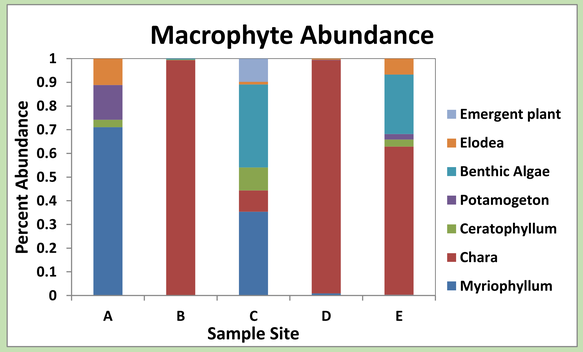


Figure 1. Macrophyte (water plant) relative abundance per site on a 0 to 1 scale; 1 is entirely that plant.

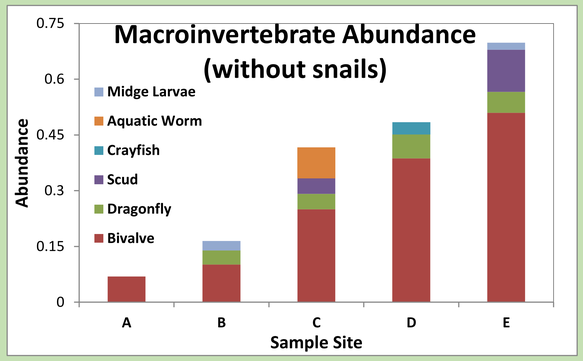


Figure 2. Macroinvertebrate relative abundance per site on a 0 to 1 scale. Snails are not included because they were the majority in most sites and make up the remaining values.

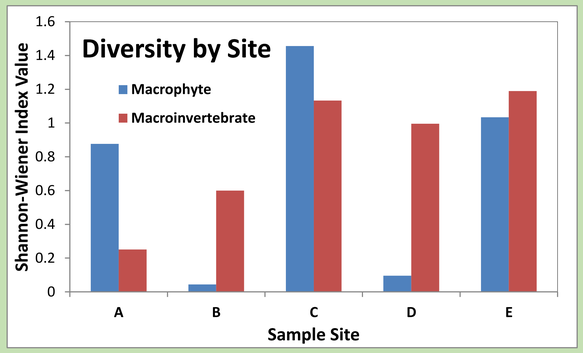


Figure 3. Diversity of both macrophytes and macroinvertebrates by site using a Shannon-Wiener indices. Higher index values denote greater biodiversity.

Discussion:

Macrophytes

- No clear relationship between treatment and both abundance of any plant taxa and diversity (Figures 1 and 3); this may be due to the selective treatment of problem sites
- Milfoil was not removed by the treatment this year at site A and seems to have returned after two years at site C (Figure 1)

Macroinvertebrates

- Treatments seem to cause a community shift favoring snails, but selecting against bivalves (Figure 2); this may be good if invasive Zebra mussels (a species of bivalve) are in high abundances
- Possible relationship between time since treatment and diversity (Figure 3), but it is hard to tell without much larger sample sizes

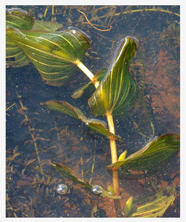
Conclusion:

Triclopyr treatment does not appear to have a lasting effect on the macrophyte community. However, there was an observed change in the macroinvertebrate community.

We believe that the best course of action is not to implement the application of the treatment. Our results show that triclopyr treatment is not effective for milfoil control, but does affect a wide range of invertebrates.

Eurasion Watermilfoil

Chara



Potamogeton

Acknowledgments:

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Citations:

Kreutzweiser DP, Holmes SB, Eichenberg DC. 1994. Influence of exposure duration on the toxicity of triclopyr ester to fish and aquatic insects. Arch. Environ. Contam. Toxicol. 26: 124-129.

Maloney RF. 1995. Effect of the herbicide triclopyr on the abundance and species composition of benthic aquatic macroinvertebrates in the Ahuriri River, New Zealand. New Zealand Journal of Marine and Freshwater Research.. 29(4): 505-515.