A Study of the Macrobenthos of the Eulittoral Zone of Otsego Lake

Elizabeth Wheat*

This study was done to monitor the eulittoral benthic biodiversity in Otsego Lake. Collection of these samples was done by sectioning shoreline into areas approximately 15 meters in length along the air/water interface (eulittoral) and gathering as many different kinds of organisms as possible. After collecting the specimens, they were brought back to the laboratory, preserved, weighed, and later classified taxonomically. This study is one of several that were conducted at the field station in 1993 to study changes that have occurred and to gather data by which to assess changes that may occur in the future.

INTRODUCTION

The eulittoral zone in Otsego Lake was sampled for benthic organisms in 1968 (Harman, et. al., 1980). From that work we know the types of animals that were present in the lake at that time. A lake that has maintained its biodiversity and water quality is a lake that is better equipped to handle the stresses of foreign invasions and human use. By repeating portions of the 1968 study we can determine if Otsego Lake has maintained its "original" biodiversity, how certain areas have reacted to the introduction of exotic species, and what areas are in danger of losing native species.

MATERIALS AND METHODS

In order to make "qualitative" samples, specimens were collected by gathering all the living organisms in areas 15 m long along the shoreline for a constant period of time (normally 15 minutes). The specimens were then brought back to the laboratory where they were fixed by immersion in boiling water. The specimens were then put into vials filled with alcohol, classified taxonomically using Pennak (1989), Thorp and Covich (1991), and Harman (1982).

We tried to duplicate the study done in 1968, however, due to time constraints we were unable to sample the same number of sites. We did sample the collection areas that best represented overall conditions on certain types of eulittoral substrates (channery, cobbles, sand, etc.). Notes on the character of the beach, the surrounding area, and other pertinent information were recorded at each site.

*NYAS High School Research Trainee, Summer 1993. Current Address: Mount Markham High School, West Winfield, N.Y.
For biomass assessment, 10 different sites were sampled quantitatively. Again, these sites were reflective of the different types of shoreline present on Otsego Lake. However, instead of sectioning off segments of the shoreline, the collections were done using a quadrat sampler. The sampler is a metal box open at both ends that is used to keep the specimens from escaping. Depending on the type of shoreline, either a 23 cm$^2$ sampler or a 0.5 m$^2$ sampler was used. After classifying these specimens, they were weighed, using electronic balances, to determine biomass. To weigh the specimens, they were removed from their individual vials and set to dry for 15 minutes. They were then weighed and placed back in the vials. We found that 15 minutes was a reasonable time for the alcohol to evaporate, without dehydrating the specimen to the point where it was rendered unrecognizable. The results are illustrated in Table 1 which shows species weight and percent biomass.

RESULTS AND DISCUSSION

From this study, it was found that the Otsego Lake eulittoral zone is dominated by high concentrations of Mollusca and Arthropoda with a lesser number of leeches (Annelida). Beaches comprised entirely of unstable cobbles, sand, or small rocks did not support diverse communities, presumably because of considerable molar action. The areas that yielded the most biodiversity were often the ones that were distant from human activity, while areas near frequently used beaches often showed a distinct lack of species. For a complete list of the taxa gathered in both the quantitative and qualitative studies please see Table 2. Figure 1 illustrates the major phyla found in the study, while Figure 2 shows the Arthropod orders.

ACKNOWLEDGMENTS

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REFERENCES


Figure 1. Dominant phyla expressed as a percentage of total biomass in quantitative samples, 1993.

- Polypheminties (0.1%)
- Arthropoda (11.0%)
- Mollusca (58.6%)
- Actinopterygii (30.2%)

Figure 2. Dominant Arthropod orders expressed as a percentage of total biomass in quantitative samples, 1993.

- Isopoda (7.52%)
- Amphipoda (1.57%)
- Diptera (19.01%)
- Trichoptera (1.11%)
- Coleoptera (0.48%)
- Odonata (0.13%)
- Ephemeroptera (0.42%)
- Hemiptera (0.01%)

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Table 1. Weights of dominant taxa in the eulittoral benthic community of Otsego Lake, Summer, 1993, based on quantitative samples (g/m²).

<table>
<thead>
<tr>
<th>Site</th>
<th>Turbellaria</th>
<th>Gastropoda</th>
<th>Oligochaeta</th>
<th>Hirudinea</th>
<th>Isopoda</th>
<th>Amphipoda</th>
<th>Diptera</th>
<th>Trichoptera</th>
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Total g/m²: 0.064 34.592251 2.942979 3.54804 4.451437 0.9244 11.19946 0.6524 0.2812 0.078 0.2468 0.007604

Percent of total weight: 0.11% 50.73% 5% 6.02% 7.51% 1.57% 18.99% 1.11% 0.68% 0.13% 0.42% 0.01%
Table 2. Taxa of eulittoral macrobenthos collected in Otsego Lake, Summer 1993.

<table>
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<th>Taxa Class</th>
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