December 2, 2013

Mr. Paul Boudreau, Chief Procurement Officer
Town of Lanesborough
83 No. Main St.
Lanesborough, MA 01237

Re: 2013 Year End Report - Aquatic Management Program at Pontoosuc Lake – Lanesborough & Pittsfield, MA

In 2013 a treatment program using Reward (diquat) herbicide was conducted at Pontoosuc Lake to control growth of non-native, invasive Eurasian watermilfoil (*Myriophyllum spicatum*) and curlyleaf pondweed (*Potamogeton crispus*). The Year End Report for the 2013 Aquatic Management Program follows. This report will serve to document the herbicide application process, the post-treatment monitoring of aquatic vegetation in the waterbody and the observed response of the targeted weeds. Attached to this report are several figures and supporting documentation that further help to explain the project and the observed results.

All work performed at Pontoosuc Lake in 2013 was conducted in accordance with the Order of Conditions (OOC) issued by the Lanesborough & Pittsfield Conservation Commissions (DEP #: 194-0161) and the License to Apply Chemicals issued by the MA DEP – Office of Watershed Management (Permit #: 13065).

A chronology of this past year's management and brief description of events follows.

2013 Program Chronology:

- DEP License to Apply Chemicals Issued 4/24/13
- Early Season Vegetation Survey 5/15/13
- Diquat Treatment for Milfoil 5/31/13
- Post-Treatment Inspection 7/26/13
- Late Season Vegetation Survey 9/10/13

Pre-treatment Survey:

A Pre-Treatment Survey was conducted on May 15th to document pre-treatment vegetation composition and confirm the extent of the proposed treatment area. The survey was performed with representatives from Friends of Pontoosuc Lake and ACT. During the survey the entire littoral area of the lake was toured and the extent of the milfoil infestation was marked with GPS. The presence of other aquatic plant species was also documented and general observations regarding distribution of species type, species density and species location were collected. An AquaVu underwater camera and plant collection with a throw-rake were used to assist in the identification of vegetation and the determination of the milfoil boundary. Observed conditions in the lake were generally consistent with pre-treatment conditions documented over the past several years.

- The littoral area of the lake supported moderate to dense cover (40%-60%) of aquatic plants, primarily Eurasian watermilfoil and curlyleaf pondweed.
- Consistent with previous surveys, milfoil and curlyleaf pondweed density were greatest at intermediate water depths (5-12 feet), but growth was observed to a depth of 14' feet. Very little growth of milfoil or curlyleaf pondweed is found in shallower depths (<5' feet), owing to the fall/winter drawdown performed annually.

- Milfoil was actively growing at the time of the survey but had not reached peak biomass and was generally 5'-6' feet tall in 6-10 ft water depths.
- Distribution of milfoil was similar to previous years with moderate to dense growth extending along the southern, western and northern shorelines. Growth along the eastern shore was very limited and consisted of scattered low-density milfoil.
- Curlyleaf pondweed cover was widespread and abundant, generally accounting for 20%-30% of the vegetative cover. Low to moderate growth of curlyleaf pondweed extended along the southern, western and northern shorelines; a few dense patches were also observed.
- Growth of curly-leaf pondweed was very advanced and was at or near the surface in 8'-10' feet of water.
- Cover of native plants was generally low (<25% cover) and was mixed with varying cover of milfoil and curlyleaf pondweed.
- Native plant species recorded during the survey included: coontail (*Ceratophyllum demersum*), common waterweed (*Elodea canadensis*) sago pondweed (*Stuckenia pectinatus*) and southern naiad (*Najas guadalupensis*).
- No spiny naiad was observed during the pre-treatment survey.
- Water clarity was fair at the time of the survey with a Secchi disk reading of 6'5".
- Dissolved oxygen concentrations were good averaging 9.4 mg/L at 13.0°C or roughly 95% saturation to a depth of 10 meters.

Eurasian Watermilfoil Management

Based on the advanced stage of milfoil and curlyleaf pondweed growth observed during the pre-treatment survey, the diquat application at Pontoosuc Lake was scheduled and performed for the following week on Tuesday, May 28.

Treatment scope did not change significantly from previous years and ultimately, ~215 acres around the perimeter of the lake were targeted for treatment. Notification of treatment including all temporary water use restrictions to be imposed following treatment was printed in The Berkshire Eagle. Printed signs displaying the water use restrictions were also posted around the lake in advance of treatment. The public boat ramp was closed during the day of treatment.

An 18 foot airboat equipped with a low pressure pump and calibrated spraying system was used for the treatment. The treatment area was split into five sections; each section was treated individually with the calculated dosage of Reward herbicide (see Figure 1 – attached). Application rates ranged from 1.0-1.5 gal/acre; rates were primarily determined by vegetation density and dilution potential in each area. The liquid Reward herbicide was mixed with lake water in an on-board tank and injected subsurface

through weighted hoses to prevent aerial drift of the herbicide. GPS was used during the application to monitor boat speed and ensure a uniform distribution of the herbicide in each treatment area. The GPS track recorded during the treatment is pictured on the previous page.

Air temperature during the treatment was approximately 71°F. Water temperature at the surface was ~68 °F. Conditions were mostly sunny with breezy wind from the west.

The treatment was completed by Aquatic Control's state certified applicator Michael Lennon, and was conducted in accordance with the product label directions and the permits issued by MA DEP and the Lanesborough & Pittsfield Conservation Commissions. At no time during the course of this management program did we either observe or receive any reports of negative affect of treatment on fish, other aquatic life or wildlife.

Post-treatment Inspection:

A cursory post-treatment inspection of Pontoosuc Lake was performed by Michael Lennon (ACT, Inc.) on July 26th to assess the results of the diquat application. During the survey the western shore and northern cove were checked for cover of milfoil.

- At the time of the inspection milfoil growth in the lake was relatively sparse and what remained was mostly dead and decaying on the lake bottom.
- Plant cover where large milfoil beds had existed was scant and was dominated by coontail and southern naiad and tapegrass.
- Stonewort/muskgrass (*Nitella sp./Chara sp.*), thin-leaf pondweed (*Potamogeton pusillus*), spiny naiad (*Najas minor*) and waterweed were also recorded.

Late Season Survey:

A Late Season Vegetation Survey was performed on September 10th. The survey was performed by Erika Haug (ACT) and representatives from Friends of Pontoosuc Lake.

The littoral area of the lake was toured and vegetation was identified. An AquaVu underwater camera and plant collection with a throw-rake were used to assist in the identification of vegetation. A map of the late season vegetation composition is attached (Figure 2 – Late Season Vegetation Assemblage).

To satisfy additional monitoring requirements, pre-established data points were also visited and vegetation was classified based on parameters defined by the Friends of Pontoosuc Lake. The data from that monitoring effort is attached to the end of this report.

- Plant distribution was consistent with what was recorded during the spring and was generally confined to depths of less than 12' feet.
- Plant cover was low-high density throughout the littoral zone with overall cover ranging from 5%-75% cover. Vegetation was dominated by a combination of spiny naiad (*Najas minor*), tapegrass and muskgrass.
- Dense growth of spiny naiad growth was recorded in Gunns Cove and along the northern shoreline near the inlet from Secom Brook. Dense patches of spiny naiad were also common of in water depths of under <6 feet around the shoreline of the lake.
- Milfoil re-growth was limited with only a occurrences near the outlet cove.
- Other plant species recorded during the survey include: Southern naiad (*Najas guadalupensis*), coontail (*Ceratophyllum demersum*), common waterweed (*Elodea canadensis*), water stargrass (*Heteranthera dubia*), thinleaf pondweed (*Potamogeton pusillius*), sago pondweed (*Stuckenia pectinatus*) and muskgrass (*Chara spp.*)

- Water clarity at the time of the survey was good with a Secchi disk reading of just 6'6".
- Dissolved oxygen concentrations were good averaging 8.0 mg/L at 19.8°C or roughly 90% saturation in the upper 8 meters of water. Temperature and dissolved oxygen dropped quickly below the thermocline.

Recommendations for Ongoing Management

The Reward (diquat) treatment performed in 2013 provided excellent season-long control of milfoil throughout Pontoosuc Lake. Late season re-growth of milfoil was reduced significantly by comparison to post-treatment conditions in 2009 and 2010 and, where found, was generally scattered and low-growing. Again, the success of treatment at Pontoosuc Lake is in part the likely result an number of factors including: weather conditions on the day of treatment; timing with regards to plant maturity; and reduced overall milfoil abundance resulting from previous years of management.

Although we cannot guarantee that results of subsequent treatments will yield the same lasting results we observed in 2011, 2012 & 2013 we are hopeful that the cumulative effect of annual treatments will continue to reduce milfoil abundance leading to higher treatment efficacy. We will continue to evaluate treatment timing and dosage to achieve the best possible milfoil control at Pontoosuc Lake. We strongly encourage Lanesborough, Pittsfield and the Friends of Pontoosuc Lake to continue with the scheduled milfoil management efforts in 2014.

If control of non-native spiny naiad is desired than an additional mid-summer (July) diquat application should be considered at Lake Pontoosuc. Trying to target both milfoil and naiad with one treatment is difficult because of their different growing characteristics and is therefore not recommended. Delaying treatment of milfoil to wait for spiny naiad germination will likely result in poor/ineffective control of milfoil and incomplete control of spiny naiad.

Specifically for the 2014 season, we recommend the following invasive aquatic plant management efforts:

1. Early Season Vegetation Survey to access milfoil growth and finalize treatment scope - early May.
2. Spot-treatment of dense milfoil growth with Reward (diquat) for the control of Eurasian watermilfoil. Treatment timing should be performed between late May and early June before annual native plants have germinated. (Specific treatment requirements will be determined following our pre-treatment survey in May 2013.)
3. Contingent mid-summer spot-treatment for nuisance growth of non-native spiny naiad.
4. Continued monitoring of vegetation in the lake with both a post-treatment inspection and a late season vegetation survey.

We look forward to our continued involvement with your lake management efforts. If you have any questions, please do not hesitate to contact us.

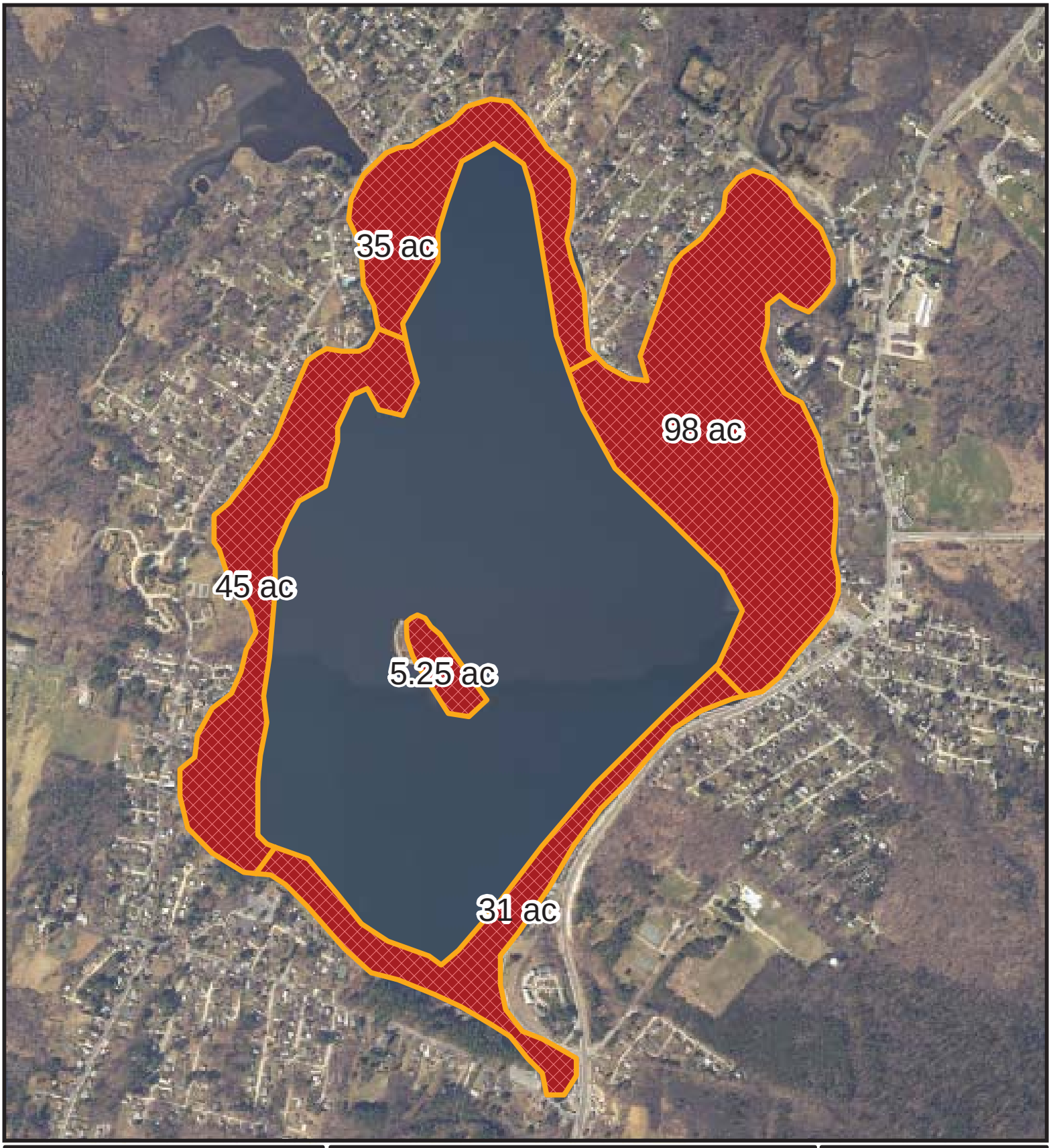
This report has been sent electronically to representatives with the Friends of Pontoosuc Lake. Please be sure to forward a copy of this report to the Conservation Commission in each town.

Sincerely,

Aquatic Control Technology

Marc D. Bellaud
President/Aquatic Biologist

Michael Lennon
Biologist



Pontoosuc Lake

Lanesborough, MA 2013

Treatment Map

FIGURE:	TREATMENT DATE:	MAP DATE:
1	5/28/13	11/18/13

Legend:

2013 Treatment Area Extent (~215 acres)

N

0 250 500 1,000 1,500 2,000 2,500 Feet

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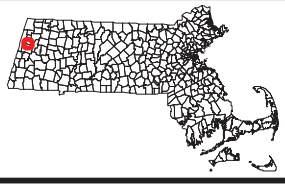

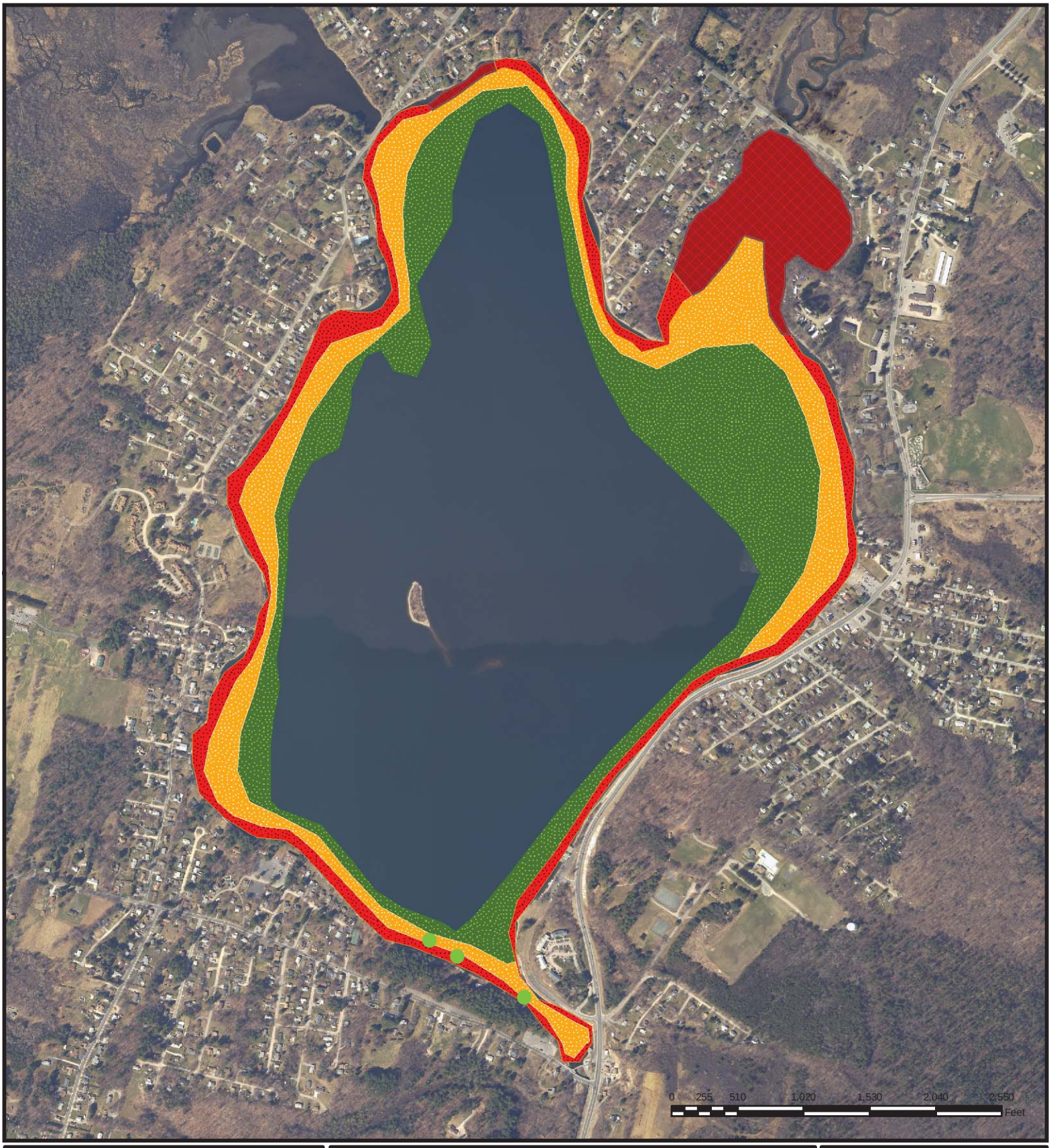

Pontoosuc Lake

Lanesborough, MA

Late Season Aquatic Plant Distribution

FIGURE:	SURVEY DATE:	MAP DATE:
2	10/16/13	11/18/13

- High density spiny naiad (cover 50%-100%)
- Low to moderate density/patchy growth of spiny naiad (cover 5%-50%)
- Moderate to high density spiny naiad, tapegrass and southern naiad (cover 50%-75%)
- Low density spiny naid, filamentous algae, muskgrass and southern naiad (cover<25%)
- Scattered Eurasian watermilfoil

N

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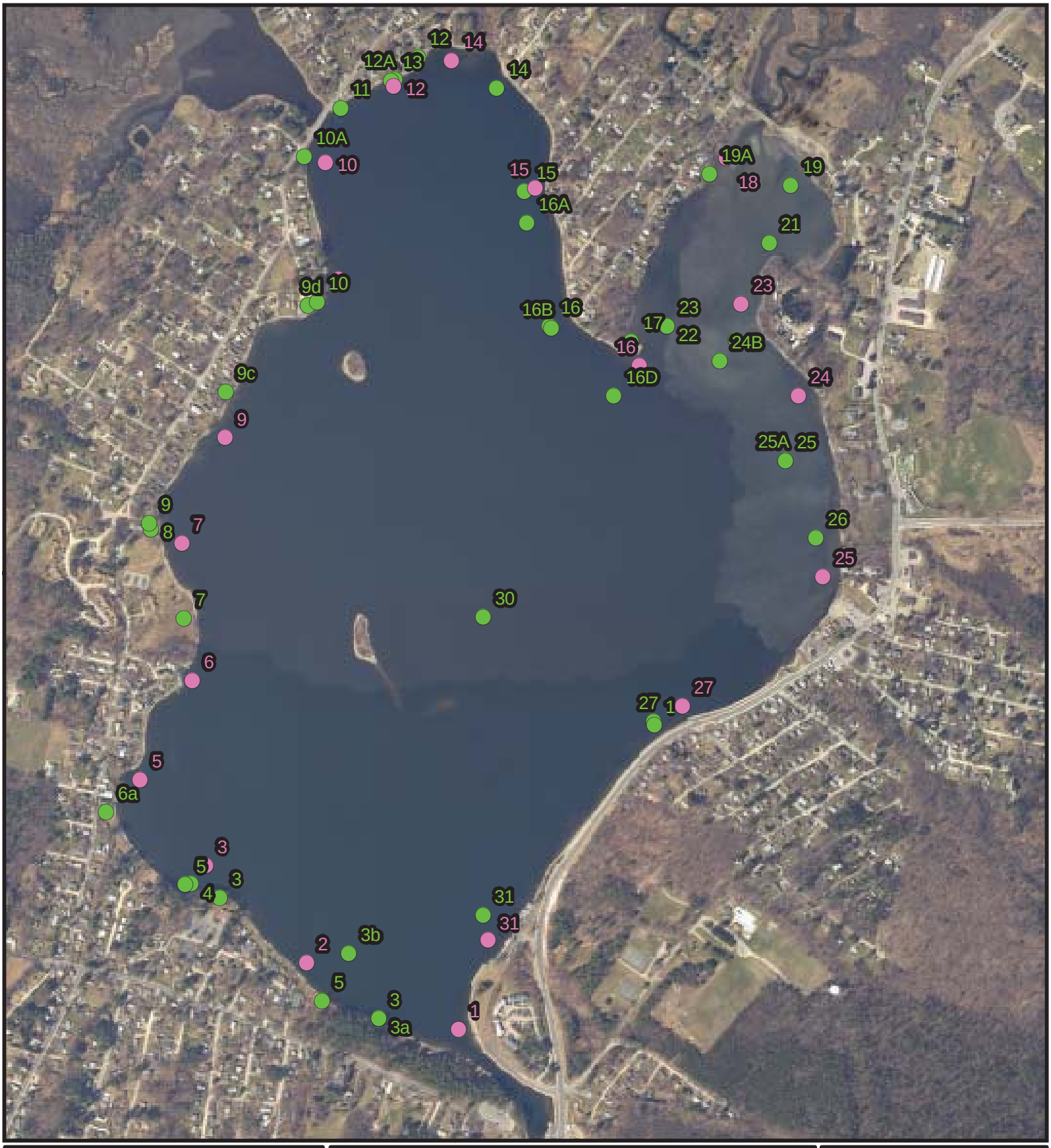
Attachment A

Friends of Pontoosuc Lake Vegetation Survey Information

- Figure 1: Survey Point Map
- Field Data
  - 5/15/13
  - 9/10/13



Pontoosuc Lake

Lanesborough, MA

Friends of Pontoosuc Lake
Survey Point Map

FIGURE:	SURVEY DATE:	MAP DATE:
--	5/13 & 9/10/13	12/2/13

Legend:

Friends of Pontoosuc Data Points

N

0 200 400 800 1,200 1,600 2,000 Feet

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PONTOOSUC LAKE

MACROPHYTE SURVEY LOG

DATE 5/15/13 **WEATHER cloudy**

	Ref.	Depth ft	42deg	73deg	weed height*	Top to surf Sur	Density	Biomass	Dominant	Others		Weed Type	# Dominate	percent	#present	percent
1	1	12	29.202	14.990	9	3	1	1	A	B	A.	Milfoil	11	50%	13	59%
2	2	10	29.250	15.137	6	4	1	2	B		B.	Curlyleaf		0%		0%
3	3	8	29.338	15.271	5	3	1	1	B	O	C.	Coontail		0%		0%
4	4	4	29.337	15.406		1	0	0			D.	Bushy Pondweed		0%		0%
5	5	6	29.455	15.434		1	1	1	B		E.	Waterweed		0%		0%
6	7	10	29.643	15.311		2	1	1	B		F.	Fil. Green Alge		0%		0%
7	7B	8	29.519	15.365		3	3	3	A	B	G.	Yellow Water Lilly		0%		0%
8	8	8	29.712	15.312		4	2	3	A	B	H.	Narrow Leaf Cat Tail		0%		0%
9	9	8	29.927	15.242	3	2	4	2	A		I.	Bur-Reed		0%		0%
10	9I	8	29.999	15.164	5		2	2	A	B	J.	Wild Celery		0%		0%
11	10	6	30.127	15.124		2	1	1	B		K.	European (Spiny) Naj		0%		0%
12	12	6	30.272	15.058	5		1	1	B	A	L.	Cat tail		0%		0%
13	13	4	30.311	14.924			0	0			M	Musk Grass (Cara)		0%		0%
14	15	11	30.111	14.805			1	1	B	AF	N	Thin Leaf Pondweed		0%		0%
15	16	6	29.950	14.656	8		1	1	B		O	Southern Niad		0%		0%
16	24	8	29.718	14.516			3	2	A	B	P	Richards Pondweed		0%		0%
17	25	8	29.808	14.384			1	2	B		Q	Sago Pondweed		0%		0%
18	25	6	29.907	14.575	1		2	1	A	B	R	Water Stargrass		0%		0%
19	26	8	29.653	14.444	4		3	2	A	B	Z	None		0%		0%
20	28	9	29.450	14.628			1	1	A	B						
21	30	10	29.328	14.843			2	2	A	B		*weed heighth, + from bottom				
22	31	11	29.260	14.912	7		2	2	A	B		- from top				
AVERAGE							1.00	1.45								

PONTOOSUC LAKE

MACROPHYTE SURVEY

DATE 9/10/13 **WEATHER rain** **LAST RAIN Now** *weed heighth, + from bottom - from top

At 3 to 5 ft depth

	Ref.	Depth ft	42deg	73deg	weed height*	Top to surf Sur	Density	Biomass	Dominant	Others	Density	Biomass	Dominant		Weed Type	# Dominant	percent	#present	percent
1	1	8	29.209	14.918			2	2	A	K	1	1	D		**All Locations**				
2	30	8	29.342	14.814			2	1	K	M	2	1	K	A.	Milfoil	1	4%	2	7%
3	28	8	29.458	14.703			1	1	S , T		1	1		D.	Bushy Pondweed	2	7%	8	30%
4	26	6	29.614	14.444	3		3	1	J	K, M, D	3	1	K	F.	Fil. Green Alge	4	15%	9	33%
5	24	7	29.752	14.409			1	1	F	M	2	1	K	J.	Wild Celery	3	11%	6	22%
6	24		29.911	14.388			1	1	D	M.K	1	1	D	K.	European (Spiny) N	14	52%	20	74%
7	24	6	29.894	14.509			3	1	J	D				M	Musk Grass (Cara)	1	4%	6	22%
8	21	4	30.068	14.485			2	2	P	Q, F	2	2	P	P	Richards Pondwee	1	4%	1	4%
9	21	4	30.101	14.441			4	4	K		4	4	K	Q	Sago Pondweed	0		1	4%
10	19	4	30.146	14.377			0	0	F		0	0	F	S	Bladder Wort	1	4%	1	4%
11		5	30.224	14.511			2	2	K	F	2	2	K	T	Flat-stemmed Pond	1	4%	1	4%
12		3	30.066	14.643			1	1	K	F	1	1	K	Z	None	1	4%		
13		6	29.975	14.689			2	1	D	K				ZZ	No rooted plants	5	19%		
14		9	30.010	14.783			1	1	K										
15		9	30.268	14.864			0	0	F						**Shallow Locations**				
16			30.317	14.987			3	2	K	D, J	3	2	K	D.	Bushy Pondweed	2	13%		
17		4	30.280	15.057			1	1	K, M		1	1	K, M	F.	Fil. Green Alge	2	13%		
18		5	30.188	15.168			0	0	F		0	0	F	K.	European (Spiny) N	9	60%		
19		6	30.035	15.139			1	1	K	D				M	Musk Grass (Cara)	1	7%		
20	5	6	29.934	15.265			3	2	K	D, J				S	Bladder Wort	1	7%		
21	2	8	29.746	15.373			1	1	J	F	3	2	K	T	Flat-stemmed Pond	1	7%		
22	3	8	29.608	15.331			0	0	Z					P	Richards Pondwee	1	7%		0%
23		6	29.545	15.394			1	1	K	D				Z	None	0	0%		
24	4	6	29.417	15.424			2	2	K	B,F				ZZ	No rooted plants	2	13%		
25	3	6	29.323	15.260			2	1	K	M, J									
26	2	6	29.240	15.126			2	2	K										
27	1	9	29.185	14.978			2	2	K	A									