



2011 Year End Report

Mount Kemble Lake Association, Inc.
Morristown, New Jersey

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Ruth Chaney
Mt. Kemble Lake Association Inc.
28 Lake Trail West
Morristown, New Jersey 07960

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Lake Management Program
Mount Kemble Lake

Summary:

The 2011 Lake Management Program for Mount Kemble Lake focused on the control of nuisance aquatic plants and algae, specifically Southern Naiad (*Najas guadalupensis*) and Variable-leaf Pondweed (*Potamogeton diversifolious*). Aquatic biologists were on site at Mount Kemble Lake in Morristown, New Jersey once every two to three weeks, May through August. The site survey included the monitoring of aquatic vegetation and algae growth, and the collection of basic water quality parameters. During each survey, biologists would analyze the lake conditions to formulate a decision for the need of herbicide or algaecide applications, and upon approval from the association, treatments were administered.

The 2011 management season was comprised of three herbicide applications targeting the growth of Southern Naiad within the shoreline and beach areas. The early season development of filamentous algae in the northern inlet area warranted one application of copper sulfate. Finally, a nutrient inactivation application was performed midsummer which significantly increased the water clarity aiding in the aesthetic appeal of the lake.

The following pages detail the lake management procedures in 2011, including detailed surveys, treatment comments from staff biologists, a discussion of conditions encountered for the previous year, and concluding with recommendations in which to proceed in the management of Mount Kemble Lake for the 2012 season.

Lake Management: Survey and Treatment Details

A total of seven site visits were completed from April to August. Surveys were conducted by boat making visual observations, water chemistry, and the use of a weed sampling anchor. Tabulated below is a full list of aquatic vegetation observed in 2011.

Table 1: Aquatic Macrophytes Observed at Mount Kemble Lake 2011:

Scientific Name	Common Name
<i>Potamogeton crispus</i>	Curlyleaf Pondweed (invasive)
<i>Najas guadalupensis</i>	Southern Naiad
<i>Chara</i>	Muskgrass
<i>Lemna valdiviana</i>	Duckweed
<i>Potamogeton diversifolius</i>	Variable-leaf Pondweed
<i>Potamogeton foliosus</i>	Leafy Pondweed

The 2011 management plan for Mount Kemble Lake was focused on the control of nuisance aquatic vegetation and algae growth. The primary areas of focus for herbicide and algaecide applications included the shallower northern inlet area, the shorelines, and the beach area. These areas encompass the littoral zone of the lake where aquatic vegetation have the greatest probability of inhabiting, and are areas of highest recreational use. Due to their shallow depth, both invasive and native plants can be a nuisance in these areas.

Early in the season the northern most end of the lake displayed a dense growth of southern naiad along with trace amounts variable leaf pondweed spread throughout. It is unusual to see dense growth of southern naiad (an annual) this early in the season. The nuisance growth of naiad and pondweeds were targeted with an application of contact aquatic herbicide Reward administered on June 22nd. Filamentous algae was observed blanketing the plant growth warranting an algaecide application utilizing copper sulfate. The survey of mid-July recorded additional growth of southern naiad within the inlet area, which required a supplemental herbicide application. For the remainder of the season no nuisance aquatic plant growth was observed in this northern portion of the lake.

The eastern and western shoreline of Mount Kemble Lake saw a varied population of plant growth including southern naiad, curlyleaf pondweed, and variable leaf pondweed. The nuisance densities of curlyleaf and variable leaf pondweed found around residential docks were controlled in June. The southern naiad was at its greatest density during the July 12th survey where sparse to moderate patches of naiad were observed around dock areas of the shoreline. This area was treated with an application of contact aquatic herbicide Reward. A focus on the beach area had minimal plant growth observed until the early portion of July. Southern naiad had grown to approximately fifteen feet off the shore warranting an herbicide application. In August the

southern naiad growth was observed to be on either side of the beach in a sparse density extending four feet into the lake basin. This was treated as the final application for the 2011 management season. While three herbicide applications for plant control may seem to be a lot, each application targeted a relatively small portion of the lake.

During the 2011 management season Mount Kemble Lake experienced clarity measurements as low as six inches of visibility. A treatment of aluminum sulfate (alum) was applied to bind phosphorus in the water column as well as within the sediment. The additional benefit of the alum application is the substantially increased water clarity. Prior to the application the recorded value of water clarity was three feet. Following the treatment the Secchi measurement displayed a ten foot value.



Photo Left. View from Lake Trail West of Mount Kemble Lake following Alum application.

Photo Right. View from Lake Trail West of Mount Kemble Lake thirteen days following application.

The table provided below displays the survey and treatment dates along with target vegetation.

Table 2. 2011 Mount Kemble Lake Herbicide and Algaecide Treatments

Date	Product Applied	Observed/ Target Plants
5/16/2011	Survey	<i>N.guadalupensis/ Lemna valdiviana</i>
6/15/2011	Copper Sulfate	<i>Filamentous Algae</i>
6/22/2011	Reward	<i>N. guadalupensis/ P. diversifolius</i>
6/30/2011	Aluminum Sulfate	<i>Nutrient Inactivation</i>
7/12/2011	Reward	<i>N. guadalupensis</i>
8/18/2011	Survey	<i>N.guadalupensis/ Lemna valdiviana</i>
8/24/2011	Reward	<i>N. guadalupensis</i>

Recommendations:

The nuisance aquatic macrophyte species observed at Mount Kemble Lake in 2011 was the growth of southern naiad. It is recommended that an application of the contact aquatic herbicide Reward (or the equivalent Redwing) be utilized in the early season for its ability to selectively control nuisance submerged vegetation by rapid absorption into the target plant. Due to the late season growth of the naiad species a supplemental application of a contact herbicide should be advised. A systemic herbicide application such as Sonar would prove effective in Mount Kemble Lake, but so little of the lake basin is littoral zone leading to the perspective that a contact herbicide would be encouraged. In addition, it is beneficial to allow certain amounts of plants to persist in the lake to provide dissolved oxygen, habitat and compete for nutrients required for nuisance plant and algae development. The growth of variable leaf pondweed (*Potamogeton diversifoliosus*) and leafy pondweed (*Potamogeton foliosus*), should be encouraged in areas of the lake such as the northern end where they are not interrupting recreational activities or reducing the aesthetic appeal of the lake.

Efforts in the restoration of Mount Kemble Lake should focus on a nutrient inactivation treatment to bind phosphorus and other suspended particles in the water column to provide a nutrient barrier over lake sediments which will reduce sediment release of phosphorus. Water quality sampling has documented elevated phosphorus in the water column which is a main nutrient source of plant and algae growth. The Alum treatment resulted in a dramatic improvement in water clarity which should last until the next significant water exchange period. This process should be considered operative on a bi-yearly basis with the next application scheduled for the 2013 lake management year. For 2012, any algae control that may be necessary could employ the new algaecide SE Clear. This copper based product will control the growth of nuisance algae and contains a water quality enhancing component designed to assimilate phosphorus released from decomposing algae cells.

Water quality monitoring allows for proactive management of the lakes' environments and reduces the opportunity for the development of problematic situations. Samples should be collected from both ends of Mt Kemble Lake at surface and near lake bottom in the deepest area for a total of three samples per sampling date. Samples should be analyzed for the normal historical parameters. In addition, Zooplankton sampling and quantification would provide insight to the forage base of the lake with respect to the fishery and will indicate the trophic state of the lake. Water quality monitoring should to be continued on a regular yearly basis over the long-term for greatest analytical results.

We at Allied Biological genuinely appreciate the opportunity to assist in the lake management efforts at Mount Kemble Lake and look forward to being of service for the 2012 season.

Sincerely,

Joshua Burns
Biologist
580 Rockport Road
Hackettstown, NJ 07840
Phone: 908-850-0303
Fax: 908-850-4994
www.alliedbiological.com