

Town of Barnstable Long Pond & Mystic Lake Non-Native Vegetation Management Program

Long Pond & Mystic Lake Hydrilla (*Hydrilla verticillata*) Management



Project Completion Report for 2011 Hydrilla Management Performed at Long Pond & Mystic Lake – Barnstable, MA

December 2011

Prepared for:



Town of Barnstable

Prepared by:



INTRODUCTION

The 2011 Hydrilla Management Program at Long Pond is a continuation of an ongoing program that began in 2002. The program over the years has provided excellent annual control of hydrilla and has also significantly reduced the overall infestation. Despite the continued reduction in hydrilla continued management remains necessary to achieve sustainable long-term control.

As in previous years, the 2010 management program consisted of assessment, monitoring, and active management tasks. A brief outline of the 2010 Management Program is provided in the following chronology.

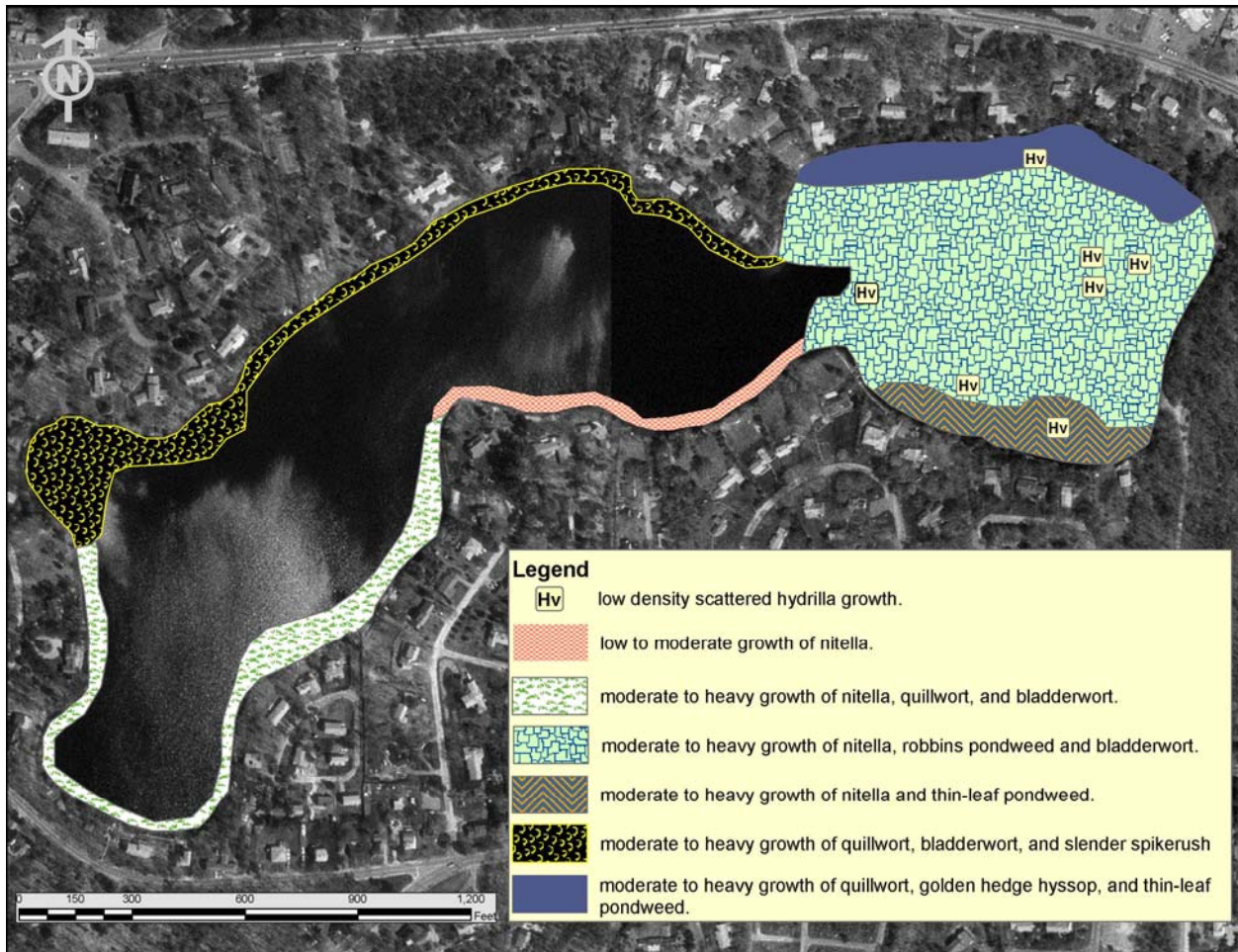
2011 Treatment Program Chronology

- Received approved MA DEP License to Apply Chemicals 6/10/11
- Pre-Treatment tuber sampling 6/17/11
- Initial snorkel vegetation survey 6/27/11
- Install limno-barrier and perform initial Sonar treatment of East Basin..... 7/5/11
- FastEST sampling and interim plant surveys..... 8/1/11; 8/14/11;
8/20/11
- Hydrilla diver hand-pulling at Mystic Lake..... 8/2/11-8/4/11;
8/11/11
- Limno-barrier removal and post-treatment tuber sampling..... 9/26/11
- Post-Treatment tuber sampling 10/4/11
- Post-Treatment vegetation survey tuber density sampling 10/12/11

PRE-TREATMENT SNORKEL VEGETATION SURVEY

In effort to provide the best and most accurate representation of the hydrilla growth and submersed plant community as a whole a snorkel survey was again utilized in 2011. The 2011 pre-treatment vegetation survey was performed by a snorkeling Aquatic Control Biologist. The snorkeler was slowly towed behind an aluminum boat throughout the littoral areas of the pond to identify dominant plant species and visually characterize the distribution and density of various plant assemblages. This information along with geo-spatial reference points for assemblage boundaries and hydrilla locations were recorded by a second biologist onboard the survey boat.

Figure 1 – 2011 Pre-Treatment Vegetation Distribution Map



Below are some of the notable observations made during the 2011 Pre-Treatment Survey, which are represented in Figure 1

- The snorkel survey was performed on 6/27/11. Historically the hydrilla emergence in Long Pond has occurred in late June and in some years has been staggered over a few weeks. The survey date was selected in an attempt to provide the most accurate depiction of the hydrilla growth.
- No hydrilla growth was observed in the western basin.
- Hydrilla density and overall distribution throughout the eastern basin consisted of widely scattered individual plants and isolated areas of increased plant occurrence.
- The limited distribution and density of the hydrilla observed at the time of the pre-treatment survey was not believed to be at a level that was conducive to realistic and cost-effective hand-pulling.
- The native plant assemblage was comprised of plant species documented in previous years, and was dominated by: stonewort (*Nitella sp.*), slender spike rush (*Eleocharis tenuis*), quillwort (*Isoetes sp.*), golden hedge hyssop (*Gratiola sp.*), common aquatic moss (*Fontinalis sp.*), bladderwort (*Utricularia sp.*), and

filamentous algae. These plants have represented the dominant native species for the last several years.

- Thin-leaf pondweed densities have been increasing over the last several growing seasons. Thin-leaf can be considered one of the more dominant native plant species in the pond.
- Significant areas of moderately dense stonewort were observed in the central portions of the east basin and in deeper water areas of the western basin. This low growing native cover provides desirable fish and invertebrate habitat and also represents an impediment to hydrilla recolonization.

SONAR TREATMENT PROGRAM

Immediately prior to the scheduled Sonar treatment a second snorkel survey was performed throughout the littoral zone of the west basin, to confirm that there was no late emergence of hydrilla growth. No hydrilla growth was observed in the west basin.

A water impermeable limno-curtain was installed across the narrow section between the east and west basin in order to aid in maintaining lethal Sonar concentrations for the desired contact time. The treatment was conducted using a combination Sonar One (pellet formulation) and Sonar AS (liquid). A combined dose targeting an in-water concentration of approximately 20 ppb was applied. The Sonar One was applied to the shoreline areas of greatest hydrilla growth using a rotary cyclone spreader/seeder. The Sonar AS was applied evenly throughout the entire basin using weighted hoses below the water surface.

Concentrations of the herbicide were monitored throughout the course of the treatment program to ensure proper contact time and assist in determining the need for additional booster treatments. The results of the three FasTEST (Fluridone) sampling rounds are summarized in the following table. No booster treatment was required.

Table 1 – Mean FasTEST concentration results.

Treatment Date	Sonar Dose Applied (ppb)	FasTEST Sample Date	Treatment Area Concentration (ppb)	Outside Treatment Area Concentration (ppb)
July 5, 2011	~20.0			
		August 1, 2011	8.8	2.7
		August 14, 2011	6.3	2.2
		August 20, 2011	3.4	1.6

DIVER HAND-PULLING AT MYSTIC LAKE

A reconnaissance survey of the Mystic Lake hydrilla infestation was part of the 2011 Long Pond hydrilla management program budget. Based on information provided from the lake association it was determined that the extent of hydrilla growth/regrowth had exceeded what the association volunteers could realistically hand-pull on their own. In light of this information it was

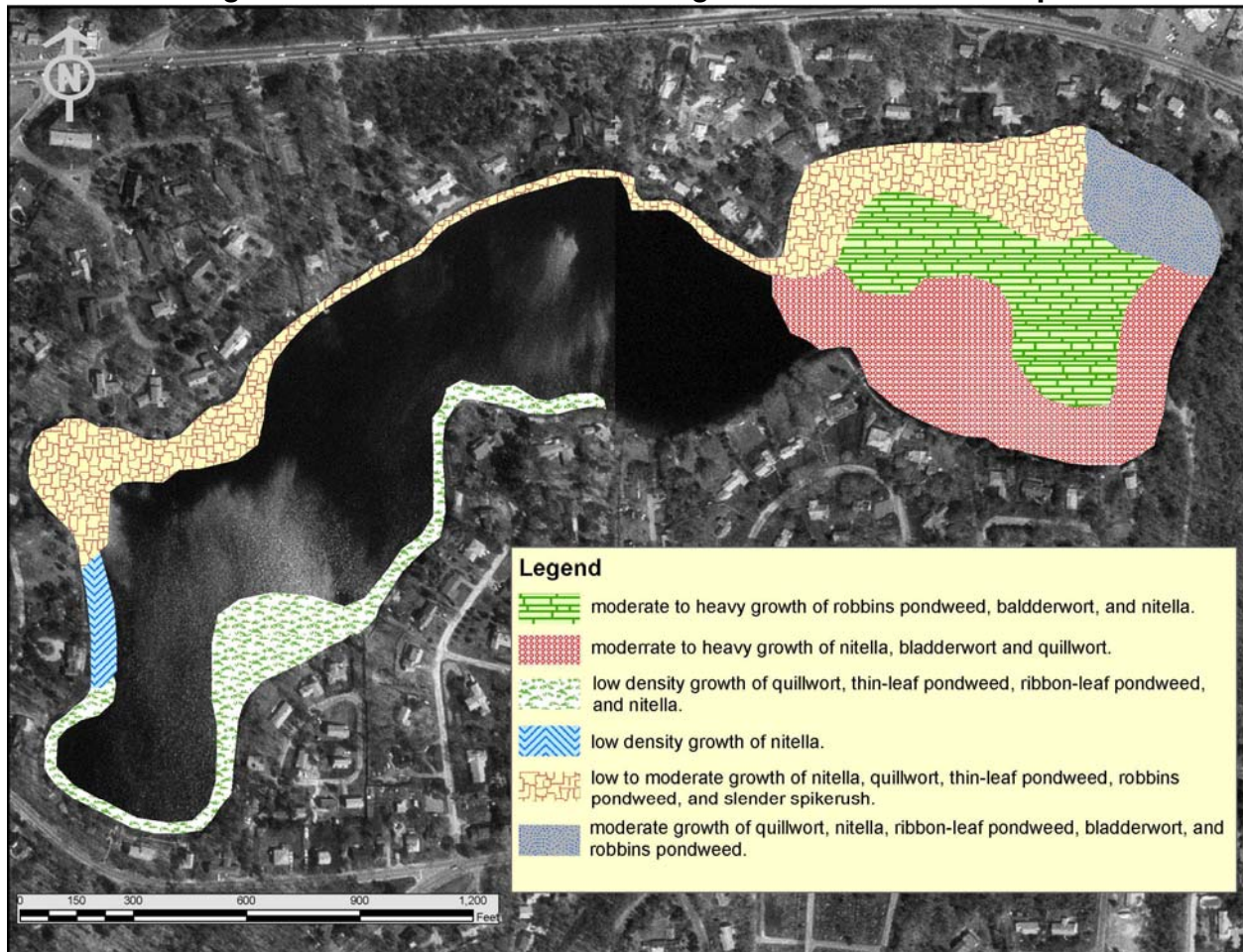
decided that Aquatic Control would conduct diver hand-pulling within the areas of densest hydrilla growth.

On August 2nd Aquatic Control staff began the hand-pulling work as directed by the Association. Two divers performed a total of four days of diver hand-pulling (approximately 32 hours). A total of 58 bags of hydrilla were removed, which equates to an estimated 5,800 plants. The effort resulted in a significant reduction of the dense hydrilla. The remainder of the growth was handled by the lake association.

POST-TREATMENT VEGETATION SURVEY

Throughout the treatment program the aquatic vegetation was monitored in conjunction with FasTEST sample collection. Based on the FasTEST sample data and our observations of the hydrilla growth throughout the treatment program it was determined that no booster treatments were required to achieve control of the hydrilla in the East basin. On 10/12/11 we performed a final post-treatment visual survey by boat. No viable hydrilla growth was observed post-treatment.

Figure 2 – 2011 Post-Treatment Vegetation Distribution Map



- No viable hydrilla growth was observed in the east or west basins at the time of the final post-treatment vegetation survey performed on 10/12/11.
- The temporary impacts of the Sonar treatment appear to be less with the partial pond treatment approach.
- The native plant growth at the end of the season was dominated by Nitella, robbins pondweed, bladderwort and quillwort.
- The density and diversity of native vegetation continues to increase throughout Long Pond. Native plant growth within the East Basin also increased over the last two growing seasons.
- Excellent control of the hydrilla was achieved in the east basin with minimal impact to native plant species.

HYDRILLA TUBER SAMPLING

Sampling of tubers and turions pre and post-treatment was again performed to quantify changes in their densities. The sampling was conducted by replicating the collection methods and sample sites first established in 2002, plus five additional sites established prior to the 2004 post-season tuber survey. The sample sites were located using way points recorded by a hand-held GPS unit. Ten replicate samples were collected from each of the ten one square meter sample sites using a modified post-hole type digger. Each of the sediment samples were screened on site to extract all tubers and/or turions present.

A summary of the tuber sampling performed at Long Pond in 2010 follows:

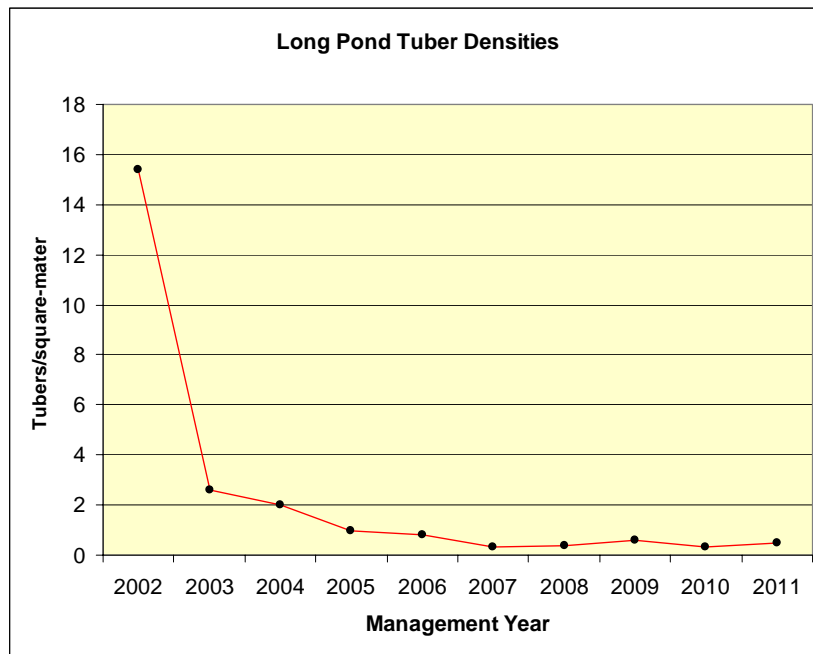
Table 4 - 2011 Pre & Post-Treatment Tuber Sampling Data

Sampling Locations	Qualitative Sediment Type	Pre-Treatment – June 17, 2011	Post-Treatment – Oct. 4, 2011
Site # 1	Sand and organic muck	1	0
Site # 2	Organic muck	2	0
Site # 3	Sand and organic muck	2	1
Site # 4	Sand and gravel	0	0
Site # 5	Soft peaty muck	0	0
Site # 6	Sand and organic muck	0	0
Site # 7	Sand and gravel	0	0
Site # 8	Sand and organic muck	0	0
Site # 9	Organic muck	0	0
Site # 10	Sand and organic muck	0	0
Total # of Tubers		5	1

Table 5 – 2002-2011 Tuber Sampling Data¹

Management Year	Total # of Tubers Collected PRE-Treatment	Total # of Tubers Collected POST-Treatment
2002	77	13
2003	13	5
2004	10	2
2005	10	3
2006	8	0
2007	3	0
2008	4	3
2009	6	1
2010	3	0
2011	5	1

¹ – The sample set, as of the Post-Treatment 2004 collection, was increased from 50 samples (10 replicate samples from five one square meter sample sites) to 100 samples (10 replicate samples from 10 one square-meter sample sites) and has remained that way through the 2009 Post-Treatment collection.



- The line graph above shows pre-treatment tuber densities since the inception of the program in 2002. The graph depicts a steady decline in tuber density since 2002 to where densities are now asymptotically approaching zero.
- This data is likely not statistically significant due to the small data set. It does allow for a look at the general trends and fluctuations in tuber density over time. Prior to the implementation of any management in 2002 the relative tuber density was calculated at approximately 15.4 tubers/m². Since that time we have observed a steady decline in tuber density. Since 2006 the calculated tuber density has been below 1 tuber/m².

MANAGEMENT RECOMMENDATIONS

We are again confident that the hydrilla management program performed in 2011 has effectively controlled the target hydrilla and prevented successful propagation. However, based on our experience with this plant in Long Pond and elsewhere we fully expect that additional hydrilla growth (from pre-existing dormant tubers) will occur during the 2012 growing season.

Based on the observed hydrilla growth conditions and success of the 2011 program we expect, at most, a similar scope and management budget for 2012. We fully anticipate that we will observe a further reduction in hydrilla growth next year; however, with tuber dormancy we cannot be certain that smaller scale non-chemical techniques will be appropriate in 2012. As in recent years that determination will have to be made following an early season snorkel survey of the emerged hydrilla growth. We therefore recommend that the Town continue with the management of the Long Pond hydrilla infestation next year and beyond.