



Using Benthic Macroinvertebrate Populations to Assess Campus Impacts on Little Niagara Creek

Biology ❖ University of Wisconsin-Eau Claire

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Introduction

Are students destroying Little Niagara Creek?

This stream is a great resource for the UWEC science classes and is used for many field labs and research projects. But is this heavy use damaging the stream and the populations of benthic macroinvertebrates that live there?

Biological diversity is critical for the healthy functioning of all ecosystems, and richness and diversity of stream organisms, particularly macroinvertebrates, are important indicators of a stream's overall health (Voshell & Bartlett 2002).

By sampling macroinvertebrates in Little Niagara at sites before, within, and after campus, we aimed to analyze the health and state of this stream, and ultimately, the effects of campus usage on this valuable UWEC resource.



Students sampling a section of Little Niagara Creek for a biology class.

Methods:

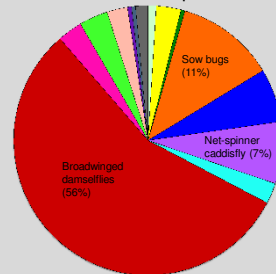
- ❖ D-frame kick nets were used to sample sections of Little Niagara Creek before, within and after campus. Three, 2-minute samples were taken in each section.
- ❖ Collected macroinvertebrates were preserved in 70% ethanol and then sorted, identified and counted in the lab.
- ❖ Statistical analyses were conducted using one-way ANOVAs to test the effect of stream location on species richness and organism abundance.



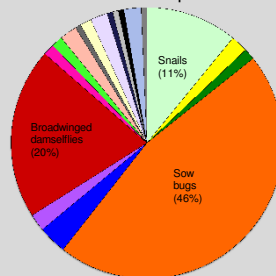
The three sampling sites on Little Niagara Creek (Goggle Earth image)

Results

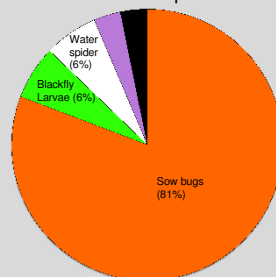
Before Campus



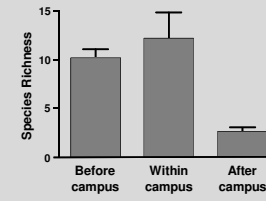
Within Campus



After Campus

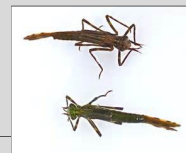


Community composition of benthic macroinvertebrates in Little Niagara Creek. Each species is indicated by a different color, and the size of the wedge represents the percent abundance. The three most abundant species at each site are listed.

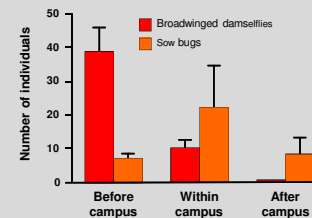


Species richness differed among the three stream locations ($F = 10.17$; $P = 0.012$). It was highest before and within campus, and lowest after campus.

Broadwinged Damselfly



Sow Bug



Different species dominated at each location. Before campus, Broadwinged damselflies made up 56% of all individuals collected, but within and after campus, Sow bugs were most abundant at 46% and 83%, respectively.

Discussion

- ❖ Our results suggest that student and class activities on campus do not have adverse effects on Little Niagara stream health. This is good news for the UWEC science departments!
- ❖ The lower richness seen after campus may be a consequence of the lack of riparian vegetation found there. Before and within campus, the stream is surrounded by tall grasses that lean into the water and provide habitat for Broadwinged Damselflies. After campus, the banks are bare, lack grasses, and the streambed has no aquatic plants.
- ❖ These differences correspond to the changes in species richness, suggesting habitat, not campus usage, is largely responsible for the composition of Little Niagara's macroinvertebrate populations.
- ❖ Although species richness within the campus is quite high, sow bugs, a species tolerant to pollution, dominated the assemblage. Also, the abundance of several species within the campus section was quite low, indicating lower evenness in the assemblage. This lack of evenness and dominance of a pollution-tolerant species suggests that the stream is not functioning at an optimal level and could be improved.



The abundant aquatic plants on the streambed within campus.

References

Voshell, J. and Bartlett, A. (2002). A Guide to Common Freshwater Invertebrates of North America. McDonald & Woodward Publishing Company. 456 p.

Invertebrate Images:

Sow bug: <http://www.bing.com/images>

Broadwinged Damselfly: <http://aquaticinsectsofcentralvirginia.blogspot.com>

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