Abstract

As the foundation of lake ecosystems, plankton have short carbon-turnover rates and are sensitive to water quality parameters. This makes them good indicators of the trophic status and ecological health of lakes. Predominant limnological data collected in 2005 (nutrients: dissolved phosphates, nitrates, and dissolved silica concentrations; salinity, temperature, total suspended solids concentrations, and secchi disk depths; and conductivity) were used to rank the trophic status of the seven central Finger Lakes (Honeoye, Canandaigua, Keuka, Seneca, Cayuga, Owasco and Skaneateles). The health of these lakes is critical to the surrounding communities because they rely on them for drinking water and as a driving force for regional tourism. This study investigated the distribution of plankton species in the Finger Lakes to determine whether seasonal distribution of the dominant taxa is consistent with the limnological data.

Methods

Horizontal and vertical (50 m deep) plankton tows were taken at two or more sites on each lake each month from mid-June to the beginning of October, 2005 and preserved in a 5-3-1 formaldehyde/water solution. Over 100 individuals (at least one individual) were identified from each sample in the lab to calculate the relative percentages of each species. The limnological data, secchi depth, nutrients (P, N and Si), chlorophyll and total suspended solids concentrations, were determined from surface and bottom water samples collected at the same sites using standard limnological techniques (Wetzel and Likens, 2000).

Location of Sample Sites

Finger Lakes - Central New York

Local Significance of the Finger Lakes

The health of these lakes is critical to the surrounding communities. Skaneateles and Seneca Lakes provide Class AA drinking water to thousands of residents. The lakes are popular for motorboating and fishing. The water bodies are a major natural resource for local recreation and sport fishing. The lakes are the major destination for local tourism. The lakes need to be healthy for the lakes and their fish to be healthy and for the lakes and fish to attract visitors. Poor water quality will result in the lakes and fish losing their value as a recreational resource.

Conclusions

Some common trends and differences in species distribution were observed among the seven lakes in this study. Limnological data were referenced to help explain these trends.

- All seven lakes show diatoms as the majority species during the late spring and early summer.
- Diatoms appear to decline in late summer/early fall and are replaced by other species.
- The lakes differed in the number of diatoms present in the beginning of the season, the rate of decline, and the specific species that emerged following the diatom decline.
- Silica concentrations appeared to increase after a drop in diatom populations, and decrease when diatom populations were high or reduced.
- Rivers made up a high percentage of plankton species during periods of diatom decline in Seneca, Cayuga and Owasco Lakes.
- Diatoms in Keuka Lake were replaced by the blue-green algae Myxocystis, which may have signaled nitrate-limiting oligotrophic conditions. Low concentrations of P and N support this suggestion. A similar surge in blue-green algae followed the decline in diatoms in Canandaigua Lake.