Saratoga Lake

Aquatic Vegetation Management Program
2008 - Year Two Report

November 2008

Prepared for:

Saratoga Lake Protection & Improvement District
P.O. Box 2551
Ballston Spa, NY 12020

Prepared by:

Aquatic Control Technology, Inc.
11 John Road
Sutton, MA 01590

AQUATIC CONTROL TECHNOLOGY, INC.
POND AND LAKE MANAGEMENT SPECIALISTS

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INTRODUCTION

The multiple-year herbicide treatment program targeting control of the dense beds of Eurasian watermilfoil at Saratoga Lake was continued for the second consecutive year in 2008. The project continued to follow the multi-faceted approach detailed in the *Environmental Impact Statement (EIS) for Saratoga Lake Invasive Species Long-Term Management Plan* (The LA Group, July 2006).

In 2007, the initial year of this program, pellet formulations of Sonar (fluridone) herbicide were applied to approximately 300 acres located at the southern end of the lake. The targeted Eurasian watermilfoil (EWM) beds were successfully controlled, but the slow response of the plants and the inability to sustain fluridone concentrations above 5 ppb throughout the entire treatment area validated concerns that Sonar herbicide could not be used effectively to treat EWM beds along the more exposed eastern and western shorelines of the lake. Instead, Renovate OTF (triclopyr flake) herbicide was proposed for treatment of the eastern shoreline in 2008. Similar to fluridone, triclopyr is systemic-acting herbicide that controls the entire plant including the root structures. However, its different mode of action only requires days of contact time with the targeted EWM plants, as opposed to the months required for fluridone. Triclopyr had also shown to be highly selective for EWM, as it primarily impacts dicot plants and many of the desirable native species (e.g. *Potamogeton* spp.) are monocots. The Renovate OTF flake formulation was proposed for use to help overcome the effects of dilution along this exposed shoreline.

The Saratoga Lake Protection and Improvement District (SLPID) was the project applicant/proponent. SLPID served as the Lead Agency for this project and was responsible for coordination of the various entities involved in the treatment program, as well as continuing to operate the sizeable mechanical harvesting operation. The LA Group serves as SLPID's primary lake management consultant and was largely responsible for permitting and project oversight. The herbicide treatment program was performed by Aquatic Control Technology, Inc. The Darrin Fresh Water Institute (DFWI) conducted the comprehensive post-treatment aquatic vegetation survey. SUNY Cobbleskill was retained to perform the fish surveys required by the New York State Department of Environmental Conservation (NYSDEC).

The following report summarizes the results of the 2008 Renovate OTF herbicide treatment performed by Aquatic Control Technology, Inc. (ACT). An interim report of the aquatic vegetation survey performed by DFWI is provided, which should fulfill the requirements of the NYSDEC permit. A copy of the full DFWI report will be submitted under separate cover, as will the results of the SUNY Cobbleskill fish survey.

HERBICIDE TREATMENT PROGRAM - 2008

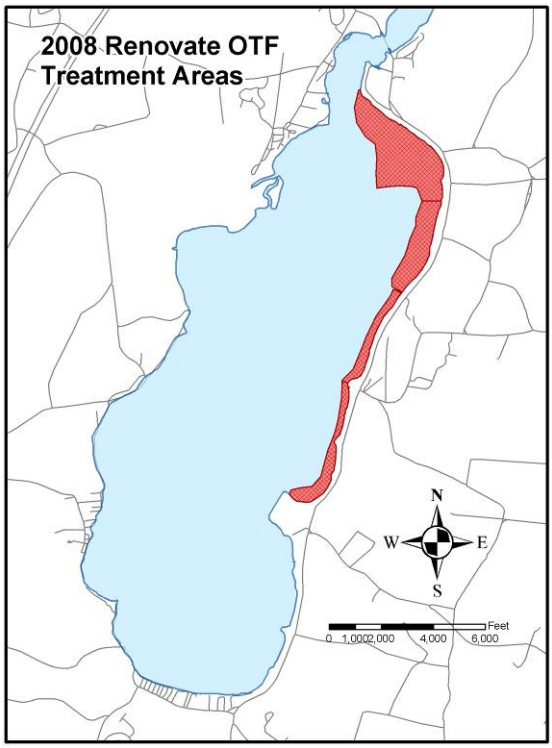
Program Chronology

A chronology of the 2008 treatment program is provided below:

- NYSDEC permit issuance (#5-4199-00002/00008)..... May 23
- Pre-treatment inspection and finalize treatment areas..... May 7
- Renovate OTF treatment..... May 27 – May 30
- Herbicide residue monitoring..... June 19
- Inspections (ACT)..... July 11, August 6, October 3
- Comprehensive aquatic plant survey (DFWI)..... August

Treatment Areas

The 2008 treatment area included the eastern shoreline extending from the narrows south of the Route 9P Bridge and adjacent to Franklin Beach Road to the north side of Snake Hill. The entire treatment area encompassed 292 acres.



The majority of EWM growth was found in water depths between 5 and 20 feet. The average water depth of EWM beds throughout the treatment area was estimated to be 8 feet. EWM beds in the widest section at the north end extended out 2,500 feet from shore in some locations. The narrower sections closer to Snake Hill extended out 300-400 feet from shore.

During the pre-treatment inspection performed on 7 May 2008, the outer edge of the EWM beds were marked with using a high-resolution depth finder and a GPS unit and the 2008 treatment areas were finalized.

Pre-Treatment Inspection

The treatment area was inspected on 7 May 2008 to assess the extent of EWM growth, verify the treatment areas, and to assess shoreline access for loading herbicide onto the treatment boats. Active EWM growth was observed throughout the treatment area. In most locations, EWM plants were between 2 and 3 feet tall. EWM and curlyleaf pondweed (*Potamogeton crispus)* were showing the most active growth of new plant tissue. Water temperature ranged from 16° C at the surface to 12° C at 5 meters. Dissolved oxygen concentrations were fairly uniform between 10.4 and 11.3 mg/l through the water column.

Treatment Planning and Protocol

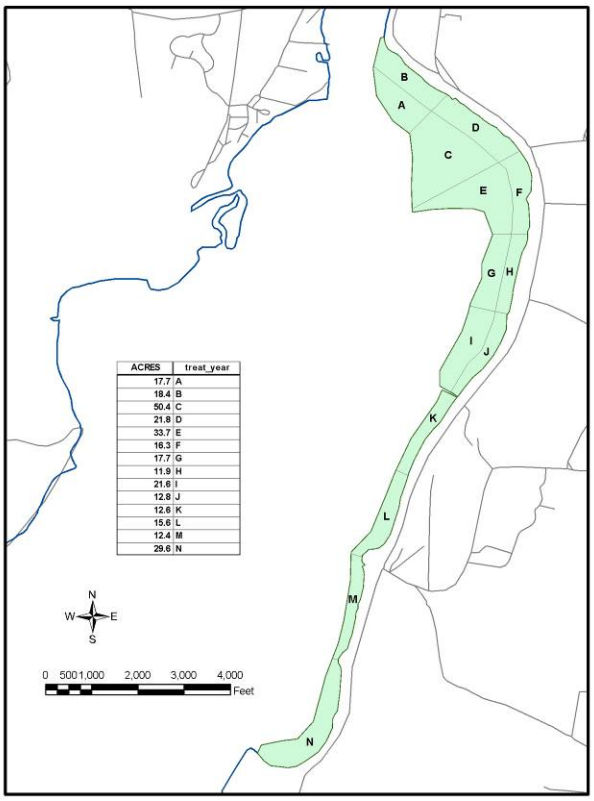
A considerable amount of planning was necessary to coordinate the 2008 treatment. Renovate OTF is a 10 percent formulation of triclopyr (EPA Reg. No. 67680-42 / SLN NY 070004). The proposed dose of 2.0-2.25 ppm in the bottom 4 feet of the water column required the application of 220 to 240 pounds of Renovate OTF per acre treated. In total, 66,920 pounds were proposed to treat 292 acres.

SLPID located and leased a storage bay on Route 9P approximately 0.2 miles south of the State Boat Launch. This was located between the two sites used for shoreline loading – the State Boat Launch at the Route 9P Bridge and the paved access point on the lake located opposite Fitch Road that is used for harvester off-loading. The Renovate OTF was delivered during the week of 19 May 2008. During the actual application, Renovate OTF was loaded onto pickup trucks and delivered to the shoreline loading locations. The 40 pound bags of Renovate OTF were transferred from the truck to the treatment boats using steel roller-conveyors. At the State Boat Launch the boats pulled up on a sandy shoreline just north of the boat ramp. At the Fitch Road site, a temporary aluminum dock was installed and used for the herbicide loading.

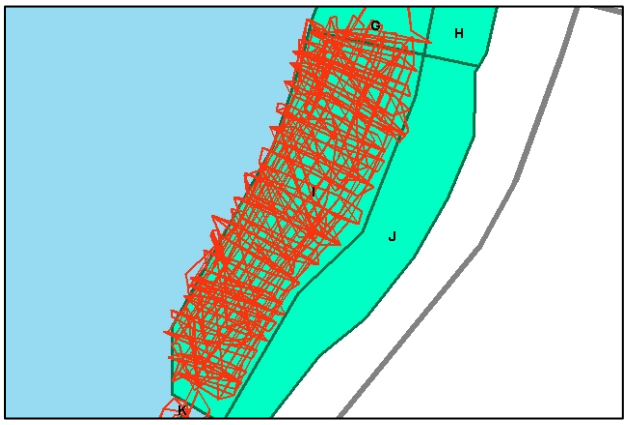
The treatment area was divided into 14 sectors that ranged in size from 12 to 50 acres. The total number of pounds of Renovate OTF (and number of 40 pound bags) was calculated for each site and a log sheet was created as an application record for the treatment boats.

Treatment Sector Table and Map

SECTOR	ACRES	OTF RATE (LBS/AC)	TOTAL LBS	# BAGS	Load (date / # bags / time)
A	17.7	220	3887	97	
B	18.4	220	4039	101	
C	50.0	220	11000	275	
D	21.8	220	4803	120	
E	33.5	220	7370	184	
F	16.3	220	3580	89	
G	17.7	240	4250	106	
H	11.9	240	2863	72	
I	21.6	240	5193	130	
J	12.8	240	3061	77	
K	12.6	240	3035	76	
L	15.6	240	3746	94	
M	12.4	240	2968	74	
N	29.6	240	7115	178	



The treatment was performed using two work skiffs. Both boats were outfitted with a granular eductor spray system that fed the granular herbicide into a stream of water using a calibrated venturi-type eductor. The mixture was then sprayed off the stern of each boat through fan-jet pattern nozzles. This system allowed for the granular herbicide to be evenly distributed throughout the treatment areas as a course spray and the "flash-mixing" the granules with water before application significantly reduced the potential for airborne dust and off-target drift. Again both boats were equipped with Differential/WAAS GPS navigation systems to insure that the herbicide was evenly applied to the designated treatment areas. (see below)



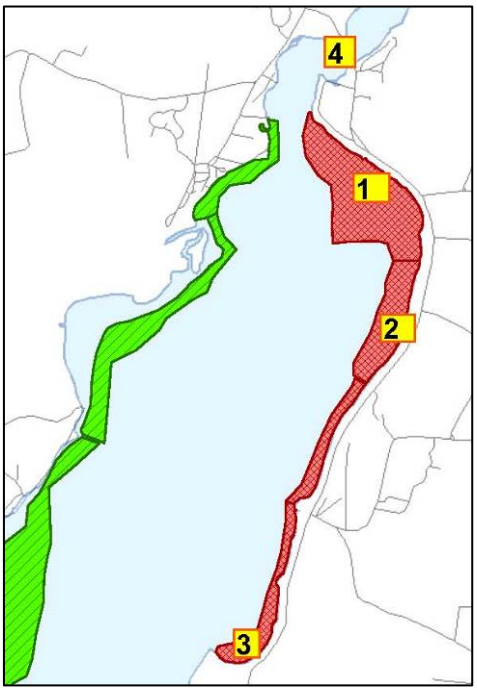
Treatment Summary

The treatment was completed between 27 May 2008 and 30 May 2008. Weather conditions were noted during each day of treatment and are summarized as follows.

Day	Wind Direction	Estimated Wind Speed (mph)	Air Temperature	Conditions
May 27 Tuesday	SW / W	5-15 variable	70° F	Mostly sunny; 1-2 foot waves building in evening
May 28 Wednesday	SW	<5	75° F	Sunny; calm
May 29 Thursday	S / SW	10-15 steady	60-65° F	Overcast; 1-2 foot waves all day
May 30 Friday	S	<5	75-80° F	Partly sunny; calm

The treatment proceeded through the sectors from north to south. The wind and waves on May 27 and May 29 prevented the treatment boats from being loaded at the Fitch Road site. The boats traveled back to the State Boat Launch for each load. This involved traveling through the no-wake zone each way, which added an estimated 30 minutes of travel time to each load. The calm conditions on May 28 and May 30 allowed the boats to be loaded at the Fitch Road site. This was especially advantageous on May 28 when the majority of treatment occurred in the sectors closest to Fitch Road (C, D, E, F, G & H). Approximately 27,000 pounds of Renovate OTF were applied by the two boats on May 28.

The granular eductor system distributed Renovate OTF at an average rate of 25 pounds per minute. A total of 66,920 pounds of Renovate OTF were applied. Each treatment boat had a New York State Certified Applicator and one assistant. There was one additional ACT assistant on-shore delivering herbicide to the on-shore loading locations using pickup trucks. No problems were encountered during the four days of application. All empty Renovate OTF bags were triple rinsed on-site and then brought back to ACT's Sutton, MA facility for recycling/disposal.



Herbicide Residue Testing

Since triclopyr only requires a relatively short contact time, extensive monitoring of in-lake concentrations was not performed. One round of samples was collected from four locations on 19 June 2008 by SLPID for analysis of in-lake triclopyr residues. Collected samples were shipped via overnight delivery to SePRO's laboratory in Whittakers, North Carolina and analyzed using their immunoassay procedure. By that time, the concentration was <1 ppb at all sampled locations and SLPID was notified that the restriction on using lake water for irrigation purposes could be lifted. Laboratory results are provided in Appendix A.

Post –Treatment Inspections

The first post-treatment inspection was performed by representatives from ACT, SLPID and the LA Group on 11 July 2008. There were overcast skies and light wind. Visibility was fair. The treatment area was toured by boat and visually assessed. A throw rake was used to sample the submersed plant community in several locations.

This was six weeks (42 days) after completion of the treatment. No viable, rooted EWM was seen in the treatment area. In addition, no EWM was seen at the south end. The EWM plants found along the west side of the lake were generally 4-5 feet below the surface, the stems appeared to be bent and the leaves were exhibiting a stunted or "clubbed" appearance. Nowhere in the lake were large beds of EWM found approaching the surface, which would certainly have been true in the middle of July in prior years.

Native plants appeared to be growing robustly throughout the treatment area and in all other portions of the lake. SLPID's harvester operators reported that the majority of the plants being harvested from the southern and western shorelines were native species. Plant species noted during the 11 July 2008 survey included: *Ceratophyllum demersum, Chara sp., Elodea canadensis, Najas spp., Potamogeton illinoensis, P. perfoliatus, P. praelongus, Stuckenia pectinata, Vallisneria americana,* and *Zosterella dubia*.

Another post-treatment inspection was performed on 6 August 2008, immediately prior to the boat tour for DEC Staff arranged by SLPID. Representatives from ACT, SePRO (the manufacturer of Renovate OTF) and the LA Group, toured the lake in similar fashion to the 11 July 2008 survey. Dr. Mark Heilman of SePRO dove and inspected the lake bottom in several locations using snorkeling gear. Observations were similar to the 11 July 2008 survey. Some widely scattered EWM plants were encountered in the treatment area and more extensive cover of EWM was found along the western shoreline.

Native plants found on 8/6/08

EWM plants showing active growth on 8/6/08

ACT conducted a late season visual inspection on 3 October 2008. Still no significant rooted EWM growth was encountered in the 2008 treatment area. Some EWM growth was found directly south of Stony Point in the southwest corner of the lake. This was outer perimeter of the 2007 treatment area. EWM plants did appear to be recovering along the western shoreline. In many locations EWM plants were still 2-3 feet below the surface and were covered with filamentous algae, but they appeared to be actively growing.

Water Quality

The 2008 Renovate OTF treatment did not appear to have any adverse impact on water quality. Temperature and dissolved oxygen profiles were checked in the treatment area during the pre-treatment inspection, the final day of treatment and six weeks post-treatment (Appendix A). Dissolved oxygen concentrations remained near the saturation level throughout the water column. There was a marked drop off in dissolved oxygen concentrations within 1 meter of the bottom, likely due to the high BOD.

No planktonic algal blooms were observed or reported following treatment. During each inspection ACT made at Saratoga Lake, water clarity was estimated to be in excess of 3 meters.

SUMMARY OF LATE SEASON COMPREHENSIVE AQUATIC VEGETATION SURVEY

An interim report of the comprehensive aquatic vegetation survey performed by the DFWI is provided in Appendix B.

The Point-Intercept Rake Toss method utilized was consistent with requirements for NYSDEC Tier III lakes. This approach also replicated the point-intercept survey of Saratoga Lake that was conducted by DFWI in 2004. Unlike the 2007 survey, this year's survey included all 324 point-intercept data points found throughout the lake's entire perimeter littoral zone.

EWM was no longer a dominant species in the 2008 treatment area, being found at only 3% of the surveyed data points (Appendix B – Figure 2). This area was designated as the "Control Area" during the 2007 survey and EWM was by far and away the most widely distributed plant being found at 80% of the surveyed data points. Results reported by DFWI for the 2007 and 2008 surveys are summarized below:

Species Frequency Comparison Between 2007 and 2008 Surveys (reported by DFWI)

2007 Control (Non-Treatment) Area		2008 Treatment Area		2008 Control (Non-Treatment) Area	
Myriophyllum Spicatum	**80%**	*Ceratophyllum demersum*	57%	*Ceratophyllum demersum*	62%
Ceratophyllum demersum	54%	*Vallisneria americana*	31%	*Najas guadalupensis*	39%
Zosterella dubia	44%	*Najas guadalupensis*	25%	*Vallisneria americana*	30%
Vallisneria americana	26%	*Zosterella dubia*	23%	*Elodea canadensis*	30%
Najas guadalupensis	15%	*Elodea canadensis*	22%	***Myriophyllum spicatum***	**26%**
Elodea canadensis	14%	*Potamogeton zosteriformes*	14%	*Zosterella dubia*	23%
Potamogeton zosteriformes	11%	*Najas flexilis*	13%	*Potamogeton zosteriformes*	15%
Potamogeton pusillus	10%	*Chara* sp.	11%	*Potamogeton pusillus*	7%
Potmogeton perfoliatus	10%	*Potamogeton pusillus*	10%	*Lemna trisulca*	5%
Chara sp.	10%	*Potamogeton perfoliatus*	10%	*Potamogeton illinoensis*	4%
Najas flexilis	3%	***Myriophyllum spicatum***	**3%**	*Najas flexilis*	3%

Again, it is important to note that 2007 Control Area and the 2008 Treatment Area are largely the same area along the northeastern and eastern shoreline of the lake. Aside from the dramatic reduction in EWM (80% in 2007 to 3% in 2008), the frequency of occurrence of the other dominant species was fairly similar. Most noteworthy was reduced frequency of Zosterella dubia and increased frequency of Najas guadalupensis and Elodea canadensis.

The average number of species per sample point was similar: 2007 Control Area (2.83 ± 0.23), 2008 Treatment Area (2.40 ± 0.13), and 2008 Control Area (2.47 ± 0.17). The differences probably explained by the absence of EWM in the 2008 Treatment Area. The species richness seen following the 2008 Renovate OTF treatment was also higher than values reported for 2007 Sonar herbicide treatment area (1.77 ± 0.19).

SUMMARY RECOMMENDATIONS FOR 2009 MANAGEMENT PROGRAM

The 2008 Renovate OTF treatment achieved nearly complete control of EWM with exceptional preservation of native species. Native plants were exhibiting robust growth within six weeks of the treatment and they became so well established near shore that SLPID had their harvesters cut shoreline access channels through some of the most abundant beds. The diversity of native plants provided significant horizontal and vertical plant structure throughout the water column.

It was encouraging to see the carryover control of EWM at the southern end of the lake from the 2007 Sonar herbicide treatment program. Based on the stunted condition of EWM plants seen along the western shoreline, it would appear that they were exposed to low-level concentrations of triclopyr. EWM growth was slowed during the summer months, but the plants appeared to be recovering in early October.

It is expected that EWM plants will continue to grow out of any effects from this sub-lethal triclopyr exposure during the 2009 season. No impacts to native plants were observed along the western shoreline.

Due to differences at each water body it is difficult to predict the duration of EWM control following herbicide treatments. Based on evidence from smaller-scale Renovate herbicide treatments performed Vermont in 2006 and 2007, good carryover EWM control is expected in the 2008 treatment area through the 2009 season. In addition, nuisance level EWM control in the 2007 Sonar treatment area at the southern end of the lake is also expected through the 2009 season.

It is recommended that SLPID proceed with the planned Renovate OTF treatment of the western shoreline in 2009. Even though the EWM plants were partially impacted by the 2008 Renovate OTF treatment, they remained widely distributed along the western shoreline and appeared to be recovering by the end of the year. Treating the western shoreline in 2009 before the EWM plants completely recover may help extend the duration of EWM control that can be achieved.

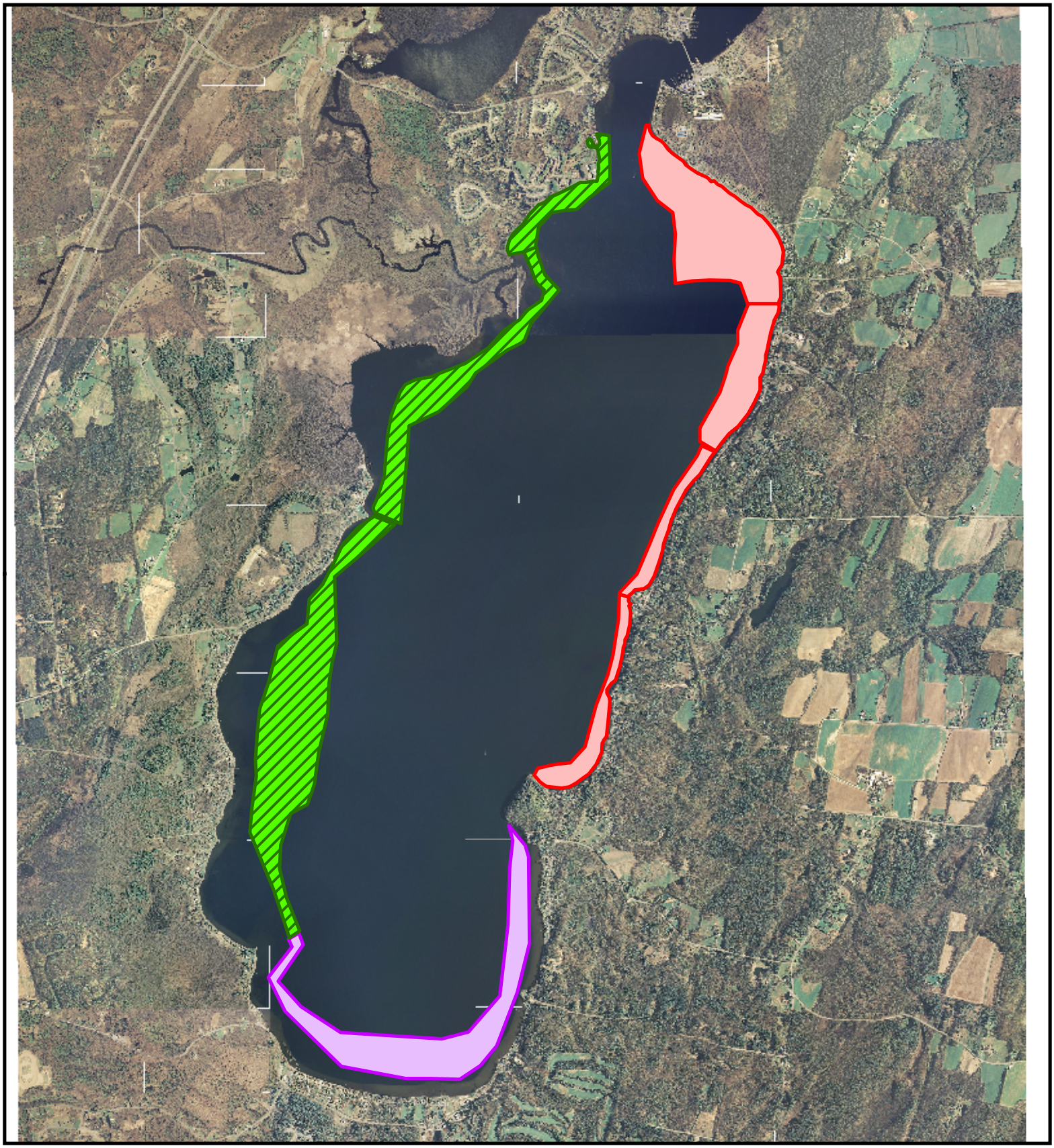
Approximately 300 acres of EWM beds along the western shoreline are targeted for treatment in 2009. Based on observations during the 3 October 2008 survey and the interim DFWI survey results, the extent of these EWM beds appears to be accurate. A pre-treatment survey should be performed in early-mid May 2009 to finalize treatment areas and to determine if any reduction to the treatment area can be made.

The timing and protocol used for the 2008 treatment appeared to be ideal. The treatment was completed over a four-day period, immediately following Memorial Day. This minimized disruption to recreational use of the lake. The triclopyr concentrations dropped below detectable limits within three weeks of the treatment, allowing for the restriction on using lake water for irrigation purposes to be lifted by the end of June. EWM plants had completely collapsed out of the water column by early July and there did not appear to be any adverse impact on the growth of native plant species.

Treatment of the western shoreline in 2009 will target the remaining dense EWM beds in Saratoga Lake. Renovate OTF appears to provide highly selective tool for EWM control. It is obviously effective for large block treatments. Future treatment efforts, in 2010 and beyond, will likely be smaller in scope and will target more challenging areas with stubborn EWM regrowth. The treatment protocol will likely need to be modified to insure efficacy of smaller scale Renovate OTF treatments.

APPENDIX A

- Three-Year (2007-2009) Treatment Area Overview Map
- 2008 Temperature / Dissolved Oxygen Profiles
- 2008 Triclopyr Residue Testing Results



SARATOGA LAKE

Eurasian Watermilfoil Treatment Areas

FIGURE:	SURVEY DATE:	MAP DATE:
2009_1	2008	11/25/08

Legend:

- 2009 Renovate OTF Treatment Area
  298 acres (proposed)
- 2008 Renovate OTF Treatment Area
  292 acres (completed)
- 2007 Sonar PR/Q Treatment Area
  158 acres (completed)

N

0 500 1,000 2,000 3,000 4,000 5,000 6,000 Feet

AQUATIC CONTROL TECHNOLOGY, INC.
11 JOHN ROAD
SUTTON, MASSACHUSETTS 01590
PHONE: (508) 865-1000
FAX: (508) 865-1220
WEB: WWW.AQUATICCONTROLTECH.COM

TEMPERATURE / DISSOLVED OXYGEN PROFILES **Saratoga Lake 2008 Season**

5/7/2008	Pre-Treatment Inspection at Fitch Road									
Depth (m)	**Temp**		**DO**							
	(Deg C)	**(Deg F)**	**(mg/l)**							
Surf	16.2	61.2	10.5							
1	15.0	59.0	10.9							
2	13.5	56.3	11.3							
3	13.2	55.8	11.2							
4	13.1	55.6	11.1							
5	13.0	55.4	10.4							
5/30/2008	Treatment at section C - Fitch Road					**5/30/2008**	Treatment at section M - Snake Hill			
Depth (m)	**Temp**		**DO**			**Depth (m)**	**Temp**		**DO**	
	(Deg C)	**(Deg F)**	**(mg/l)**				**(Deg C)**	**(Deg F)**	**(mg/l)**	
Surf	19.5	67.1	11.5			Surf	18.4	65.1	14.2	
1	18.3	64.9	11.3			1	16.6	61.9	10.6	
2	17.9	64.2	10.8			2	16.4	61.5	10.6	
3	17.8	64.0	11.1			3	16.2	61.2	10.4	
4	17.1	62.8	6.8			4	16.2	61.2	10.3	
5	17.2	63.0	1.1	(bottom)		5	16.4	61.5	8.5	(bottom)
7/11/2008	Post-Treatment Inspection at Fitch Road									
Depth (m)	**Temp**		**DO**							
	(Deg C)	**(Deg F)**	**(mg/l)**							
Surf	25.9	78.6	8.8							
1	25.9	78.6	9.8							
2	25.8	78.4	10.2							
3	25.4	77.7	7.8	(bottom)						

Cooperator:	Aquatic Control Technology, Inc			**Phone:**	**Fax:**
Gerald Smith	11 John Rd			(508) 865-1000	(508) 865-1220
Territory: Sarah Miller	Sutton	MA	01590-		

Sample	Date(s) Treated	Herbicide	Date Collected	Rate Applied	Acres Treated	Sample Location Description	Results	UOM
1.	05/30/08	Renovate 3		2.0-2.5ppm		1	<1.0	ppb
2.	05/30/08	Renovate 3		2.0-2.5ppm		2	<1.0	ppb
3.	05/30/08	Renovate 3		2.0-2.5ppm		3	<1.0	ppb
4.	05/30/08	Renovate 3		2.0-2.5ppm		4	<1.0	ppb
5.								
6.								
7.								
8.								
9.								
10.								

Depth Sample Collected:	surface	**Date Sample Received:**	6/20/2008
Storage Conditions:	Refrigerated	**Condition of Sample(s) Box/Water Containers:**	Excellent / excellent
Date Shipped to SePRO:	6/19/2008	**Date Analysis was Performed:**	6/24/2008

Run #: 30 **% Control Rec:** 98 **Correlation:** 1 **Date Results Sent to Cooperator:** 6/25/2008

Back of Data Sheet

Name of Waterbody:	Saratoga Lake	**Size of Waterbody in Acres:**	
Average Depth in Feet:	0	**Target Plant(s) to Control:**	

Back of Data Sheet

APPENDIX B

Interim Report - Comprehensive Aquatic Vegetation Survey

(prepared by Darrin Fresh Water Institute)

Interim Report on Vegetation of Saratoga Lake, New York

Lawrence W. Eichler and Charles W. Boylen
Darrin Fresh Water Institute
Bolton Landing, NY 12814
(518) 644-3541 (voice) (581) 644-3640 (fax)
eichll@rpi.edu boylec@rpi.edu

Background.

Quantitative aquatic plant surveys were undertaken for Saratoga Lake, New York as part of a cooperative effort between Aquatic Control Technologies (ACT) and the Darrin Fresh Water Institute, and supported by the Saratoga Lake Protection and Improvement District (SLPID). The aquatic plant survey was designed to be comparable to pre-treatment and post-treatment data collected by the author in 2004 and 2007 (Eichler & Boylen 2004; 2007) to evaluate a treatment program based on application of the herbicide fluridone (SONAR^{TM}) in 2007 and the herbicide triclopyr (Renovate) in 2008 to control Eurasian watermilfoil (*Myriophyllum spicatum*). The Point-Intercept Rake Toss method presently required by NYS DEC for Tier III Lakes was employed.

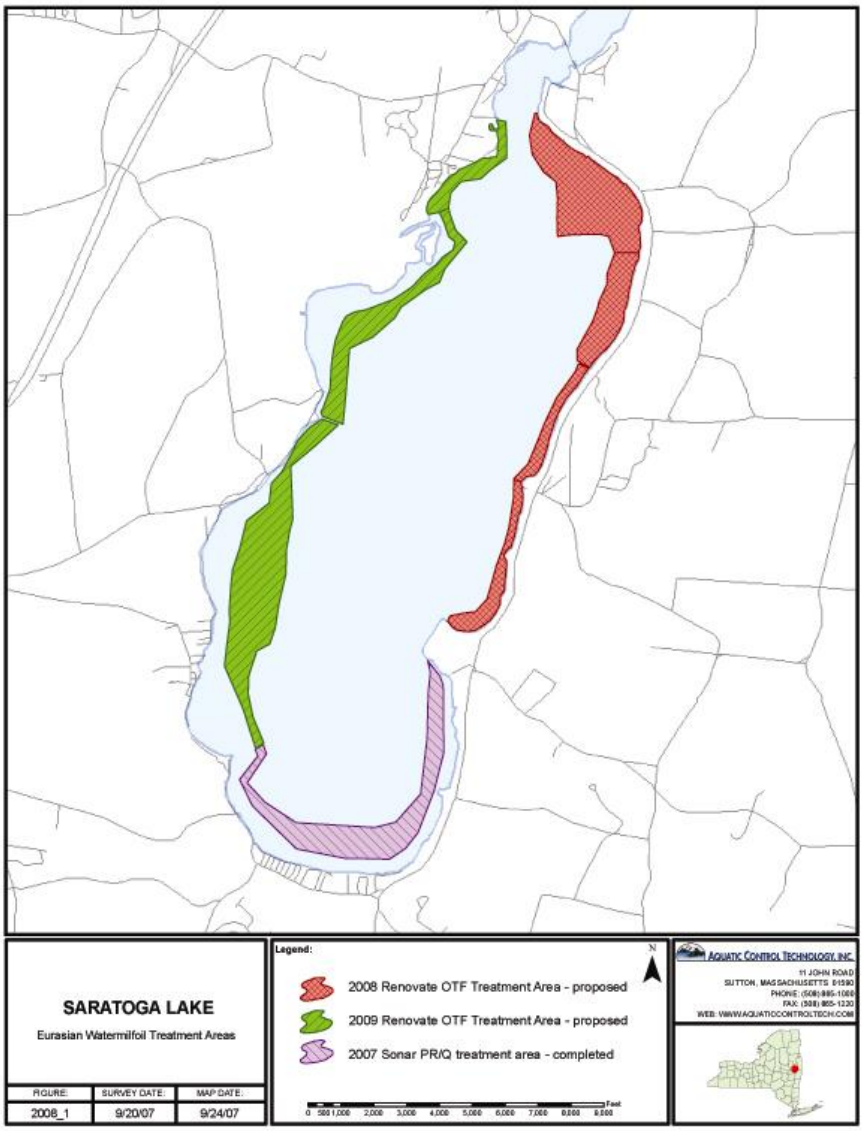
The survey area encompassed the entire littoral zone of Saratoga Lake, with a focus on the southern and northern treatment areas (treatment area plus 20-25%) plus control survey areas on the western side of Saratoga Lake. The control (non-treatment) area was surveyed to document annual variation in plant composition.

The project was designed to obtain data to evaluate current aquatic plant management efforts and review potential new strategies. The assessment will generate the information necessary to: 1) review effectiveness of aquatic plant management efforts, 2) meet all permit requirements and 3) provide data for comparison of post-treatment conditions to prior survey information.

Methods

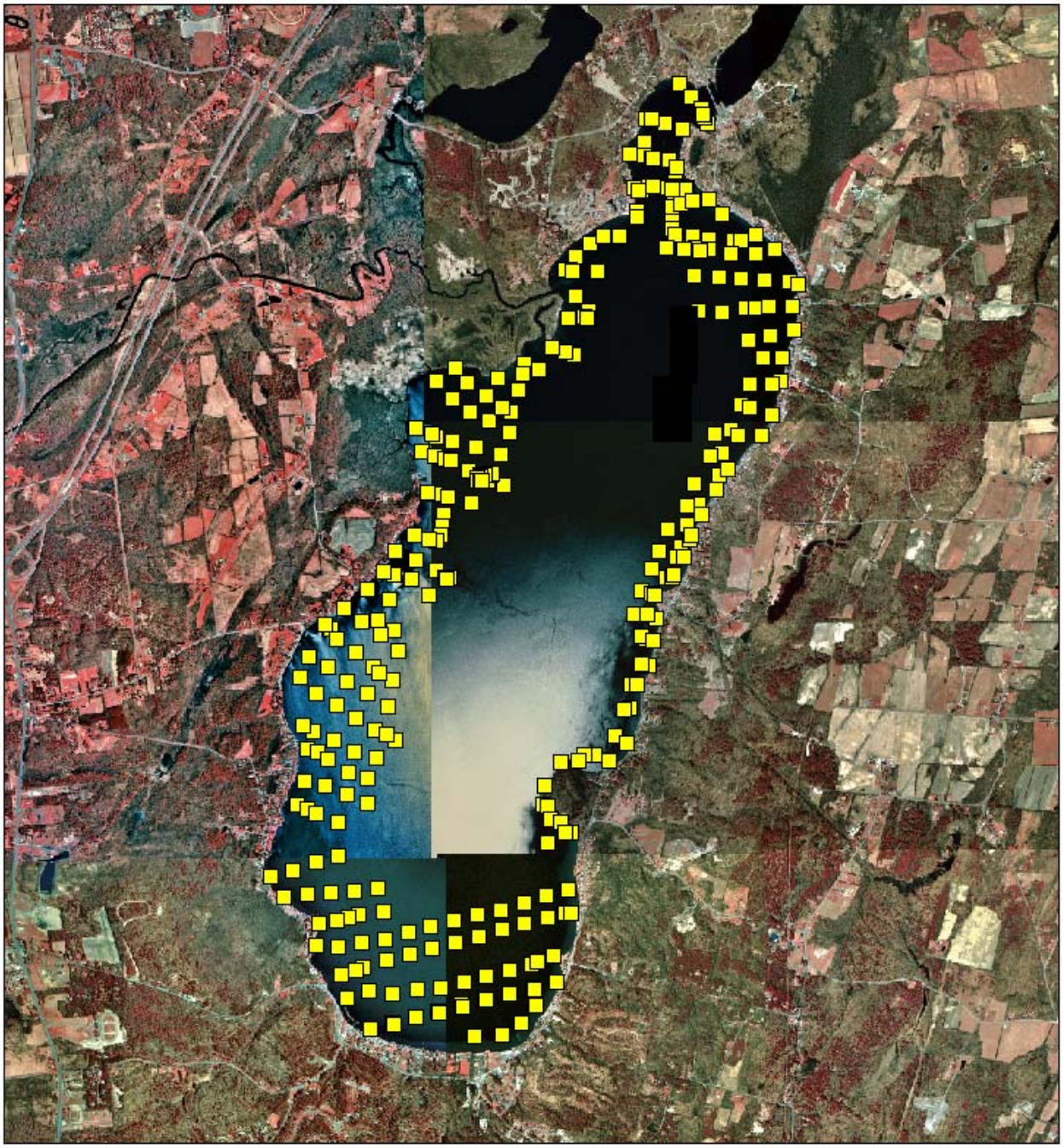
1. Species List and Herbarium Specimens. As the lake was surveyed, the occurrence of each aquatic plant species observed was recorded and adequate herbarium specimens collected. Herbarium specimens were pressed, dried, and mounted (Hellquist 1993) at the Darrin Fresh Water Institute Laboratory in Bolton Landing, NY, where they became part of the permanent collection.

2. Point Intercept. The frequency and richness of aquatic plant species were evaluated using a point intercept (rake toss) method (Madsen 1999). At each grid point intersection, all species



located at that point were recorded, as well as water depth. Species were located by a visual inspection of the point and by deploying a rake to the bottom, and examining the plants retrieved. A differential global positioning system (DGPS) was used to navigate to each point for the survey observation. Point intercept plant frequencies were surveyed in August of 2008, at the time of maximum aquatic plant abundance. Based on an 80 m grid and excluding the majority of points outside the littoral zone, we surveyed a total of 324 points on Saratoga Lake. The point intercept method allows a large number of discrete observations in a short period of time facilitating statistical analysis and comparisons. Point intercept methods also allow for production of distribution maps for all species listed.

Figure 1. Sampling points for 2008 Saratoga Lake aquatic plant survey.



Results

1. Species List. A preliminary list of species observed for Saratoga Lake is provided in Table 1. A total of 22 species were collected in the point intercept portion of the survey. Twenty-one species were present in the control areas and 18 species in the treatment areas.

2. Species Frequency. Species richness in Saratoga Lake was quite high, with a large number of species occurring in more than 5% of survey points (Table 2). In the control portion of the survey, Eurasian watermilfoil was the fifth most widely distributed plant (26% of survey points, Figure 2), a number of native species were commonly observed. Common species included *Ceratophyllum demersum* (62%), *Najas guadalupensis* (39%), *Vallisneria americana* (30%), *Elodea canadensis* (30%), *Zosterella dubia* (23%), *Potamogeton zosteriformes* (15%) and *Potamogeton pusillus* (7%). In the treated portion of the survey, Eurasian watermilfoil was no longer a dominant plant (3% of survey points, Figure 2). A number of native species were commonly observed, including *Ceratophyllum demersum* (57%), *Vallisneria americana* (31%), *Najas guadalupensis* (25%), *Zosterella dubia* (23%), *Elodea canadensis* (22%), *Potamogeton zosteriformes* (14%), *Najas flexilis* (13%), *Chara* sp. (11%), *Potamogeton pusillus* (10%) and *Potamogeton perfoliatus* (10%). Average number of species per sample point was greater in the control area (2.57 ± 0.17) than the treated area (2.40 ± 0.13), however Eurasian watermilfoil accounted for the additional species in many of the cases.

Figure 2. Distribution of Eurasian watermilfoil (*Myriophyllum spicatum*) in surveyed areas of Saratoga Lake in 2008.

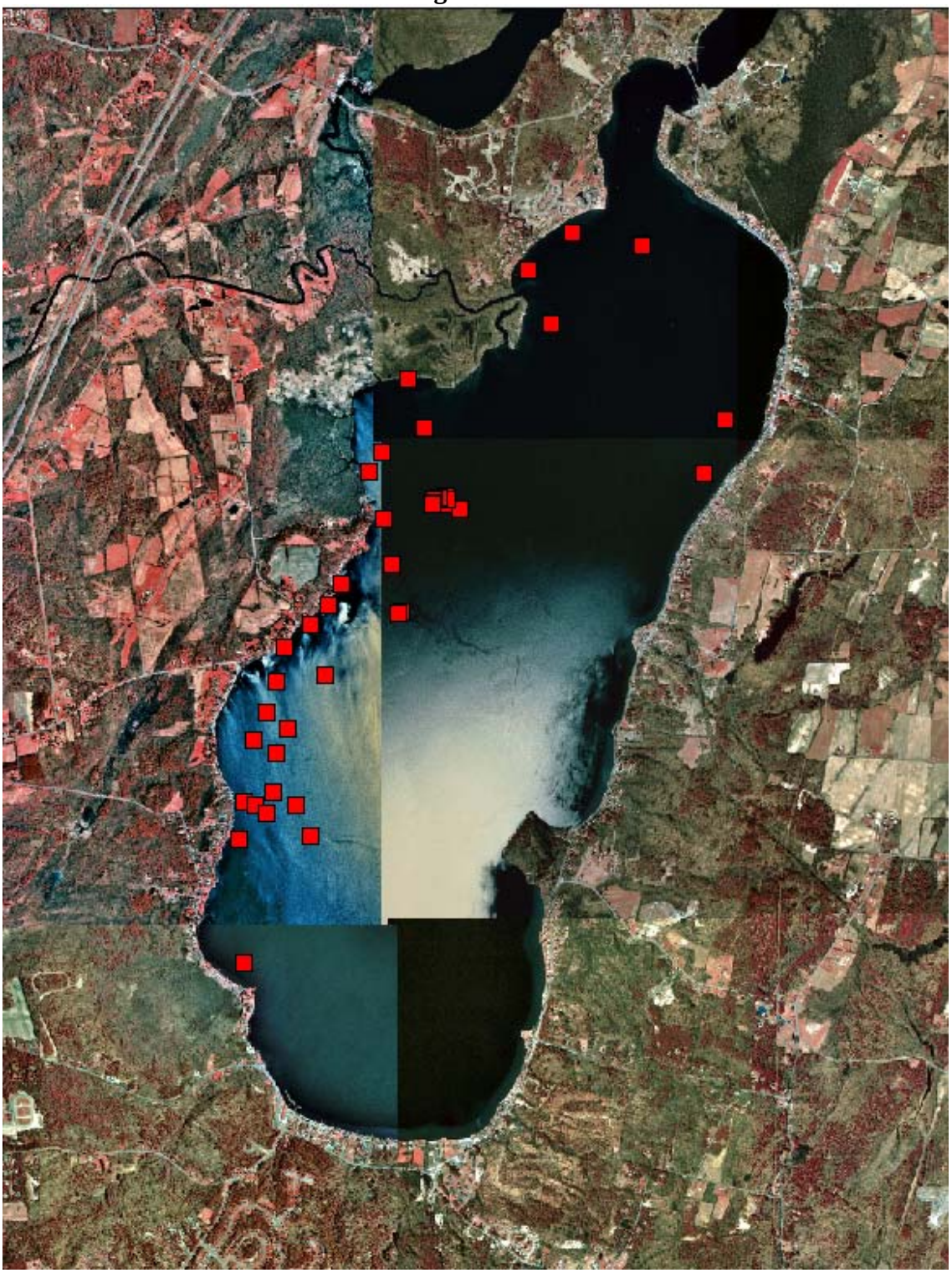


Table 1. Aquatic plant species present in Saratoga Lake in recent surveys.

Species	**Common Name**	**1932**	**1969**	**1982**	**1994**	**2004**	**2007**	**2008**
Ceratophyllum demersum L.	coontail	x	x	x	x	x	x	x
Chara/Nitella sp.	muskgrass, chara		x	x	x	x	x	x
Eleocharis acicularis (L.) Roemer & Schultes	needle spike-rush	x		x	x	x		
Elodea canadensis Michx.	elodea	x	x	x	x	x	x	x
Eriocaulon septangulare With.	pipewort				x			
Lemna minor L.	duckweed	x	x	x	x	x	x	x
Lemna trisulca	duckweed					x	x	x
Megalodonta beckii Torr.	water marigold				x	x	x	x
Myriophyllum sibiricum	northern watermilfoil		x					
Myriophyllum spicatum L.	Eurasian watermilfoil			x	x	x	x	x
Najas flexilis (Willd.) Rostk. & Schmidt.	bushy pondweed		x		x	x	x	x
Najas minor				x				
Najas guadalupensis (Spreng.) Magnus	Southern naiad			x	x	x	x	x
Nuphar luteum (Ait.) Ait. f.	yellow pondlily		x	x	x	x	x	x
Nymphaea odorata	white pondlily		x	x		x	x	x
Pontederia cordata	pickerelweed	x	x			x	x	x
Potamogeton amplifolius Tuckerm.	largeleaf pondweed	x	x	x	x	x	x	x
Potamogeton crispus L.	curlyleaf pondweed	x	x	x	x	x	x	x
Potamogeton epihydrus Raf.	ribbon-leaf pondweed				x			
Potamogeton gramineus L.	variable-leaf pondweed				x	x	x	x
Potamogeton illinoensis L.	Illinois pondweed					x	x	x
Potamogeton natans	pondweed	x	x					
Potamogeton perfoliatus L	Clasping-leaved Pondweed				x	x	x	x
Potamogeton praelongus Wulfen	white-stem pondweed	x			x	x	x	x
Potamogeton pusillus L.	small pondweed		x		x	x	x	x
Potamogeton richardsonii (Ar. Benn.) Rydb.	Richardsons' pondweed		x	x		x		
Potamogeton robbinsii Oakes	Robbins' pondweed		x	x	x			x
Potamogeton zosteriformis Fern.	flat-stem pondweed				x	x	x	x
Ranunculus longirostris Godron	white watercrowfoot				x	x		
Sagittaria graminea Michx.	arrowhead	x	x	x	x	x		
Scirpus	rush	x	x					
Sparganium sp.	burreed	x			x			
Spirodela polyrhiza (L.) Schlieden	great duckweed			x	x			

Species	**Common Name**	**1932**	**1969**	**1982**	**1994**	**2004**	**2007**	**2008**
Stuckenia pectinata L.	sago pondweed			**x**	**x**	**x**	**x**	**x**
Trapa natans L.	waterchestnut				**x**	**x**	**x**	
Typha	cattail	**x**	**x**	**x**	**x**	**x**	**x**	**x**
Utricularia vulgaris L.	great bladderwort				**x**			
Vallisneria americana L.	wild celery	**x**	**x**	**x**	**x**	**x**	**x**	**x**
Wolffia	watermeal		**x**	**x**				
Zosterella dubia Jacq.	water stargrass			**x**	**x**	**x**	**x**	**x**

Table 2. Percent frequency of occurrence of aquatic plant species in Saratoga Lake, lakewide (all) and in the treated and control areas.

Species	**All**	**Control**	**Treated**
Myriophyllum spicatum	**13.0%**	**25.9%**	**3.2%**
Ceratophyllum demersum	59.0%	61.9%	56.8%
Zosterella dubia	23.1%	23.0%	23.2%
Vallisneria americana	30.6%	29.5%	31.4%
Najas guadalupensis	30.9%	38.8%	24.9%
Elodea canadensis	25.3%	29.5%	22.2%
Chara/Nitella	6.8%	1.4%	10.8%
Potamogeton zosteriformes	14.5%	15.1%	14.1%
Najas flexilis	8.6%	2.9%	13.0%
Potamogeton perfoliatus	5.9%	0.7%	9.7%
Lemna trisulca	2.2%	5.0%	0.0%
Megalodonta beckii	0.9%	1.4%	0.5%
Potamogeton illinoensis	4.0%	4.3%	3.8%
Potamogeton praelongus	2.8%	2.2%	3.2%
Potamogeton crispus	5.6%	1.4%	8.6%
Potamogeton pusillus	8.6%	6.5%	10.3%
Potamogeton gramineus	0.3%	0.0%	0.5%
Nuphar luteum	0.6%	1.4%	0.0%
Potamogeton amplifolius	1.2%	2.9%	0.0%
Stuckenia pectinata	2.5%	1.4%	3.2%
Nymphaea odorata	0.6%	0.7%	0.5%
Potamogeton robbinsii	0.3%	0.7%	0.0%

3. References

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