SŌLITUDE
LAKE MANAGEMENT

Massapoag Lake
Aquatic Management Program
2018 Annual Summary Report
Sharon, MA 02067

Prepared For: Noah Siegel, Chairman
Sharon Lake Management Committee

Introduction

SOLitude Lake Management was contracted by the Sharon Lake Management Committee to conduct an aquatic vegetation management program at Massapoag Lake in Sharon, MA. The management program consisted of targeting invasive Fanwort (*Cabomba caroliniana*) in the 4-acre lagoon as well as completing a littoral zone vegetation survey throughout the main body of the lake. Managing the fanwort was accomplished by performing a series of herbicide treatments using the USEPA/MA DEP registered aquatic herbicide Sonar One (active ingredient: fluridone) and aquatic herbicide Sonar Genesis (active ingredient: fluridone). All management activities were consistent with the Order of Conditions, and the License to Apply Chemicals issued by the MA DEP – Office of Watershed Management (#18355). An outline of the 2018 program, along with our recommendations for ongoing management follow.

Project Task	Date Performed
File MA DEP pesticide use permit	July 16th
Received approved MA DEP pesticide use permit	July 18th
Performed pre-treatment vegetation survey of the lagoon	July 19th
Performed initial herbicide treatment in lagoon	July 19th
Conducted booster herbicide treatment in lagoon	August 24th
Completed littoral vegetative survey of main body of water	August 24th
Completed post-treatment survey of the lagoon	September 13th

Pre-treatment Survey

On July 19th, a SOLitude Lake Management Biologist performed a pre-treatment vegetation survey of Massapoag Lake's 4-acre lagoon. The survey was accomplished by using a jon boat to navigate around the treatment area to record visible observations of plant growth. In areas where the submersed vegetation could not be seen (either due to depth or algae surface cover), a specialized throw rake was used. The intent of the inspection was to document dominant vegetation growth during pre-treatment conditions in order to have a baseline by which to evaluate the efficacy of the herbicide treatment, gauge non-target impacts, if any, and assess future management needs and/or necessary program modifications. During this survey, it is noted that the treatment area was about 80-90% topped out with fanwort. Throughout the fanwort were sparse populations of variable milfoil (*Myriophyllum heterophyllum*). There were also areas of dense waterlilies throughout roughly 60% of the pond. Lastly, a sparse density of duckweed was observed around the shoreline. A list of the dominant plant species and relative abundance[1] is provided below.

Dominant Plants	Relative Abundance
▪ **White water lily (*Nymphaea odorata*)**	Dense – Scattered throughout the pond in dense populations, especially in the northern/eastern portions of the lagoon
▪ **Yellow water lily (*Nuphar lutea*)**	Dense – Scattered throughout the pond in dense populations, especially in the northern/eastern portions of the lagoon
▪ **Variable Milfoil (*Myriophyllum heterophyllum*)**	Sparse/Moderate – Scattered throughout the fanwort
▪ **Fanwort (*Cabomba Caroliniana*)**	Dense– Dense patches throughout the lagoon
▪ **Duckweed (*Lemnoideae*)**	Sparse – Growing around the shoreline, scattered throughout waterlilies

[1] **Relative Abundance** – This measurement is determined by using the scale of "Trace, Sparse, Moderate, and Dense". To establish a precise measurement, we define the terms as following:

Trace	Few plants on rake
Sparse	Finger full on rake
Moderate	Handful on rake
Dense	Difficult to bring rake onto boat

Treatment Program

SŌLitude Lake Management conducted an herbicide treatment to manage the invasive vegetation growth on July 19th. A follow-up booster treatment was conducted about four weeks later on August 24th. Both treatments were conducted by diluting the liquid herbicide concentrate with pond water in a 55-gallon mixing tank, onboard the treatment vessel. The solution was then evenly applied evenly to the treatment areas as a surface spray. The granular formulations were spread out evenly throughout the treatment area using a spreader. While the lagoon is 4 acres, Solitude was able to treat roughly 1.5 acres due to the shallow nature of the lagoon. Below is a table illustrating the application schedule and rates.

Herbicide Applied	Application Date	Acreage Treated
Sonar One	July 19th, August 24th	~ 1.5 acres
Sonar Genesis	July 19th, August 24th	~ 1.5 acres

Post-treatment Surveys

The post-treatment survey was conducted approximately 2-4 weeks following the herbicide application to analyze the effectiveness of the treatment. During the post-treatment survey (conducted on September 13th) it was observed that the treatment worked extremely well. There were no signs of the targeted species within the treatment area.

Massapoag Lake Survey

On August 24th, SŌLitude performed a survey of Lake Massapoag to monitor the extent of non-native species, specifically fanwort and variable milfoil. This was accomplished by completing a visual littoral survey used to determine the dominant plant assemblage at Lake Massapoag. In addition to visual observation, a throw-rake was used to sample areas where visual observation was inadequate. Lake locations were surveyed based on previous survey years; the littoral zone is confined to the shoreline, plateaus, Fletcher's Cove, and the southern end.

During the survey, it was noted that most of the vegetation growth within the lake was located in the southern cove and the lagoon. (see page 4 – vegetation assemblage map). The lagoon was 100% enclosed with waterlilies and fanwort, with a few individual milfoil stalks scattered throughout the fanwort. The most southern cove of the lake consisted of an assemblage between native and non-native species. Observed throughout the southern cove included fanwort and milfoil, along with a few species of native macrophytes: tapegrass (Vallisneria americana), clasping-leaf pondweed (*Potamogeton perfoliatus*), snailseed pondweed (*Potamogeton bicupulatus*), bladderwort (*Utricularia sp.*), marsh seedbox (*Ludwigia palustris*), ribbon-leaf pondweed (*Potamogeton epihydrus*), and a sparse patch of yellow waterlily (*Nuphar variegata*).

The remaining shoreline of the lake primarily consists of rocky substrate, which most vegetation species is unable to inhabit. There are portions of the shoreline that contain native vegetation such as Snail-seed pondweed, Ribbon-leaf pondweed, Tapegrass, Muskgrass, Waterlilies, and Watershield (see Page 4 for vegetation locations – Map Assemblage). Also observed was a patch of phragmites on the eastern shoreline – moving forward it is important to keep an eye on this population as phragmites have the ability to spread extremely fast.

Recommendations for 2019

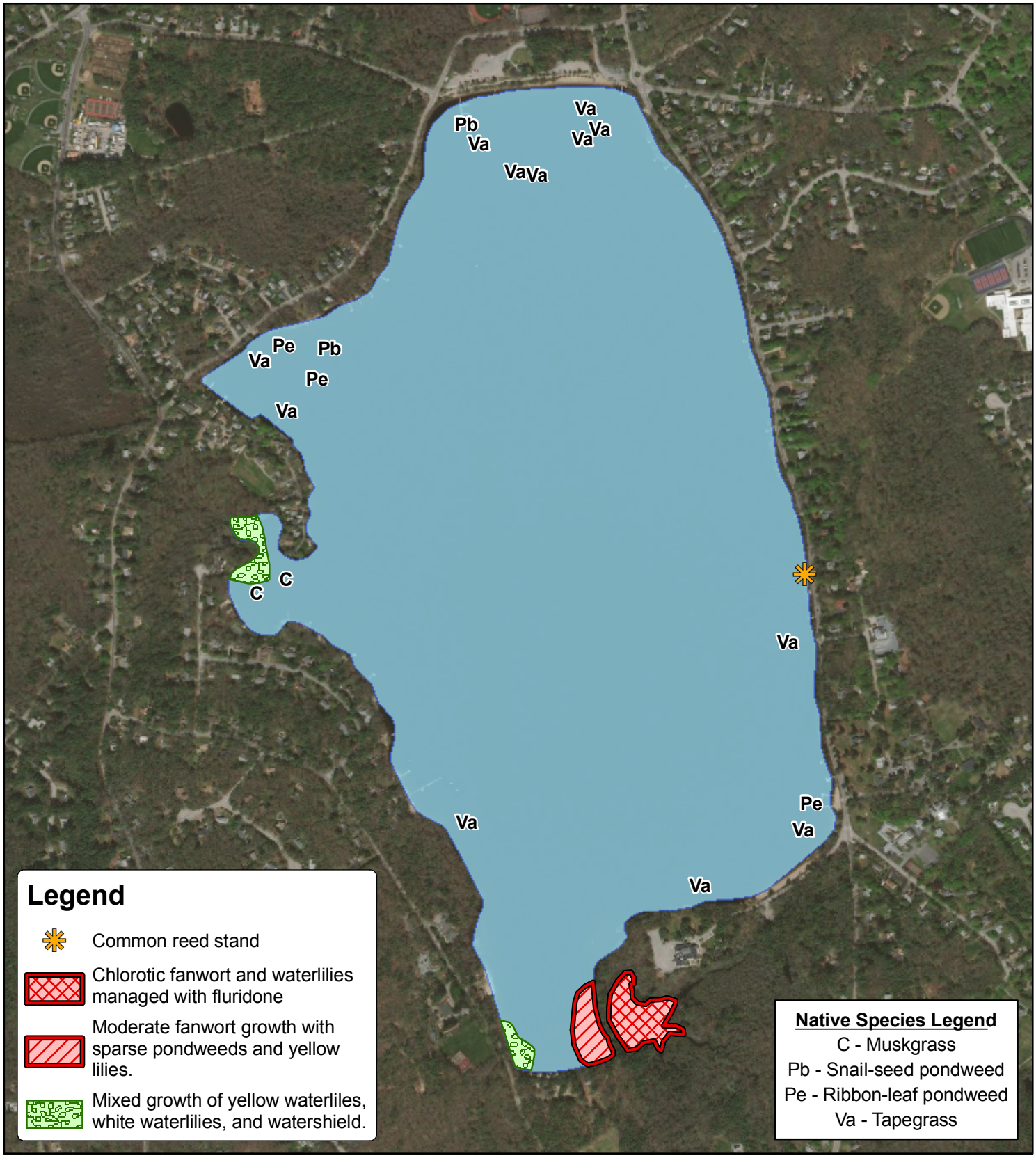
The 2018 aquatic management plan created for Massapoag Lake worked extremely well and we look to continue this aquatic program into the future management season. Although great success was achieved this year, we recommend additional modifications for future management.

- Expand the current treatment zone to manage a more extensive portion of the lake. Although the treatment worked great, we have identified other areas of invasive concern within the main body of lake.
- Monitor the phragmite population on the eastern shoreline and treat when necessary. Phragmites are a rhizomatous plant and have the ability to spread very fast.
- Maintain balanced waterlily growth through the application of AquaPro (glyphosate). By treating waterlilies every other year, a healthy balance of plants can be achieved. If left unmanaged, waterlilies will encroach on open water habitat further degrading the pond. By treating every other year, we can allow for a healthy distribution of vegetation.

We feel that our additional recommendations will help continue to enhance the lake's aesthetic, ecological and recreational value. We truly appreciate your business and look forward to working with you again next season in 2019. Please feel free to call the office with any questions or concerns!

FIGURE 1: 2018 Vegetation Assemblage

SOLITUDE
LAKE MANAGEMENT
888.480.5253
solitudelakemanagement.com



Lake Massapoag
Sharon, MA
Norfolk County
42.10334°, -71.17713°

Lake Massapoag

0 500 1,000 1,500 Feet

1:11,000

N

Map Date: 08/31/18
Prepared by: MS
Office: SHREWSBURY, MA