REPORT FOR:
MOUNT KEMBLE LAKE ASSOCIATION INC.

AQUATIC MACROPHYTE SURVEY
SEPTEMBER 11, 2006
MOUNT KEMBLE LAKE
MORRISTOWN, NJ

Allied Biological, Inc.
580 Rockport Road, Hackettstown, NJ 07840
ph (908) 850-0303 fax (908) 850-4994

I. Introduction

On September 11, 2006 Allied Biological, Inc. conducted a detailed aquatic macrophyte survey at Mount Kemble Lake. This survey is essential in order to determine the aquatic macrophytes that comprise the Mount Kemble Lake assemblage and their relative abundance and distribution.

II. Procedures

Before the survey began, random sample locations were plotted on a hand-drawn map of the lake focusing on the littoral areas. The points were aligned in transects in an effort to sample both the shoreline and open water communities. The total number of sample locations is based on the total acreage of the lake. As a rule of thumb, one sample location per acre (minimum 50 sample locations) is surveyed. If the lake is over 100 acres in size, the number of sample locations is reduced to about 100. Since every lake is different, the survey can focus on problematic locations according to the client's instructions. It should also be noted that deeper water areas (total depth greater than 15 feet) are generally not surveyed due to the lack of aquatic macrophyte growth caused by poor light penetration. The sample locations are depicted on a map at the back of this report.

Using the hand-drawn map as a guide, the survey boat is piloted to the first sample location. On arrival, the GPS coordinates of the sample location are recorded using a TeeJet Smartpad II (ver. 4.02, or equivalent), and a Midtech High Accuracy Differential Receiver (RX 400p, or equivalent). The water depth is also measured, using a boat mounted depth finder, or a Fish Ray depth gun (Aquatic Ecosystems, model FR-100, or equivalent). The water depth is recorded on a field log, and is depicted on a map. Any other pertinent field notes regarding the sample location are also recorded on a field log.

Next, a weed anchor attached to a 10 meter-long piece of rope is tossed from a random side of the boat. It is important to toss the weed anchor the full 10 meters (a loop at the end of the rope should be attached to the boat to prevent losing the anchor). The weed anchor is slowly retrieved along the bottom, and carefully hoisted into the boat. To determine the overall submersed vegetation amount, the weed mass is assigned one of five densities, based on semi-quantitative metrics developed by Cornell University (Lord, et al, 2005). These densities are: No Plants (empty anchor), Trace (one or two stems per anchor, or the amount that can be held between two fingers), Sparse (three to 10 stems, but lightly covering the anchor, or about a handful), Medium (more than 10 stems, and covering all the tines of the anchor), or Dense (entire anchor full of stems, and one has trouble getting the mass into the boat). See the appendix of this report for pictures of these representative densities. These densities are abbreviated in the field notes as 0, T, S, M, and D. Next the submersed weed mass is sorted by Genus (or species if possible) and one of the five densities (as described above) is assigned to each Genus. Finally, overall floating macrophyte density within a 10 meter diameter of the survey boat is assigned a density, as well as an estimated density for each separate genus (or species). This data is recorded in the field notes. This procedure is then repeated for the remaining sample points.

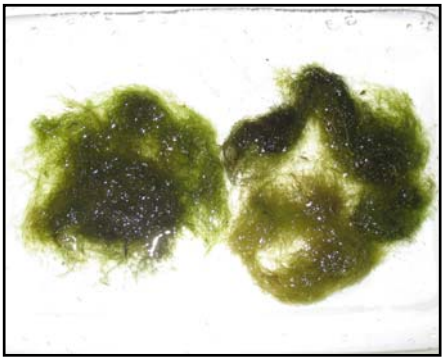
A sample of each different macrophyte is collected and placed in a bottle with a letter or number code (A, B, 1, 2, etc.). If possible, these samples should include both submersed and floating leaves (if any), seeds, and flowers (if present), to facilitate identification. These bottles are placed in a cooler stocked with blue-ice packs or ice, and returned to Allied Biological's lab for positive identification and photographing. Regionally appropriate taxonomic keys are used to identify the aquatic macrophytes (see section V for a list of references).

The weed anchor used for aquatic macrophyte surveys has a specific design. It is constructed with two 13.5-inch wide metal garden rakes attached back to back with several hose clamps. The wooden handles are removed and a 10 meter-long nylon rope is attached to the rake heads.

III. Macrophyte Summary

The following aquatic macrophytes were observed at Mount Kemble Lake on September 11, 2006. The respective plant densities are summarized on table #1 in the appendix. In addition, the distribution of each individual macrophyte is depicted on separate maps located in the appendix of this report. Below is a short description of each macrophyte and a picture.

Water Starwort (*Callitriche* sp.) are commonly found in this region. This species typically grows in shallow shoreline portions of lakes and ponds. It can be found in coves and swampy sections of lakes and ponds. This species rarely grows to nuisance densities. This aquatic species is grazed on by ducks and fish and also creates cover for young fish.



Benthic and Floating Filamentous Algae: Filamentous algae are a chain or series of similar algae cells arranged in an end to end manner. Benthic filamentous algae are attached to a hard substrate, such as logs, rocks, a lake bottom, or even other aquatic plants. When growing in heavy densities, benthic filamentous algae can appear as brown or green mats of vegetation that can reach the surface. When large pieces break off the bottom substrate they become floating filamentous algae patches. Benthic filamentous algae can comprise an entire range of morphologies, but flagellated taxa are far less common.

IV. Discussion

At the back of this report are total of 5 maps. One of these maps represent the distribution of the lone aquatic macrophyte according to species location. The remaining four maps depict sample station distribution, water depth distribution, total aquatic vegetation distribution, and total algae distribution for Mount Kemble.

A total of 89 sample locations were surveyed at Mount Kemble Lake during the September 2006 survey. The appendix of this report contains a spreadsheet summarizing the data collected at each sample point.

In addition to surveying the aquatic vegetation, water depth readings were recorded at all 89 sample locations, using a boat mounted fish finder. In the case of shallow water and/or extensive vegetation beds that would interfere with the depth finder, a pole was used to measure water depth. An average depth of 10.61 feet was calculated from these 89 measurements.

One submersed aquatic macrophyte and benthic filamentous algae were observed at Mount Kemble Lake during the September 11, 2006 survey. This species was not an invasive species. A large portion of the aquatic sample site contained no vascular plant species. The majority of these site were deeper than 10 feet. Additionally, dredging of the upper portion of the lake last spring removed a large portions of the seed bank and may have resulted in the relative lack of vascular plant growth in this lake.

Water starwort was collected at only 2 (or 2%) of the sample sites. One of the sites returned trace densities, and the other returned sparse densities each site was ~ 1% of the total sites sampled.. This species was also visible at sparse densities along the shoreline from two of the sample sites.

Benthic filamentous algae was collected at 16 (or 18%) of the locations surveyed. It was collected at 8 (or 9%) of the sites at trace density. At 8 (or 9%) of the sites surveyed, it occurred at sparse density. This species was at non-nuisance densities throughout the lake and was not even visible through the majority of the sites sampled.

V. References

Through the Looking Glass: A Field Guide to Aquatic Plants. 1999. Borman, et al. Wisconsin Lakes Partnership, University of Wisconsin-Extension. Reindl Printing, Inc. Merrill, WI.

Effective Aquatic Plant Monitoring: Data and Issues from Waneta Lake. 2005. Lord et al. Presentation at the Northeast Aquatic Plant Management Society Annual Meeting. Saratoga Springs, NY.

Appendix