Lake Management Consultants
Experts in
Aquatic Vegetation Control

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December 15, 2016

Scott Meade
149 Cedar Lake East
Denville, New Jersey 07834

Dear Mr. Meade:

Re: Cedar Lake
2016-Year End Report

The following report addresses the 2016 lake management program that was conducted by Aquatic Technologies Inc. Aquatic Technologies Inc. has been hired by Cedar Lake POA to provide lake management and aquatic vegetation control since 1996. The items addressed in this report include the following:

1) Introduction
2) Overview of 2016 Lake Management Program
3) Recommendations
4) Summary

INTRODUCTION

Aquatic Technologies, Inc. provided consultative service from the initial survey and application until the end of the growing season. Aquatic Technologies Inc. monitored the lake to assure proper vegetation control and effective lake management strategies. Service calls included a complete survey of the vegetation growth throughout the lake body and shoreline.

In addition, during site visits, Aquatic Technologies, Inc. analyzed the following parameters:

A) Dissolved Oxygen
B) Temperature
C) Secchi (water clarity)

Based on observations and the data collected, Aquatic Technologies, Inc. determined the areas of concern and addressed each concern with either recommendations and/or herbicide applications.

During the course of the growing season, Aquatic Technologies, Inc. observed the following species of nuisance aquatic vegetation in Cedar Lake:

- Curly-Leaf Pondweed – *moderate growth*
- Eurasian Milfoil- *moderate growth*
- Waterlily
- Watershield
- Naiad Species – *minor growth*
- Pondweed Species *(Clasping Leaf, Large Leaf, Sago, Flat-Stem and Narrow Leaf Pondweeds). - moderate/heavy growth*
- Bladderwort (Utricularia *sp*) moderate growth
- Cattail - *minor growth*
- Pithophora algae- *blue green algae*
- Cladophora- *blue green algae*
- Lyngbya algae – *blue green algae*
- Spirogyra algae- *green algae*

# 2016 LAKE MANAGEMENT PROGRAM SUMMARY

The 2016 aquatic vegetation management program utilized the "Integrated" approach of using Contact/Systemic products. Sonar (Systemic product) was incorporated as the primary herbicide. It was used for the control of the primary targeted vegetation- Curly-Leaf Pondweed, Eurasian Water Milfoil and Naiads. It is also the primary tool utilized in nuisance invasive plant control without damaging desirable native plants. It allowed for the reintroduction of the native species. The select and specific use of Sonar, also allowed for the growth of the desired Naiad populations along the lake bottom. With controlled concentration and product adjustments to the Sonar rates and application techniques, Aquatic Technologies manipulated the program to allow for the populations of the Naiad Species to grow within the deep waters and further controlled Naiad populations along the shallows.

The "Integrated" approach use of contact herbicides was limited to small areas of the lake. During the late summer, the minor populations of nuisance Naiad populations appeared in the shallows of the North and South coves. During this time, control techniques were implemented and the plants were controlled. Timing of these spot applications were in conjunction and authorization of the Board.

It should be noted that these Native Pondweeds (*Potamogeton species*) and Naiad populations "DID NOT" reach the historical nuisance levels, as seen in 2010-2014. Furthermore, the populations "DID NOT" require multiple management applications to reduce nuisance populations, as experienced over the past few years.

The 2016 Integrated-Sonar program reduced the potential for filamentous and planktonic algal blooms throughout the lake. The lake experienced minor algae blooms in July and August in the northern and southern coves. The algaecide treatments controlled the growth and follow-up treatments were also applied to further control any nuisance population growth. It must be noted the vast decrease in algae populations within the 2016 Season compared to the 2010-2014 seasons. This correlation is a clear function of the Sonar's ability to control the plants and decrease the amount of Biomass decomposing within the lake. This decrease in biomass directly correlates to the decrease in nutrients cycling within the water column during the mid summer – therefore decreasing the potential for the algae populations.

The Integrated program also included shoreline emergent vegetation control. Spot treatment were initiated to control and limit the growth of the Lily, Cattail and Phragmyties populations, which reached nuisance levels along spot specific areas of the shorelines. These applications were all approved by the Board to help control those nuisance populations along resident waterfronts.

It must be noted that during the 2016 season, the lake experienced the growth of green planktonic algae later in the growing season. This is extremely beneficial for the water quality and for the micro/macro-invertebrates with the lake. This benefit to these invertebrate populations will directly improve the food chain for the fisheries.

For the eighth year in a row, the lake experienced a decline in the snail population within the ecosystem. This decline is likely attributed to the natural population crash of the snail community or the lakes inability to sustain the current population. Only further investigation can determine the facts of the situation.

The 2016 program continued to allow for the re-establishment of native aquatic plants. Observed was the growth of Naiads and Chara, as well as the re-establishment of *Potamogeton pectinatus* (Sago pondweed) and (*Potamogeton amplifoius*) Large-Leaf Pondweeds. 2016 also observed the 'control' of the non-native Eurasian Water Milfoil, Bladderwort, Coontail and native Elodea populations. These plants caused minor nuisance levels and can be detrimental to the native plant population. Aquatic Technologies will continue to monitor the growth of these populations and spot control if necessary.

2016 RECOMMENDATIONS

Based on our findings since 1996. Aquatic Technologies presents the following recommendations for your consideration:

A) Continue the "Integrated" Contract/Systemic-Sonar Program"- (*Proactive Management Technique*) for the control of rooted aquatic vegetation and assure proper vegetation management. Highly recommended by A.T.

B) Continue the split application of Fluridone to work in conjunction with the water level criteria and the proscribed concentration of Fluridone in the water column.

C) Continue the split sonar-monitoring schedule in order to maintain an effective lake management program and vegetation control.

D) Incorporate a selective management program, for small populations of nuisance aquatic vegetation.

E) Continue the selective management of nuisance shoreline emergent vegetation, i.e. Phragmites and Cattails.

F) Continue to improve communications between lake association contacts, Princeton Hydro and A.T. to expedite the services and management techniques.

G) Treatments should be authorized quickly to achieve the control of the targeted plants, thus not allowing the plants to cause nuisance populations and/or possible nuisance algal stands.

H) Continue to spot-treat the lagoon for emergent vegetation and limit these populations of emergent vegetation. Management of these populations will improve the overall value of the lagoon.

I) Recommend the incorporating of a Hydroraking Program for the Lagoon and shallows to remove unwanted organics and nuisance aquatic vegetation, thus begin to remediate the lagoon area.

J) Establish a program to remove the debris (fallen trees, branches and organics) along the spot specific shorelines areas (i.e. western shoreline, coves and beach areas)

K) Monitor the Bladderwort population, and selectively manage if nuisance populations are observed.

L) Continue to incorporate an early algaecide application to the lake to deter any aggressive growth of the mid season algal bloom, (if required).

M) AT will file the NJDEP permit in February/March. NJDEP early permit approval allows for the lake treatments and monitoring to begin prior to excessive nuisance vegetation growth and thus achieve a successful vegetation control program.

Over the past 20 years, Aquatic Technologies thanks the Cedar Lake Board for their business relationship and Aquatic Technologies Inc. looks forward to the continued successful consultative lake management program.

Should you have any questions or comments regarding this report, please feel free to contact us at (973) 773-9567.

Sincerely,

Christopher Hanlon
Aquatic Technologies, Inc.