

SECONDARY PRODUCTIVITY STUDIES: BENTHIC MACROINVERTEBRATES  
OF LAKE GEORGE

A Preliminary Study (June, 1973 - October, 1973)

A final technical report for Union Carbide Subcontract No. 3808-3  
for the Eastern Deciduous Forest Biome, IBP, Lake George Site

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ABSTRACT

The production of benthic invertebrates in Lake George is likely based on both autochthonous and allochthonous production. We determined the production of five dominant macroinvertebrates, examined their P and N content and are now examining their role in remineralizing these nutrients.

## I. INTRODUCTION

The purpose of this investigation was to determine the production of the dominant benthic macroinvertebrates based on their use of autochthonous and allochthonous materials so as to elucidate their role as nutrient rejuvenators in the Lake George ecosystem. The quantifications resulting were to be used to generate a benthic model at the Lake George - RPI site and to verify a model at the Lake Wingra site.

To accomplish our objectives a survey of various areas of the lake was undertaken and two areas were chosen as representative lake bottom communities for sampling during the year. The organisms present in each dredge sample taken were identified, counted, measured and weighed.

## II. RESULTS AND DISCUSSIONS

Table I shows the measurements taken and the results of the analysis of the benthic samples from Tea Island and Smith Bay, Lake George, New York, during July and October 1973.

A difference in total biomass between the benthic communities at Tea Island and Smith Bay is not as great as the numbers suggest because included in the Tea Island weights are the shells from seven very large snails and the dry weights of four large clams (weighed without shells) in the "others" category.

At both stations the biomass of chironomids has increased fourfold from July to October, and the actual increase is likely much greater because the rate of predation upon the population is

yet unknown.

It is too early to predict the carrying capacity of the areas under study but fluctuations in the population sizes among the groups present (asellus decreased to zero at Tea Island, while Chironomids gained 114 individuals) indicates a dynamic community

Deep water samples were also taken (26 M) and analyzed from both areas. Pisidium was found at densities of 5/ft<sup>2</sup>, but the greatest number and bulk of the biomass was Pontoporeia affinis. P. affinis accounted for over 75% of the biomass at all times in the deep waters. This is the first reported finding of P. affinis in Lake George since the 1922 reporting by Needham and Juday. They reported about 135 per M<sup>2</sup> at 23.5 M, compared to our results of 140 per M<sup>2</sup> at 26 M.

Table II shows the class-size frequency for Chironomus spp., Gammarus fasciatus and Hyaella azteca during July 1973 at the Tea Island and Smith Bay stations.

Also compared are the class size frequencies for the chironomid populations at each station, after a period of some fifteen weeks. There are two populations of Chironomids present, one Chironomus polypedilum ranges in size from 1 to 4.5 mm. Table II indicates that this population has essentially left the benthic community by fall (October). The other group, C. Tribelos sp. (from 5 mm up in size) has undergone both an increase in numbers and biomass.

Figure 1. compares graphically the Chironomid populations at Tea Island after a period of one week and again after a period

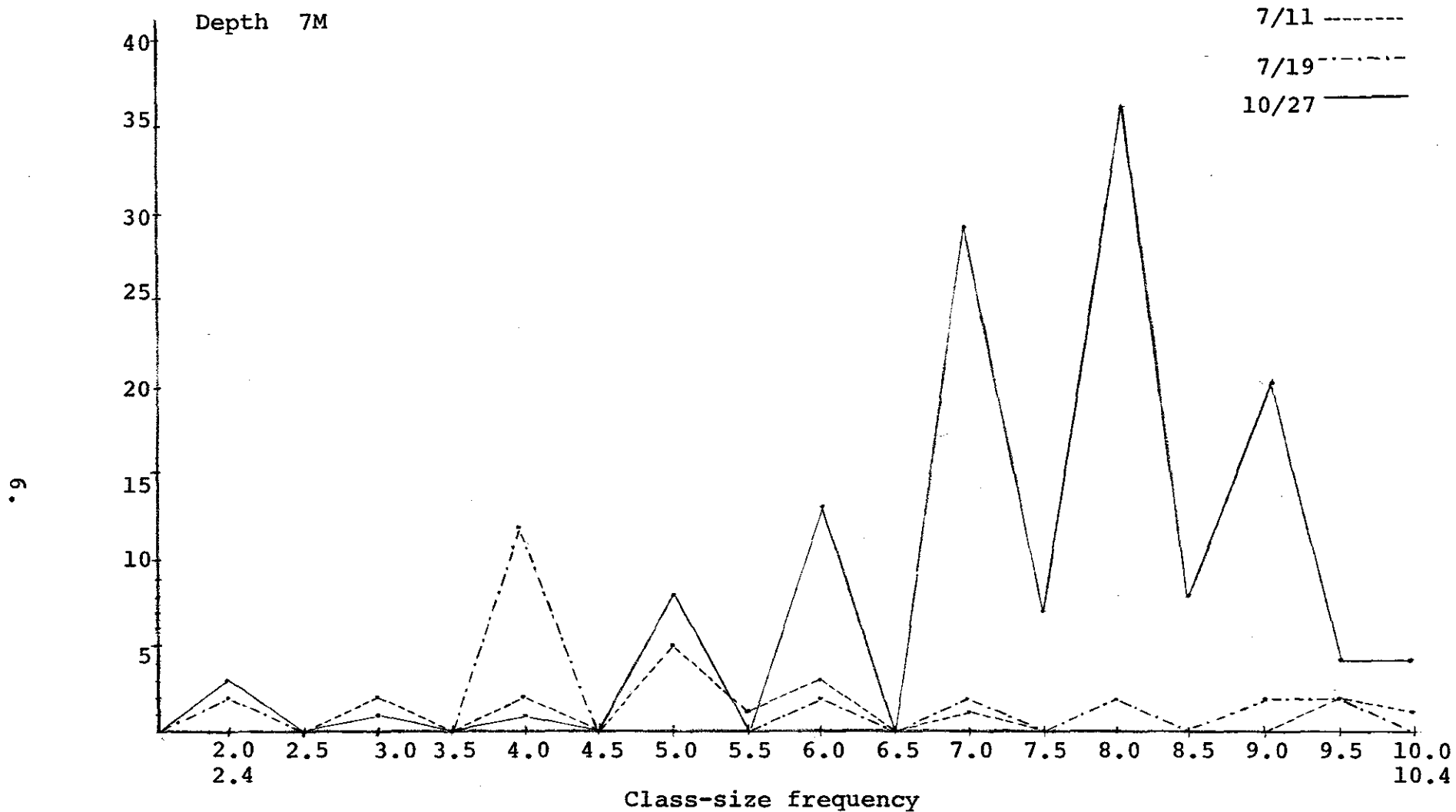


FIGURE I

A COMPARISON OF THE CLASS-SIZE FREQUENCY OCCURING IN A ONE WEEK AND FIFTEEN WEEK PERIOD FOR THE CHIRONOMOUS POPULATIONS AT TEA ISLAND, LAKE GEORGE, NEW YORK

one week and again after a period of fifteen weeks. Correlating these fluctuations with emergence, predation, reproduction and natural mortality will be possible as our lake studies continue and our tanks at the Lake George Fresh Water Institute Laboratory are observed over time.

Table III shows the percent phosphorous and nitrogen for the dominant populations present at Tea Island, 7 meters depth, on July 19, 1973. As our next set of numbers become available for comparison, then the turn-over rates of these nutrients can be examined.

While it is obvious that this summary report of a single summer's sampling cannot provide all the information desired, we believe that the basic structural work is completed and that continued sampling and measurements of the parameters we have established will fulfill all the objectives we had set.

A listing of the literature we have gathered for reading follows. When information pertinent to our findings is found it will be used and finally incorporated into the bibliography of our final paper.

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