

November 29, 2011

John Bennett, Pesticide Control Specialist
 Bureau of Pesticide Management
 NYDEC Region 5 Warrensburg Sub-Office
 232 Golf Course Road
 Warrensburg, NY 12885-0220

Re: Annual Report – Saratoga Lake Herbicide Treatment Program – DEC # 5-4199-00002/00008 & 00010

Dear Mr. Bennett:

Please accept the following as the Annual Report for the 2011 aquatic herbicide treatment program that was performed in Saratoga Lake.

Project Applicant / Lead Agency:	Saratoga Lake Protection and Improvement District (SLPID)
Applicant Contact:	Joe Finn, SLPID Commissioner [518- 581-0409 or jfynn14@nycap.rr.com]
Applicator:	Aquatic Control Technology, Inc. / Reg . # 07865 Gerald Smith / Applicator ID# C062471 [508-865-1000 or gsmith@aquaticcontroltech.com] Marc Bellaud / Applicator ID# C0806081 [508-865-1000 or mbellaud@aquaticcontroltech.com]
Lake Manager:	Dean Long, Director of Environmental Planning, The LA Group, P.C. [518-587-8100 or dlong@thelagroup.com]
Vegetation Surveyor:	Lawrence Eichler, Research Scientist, Darrin Fresh Water Institute [518-664-3541 or eichll@rpi.edu]

A summary of the 2011 chemical treatment program performed at the Saratoga Lake is provided below.

INTRODUCTION AND RECENT INVASIVE AQUATIC PLANT MANAGEMENT

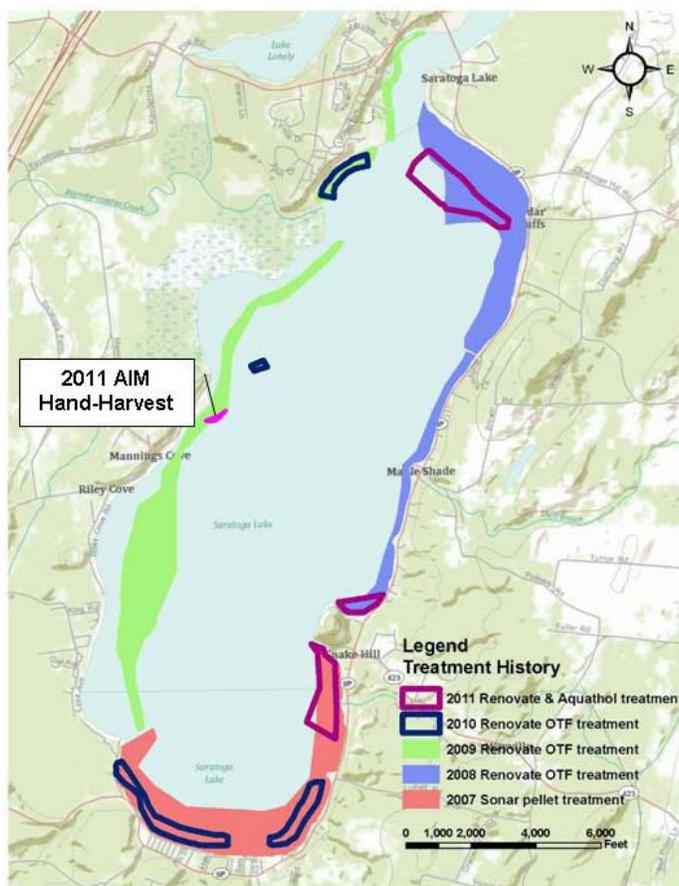
The current invasive aquatic plant management program being conducted on Saratoga Lake is following a comprehensive plan that was developed over several years of investigations and studies. An integrated approach that utilizes winter drawdown, mechanical harvesting, hand-harvesting and herbicide treatments has been employed since 2007. These strategies were detailed in the Watershed Management Plan prepared by The LA Group in 2002, the Long-Term Aquatic Vegetation Management Plan prepared by Aquatic Control Technology in 2005, and the EIS prepared by The LA Group in 2007.

The initial goal of herbicide treatments on Saratoga Lake was to control the dense beds of Eurasian watermilfoil (*Myriophyllum spicatum*) which were documented in 700-800 acres. A phased herbicide treatment program was initiated in 2007 to target all of the dense beds of Eurasian watermilfoil over a three-year period. It was then hoped that drawdown and harvesting could be used to keep nuisance plant growth at manageable levels, and herbicides would be used as a complimentary maintenance strategy to control invasive species.

Since 2007, the following herbicide treatments have been performed at Saratoga Lake:

Year	acres treated	location	herbicide applied
2007	158	south end	Sonar PR & Q (fluridone pellets)
2008	292	northeast and east shore	Renovate OTF (triclopyr granular)
2009	285	northwest and west shore	Renovate OTF (triclopyr granular)
2010	50	various locations	Renovate OTF (triclopyr granular)

Even though the 2007 Sonar herbicide treatment program proved to be very effective, it was determined that dilution due to configuration, flow and “edge-effect” would limit its efficacy in other portions of the lake. Renovate OTF was utilized between 2008 and 2010. The 2008 and 2009 treatments were large applications that provided effective and highly selective control of Eurasian watermilfoil. Some Eurasian watermilfoil recovery was observed by the end of the 2009 season, so smaller-scale spot-treatments were planned and performed using Renovate OTF in 2010.



All of the treatments performed between 2007 and 2010 achieved effective and highly-selective control of Eurasian watermilfoil, but by the end of the 2010 season the Eurasian watermilfoil frequency was again increasing. Considerable increases in the amount of invasive curlyleaf pondweed (*Potamogeton crispus*) were also being documented. This plant was particularly dense in the early part of the summer as it was “topping-out” on the surface by late May and becoming the focus of harvesting efforts in the early part of the season.

Frequency of Occurrence data from DFWI surveys

Plant	2008	2009	2010
Eurasian watermilfoil	13.0%	6.8%	22.1%
Curlyleaf pondweed	5.6%	3.1%	9.4%

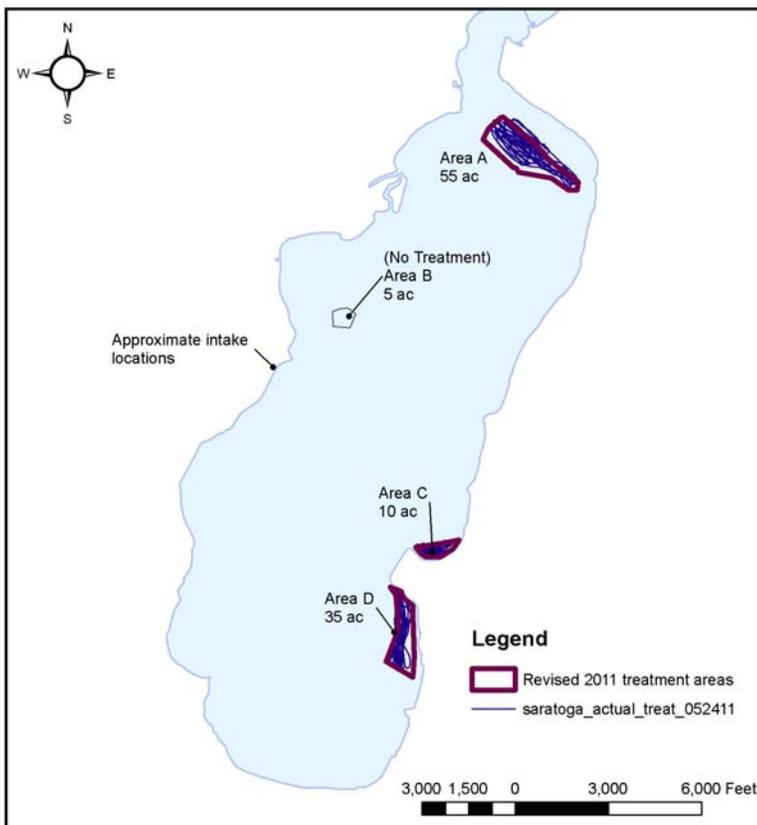
Following the 2010 season, SLPID decided to pursue a more aggressive maintenance herbicide treatment program in 2011 that would target areas that supported problematic densities of both Eurasian watermilfoil and curlyleaf pondweed. Based on considerable recent research in the Midwest and Pacific Northwest, use of an herbicide combination was pursued for the 2011 season. Renovate (triclopyr) and Aquathol (endothall) are being used in combination for large-scale treatments targeting control of mixed communities of Eurasian watermilfoil and curlyleaf pondweed. The two herbicides can be applied at low use rates, but there is an additive effect of using the two in combination that has provided enhanced control. The combination treatment is performed early in the growth cycle, which helps limit impact to non-target native plants. It is also carries lower per-acre unit costs since comparatively low doses of the herbicides are being applied.

2011 TREATMENT SUMMARY

A chronology of the herbicide treatment activities performed in 2011 is provided below:

- Permit issuance (Freshwater Wetlands Permit ID 5-4199-00002/00008; Aquatic Pesticides Permit ID 5-4199-00002/00010)5/19/11
- Pre-treatment inspection.....5/9/11
- Renovate (triclopyr) and Aquathol (endothall) combination treatment of 100 acres5/24/11
- FasTEST analysis of triclopyr residues 5/28, 6/5, 6/21 & 8/11/11
- Post-treatment inspections by Aquatic Control Technology6/21, 8/11, 10/17/11

Initially, four distinct areas totaling approximately 105 acres were targeted for treatment in 2011. During the permit application review, several homes with intakes that draw water from the lake for household uses were discovered along Manning Cove Road on the western shoreline. Due to the presence of these intakes and the water use restrictions associated with the EPA Specimen Labels and the NY SLN Labels for the two herbicides, it was decided that Area B would not be treated. SLPID decided to contract with Adirondack Invasives Management (AIM) to conduct hand harvesting of dense Eurasian watermilfoil growth in close proximity to that location. The herbicide treatment was reduced to three areas totaling approximately 100 acres.



2011 Treatment Areas

Area	Acreage	Location
A	55 ac	Northeast shore by Franklin Beach
B	5 ac	West shore at sunken island
C	10 ac	Southeast shore immediately north of Snake Hill
D	35 ac	Southeast shore immediately south of Snake Hill

2011 Herbicide Application Rates

Area	Acres	Renovate (rate)	Gals.	Aquathol (rate)	Gals.
a	55	0.75 ppm or 2.7 gals/ac	148.5	1.75 ppm or 4.4 gals/ac	242.0
c	10	1.25 ppm or 4.5 gals/ac	45.0	2.5 ppm or 6.4 gals/ac	64.0
d	35	0.75 ppm or 2.7 gals/ac	94.5	1.75 ppm or 4.4 gals/ac	154.0
TOTALS			310.5		492.0

- Renovate 3 / EPA Reg. No.: 62719-37-67690; SLN NY-060001
- Aquathol K / EPA Reg. No.: 70506-176; SLN NY-080004

The treatment was performed as scheduled on May 24, 2011. One treatment boat was used to complete the application in approximately seven hours of application time. Weather conditions were favorable with overcast skies and a light southwest wind (~5 mph) that produced a small chop on the water's surface. A fast-moving shower did result in about 15-20 minutes of rainfall, but the amount of precipitation was insignificant. Water clarity appeared to be very good on the day of treatment, estimated at greater than 3 meters. The water temperature and

dissolved oxygen concentrations were fairly uniform in upper 3 meters of water within the treatment areas ranging from 17.5 – 16.7° C and 10.46 – 9.98 mg/l, respectively.

The herbicide quantities applied as shown in the table above were consistent with what was requested the permit application. The treatment approach was to target approximately at 2:1 ratio of endothall to triclopyr. Higher concentrations were proposed in Area C due to its small size. The application rate was based on treatment of the bottom four (4) feet of the water column.

The concentrated liquid herbicides was diluted with lake water and injected subsurface using a calibrated pumping system through deep trailing hoses that were affixed to 5-foot long vertical booms that were mounted on spring-steel at the stern of a conventional spray boat. Herbicide was loaded at the Fitch Road access point in the northeast corner of the lake near Area A. The spray boat was equipped with a DGPS/WAAS system that provided real-time navigation and insured that the herbicide is evenly applied throughout the designated treatment areas as shown in the map above. The herbicide treatment was performed by Marc Bellaud (Certification No. C0806081) of Aquatic Control Technology. The treatment was performed in accordance with the product label instructions and permit conditions.

HERBICIDE RESIDUE MONITORING

In accordance with DEC requests, post-treatment water samples were collected from two locations along Manning Road on the west shore, in proximity to the known water intakes for analysis of triclopyr residues. Samples were collected 24 hours post-treatment and then at 12 days, 28 days, and 79 days post-treatment. The highest triclopyr concentrations detected was 0.007 ppm or 7 ppb, which is well below the NY SLN drinking water reuse level of <50 ppb. Trace concentrations were detected at 28 days post-treatment, but no concentrations were detected at 79 days post-treatment. Copies of the laboratory reports are provided in Attachment B.

RESULTS

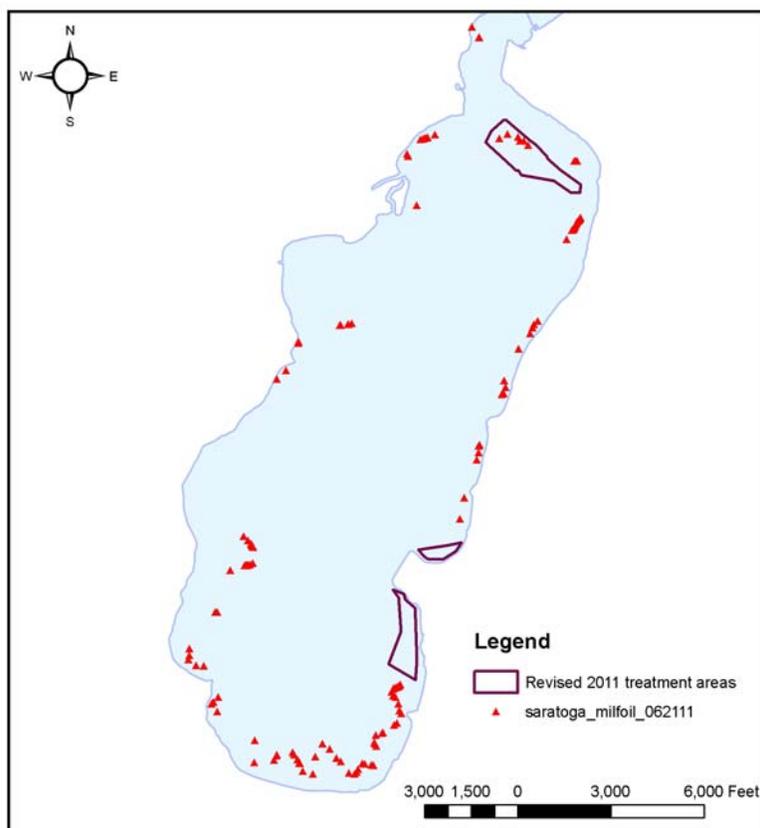
June 21, 2011

The initial post-treatment survey by Aquatic Control Technology was performed on June 21, 2011, four weeks after treatment. Most of the Eurasian watermilfoil in the treatment areas was effectively controlled by that time.

- Area A (55 ac) >70% control
- Area C (10 ac) >99% control
- Area D (35 ac) >99% control

The only exception was the northern end of Area A near Franklin Beach. This treatment area was situated far off-shore and adjacent to deep water. It appears as if there was excessive dilution in this location and incomplete control was achieved.

Eurasian watermilfoil was found in varying densities throughout much of the remainder of the lake. GPS locations of Eurasian watermilfoil plants are shown in the map.



Mapping of curlyleaf pondweed was planned for the June 21st survey, but there was not enough curlyleaf pondweed left to map accurately. Some remaining plants were found along the western shoreline, but they were secondary Eurasian watermilfoil and native plant species. No curlyleaf pondweed was found in or adjacent to any of the treatment areas. The SLPID harvester operators did indicate that they had removed a considerable amount of curlyleaf pondweed from the south end. It would appear that the endothall herbicide did cause a significant reduction in the curlyleaf pondweed growth.

Native plant growth appeared to be robust within and adjacent to treatment areas. The dominant native species observed included:

<i>Ceratophyllum demersum</i>	Coontail
<i>Elodea canadensis</i>	Elodea
<i>Potamogeton amplifolius</i>	Largeleaf pondweed
<i>Potamogeton illinoensis</i>	Illinois pondweed
<i>Potamogeton richardsonii</i>	Richardson' pondweed
<i>Potamogeton praelongus</i>	White-stem pondweed
<i>Vallisneria americana</i>	Wild celery
<i>Zosterella dubia</i>	Water stargrass

No obvious impacts to water quality were observed. Measurements were collected at the deep water edge of Area A towards the northern end of the lake. Secchi disk water clarity was measured to be 3.2 meters (10.5 feet). A temperature/dissolved oxygen profile was also recorded using a YSI meter.

Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/l)
Surface	25.5	10.9
1	23.5	11.1
2	22.0	10.6
3	21.5	10.1
4	21.2	9.8
5	20.9	8.6
6	20.4	7.5
7	18.9	5.2

August 11, 2011

Similar conditions were observed during an August 11th inspection. By that time, there was more recovery of Eurasian watermilfoil evident in Area A at the northern end of the lake. Some Eurasian watermilfoil regrowth was also evident in Area D, south of Snake Hill. No Eurasian watermilfoil was found in Area C, north of Snake Hill. Native plant growth was abundant in many locations along the eastern and southern shorelines and several of the broad-leaf pondweeds, particularly white-stem pondweed, were approaching the surface and forming small beds of vegetation.

The hand-harvesting operation being performed by AIM was underway along the western shoreline at the time of this inspection. They reported removal of a considerable amount of Eurasian watermilfoil from the western shoreline.

October 17, 2011

After receiving the interim aquatic plant survey report from DFWI, a final inspection was performed on October 17th. The lake was toured to inspect areas where common and dense Eurasian watermilfoil growth was reported and to determine potential herbicide treatment locations for the 2012 season. Eurasian watermilfoil was more easily compared to earlier inspections since many of the native plant species were naturally senescing. Regrowth of Eurasian watermilfoil was evident in the northeast corner near Franklin Beach (Area A) and south of Snake Hill (Area D). Practically no Eurasian watermilfoil regrowth was observed north of Snake Hill (Area C).

Comprehensive Aquatic Plant Survey by DFWI

The annual comprehensive aquatic plant survey was conducted by DFWI in late August. A copy of their full report is provided in Attachment C. The survey findings clearly indicate that Eurasian watermilfoil coverage is increasing. The lakewide frequency of occurrence value for Eurasian watermilfoil is now almost 30%, which is over a four-fold increase from 2009 that was the conclusion of the whole-lake treatment effort.

Frequency of Occurrence data from DFWI surveys

Year	2004	2007	2008	2009	2010	2011
<i>Treatment performed</i>	<i>Pre-treatment</i>	<i>South end Sonar 158 acres</i>	<i>East and northeast shore Renovate OTF 292 acres</i>	<i>West shore Renovate OTF 285 acres</i>	<i>Spot-treatment Renovate OTF 50 acres</i>	<i>Spot-treatment Renovate & Aquathol combo 100 acres</i>
Eurasian watermilfoil	54.2%	49.7%	13.0%	6.8%	22.1%	29.3%
Curlyleaf pondweed	5.6%	5.6%	5.6%	3.1%	9.4%	0.7%

Eurasian watermilfoil biomass remains significantly lower than what was documented prior to the onset of large-scale herbicide treatments in 2007, but if it is left unmanaged further expansion of cover and biomass is expected to occur rapidly.

The frequency of occurrence of curlyleaf pondweed was considerably lower in 2011 than it had been in recent years. It is difficult to determine how much of this was due to the fact that curlyleaf pondweed was specifically targeted by treatment in 2011, or if this was just due to annual variations in growth.

Again in 2011, native species dominated the aquatic plant community in Saratoga Lake. Quantitative measures of frequency of occurrence and species richness were consistent with prior years. Slight reductions in these indices are attributed to the loss of invasive species from several of the sampled data point locations. Twenty-four species were encountered during the 2011 survey, which is comparable with prior years.

Saratoga Lake continues to support a diverse and robust submersed aquatic plant community. The variety of species encountered in littoral zone provides varied habitat and structure for fish and wildlife. The density of native plants is undoubtedly slowing the reestablishment of Eurasian watermilfoil. Native plants are still being “top-cut” with SLPID’s maintenance harvesting program. Cutting is generally limited to the top two feet of the water column, which provides open water access for boating and fishing, while leaving favorable bottom cover of plant growth.

SUMMARY

Saratoga Lake is a productive lake that will continue to support abundant littoral zone growth of submersed aquatic vegetation. The current herbicide treatment program initiated in 2007 has effectively controlled the large, monotypic beds of Eurasian watermilfoil that impeded boating and recreational use of the lake. These areas now support a diverse assemblage of native plant growth. Ongoing management efforts must be continued in order to maintain low density growth of Eurasian watermilfoil, curlyleaf pondweed and other invasive species.

The Renovate (triclopyr) and Aquathol (endothall) combination herbicide treatment utilized in 2011 did provide reasonably good control of Eurasian watermilfoil and excellent control of curlyleaf pondweed. Complete control of Eurasian watermilfoil was not achieved in areas subject to excessive dilution caused by flow, edge-effect, and location of the treatment plot. Despite the fact that the herbicides were injected five-feet below the surface, use of the liquid formulations of these herbicides may have allowed for more significant mixing and dilution than what may occur when using granular formulations.

Continued herbicide treatment is recommended and planned for the 2012 season to maintain manageable levels of invasive Eurasian watermilfoil and curlyleaf pondweed growth and to prevent further displacement of native

species. Mechanical harvesting, drawdown and possibly some additional hand-harvesting will also continue to be utilized as part of the integrated lake management program. Specific recommendations for maintenance herbicide treatment during the 2012 season include:

- Continue to focus on larger-block treatment areas to limit the effects of dilution and to maximize treatment efficacy.
- Focus 2012 treatment efforts on expanding Eurasian watermilfoil growth found in the southeast corner of the lake.
- Use granular herbicide formulations that will be more appropriate in many areas of Saratoga Lake that are subject to excessive dilution.
 - Renovate OTF (triclopyr granular) for control of Eurasian watermilfoil.
 - Clearcast 2.7G (imazamox granular) for control of curlyleaf pondweed instead of Aquathol (endothall)
- A split-application approach should be utilized to increase the herbicide concentration-exposure-time. Approximately 50-70% of the herbicide is sequentially applied to all areas, and then the remaining herbicide is applied to the same areas and in the same sequence several hours later.
- Schedule the treatment in mid-late May to limit associated water use restrictions during the peak summer use period.

We trust that this information satisfies the reporting requirement for the 2011 herbicide treatment program at Saratoga Lake. Please feel free to contact us should you have any questions or require additional information.

Sincerely,

AQUATIC CONTROL TECHNOLOGY, INC.

Marc Bellaud
Vice President/Aquatic Biologist

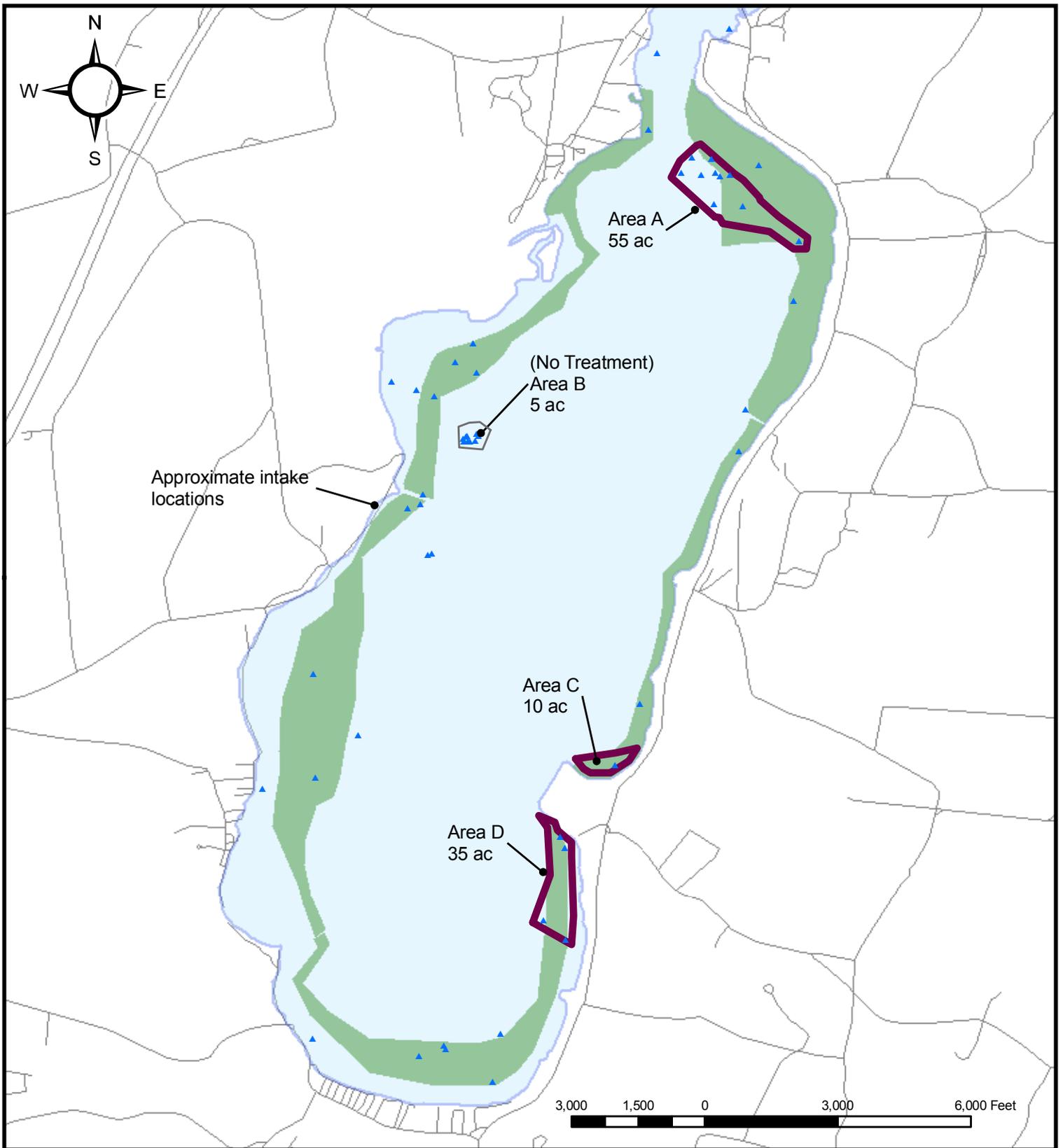
Enclosures

CC: Marc Migliore, Deputy Regional Permit Administrator, NYSDEC DEP Region 5
Joseph Finn, SLPID Commissioner
Dean Long, Director of Environmental Planning, The LA Group, P.C.

ATTACHMENT A

Maps

- Figure 2011_1 – 2011 Treatment Areas



SARATOGA LAKE

Preliminary 2011 Treatment Areas

FIGURE:	SURVEY DATE:	MAP DATE:
2011_2	05/9/11	05/17/11

Legend

- ▲ Saratoga_Lake_EWM_distribution_2010
- ▭ Revised 2011 treatment areas

AQUATIC CONTROL TECHNOLOGY, INC.

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 SUTTON, MASSACHUSETTS 01590
 PHONE: (508) 865-1000
 FAX: (508) 865-1220
 WEB: WWW.AQUATICCONTROLTECH.COM

ATTACHMENT B

FasTEST Information

- Laboratory report forms



Chain of Custody EC21A7EE-0

Customer Company

Customer Contact

Company Name:	Aquatic Control Technology, Inc.	Contact Person:	Gerald N
Address:	11 John Road	E-mail Address:	gnsmith@aquaticcontroltech.com
City:	Sutton	Phone:	
State:	MA 01590-2509	Fax:	

Payment Information

Payment Type:	Invoice	Card Number/Expiration Num:	
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Waterbody Information

Waterbody:	Saratoga Lake	Waterbody Size (acres):	4000.00
Depth Average:	20.00		
Target Plants	Eurasian Watermilfoil,		

Sample Information

Sample Site ID	Date Treated	Date Sample Collected	Sample Location	Products	Acres Treated	Rate	Active	Result
1 WS	05/24/2011	05/26/2011	west shore	Renovate 3	100	0.75	Triclopyr	0.004 ppm
11 CL	05/24/2011	05/26/2011	west shore	Renovate 3	100	0.75	Triclopyr	0.004 ppm
1 WS	05/24/2011	05/28/2011	west shore	Renovate 3	100	0.75	Triclopyr	0.005 ppm
11 CL	05/24/2011	05/28/2011	west shore	Renovate 3	100	0.75	Triclopyr	0.007 ppm

Laboratory Information

Date Received:	6/2/2011	Date Analysis Performed:	6/2/2011
Date Results Sent:	6/2/2011	Storage Conditions	Analyzed Immediately



Chain of Custody 6DB22CE5-7

Customer Company

Customer Contact

Company Name:	Aquatic Control Technology, Inc.	Contact Person:	Gerald N
Address:	11 John Road	E-mail Address:	gnsmith@aquaticcontroltech.com
City:	Sutton	Phone:	
State:	MA 01590-2509	Fax:	

Payment Information

Payment Type:	Invoice	Card Number/Expiration Num:	
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Waterbody Information

Waterbody:	Saratoga Lake	Waterbody Size (acres):	4000.00
Depth Average:	20.00		
Target Plants	Eurasian Watermilfoil,		

Sample Information

Sample Site ID	Date Treated	Date Sample Collected	Sample Location	Products	Acres Treated	Rate	Active	Result
1 WS	05/24/2011	06/05/2011	west shore	Renovate 3	100	0.75	Triclopyr	0.005 ppm
CL 2	05/24/2011	06/05/2011	west shore	Renovate 3	100	0.75	Triclopyr	0.005 ppm

Laboratory Information

Date Received:	6/8/2011	Date Analysis Performed:	6/8/2011
Date Results Sent:	6/8/2011	Storage Conditions	Analyzed Immediately



Chain of Custody E0E04615-F

Customer Company

Company Name: Aquatic Control Technology, Inc.
Address: 11 John Road
City: Sutton
State: MA 01590-2509

Customer Contact

Contact Person: Gerald N
E-mail Address: gnsmith@aquaticcontroltech.com
Phone:
Fax:

Payment Information

Payment Type: Invoice
Card Number/Expiration Num:

Waterbody Information

Waterbody: Saratoga Lake
Waterbody Size (acres): 4000.00
Depth Average: 20.00
Target Plants: Eurasian Watermilfoil,

Sample Information

Sample Site ID	Date Treated	Date Sample Collected	Sample Location	Products	Acres Treated	Rate	Active	Result
1	05/24/2011	06/21/2011	CL	Renovate OTF	100	0.75	Triclopyr	0.007 ppm
2	05/24/2011	06/21/2011	WS	Renovate OTF	100	0.75	Triclopyr	0.006 ppm

Laboratory Information

Date Received: 6/24/2011
Date Results Sent: 6/24/2011
Date Analysis Performed: 6/24/2011
Storage Conditions: Analyzed Immediately



Chain of Custody 40EC8EF1-2

Customer Company

Company Name: Aquatic Control Technology, Inc.
Address: 11 John Road
City: Sutton
State: MA 01590-2509

Customer Contact

Contact Person: Gerald N
E-mail Address: gnsmith@aquaticcontroltech.com
Phone:
Fax:

Payment Information

Payment Type: Invoice
Card Number/Expiration Num:

Waterbody Information

Waterbody: Saratoga Lake
Waterbody Size (acres): 4000.00
Depth Average: 20.00
Target Plants: Eurasian Watermilfoil,

Sample Information

Sample Site ID	Date Treated	Date Sample Collected	Sample Location	Products	Acres Treated	Rate	Active	Result
1	05/24/2011	08/11/2011	CL	Renovate 3	100	0.75	Triclopyr	0.000 ppm
2	05/24/2011	08/11/2011	WS	Renovate 3	100	0.75	Triclopyr	0.000 ppm
3	05/24/2011	08/11/2011	Snake Hill	Renovate 3	100	0.75	Triclopyr	0.000 ppm

Laboratory Information

Date Received: 8/18/2011
Date Results Sent: 8/18/2011
Date Analysis Performed: 8/18/2011
Storage Conditions: Analyzed Immediately

ATTACHMENT C

- Saratoga Lake Aquatic Plant Survey – 2011 (prepared by Darrin Fresh Water Institute)