

March 31, 2021

TO: Freetown & Lakeville Lake District Association

FROM: Marc Bellaud, Director of Technical Services

RE: **Task 1 - Invasive Aquatic Plant Survey Report - Fall 2020**

SOLitude Lake Management was contracted in the fall of 2020 to conduct a two-phased aquatic plant survey of Long Pond to document the extent of aquatic invasive species growth and to formulate management plans.

The scope of the two surveys were defined as follows:

Task 1: October/November 2020 (completed): The lake's littoral zone was surveyed by boat using GPS technology and satellite imagery to map the overall distribution of aquatic invasive species. A GIS map of the dominant invasive species distribution was prepared.

Task 2: July/August 2021 (pending): A comprehensive survey of the lake will be performed during the peak of the growing season. Data point survey locations will be established using a random grid and GIS mapping software at a frequency of approximately 1 point per hectare squared throughout the littoral zone of the lake. An estimated 250-300 data points will be established in the lake. At each data point the following information will be collected: dominant plant species present, aquatic invasive species presence/absence, percent plant cover, vegetation biomass and water depth. Data will be gathered using an underwater camera system, high resolution depth finder/sonar unit and systematic rake tosses. Plants will be identified to genus and species level where possible.

Results of the two surveys will be used to develop a systematic aquatic invasive species management plan. The plan will evaluate available and effective management techniques and provide specific recommendations for Long Pond complete with associated cost estimates. Survey results will also be used as pre-management documentation of conditions to support state and local permitting efforts.

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TASK 1: Fall 2020 Aquatic Invasive Species Survey Findings

Long Pond was surveyed over the course of 3 days; October 29, November 3, & November 6, 2020. Two of the three days were shortened for safety concerns because of high winds. In addition, due to the sandy bottom, high winds increased the turbidity levels and made visual observations difficult. November 6 was the most productive day where conditions were ideal for surveying and turbidity levels had decreased.

As suspected, two aquatic invasive species were observed during the survey: fanwort (*Cabomba caroliniana*) and variable milfoil (*Myriophyllum heterophyllum*). The shallow nature of Long Pond provided ample habitat for these two hardy species. Growth occurred throughout the lake in depths of up to ten feet where plants were present relatively low in the water column. The densest area of fanwort and milfoil occurred in the south-western cove along Point of Pines Road where depth was between one and four feet and growth was still present at the surface. Other moderate patches were present in the area of Dean's Point and north of Nelson Island. Occasional presence was observed on the eastern-half of the lake.

The distribution of fanwort and variable milfoil are depicted in Figure 1. Due to the lateness of the year, active plants were only observed in areas that previously supported dense plant growth. Approximately 200 acres of acre located throughout the lake supported dense beds of fanwort and variable milfoil. It is estimated that the actual distribution of these two invasive species is probably 2-3 times greater than what was observed in late October and early November 2020, but likely at lower plant densities. The full distribution of these two plants will be documented during the mid-summer 2021 survey that will be conducted during the peak of the aquatic plant growing season.

Additional aquatic species that were observed included floating burreed (*Sparganium fluctuans*), yellow water lily (*Nuphar variegata*), white waterlily (*Nymphaea odorata*), tapegrass (*Vallisneria americana*), and stonewort (*Nitella spp.*). Most native species had degraded at the time of the survey and were in low densities where present.

MANAGEMENT ALTERNATIVES - PRELIMINARY REVIEW

Fanwort and variable milfoil often cohabit the same waterbodies in Massachusetts and other New England states. Both of these aquatic invasive species prefer water that is slightly acidic or has low water hardness/alkalinity. These two plants are particularly prevalent through central and southern New England. They are capable of colonizing all areas with suitable bottom substrate throughout the littoral zone (where sunlight penetrates to the bottom). Depth of colonization will be limited to some extent by water clarity, but these plants are regularly found growing throughout the water column and reaching the surface to depths of

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10-12 feet or more in some cases. Both plants flower and propagate through seed production, but vegetation reproduction through plant fragmentation and root and rhizome expansion is likely more common once the plants are established in a waterbody. *[Picture to the right shows variable milfoil and fanwort (brighter green) growing together]*



Large scale management strategies that have proven to effectively control fanwort and variable milfoil include drawdowns, physical removal (i.e. hand-harvesting or diver assisted suction-harvesting), and the use of EPA/State registered herbicides. Mechanical harvesting (i.e. cutting and collecting) or raking are usually not recommended because the fragmentation that is inevitable with these techniques can result in spreading the infestation. There are no proven biological controls that are selective for these two species and currently approved for use in Massachusetts waterbodies.

Drawdown to expose plants to drying (desiccation) and freezing conditions during the winter months can effectively control these plants, but Long Pond does not have enough deep water areas to support other aquatic plants and animals for the lake to be lowered enough to control all of the nuisance fanwort and variable milfoil growth. Considering the large size of Long Pond (over 1700 surface acres) and the current extent of the aquatic invasive species (likely upwards of 400 acres), it is expected that the use of aquatic herbicides will be the only cost-effective management alternative. Once the infestations are controlled and the distribution is reduced significantly, then hand-harvesting and diver assisted suction-harvesting (DASH) could be incorporated into an ongoing maintenance management program.

Even though fanwort and variable milfoil look similar and favor the same habitats and water quality for growth, they react differently to herbicides that are currently registered for aquatic use. In addition, herbicide treatments in Long Pond will be limited to products that can be permitted for use in surface water protection areas due to the surface water supply reservoirs located immediately downstream. A brief description of the products that would be most likely to be permitted for use at Long Pond follows:

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- **Fluridone** - is a systemic acting herbicide that controls the entire plant including the root structures. Fluridone has been registered for aquatic use since the 1980's and has a long history of use in Massachusetts' lakes and ponds. It can be used to control both fanwort and variable milfoil. It is a slow-acting herbicide that usually requires upwards of 90 days of exposure to completely control the plants. Fluridone is highly soluble, so it is most effective for whole-lake or large-scale applications and is less effective for spot-treatments.
- **ProcellaCOR EC** - is one of the newer products registered in aquatics. It is also systemic-acting providing complete control of susceptible plants, but it is only effective against variable milfoil and other plants in the milfoil family. It does not have activity on fanwort. ProcellaCOR would be an excellent tool to spot-treat persistent patches of variable milfoil.
- **Flumioxazin** - is a contact-acting herbicide that is highly effective against fanwort, but has less activity on variable milfoil. Aside from Fluridone, Flumioxazin is the only herbicide that effectively controls fanwort. However, there are restrictions on its use in Massachusetts because a complete review of potential impacts to some state protected aquatic species including rare freshwater mussels has not been conducted. It can be permitted for use, but the areas being treated must be rotated and can only be treated once in a four-year cycle and no more than one-quarter of the littoral zone can be treated per year. Flumioxazin will be an important tool for ongoing spot-treatment of fanwort growth.

The three herbicides described above are all permitted for use in water that is used for potable (drinking) purposes per the language on their EPA specimen labels. There are state and possibly local regulations that may limit their use, but they should be able to be permitted for use in Long Pond. In fact, Fluridone has already been approved for use in the dredged canals at the north end of the lake off of Parkhurst Drive. The full extent of growth seen during the upcoming mid-summer survey will determine the extent of area that requires treatment and what treatment approaches should be considered.

Where the fanwort and variable milfoil growth appears to be found in many of the same locations, treatment with Fluridone may offer the best control to initially get the infestations under control. Spot or partial-lake treatments with Fluridone can be performed using time-release pellet formulations and multiple applications, but the unit cost is likely to be \$1200-\$1500/acre or higher for spot-treatments. Since we expect that there will be considerably more than 200 acres of the lake that support fanwort and variable milfoil growth and will require treatment, it may be more cost-effective to perform a whole-lake treatment with Fluridone herbicide. The estimated cost for a whole-lake treatment will likely be in the \$350,000-\$400,000 depending on monitoring requirements required by approved permits.

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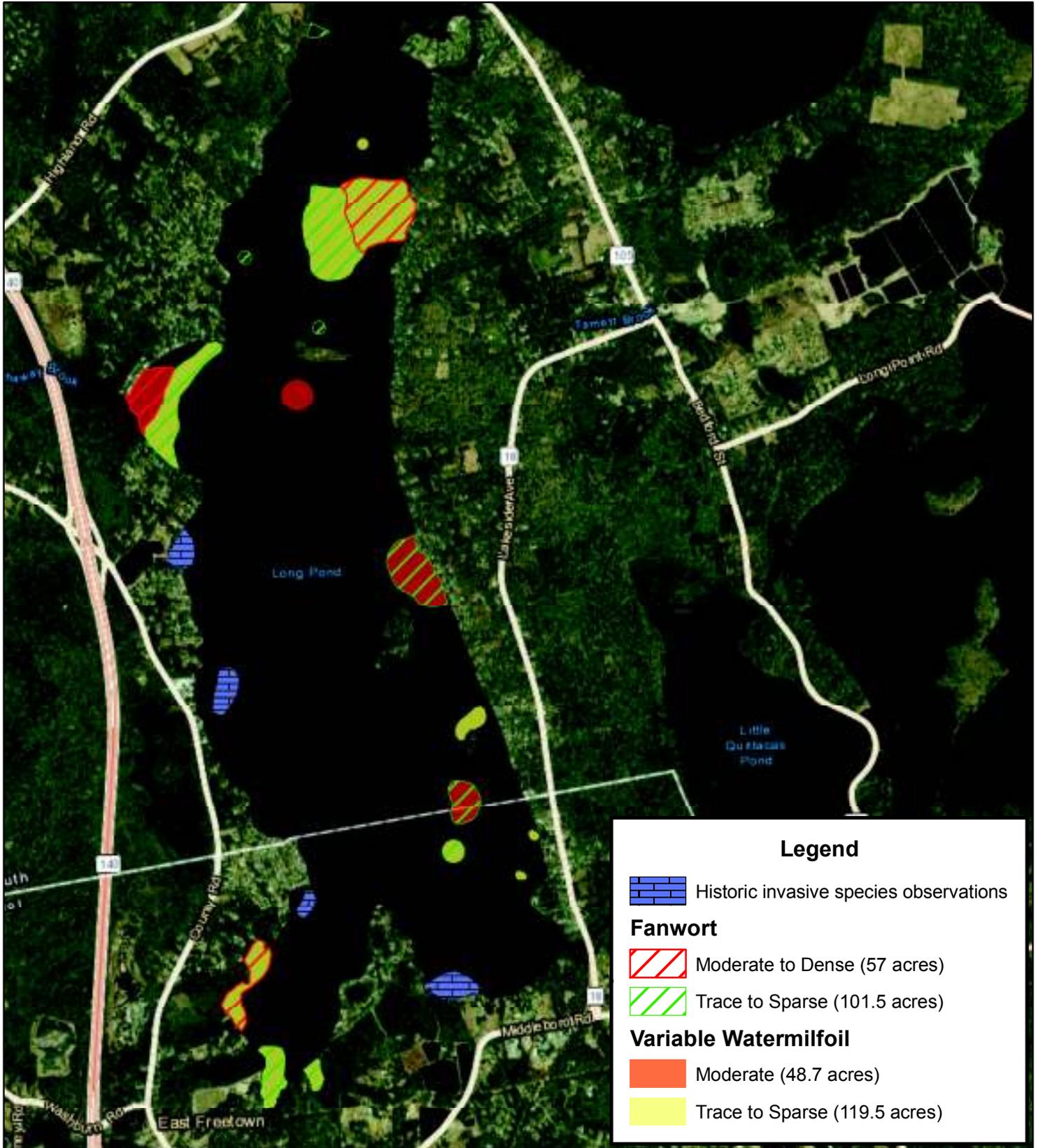


In most cases, ongoing management of aquatic invasive species will be required at some level once lake-wide management is initiated. Ongoing maintenance treatments need to occur even after a whole-lake Fluridone treatment, but the scope and cost for maintenance treatments will be greatly reduced. A more thorough management program evaluation and specific management recommendations with associated costs will be completed following the mid-summer survey in 2021.

Enclosure

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FIGURE 1: Relative Abundance & Distribution of Fanwort & Variable Watermilfoil



Long Pond
Lakeville, MA
County

Long Pond

0 2,900 5,800
1:30,000 Feet

Map Date: 11/12/2020
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