

REC'D DEC 10 1996

RE: Summary of TNC work on Northern Lake Huron BioReserve

## 1. Qualitative Assessment of Results

### INTRODUCTION

Considering the perturbations that the Great Lakes are exposed to, such as suspended sediments and pollutants (Krieger, 1992), the need for conservation of endemic species of animals and plants and the ecosystems that provide habitat is imperative. Great Lakes marshes are the third most biologically productive ecosystems in the world, trailing rain forest and salt water marshes (TNC, 1993).

Invertebrates provide an important role in the transfer of energy to many waterfowl and fish species. In the 1960s and 1970s, wildlife workers discovered that insects were important waterfowl food (Batzer and Wissinger, 1996), due to their high biomass and secondary productivity (Bataille and Baldassarre, 1993). Moreover, the Great Lakes contain about 200 species of fish; 90% of these species are directly or indirectly dependent on wetlands during some portion of their life cycle (Whillans, 1990). Fish utilize the Great Lakes Coastal wetlands to provide both food and shelter for early life stages (Goodyear et al., 1982). In addition, many invertebrate taxa that fish prey upon most heavily are also important in the diets of migratory waterfowl. Conversely, the knowledge of taxa of macroinvertebrates present in wetlands is vastly understudied (Kreiger, 1992), though the data base has been growing steadily since the mid 1980's.

Functional feeding group analysis is a useful tool to estimate the quality of an aquatic ecosystem, because it focuses on linkages between food resources and the special adaptations for the acquisition of these resources. Desirable ecosystem conditions are most often judged against historical standards as chronicled by the condition of particular groups of organisms, such as macroinvertebrates. In Prentiss Bay, a historical standard needs to be created. Various indices in similar marsh habitats require further testing and refining to address the effects of pollution on wetlands. Most of these indices are based on taxa richness rather than trophic interactions. These will be used as a reference for Prentiss Bay and its invertebrate community (Brady, 1992; Ohio EPA 1988; Merritt and Cummins, 1996a).

### OBJECTIVES

The intent of the study is to add information to the growing data base of macroinvertebrates in freshwater wetlands. Specific objectives include:

- Determine the diversity of aquatic macroinvertebrates present in the Prentiss Bay marsh community.
- Provide a functional analysis of marsh macroinvertebrate community structure.
- Determine community dynamics on a seasonal basis.

The taxa will be keyed down to the lowest taxonomic level possible. Also, the functional group ratios will be used as an indicator of the health of the marsh and for future studies (Cummins and Wilzbach, 1985b).

## METHODS

Samples were collected from a fixed transect that extended approximately 100 meters into the water at a maximum depth of 1.5 meters. Benthic macroinvertebrates were randomly sampled each month with a D-frame aquatic sweep net (500  $\mu\text{m}$  mesh size). Functional feeding groups were assigned according to mouth part morphology and means of food acquisition. Various functional group ratios were calculated to make assessments of ecosystem attributes.

## RESULTS AND DISCUSSION

Site 1 can be characterized as having a largely peat depositional substrate for the entire sampling transect, with dense vegetation consisting of stands of *Typha*, *Sagittaria*, *Nuphar*, and species of *Potamogeton* and *Scripus*. As one would expect with the abundance of vegetation, shredder populations were well represented and fairly constant during June through September except for the decrease in July. The decrease was most likely due to the emergence of spring-shredder species during this time period. Collectors, having an abundant food resource and represented mainly by chironomid filterers and gatherers, were lowest in June but peaked during the summer and remained high in late summer and fall. Scrapers saw a similar decrease in July as did the shredders, probably representing an emergence period for this functional group during this time. Predators were fairly uniform in composition throughout the entire sampling period.

In contrast to Site 1, which gradually increased in depth with distance from shore, Site 2 had a sharp degrading slope with significant wave action representing an erosional shoreline in many respects. The shoreline was composed of sandy substrate containing some large flat rocks near shore. As one moved away from the shoreline, hardstem bulrush dominated the vegetation in this area. Although shredders were present in June and July at this site, the peak numbers occurred in August rather than in June at Site 1. Collecting and filtering midges were well represented at Site 2 and appeared to have an emergence period in August. As with Site 1, predators also were fairly uniform in composition at Site 2 throughout the sampling period.

When we calculated functional group ratios representing habit type,

they showed that Site 1 had a greater proportion of invertebrate sprawlers as a proportion of clingers + burrowers + swimmers than Site 2. In making assessments of ecosystem attributes, the ratio of invertebrates with more exposed habits (sprawlers) compared to those of less exposed habits (burrowers) indicated that at Site 1 a potentially better food supply was available for wading birds and benthic feeding fish than at Site 2.

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### 3. How did coordination enrich your work?

Coordination among different universities and projects in the Lake Huron project has definitely enriched our work. It provided us with information on different research projects that were ongoing along with ours and enabled us to cooperate with other graduate students and faculty on these projects. It also saved us time in the duplication of effort in monitoring data which was required by all those conducting research on the different marshes. For example, from the botanists working on the marshes, we now have important information on plant species that aquatic insects colonize in the marsh during the spring and summer, and they have access to the insect data that we have collected, if needed. I also think that the cooperation among different groups working on the Northern Lake Huron project has stimulated working relationships and interactions among faculty, students, and TNC personnel that never would have come about otherwise.

### 4. Did the relationship with TNC further your work?

We feel the the relationship with TNC has been very positive and stimulated the research on the Lake Huron project in several ways. First, by providing some funding for graduates students, it has enabled us to direct a project for a student or group of students with a common goal. They all work together and are able to partition out different aspects of the study. Second, the TNC has served as the facilitator in getting people together with busy schedules and helped with guidance and communication among groups, which is always difficult when different universities and government organizations are involved. Third, the TNC has coordinated the housing, boat rentals, and other logistics which often takes the most time on a project.