

2013 Hobomock Pond Management Program

Hobomock Pond Hydrilla (*Hydrilla verticillata*) Management Program



Project Completion Report for 2013 Hydrilla Management Performed at Hobomock Pond – Pembroke, MA

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INTRODUCTION

The 2013 Hobomock Pond Hydrilla Management Program is the fifth year of an ongoing multi-year effort to prevent the spread of and possibly eradicate the state listed noxious/prohibited weed, *Hydrilla verticillata*, first discovered in 2008. The Town of Pembroke, again funded the 2013 hydrilla management effort at Hobomock Pond. The 2013 program is similar to the program that was originally developed in 2009. This year's program consisted of early season vegetation monitoring and a whole pond Sonar herbicide treatment program.

The various tasks of the management program are discussed in the following sections. Provided below is a chronology of the major elements of the 2013 program.

2013 Treatment Program Chronology

- Received approved MA DEP *License to Apply Chemicals*..... 4/24/12
- Pre-Treatment tuber sampling & vegetation survey 6/17/13
- Initial Sonar One herbicide treatment 7/3/13
- Second Sonar One herbicide treatment 8/12/13

PERMITTING

The approved Order of Conditions from the Pembroke Conservation Commission received in 2009 was automatically extended for four years (2016) by the Permit Extension Act; therefore, no additional MA Wetlands Protection Act permitting was required in 2013. For the aquatic herbicide treatment component of the project, however, a site specific *License to Apply Chemicals* Permit was required from MA DEP Office of Watershed Management. The permit, approving the application of Sonar One (fluridone) herbicide, was received well in advance of the treatment on 4/24/13.

PRE-TREATMENT VEGETATION SURVEY

It is desirable in a multi-year management program such as this, to collect data that not only provides a sufficient level of detail, but that can also be accurately compared to previous years results to track changes in the target and non-target vegetation. For this reason the exact pre-treatment survey methodology established in 2009 was replicated during the 2013 survey. The survey was a point intercept (Madsen 1999) presence/absence type vegetation survey that was performed in mid June as the hydrilla growth was beginning to emerge. The previously established and geo-referenced data collection points were revisited using a WAAS enabled hand-held GPS unit.

At each of the data collection sites the following information was recorded:

- Water depth
- Qualitative sediment type
- Soft sediment thickness
- Aquatic plant species present
- Dominant aquatic plant species
- Overall areal plant cover

The presence/absence of aquatic plant species at each data point was assessed from two throw-rake tosses, and through observations directly below the boat using an underwater camera system. Overall areal plant cover was recorded using a simple density index (1 = 1-25% cover; 2 = 26-50% cover; 3 = 51-76% cover; & 4 = 76-100% cover) in order to track possible variations in plant cover.

The pre-treatment vegetation field data along with full scale vegetation distribution maps are provided in Appendix A.

The pre-treatment survey was conducted on 6/17/13, which is a time when the hydrilla growth in Hobomock Pond has historically begun vegetative growth. At the time of the survey the hydrilla growth was relatively immature with only 4-6 inches of vegetative growth observable above the sediment layer.

- Hydrilla was present at 9 of the 57 survey points, which is less than half of the 2011 and 2012 surveys
- Hydrilla was the dominant vegetation species at three of the survey points sampled.
- The overall submersed vegetation density in the pond has roughly stayed the same with a density of 2.0. This is similar to 1.9 and 2.1 in 2011 and 2012, respectively
- The percent occurrence of hydrilla was approximately 16%, which is a reduction from roughly 52% observed in 2009 pre-treatment.
- At the time of the Pre-Treatment Survey the overall plant assemblage consisted of eight submersed species and two emergent species. Of the eight submersed species, stonewort

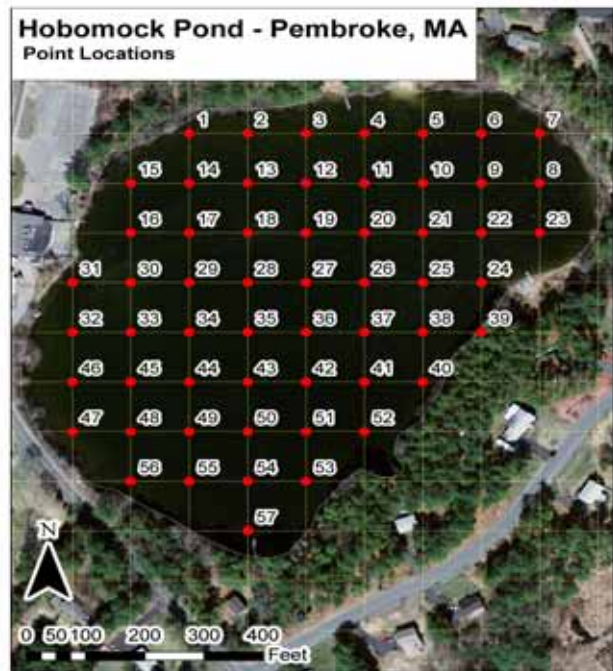


Figure 1 – 2013 Point Intercept Data Collection Point Locations



Figure 2 – 2013 Hydrilla Distribution Map

(*Nitella sp.*) was the most abundant, being present at 53 of the 57 data collection points (93%) and was dominant at 36.

- All of the plant species that were recorded during the survey include: slender spike rush (*Eleocharis sp.*), arrowhead (*Sagittaria sp.*), hydrilla (*Hydrilla verticillata*), aquatic moss (*Fontinalis sp.*), quillwort (*Isoetes sp.*), stonewort (*Nitella sp.*), common reed (*Phragmites australis*), bladderwort (*Utricularia sp.*), cattails (*Typha sp.*), and golden hedge hyssop (*Gratiola sp.*).

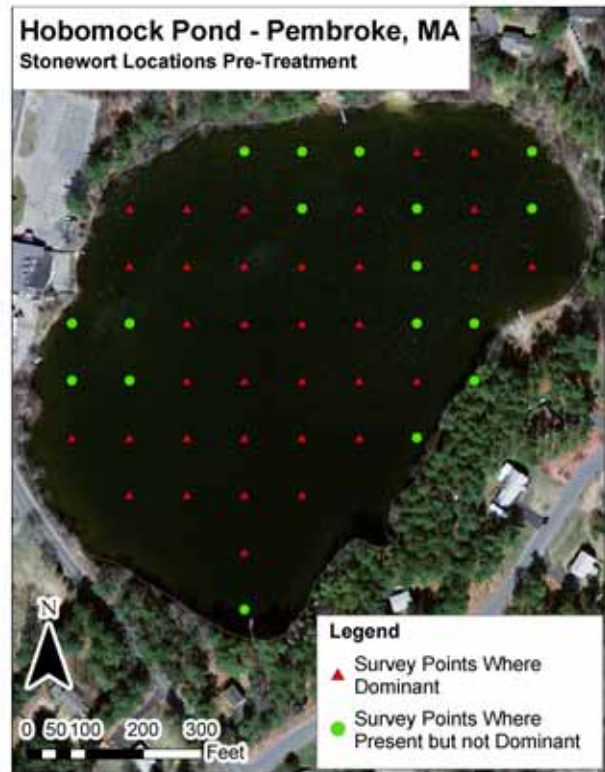


Figure 3 – 2013 *Nitella* Distribution Map

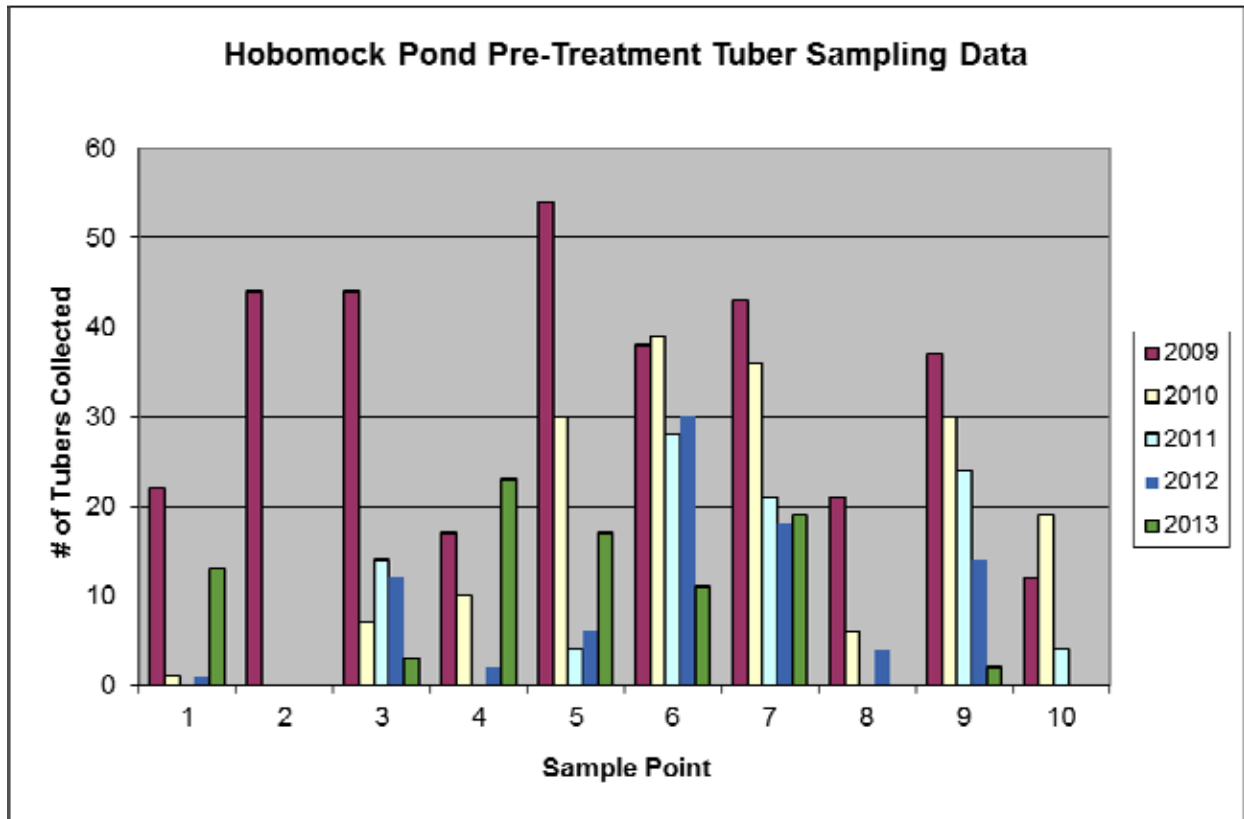
SONAR TREATMENT PROGRAM

Because of the efficacy of the Sonar management program in previous years, the primary focus of the program remained the same in 2012. The specific tasks of the program and the observed results are outlined in the following section.

- In an effort to prevent successful tuber production in the emerging hydrilla growth, the initial Sonar herbicide treatment was scheduled for early July (7/3/13). The timing of the initial treatment was guided by observations made during our pre-treatment survey and subsequent inspections in late May and June.
- Using Sonar One pellets, a dose targeting a pond-wide in-water fluridone concentration of 10-12 ppb. From a shallow draft Jon boat Sonar One pellets were evenly broadcast throughout the littoral zone (near shore area with depths capable of supporting rooted plant growth) of the pond using a cyclone rotary spreader/seeder.
- A “booster” treatment of Sonar herbicide was performed in mid August (8/12/13) in an effort to maintain a lethal concentration (>6ppb) in the pond.
- All interim vegetation inspections indicated positive impacts to the target hydrilla growth as a result of the herbicide treatment program. Chlorotic tissue increased down the meristem of the plants as the contact time of the herbicide increased during the program.

HYDRILLA TUBER SAMPLING

The tuber sampling protocols established in 2009 were again replicated at the time of the pre-treatment survey. The Ten point intercept data collection points (sites 1, 3, 7, 8, 15, 16, 32, 38, 47, 52) were sampled using a modified post-hole type digger. Ten replicate sediment samples, representative of the upper 4-6 inches of soft sediment, were collected from an approximate one square-meter area (100 total samples). Each sediment sample was then strained on site to extract viable hydrilla tubers and/or turions. The results are provided below.



- Pre-treatment tuber density was 8.8 tubers/m².
- The sampling results continue to show an effective reduction in tuber numbers and density on an annual basis.
- Three sampling sites showed a slight increase in tuber numbers from 2011 to 2012. This is likely not the result of successful tuber production in 2011, but more likely the result of sampling variability. These sampling results are not intended to provide statistically significant data but is rather an index on which to assess management efficacy.

MANAGEMENT RECOMMENDATIONS

The post-treatment hydrilla and tuber density survey data indicates effective control and reproductive suppression of the hydrilla growth. These findings represent good progress toward

achieving long-term control of this invasive species. Although reductions in hydrilla growth (based on plant cover, biomass, and tuber density) have been achieved, continued management is required to sustain this level of hydrilla reduction and control. Therefore, in order to provide long-term control or even eradication of the hydrilla growth, annual management is necessary to prevent successful reproduction and reduce the potential for spread to nearby waterbodies. We therefore recommend continuing with the program as currently constituted in 2014.

APPENDIX A

Pre-Treatment Vegetation Data
Pre-Treatment Tuber Sampling Data
Dominant Vegetation Distribution Maps

PRE-TREATMENT SURVEY DATA - JUNE 17, 2013

Data Point	Latitude	Longitude	Depth (ft.)	Soft Sediment Thickness	Density Index	Eo	S	Hv	F	I	Ni	Pp	U	Ct	Hh	Fa
1	42.05835545	-70.80964844	2.5	0.5	3	D	X	X	X	X				X	X	
2	42.05835326	-70.80928475	3	0.5	2	D					X					
3	42.05835106	-70.80892106	5	0.5	2	X					X					D
4	42.05834887	-70.80855737	4	0	2	D					X					X
5	42.05834667	-70.80819368	3	0	3	X	X				D					X
6	42.05834447	-70.80782999	1.5	0	2	X		X			D	X	X			X
7	42.05834227	-70.8074663	3	0.5	2	X		D	X	X	X					X
8	42.05807124	-70.80746925	4.5	0	2	X		X	D		X					X
9	42.05807344	-70.80783294	8	0	3						D					
10	42.05807564	-70.80819663	15	0	1				D		X					
11	42.05807784	-70.80856032	10	0	2				X		D					
12	42.05808003	-70.80892401	13	0	3	X					X					D
13	42.05808223	-70.8092877	10	0	3				X		D					X
14	42.05808442	-70.80965139	7	0.5	2						D					X
15	42.05808661	-70.81001508	3.5	0.5	1		X				D					
16	42.05781558	-70.81001802	4.5	0.5	3						D					
17	42.05781339	-70.80965433	14	0	3						D					
18	42.0578112	-70.80929064	14	0	3						D					
19	42.057809	-70.80892695	14	0	3				X		D	X	X			
20	42.0578068	-70.80856327	13	0	2				D		D		X			
21	42.05780461	-70.80819958	14	0	1				X		X					
22	42.05780241	-70.80783589	12	0	3						D					
23	42.05780021	-70.8074722	3.5	0	2						D					
24	42.05753138	-70.80783884	4.5	0	2	D			D		X		X			
25	42.05753358	-70.80820253	13	0	1				X		X					
26	42.05753577	-70.80856621	14	0	2				X		D					
27	42.05753797	-70.8089299	13	0	2				X		D					
28	42.05754017	-70.80929359	14	0	2						D					X
29	42.05754236	-70.80965727	8	0	2				X		D					
30	42.05754455	-70.81002096	9	0	1	X					X					D
31	42.05754675	-70.81038465	2	0.5	2	X	X	D		X	X					
32	42.05727571	-70.81038759	2.5	0	3			X			X	D				
33	42.05727352	-70.8100239	6	0	2				D		X	X				
34	42.05727133	-70.80966022	13	0	1				X		D					
35	42.05726914	-70.80929653	14	0	2				X		D					
36	42.05726694	-70.80893285	13.5	0	2				X		D					
37	42.05726474	-70.80856916	13.5	0	2				X		D	X				
38	42.05726255	-70.80820548	7	0	2						D					

Data Point	Latitude	Longitude	Depth (ft.)	Soft Sediment Thickness	Density Index	Eo	S	Hv	F	I	Ni	Pp	U	Ct	Hh	Fa
39	42.05726035	-70.80784179	2	0	2			X			X			D	X	
40	42.05699152	-70.80820843	1.5	0.5	2	X		D		X	X			X		
41	42.05699371	-70.80857211	14	0	1				X		D					
42	42.05699591	-70.80893579	14	0	2				X		D					
43	42.0569981	-70.80929948	13.5	0	1						D					
44	42.0570003	-70.80966316	13.5	0	2				X		D					
45	42.05700249	-70.81002684	13	0	3				X		D					
46	42.05700468	-70.81039053	4	0	3				X		D					
47	42.05673365	-70.81039347	3.5	0	1											
48	42.05673146	-70.81002979	12.5	0	1				X		D					
49	42.05672927	-70.8096661	13.5	0	1				X		D					
50	42.05672707	-70.80930242	13.5	0	1				D							
51	42.05672488	-70.80893874	14	0	2				X		D					
52	42.05672268	-70.80857506	4.5	0	1						D					
53	42.05645385	-70.80894169	4	0	1						D		X			
54	42.05645604	-70.80930537	9	0	3				X		D					
55	42.05645824	-70.80966905	5	0	2						D		X			
56	42.05646043	-70.81003273	3	0.5	2	D							X			
57	42.05618501	-70.80930831	3	0	3			X	D	X			X			
Averages			8.60	0.09	2.02											

Eo = slender spike rush (*Eleocharis sp.*)

S = arrowhead (*Sagittaria sp.*)

Hv = hydrilla (*Hydrilla verticillata*)

F = aquatic moss (*Fontinalis sp.*)

I = quillwort (*Isoetes sp.*)

Ni = stonewort (*Nitella sp.*)

Pp = thin-leaf pondweed (*Potamogeton pusilius*)

U = bladderwort (*Utricularia sp.*)

Ct = cattails

Hh = golden hedge hyssop

Fa = filamentous algae

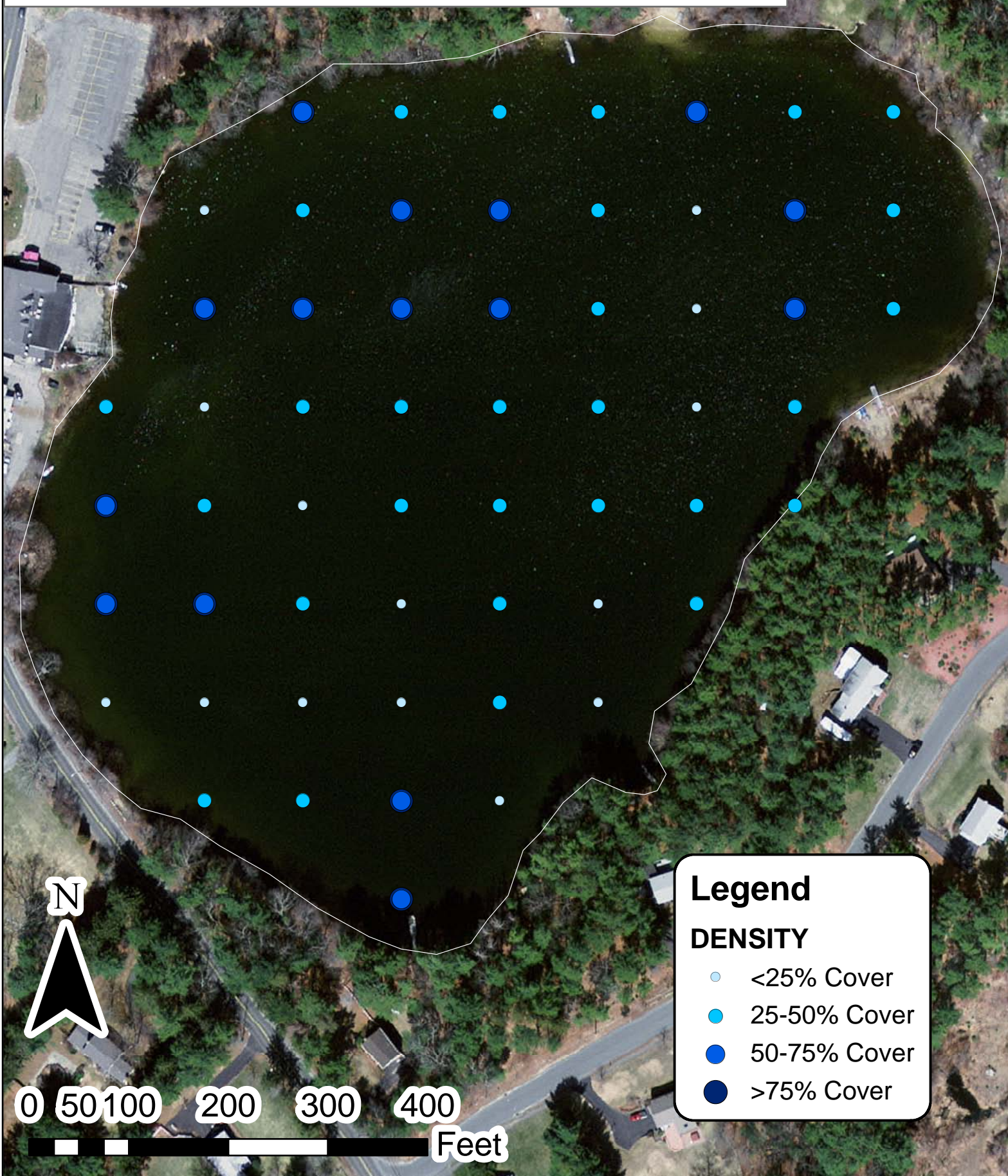
D = dominant species

X = species present

	Tuber Number of Tubers (Pre-Treatment)				
Sample Point	2009	2010	2011	2012	2013
1	22	1	0	1	13
3	44	0	0	0	0
7	44	7	14	12	3
8	17	10	0	2	23
15	54	30	4	6	17
16	38	39	28	30	11
32	43	36	21	18	19
38	21	6	0	4	0
47	37	30	24	14	2
52	12	19	4	0	0
# Tubers/m2	33.2	17.8	9.5	8.7	8.8

Hobomock Pond - Pembroke, MA

Plant Density Pre-Treatment



Legend

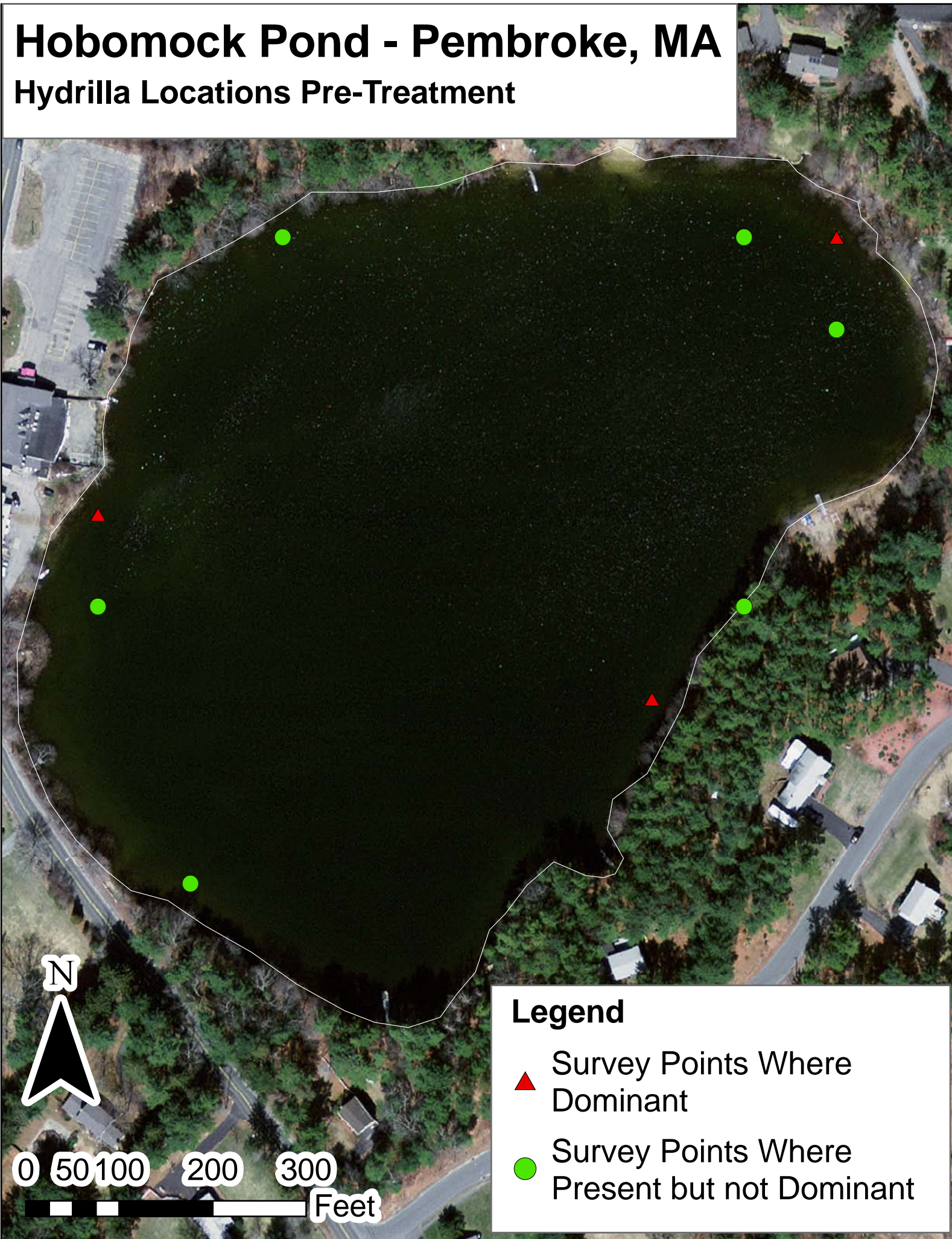
DENSITY

- <25% Cover
- 25-50% Cover
- 50-75% Cover
- >75% Cover



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Hydrilla Locations Pre-Treatment



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Stonewort Locations Pre-Treatment

