

Sampling in the lower Niagara River

Remote sensing plays an important role in our everyday life. It's used in GPS navigation, air traffic control, and observing large-scale algae blooms in the Great Lakes. But how can remote sensing be applied to understanding the benthic invertebrate community distribution in the Niagara River?

To answer this question, scientists from the Great Lakes Center received a three year grant from the Ecological Greenway Fund to study the **benthic invertebrate community composition in the lower Niagara River**. Using side scan sonar images obtained from the U.S. Fish & Wildlife Service together with video and sediment data, different types of bottom substrates were classified to create benthic habitat maps for the entire lower Niagara River. Then, benthic samples from each substrate were taken to assess the diversity and structure of the benthic invertebrate community. The results of this study will help to assess valuable habitats for conservation and identify critical habitats as feeding grounds for higher trophic levels. For instance, the occurrence of threatened lake sturgeon (*Acipenser fulvescens*) in some parts of lower Niagara River might be related to more abundant food resources in these areas.



Knut Mehler collecting benthic samples from the lower Niagara River (left). Common substrate and associated benthic fauna from lower Niagara River (above).

In total, 257 sites were chosen along the lower Niagara River based on the habitat map and sampled throughout July and August with 124 benthic samples obtained. Additionally, 80 videos were taken and analyzed to describe the substrate in areas which could not be sampled due to strong currents or rocky substrates. 60 sediment samples were taken to determine the grain size distribution and the organic matter content of the substrate

as both variables effect the invertebrate community.

"It's a great study for two reasons," says Knut Mehler, Research Scientist at the Great Lakes Center. "First, it uses an interdisciplinary approach that draws from many different fields and second, it proves that remote sensing can be an important tool in benthic ecology."

Lower Niagara Sturgeon Study Gets Going

by Eric Bruestle

Your first encounter with the largest freshwater fish in North America is quite an experience. Adult lake sturgeon (*Acipenser fulvescens*) can reach up to 2 m in length and live up to 150 years. It is hard not to feel deep respect for a fish that has a longer lifespan than all of us. However, lake sturgeon populations sizes are just of a small fraction of what they were historically. An ongoing study by the Great Lakes Center and the U.S. Fish & Wildlife Service (USFWS) is examining the movement patterns and diet of the recovering **lake sturgeon population in the lower Niagara River**.

This study, funded by the Niagara Greenway Ecological Fund, utilizes acoustic telemetry technology to identify critical habitats and diet analysis to determine the prey base vital to this recovery. Findings from this study will inform future conservation efforts to preserve these resources. This summer, researchers



Grad student Eric Bruestle with a lake sturgeon about to be released after tagging (above) and during surgery (right).

under Dimitry Gorsky from USFWS have tagged 30 adult lake sturgeon with acoustic transmitters. These tags emit ultrasonic pulses that are detected by 39 stationary passive receivers that have been strategically deployed throughout the lower river and at the mouth of Lake Ontario. The acoustic array tracks the movements of sturgeon up and down the river, identifies areas where they spend the majority of their time, and documents when sturgeon exit the river for Lake Ontario.

Another part of this study is to describe diet of lake sturgeon and identify important prey



items using stomach content analysis and stable isotope analysis. These two techniques, when used in conjunction, can recreate the short and long term diet history of lake sturgeon. So far, 34 stomach samples and over 100 stable isotope samples have been collected.

Once thought to be on the road to extinction, the lake sturgeon is making a remarkable recovery. By furthering our understanding of this recovery we help ensure that future generations have their shot at meeting a lake sturgeon face to face. •