PROJECT COMPLETION REPORT
2004 Sonar AS Herbicide Treatment of Lake St. Catherine, Lily Pond and Little Lake

November 2004

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INTRODUCTION

This report documents the in-lake monitoring and Sonar AS herbicide treatment program undertaken at Lake St. Catherine, Lily Pond and Little Lake during the 2004 season. Sonar treatment of the 1,088-acre Lake St. Catherine system is the largest whole-lake herbicide treatment known to have occurred in New England. The monitoring elements of this program were conditions of the Aquatic Nuisance Control Permit #2001-C008 issued by the Vermont Department of Environmental Conservation (DEC). The permit approved a whole-lake treatment of Lake St. Catherine, Lily Pond and Little Lake with Sonar* AS (Aqueous Solution) herbicide to control the non-native and invasive Eurasian watermilfoil weed.

The Lake St. Catherine Association (LSCA) was the project Applicant/Permittee for this project. The whole-lake Sonar treatment was the first phase of five-year integrated management plan (IMP) prepared for and with LSCA. Aquatic Control Technology, Inc. of Sutton, Massachusetts was contracted to prepare and file the permit application with DEC and subsequently to conduct the whole-lake Sonar treatment and monitoring tasks in 2004. Aquatic Control and the LSCA were assisted by SePRO Corporation, the manufacturer of Sonar AS, in several aspects of treatment program design and permit compliance.

The DEC permit approved a target concentration of 8 parts per billion (ppb) of fluridone to Lake St. Catherine, Lily Pond and Little Lake. Follow-up booster applications were to be performed as required to maintain fluridone concentrations between 5 and 8 ppb in all three waterbodies over a minimum 90-day period. The initial application of Sonar AS occurred on June 1, 2004. Three additional booster applications were performed on the whole system between June and the end of August, with a fourth application on Little Lake only. Expected results were seen in the year of treatment. Excellent milfoil control was achieved by the end of the summer, while varying levels of impact were seen on non-target, native species.

The following report summarizes the 2004 treatment program and findings of the post-treatment aquatic plant survey that was completed on September 21, 2004. Results of the aquatic plant survey are compared with the pre-treatment survey that was completed by Aquatic Control in 2001. Detailed descriptions of the herbicide applications are provided, along with a discussion of the in-lake fluridone concentration monitoring results. Finally, conclusions are drawn from outcome of the 2004 treatment program, with regard to on-going management requirements at the lake.

2004 HERBICIDE TREATMENT SUMMARY

Final planning for the treatment program occurred after the DEC permit was issued. Conditions of the Permit were reviewed and assigned to LSCA and Aquatic Control for compliance. LSCA handled most of the required notification, sample collections for FasTEST analysis and direct communication with DEC, while Aquatic Control handled tasks associated with the treatments, monitoring and reporting.

* Trademark of SePRO Corporation, Carmel, IN

Pre-Treatment Planning

Accompanied by LSCA Representatives, Aquatic Control inspected Lake St. Catherine, Lily Pond and Little Lake by boat on May 21st. The purpose of the survey was to determine the extent of plant growth, determine the thermocline depth, observe outflow and to inspect boat launching and staging areas for the treatments. Milfoil growth was clearly active in all three waterbodies, but only a weak thermal stratification was found at water depths between 15 and 20 feet. June 1st was targeted for the initial treatment.

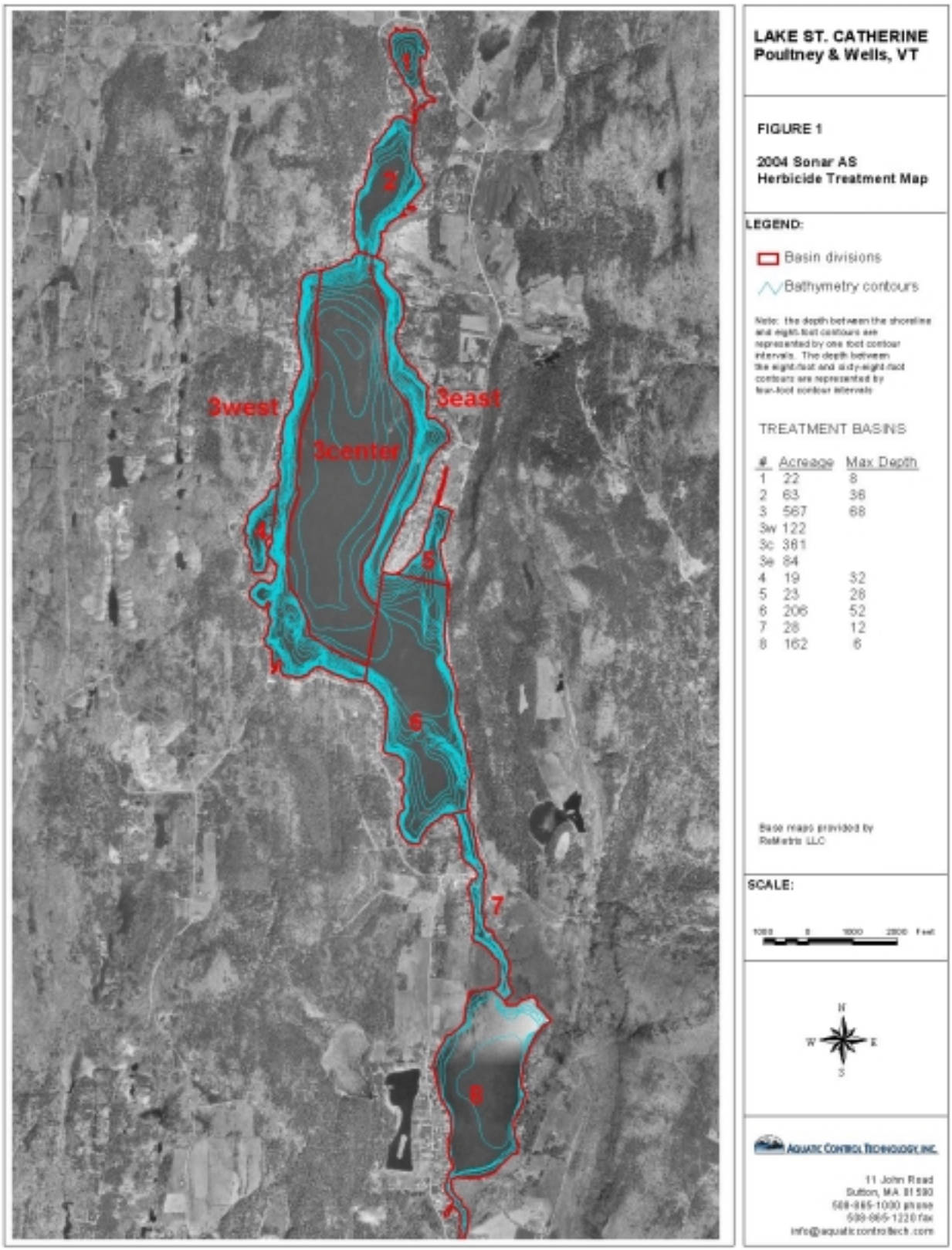
LSCA retained Dr. William Barnard, a Biology Professor at Norwich University, to record temperature and dissolved oxygen profiles prior to the initial application. An improving trend in the thermal stratification was seen on May 27th, May 30th and May 31st. Establishing an accurate thermocline depth was essential for proper dosing calculations.

Using the map of treatment basins that was prepared by ReMetrix and Aquatic Control in 2001 (Figure 1), the thermocline depth was used to determine water volumes and calculate the quantity of Sonar AS to be applied to each basin. Immediately prior to each Sonar application, Aquatic Control recorded temperature profiles and adjusted the treatment dose as necessary. Temperature profile sampling locations are shown in Figure 2. For the initial Sonar AS application on June 1st, a thermocline depth of 19 feet was used for the north end of Lake St. Catherine and 15 feet for the south end. The thermocline moved deeper and stabilized as the summer progressed. A thermocline depth of 22 feet was used for all the remaining booster applications.

The Sonar AS (Aqueous Solution) treatment program approved in the VTDEC permit, allowed for a target maximum dose of 8 ppb of Sonar, with multiple booster application permitted in order to maintain an average chemical concentration of 5 ppb or greater, over a minimum period of 90 days. PlanTEST* bioassays performed on milfoil samples previously collected from Lake St. Catherine indicated that a concentration of just 3-4 ppb of Sonar with an exposure period of approximately 90 days would be lethal to Eurasian watermilfoil.

Throughout the treatment program, DEC also required weekly monitoring of Sonar residues in all three waterbodies, as well as downstream. Samples were also collected and analyzed for Sonar (fluridone) levels approximately 24 hours following each Sonar AS application. The location of the FasTEST sampling stations are shown in Figure 2. There were twelve in-lake sampling locations (1 in Lily Pond, 9 in Lake St. Catherine, 2 in Little Lake) and two located downstream per the permit requirements. FasTEST samples were diligently collected by LSCA members and were shipped to SePRO's Laboratory in Indiana for analysis. The FasTEST results were used to gauge the timing for repeat, booster applications of Sonar. Preparations were made to analyze water samples for NMF (per the DEC permit) if any of the 24 hour samples showed a Fluridone concentration >30 ppb. The highest fluridone concentration found was 11.7 ppb, therefore, no NMF analyses was required or performed.

* PlanTEST (Trademark of SePRO Corp.) is a pretreatment plant bioassay sampling method, that determines the susceptibility of plants in a given area to be treated. PlanTEST involves first gathering pre-treatment plant samples from a specific area or waterbody, preparing and processing the plant samples in the lab, then completing the analysis and interpreting the data to determine the level of Sonar susceptibility for those plants taken from a specific area or waterbody. PlanTEST data is very useful to make sure prescribed application rates are going to provide the desired level of control on the target plants. It is also useful for establishing a baseline for tolerance on beneficial or protected aquatic plant species.


3west
3east
3center
2
4
5
6
7
8
LAKE ST. CATHERINE
Poultney & Wells, VT
FIGURE 1
2004 Sonar AS
Herbicide Treatment Map
LEGEND:
Basin divisions
Bathymetry contours
Note: the depth between the shoreline and eight-foot contours are represented by one-foot contour intervals. The depth between the eight-foot and sixty-eight-foot contours are represented by four-foot contour intervals
TREATMENT BASINS
Acreage Max Depth
1 22 8
2 63 36
3 567 68
3w 122
3c 381
3e 84
4 19 32
5 23 28
6 206 52
7 28 12
8 162 6
Base maps provided by ReMetrix LLC
SCALE:
1000 0 1000 2000 Feet
N
W E
S
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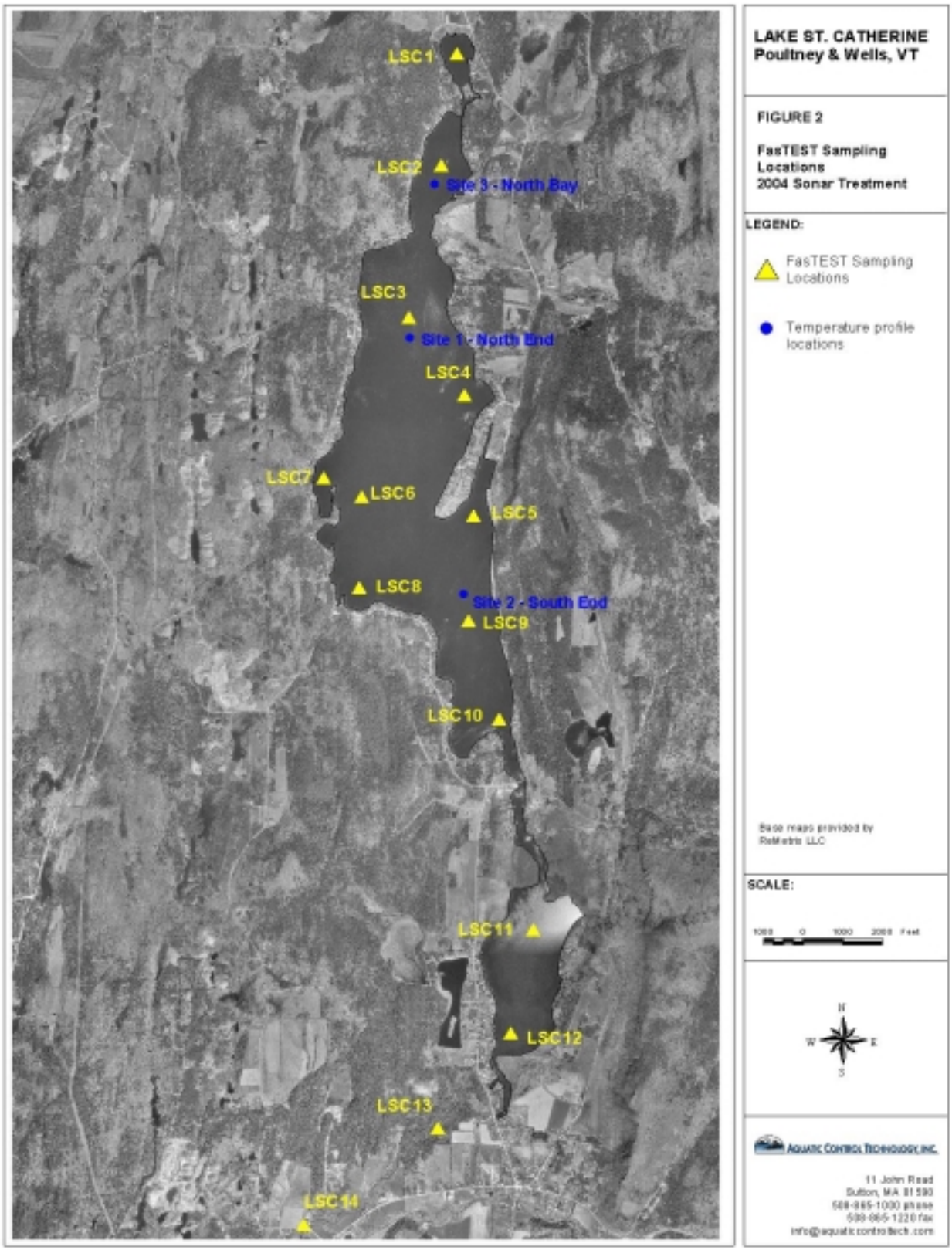
LSC1
LSC2
Site 3 - North Bay
LSC3
Site 1 - North End
LSC4
LSC7
LSC6
LSC5
LSC8
Site 2 - South End
LSC9
LSC10
LSC11
LSC12
LSC13
LSC14
LAKE ST. CATHERINE
Poultney & Wells, VT
FIGURE 2
FasTEST Sampling Locations
2004 Sonar Treatment
LEGEND:
FasTEST Sampling Locations
Temperature profile locations
Base maps provided by ReMetrix LLC
SCALE:
1000 0 1000 2000 Feet
N
W
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Herbicide Applications

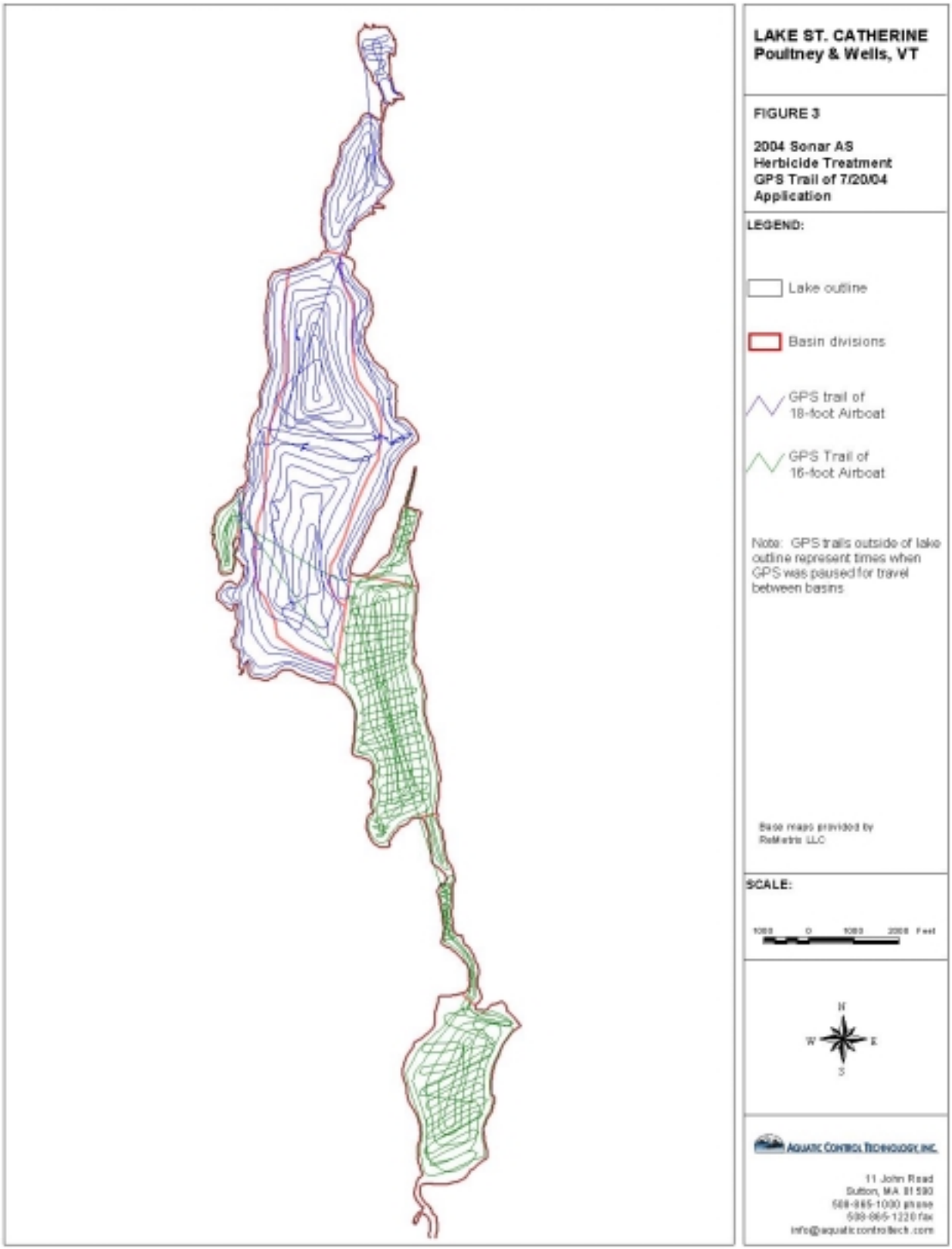
Gerald Smith, President/Principal Biologist and Marc Bellaud, Senior Biologist of Aquatic Control were present for all herbicide applications performed at Lily Pond, Lake St. Catherine and Little Lake. Both individuals are Licensed Applicators in Vermont. All of the treatments were conducted using two treatment boats and crews, except for the June 29th application that was made to Little Lake only using one Airboat.

Aquatic Control's 18-foot Panther/Classic Airboat equipped with a 100 gallon spray-tank, pump and specially designed, chemical injection system. This large (18 foot) Airboat, powered with a 454 HP engine, is very well suited to handle the potential "rough" water conditions and heavy payloads that are frequently encountered when treating larger waterbodies. The concentrated Sonar AS was carefully measured-out for each treatment sub-basin and mixed in the spray-tank with lake water at a ratio of >25 to 1 of water to chemical concentrate. The rate of chemical flow and dispersal was carefully monitored in accordance with the speed of the boat and width between passes of the boat. Four weighted hoses to dispense the diluted Sonar (two on either side of the Airboat) were located towards the bow of the boat.

During the June 1st application, an 18-foot Alumacraft boat with a 50 HP outboard was used as the second boat. This boat was selected to treat shoreline areas in Lake St. Catherine because it can handle rough water and because it produces less wake for the near shore application. However, for the June 21st, July 20th and August 24th booster applications another Airboat, a 15-foot Panther/Classic, was used as the second boat due to favorable weather forecasts. Both boats were outfitted with a 50 gallon spray tank and injection system with weighted hoses that deliver a subsurface application. Because of the smaller tank and slower application speed, Sonar AS was diluted >50 to 1 with lake water when using this boat.

Both treatment boats were equipped with GPS navigation systems. The 18-foot Airboat had a differential GPS navigation system with sub-meter accuracy that was mounted on a pedestal located next to the elevated seat on the Airboat. A map of the lake that had been previously downloaded into the GPS unit showed the different treatment basins and lake shoreline. This GPS unit mapped the actual path of the Airboat in real-time, helping to thoroughly cover the treatment area. Typically, the first treatment pass was made at headway speed within approximately 50-75 feet of shore. Subsequent passes were made roughly 200 feet apart, in decreasing concentric circles. Once the entire treatment area was covered in this manner for each sub-basin, additional perpendicular passes of the Airboat were made until all of the chemical tank-mixed for that area had been applied. All empty herbicide containers were triple rinsed and the rinsate was poured into the spray tank and applied. Empty containers were returned to our Sutton, MA facility for recycling with our chemical distributor.

The second treatment boat utilized a hand-held GPS unit. This unit also recorded the path of the treatment boat and showed the distance between passes, but it did not have sub-meter accuracy or show the treatment basins or lake shoreline. Consequently, the second boat was used to treat Little Lake and the southern end of Lake St. Catherine, where the lake is narrower and visual references on the shoreline could be more easily utilized. Otherwise the treatment was performed in the same fashion as with the larger Airboat. A representative map showing the GPS trail from the July 20th application is depicted in Figure 3.


LAKE ST. CATHERINE
Poultney & Wells, VT
FIGURE 3
2004 Sonar AS
Herbicide Treatment
GPS Trail of 7/20/04
Application
LEGEND:
Lake outline
Basin divisions
GPS trail of
18-foot Airboat
GPS Trail of
16-foot Airboat
Note: GPS trails outside of lake outline represent times when GPS was paused for travel between basins
Base maps provided by
ReMetrix LLC
SCALE:
1000 0 1000 2000 Feet
N
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All treatments proceeded smoothly and without incident. There were no significant mechanical problems experienced with the Airboat or other equipment during any of the treatments. The weather during all treatments was generally good, with the water surface varying from calm to a moderate "chop". Each treatment is briefly summarized below:

Table 1 – Sonar AS Treatment Summary

Date	Areas Treated	Concentration Applied	Total Sonar AS Applied
6/1/04	Lake St. Catherine Lily Pond Little Lake	8 ppb	83.75 gals.
6/21/04	Lake St. Catherine Lily Pond Little Lake	1.75-3.1 ppb 6 ppb 3.3 ppb	23.8 gals.
6/29/04	Little Lake	2.8 ppb	1.3 gals.
7/20/04	Lake St. Catherine Lily Pond Little Lake	2.5-3.5 ppb 4.9 ppb 3.5 ppb	35.15 gals.
8/24/04	Lake St. Catherine Lily Pond Little Lake	2 ppb 7 ppb 2.5 ppb	23.57 gals.

FasTEST Results

In-lake fluridone concentration monitoring was performed weekly and 24-hours after each Sonar AS application between June 2nd and September 28th. LSCA members collected samples from 12 in-lake locations and 2 downstream locations. There were 19 separate sampling rounds, 5 of which occurred 24 hours after each application, and a total of 242 samples were analyzed using the FasTEST immunoassay process. A summary table of data from all the FasTEST samples that were analyzed is provided in the Appendix.

The average fluridone concentrations maintained over the duration of the treatment program ranged from 5.1 ppb in Lily Pond to 6.4 ppb at one of the basins in Lake St. Catherine (Chart 1). Excluding the 24 hour FasTEST results lowered the average values to 4.4 ppb in Lily Pond and 6.1 in Lake St. Catherine (Chart 2). The highest fluridone concentration recorded 11.7 ppb was collected on the eastern shoreline on June 2nd following the initial application. In general, the highest and most variable fluridone concentrations were found in the 24-hour sampling rounds. By the following week's sampling round, in-lake concentrations were more evenly mixed.

It was very difficult to maintain adequate fluridone concentrations in Lily Pond and Little Lake. Both of these smaller basins received direct inflow from streams or large wetland areas and experienced rapid water turnover making the herbicide much more subject to dilution. A special Sonar AS application was made to Little Lake on June 29th, because the concentrations achieved following the June 21st application were lower than expected and only averaged 5.8 ppb for the basin. Concentrations found at the two outlet sampling stations were consistently lower than the in-lake concentrations. The highest reading recorded was 6.45 ppb on June 7th. Most other results at the outlet locations were below 5 ppb.

Chart 1 – Average FasTEST Values at Each Sample Site (including 24-hour samples)

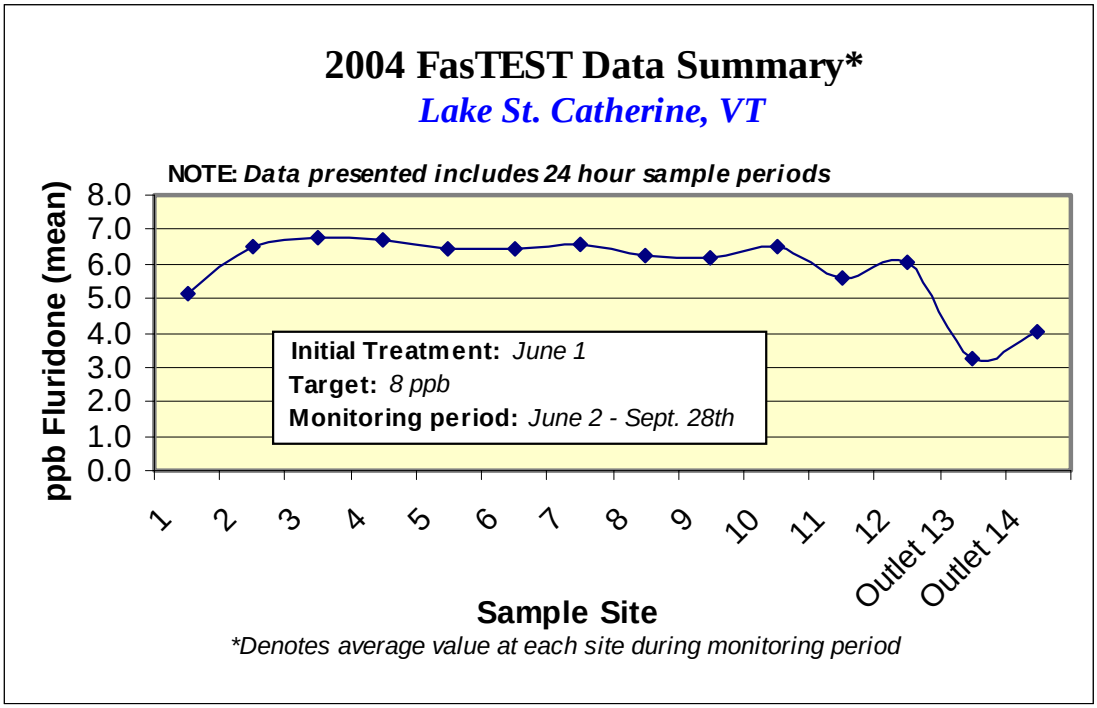


Chart 2 – Average FasTEST Values at Each Sample Site (excluding 24-hour samples)

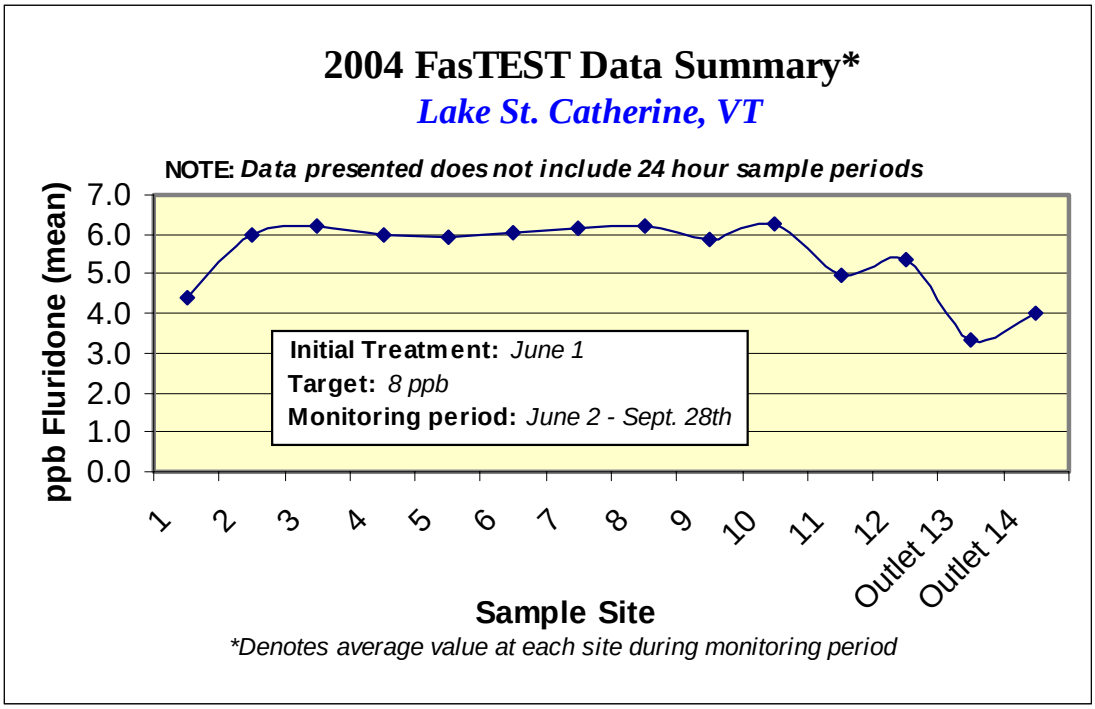
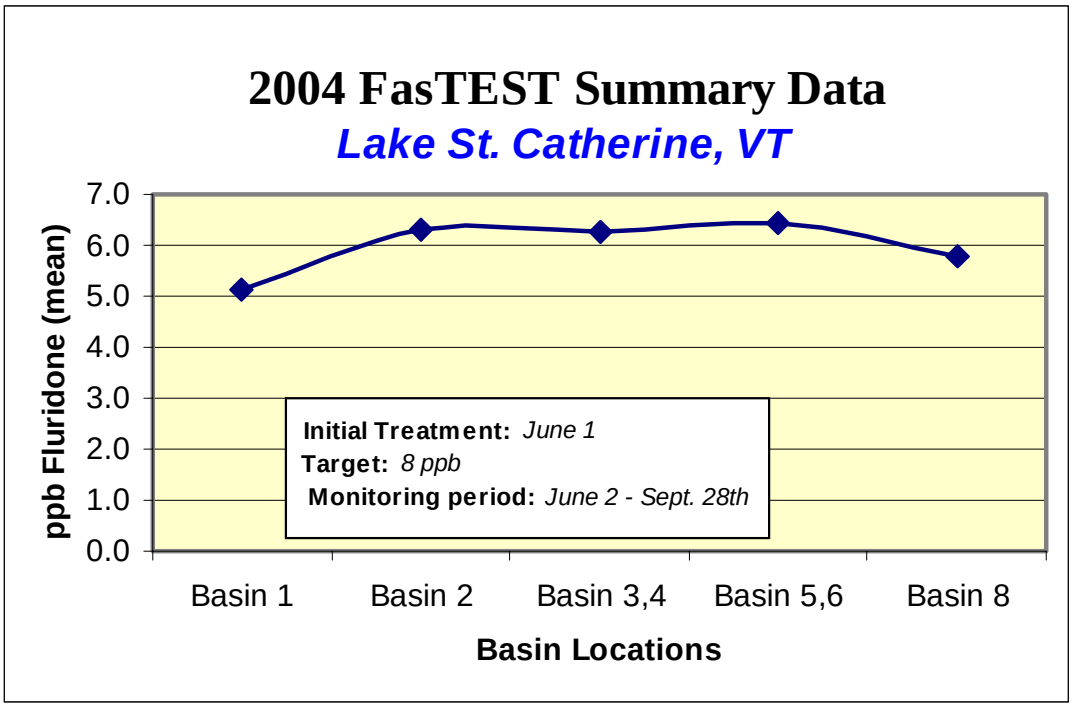


Chart 3 – Average FasTEST Values at by Treatment Basin (see Figure 1)



Ultimately, lethal concentrations of Sonar were maintained in the majority of the lake for well over a 100 days. On September 13th or 105 days after the initial application, average fluridone concentrations in Lake St. Catherine were just dropping below 5 ppb. The following week concentrations were still averaging about 4.5 ppb in all basins except for Lily Pond.

Milfoil Response to Treatment

As expected, the visible response to the Sonar AS treatment seen on the milfoil plants was slow in developing and very subtle to the untrained eye. Visual symptoms of Sonar's effect on milfoil post-application is often difficult to detect, as compared to its very apparent chlorotic (whitening/pinking) effect on some other plant species. The most notable symptom of impact on milfoil is the loss of leaves, which occurs from the bottom on up the plant stem. As these symptoms progress, the milfoil stems turn color from the normal "pinkish/reddish/bright green", to a brown and eventually black in color. The stems looked to be "bleached-out". Even though milfoil that has been severely impacted and damaged by the Sonar, it may still support greenish colored growing tips, typically ranging from a few inches to perhaps one foot in length. Just prior to complete collapse of the milfoil plant to the bottom, the stems are black and weak and the greenish tips are very small or have disappeared entirely, sometimes with just a single or few green leaves remaining.

Milfoil plants were generally 3-6 feet in length prior to the initial Sonar AS application on June 1st. On June 21st when the second application was performed, there were no notable changes on the milfoil plants other than some slight discoloration, where plants were losing their bright green and red color. In fact, milfoil plants had continued to grow taller in several locations. The

first time visible impact was clearly evident was during the July 20th treatment. By then, most milfoil plants were 1-3 feet below the surface, dull green or brownish in color and were starting to show the "poodling-effect" of bare stems loosing their leaflets.

On August 10th, the lake was inspected by Gerald Smith of Aquatic Control, Shaun Hyde of SePRO, Ann Bove and Susan Jary of DEC and members of LSCA to observe impacts to the milfoil. The timing of that inspection was approximately 70 days post-treatment and about 20 days following the July 20th treatment. Further progression of the chlorotic effects was noticed on the milfoil plants on August 10th. Even though there was consensus among the group that there was a significant reduction in milfoil cover and biomass, some concern was voiced by LSCA representatives over the fact that so many plants remained erect in the water column and many still supported green leaflets. This response of milfoil to fluridone exposure is regularly encountered and appears to be a final effort of the plant to survive, rather than an indication it is rebounding and will survive the treatment.

On two occasions, July 20th and August 10th, plant samples were collected from three locations on the lake for EffecTEST* analysis by SePRO's Laboratory to examine the degree of Sonar impact. The plants were characterized as showing "strong growth inhibition, phytotoxic effect likely." The upshot of these EffectTEST results were described in the report from SePRO as follows, *"[R]esidue management to date, field survey information, and measured biochemical response suggest very good likelihood of effective control of Eurasian milfoil in Lake St. Catherine using Sonar"* (copy of EffecTEST report is provided in the Appendix). After seeing the in-lake concentrations from the August 16th FasTEST sampling round, a decision was made to perform another booster application on August 24th. This last treatment would occur approximately 85 days after the initial treatment and would insure that average fluridone concentrations would be maintained above 5 ppb for well over 90 days.

By the time the comprehensive post-treatment vegetation survey was performed on September 20th and 21st, the vast majority of milfoil plants had fallen out of the water column. Remaining milfoil plants were highly chlorotic, having almost completely stripped stems. Remaining leaflets were dull green or brown and covered with filamentous algae in many locations.

* EffecTEST – a post-treatment plant biochemical sampling method, allows the lake manager to monitor herbicide effectiveness in previously treated Sonar use sites. This laboratory analysis involves first gathering post-treatment plant samples from a treated area or waterbody, preparing and processing the plant samples, performing the analysis and interpreting the data to determine the level of Sonar injury of those plants taken from a specific area or waterbody. EffecTEST is an excellent tool for determining Sonar's effectiveness.

2004 AQUATIC PLANT SURVEY

Conducting a comprehensive post-treatment aquatic vegetation survey in the year of treatment was a monitoring condition of the DEC permit. The purpose of this survey was to document the level of milfoil control that was achieved, as well as documenting impacts to non-target, native plants. In order to comply with this monitoring requirement, Aquatic Control replicated the pre-treatment vegetation survey that they conducted in 2001.

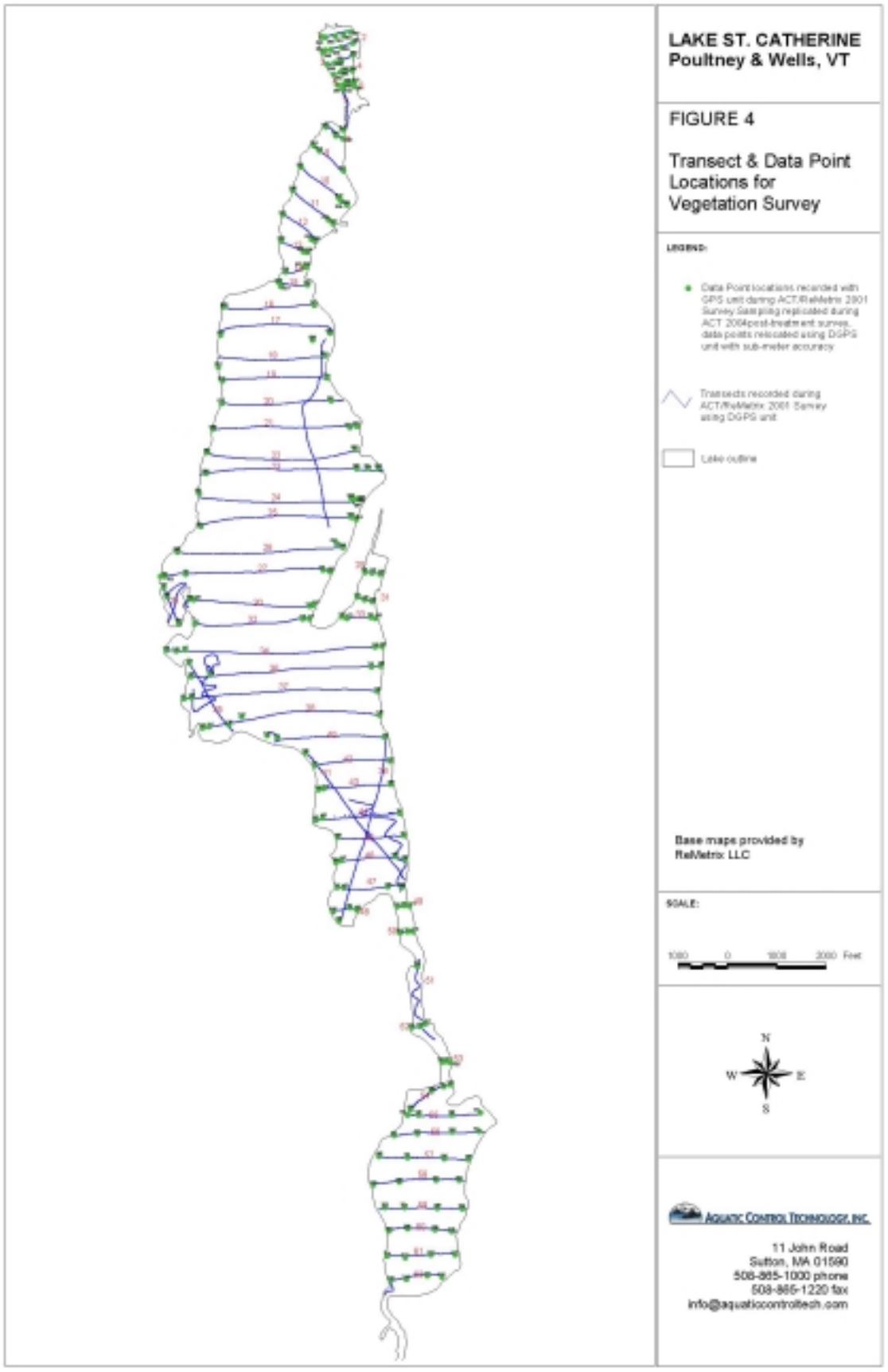
Survey Methods

The post-treatment vegetation survey was performed using the same methods and approach as the 2001 pre-treatment survey. The post-treatment survey was completed on September 20th and 21st. Marc Bellaud, Aquatic Control Senior Biologist, conducted the survey with assistance from a staff biologist.

All three major lake basins were systematically toured by boat. The transect and data point locations that were established in 2001, were relocated using a Differential GPS system equipped with sub-meter accuracy. This enabled the practically the same locations to be examined during both surveys (Figure 4). The following information was recorded at each data point: aquatic plants present in decreasing order of abundance, percent total plant cover, plant biomass and percent milfoil cover. Water depths that were recorded during the pre-treatment survey were checked using a high-resolution depth finder. In most cases, the water depth at the data point was within 1 foot of what was recorded during the pre-treatment inspection. The plant community was assessed through visual inspection, use of a long-handled rake and throw-rake, and with an Aqua-Vu underwater camera system. Plants were identified to genus and species level when possible. Plant cover was given a percentage rank based on the areal coverage of plants within an approximate 400 square foot area assessed at each data point. Generally, in areas with 100% cover, bottom sediments could not be seen through the vegetation. Percentages less than 100% indicated the amount of bottom area covered by plant growth. The percentage of Eurasian watermilfoil was also recorded at each data point. In addition to cover percentage, a plant biomass index was assigned at each data point to document the amount of plant growth vertically through the water column. Plant biomass was estimated on a scale of 0-4, as follows:

0	No biomass; plants generally absent
1	Low biomass; plants growing only as a low layer on the sediment
2	Moderate biomass; plants protruding well into the water column but generally not reaching the water surface
3	High biomass; plants filling enough of the water column and/or covering enough of the water surface to be considered a possible recreational nuisance or habitat impairment
4	Extremely high biomass; water column filled and/or surface completely covered, obvious nuisance conditions and habitat impairment severe

Information recorded at each data point is provided in the Table 3 - Field Survey Data found in the Appendix.


LAKE ST. CATHERINE
Poultney & Wells, VT
FIGURE 4
Transect & Data Point Locations for Vegetation Survey
LEGEND:
Data Point locations recorded with GPS unit during ACT/ReMetrix 2001 Survey. Sampling replicated during ACT 2004 post-treatment survey, data points relocated using DGPS unit with sub-meter accuracy
Transects recorded during ACT/ReMetrix 2001 Survey using DGPS unit
Lake outline
Base maps provided by ReMetrix LLC
SCALE:
1000 0 1000 2000 Feet
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info@aquaticcontroltech.com

Survey Findings

As expected, there were noticeable changes to the plant community, primarily due to the removal of milfoil from the plant community. Most of the native species found during the 2001 inspection were still present during the post-treatment inspection, albeit at lower densities and frequency of occurrence. In 2001, twenty of the twenty-eight aquatic plant species found in the three waterbodies were classified as submersed species. Only three of these species (*Elodea canadensis, Megalodonta beckii, Utricularia gibba*) were not encountered during the post-treatment survey. A list of the plant species recorded during the 2001 and 2004 surveys, complete with notes on their post-treatment distribution is provided in Table 4 on the following page.

Lily Pond and Little Lake continued to support the greatest numbers of plant species. This was further confirmed by comparing the average plant cover and biomass values for the 2001 and 2004 surveys.

TABLE 5 - SUMMARY OF 2001 & 2004 SURVEY DATA

LILY POND	2001	2004
Total Number of Data Points	24	24
Average Percent Plant Cover	90.30%	80.00%
Average Viable Milfoil Cover (percentage of total plant cover)	10.20%	<0.10%
Average Plant Biomass Index	3.1	2.5
LAKE ST. CATHERINE		
Total Number of Data Points	129	129
Average Percent Plant Cover	65.90%	45.90%
Average Viable Milfoil Cover (percentage of total plant cover)	64.80%	0.00%
Average Plant Biomass Index	1.9	1.5
LITTLE LAKE		
Total Number of Data Points	43	43
Average Percent Plant Cover	72.40%	65.70%
Average Viable Milfoil Cover (percentage of total plant cover)	21.20%	0.00%
Average Plant Biomass Index	2.3	2.1

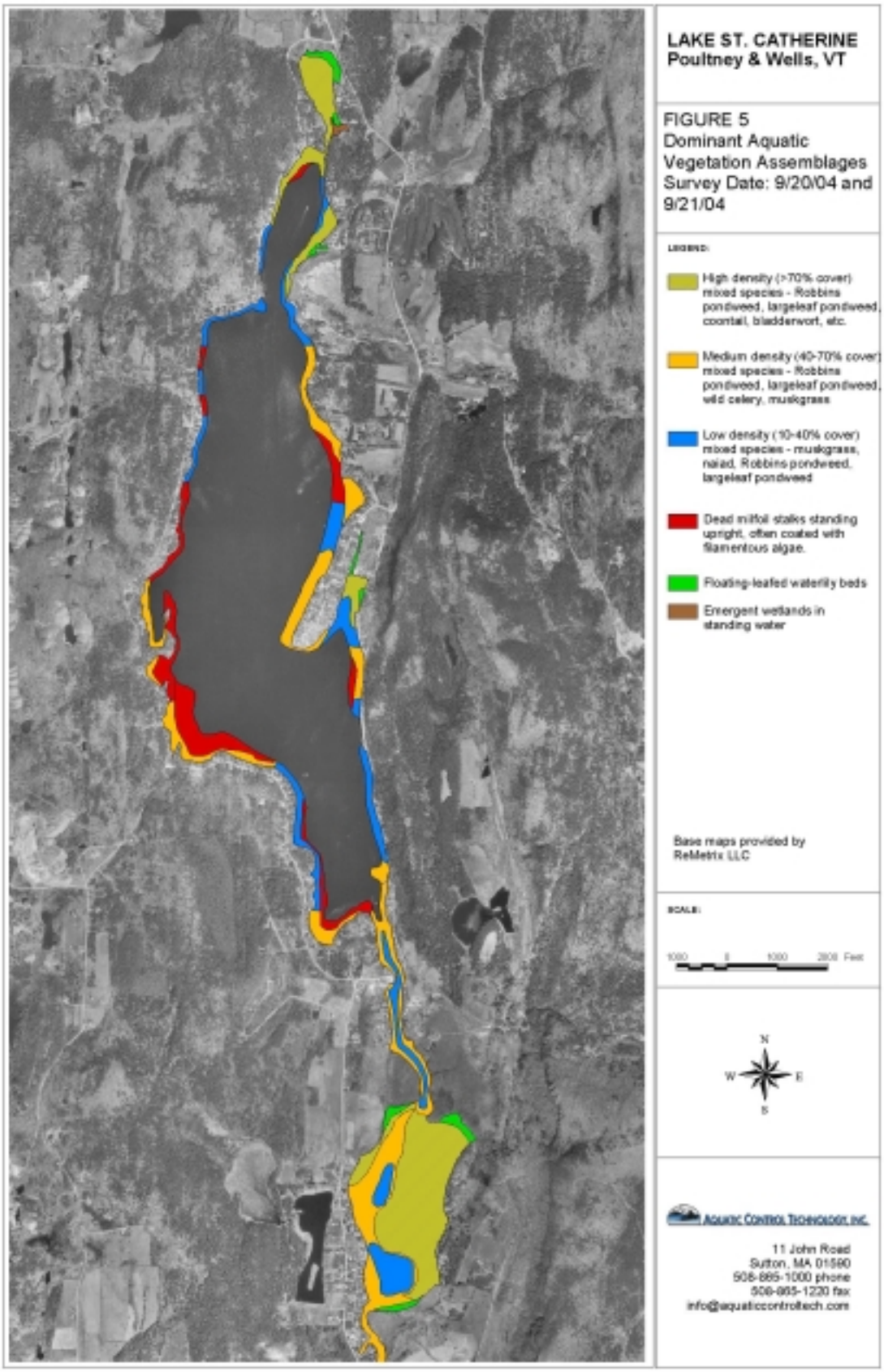
Both Lily Pond and Little Lake experienced only slight reductions in the total plant cover and plant biomass post-treatment. Of course milfoil only accounted for approximately 10% and 21% of the pre-treatment plant cover in these lakes, respectively. Greater loss of plant cover and biomass was seen in the Lake St. Catherine littoral zone, where milfoil accounted for nearly 65% of the plant cover pre-treatment. There was a twenty-percent reduction in both the total plant cover and biomass.

The dominant plant assemblages seen during the post-treatment survey are depicted in Figure 5.

Lily Pond continued to support the greatest diversity and density of plants. Three different assemblages were encountered during the post-treatment inspection. Floating-leafed waterlilies were still prevalent along the northern and southeast shorelines, but the beds did appear to have

TABLE 4 - PLANTS ENCOUNTERED DURING AUGUST 2001 & SEPTEMBER 2004 SURVEYS

Macrophyte Species	Common Name	Abbreviation	Type	Post-Treatment Distribution 2004
Brasenia schreberi	Watershield	B	floating-leafed	sparse
Ceratophyllum demersum	Coontail	Cd	submersed	sparse
Chara sp.	Muskgrass	Ca	submersed	scattered
Chlorophyta	Filamentous green algae	Fa		common
Decodon verticillatus	Water-willow	Dv	emergent	shoreline growth - Lily Pond and Little Pond
Eleocharis sp.	Spikerush	Eo	submersed	sparse
Elodea canadensis	Waterweed	Ec	submersed	None encountered
Heteranthera (Zosterella) dubia	Water stargrass	Hd	submersed	sparse - Little Pond
Isoetes sp.	Quillwort	I	submersed	sparse
Lemna minor	Duckweed	L	floating	sparse - Lily Pond
Megalodonta beckii	Water marigold	Mb	submersed	None encountered
Myriophyllum spicatum - viable	Eurasian watermilfoil	Ms	submersed	viable plants - only a few found in Lily Pond
Myriophyllum spicatum - dead	Eurasian watermilfoil	DMs	submersed	dead plants - common throughout main lake
Najas flexilis	Naiad	Nf	submersed	sparse
Nitella sp.	Stonewort	Ni	submersed	sparse
Nuphar variegatum	Yellow waterlily	Nu	floating-leafed	common/abundant - Lily Pond and Little Pond
Nymphaea odorata	White waterlily	Ny	floating-leafed	common/abundant - Lily Pond and Little Pond
Polygonum sp.	Water smartweed	Po	floating-leafed	shoreline growth - Lily Pond and Little Pond
Potamogeton amplifolius	Large-leaf	Pa	submersed	common
Potamogeton crispus	Curly-leaf pondweed	Pc	submersed	sparse
Potamogeton epihydrus	Ribbon-leaf pondweed	Pe	submersed	sparse
Potamogeton gramineus	Variable pondweed	Pg	submersed	sparse
Potamogeton illinoensis	Illinois pondweed	Pi	submersed	sparse
Potamogeton robbinsii	Pondweed	Pr	submersed	common/abundant - most common plant
Potamogeton zosteriformis	Flat-stem pondweed	Pz	submersed	sparse
Typha sp.	Cattail	T	emergent	shoreline growth - Lily Pond and Little Pond
Utricularia gibba	Creeping bladderwort	Ug	submersed	None encountered
Utricularia vulgaris	Common bladderwort	Uv	submersed	common - Lily Pond and Little Pond
Valisneria americana	Wild celery/Tapegrass	Va	submersed	scattered


LAKE ST. CATHERINE
Poultney & Wells, VT
FIGURE 5
Dominant Aquatic Vegetation Assemblages
Survey Date: 9/20/04 and 9/21/04
LEGEND:
High density (>70% cover) mixed species - Robbins pondweed, largeleaf pondweed, coontail, bladderwort, etc.
Medium density (40-70% cover) mixed species - Robbins pondweed, largeleaf pondweed, wild celery, muskgrass
Low density (10-40% cover) mixed species - muskgrass, naiad, Robbins pondweed, largeleaf pondweed
Dead milfoil stalks standing upright, often coated with filamentous algae.
Floating-leafed waterlily beds
Emergent wetlands in standing water
Base maps provided by ReMetrix LLC
SCALE:
1000 0 1000 2000 Feet
N
W
E
S
Aquatic Control Technology, Inc.
11 John Road
Sutton, MA 01590
508-865-1000 phone
508-865-1220 fax
info@aquaticcontroltech.com

thinned-out compared to what was seen in 2001. Most of Lily Pond supported a high density mix of native plants (plant cover >70%). Dominant species included Robbins pondweed, largeleaf pondweed and common bladderwort. Some of the species that were less frequently encountered included coontail, water stargrass, and duckweed. The only species not encountered were elodea and variable pondweed. The third assemblage in Lily Pond was comprised of emergent wetland species, dominated by water willow and pickerelweed. No impact to this plant assemblage was observed. The southeast corner of Lily Pond was also the only area where milfoil plants that appeared to be viable were found. A few plants were found in about 1-2 feet of water among the waterlilies and emergent plants.

Only the North Bay and Hall's Bay sections of Lake St. Catherine supported plant cover and biomass similar to what was seen in Lily Pond. These areas were dominated by Robbins pondweed, largelaf pondweed, flat-stem pondweed, coontail and muskgrass. There were also sizeable waterlily beds found in both locations. The remainder of Lake St. Catherine littortal zone supported a low to moderate density mixed plant assemblage, or it still had upright dead milfoil stems that often coated with filamentous algae. The moderate density plant assemblage (40-70% cover) was usually dominated by Robbins pondweed and largeleaf pondweed. The low density assemblage (10-40% cover) was often either Robbins pondweed or muskgrass/stonewort. Dead milfoil stems and filamentous algae was also a component of both assemblages. Areas that supported almost exclusively dead milfoil stems and filamentous algae are mapped as such. This assemblage was most prevalent in the southern two-thirds of Lake St. Catherine and was usually in deeper water areas (>7 feet). Dead milfoil stems accounted for almost half of the total plant cover in Lake St. Catherine.

Little Lake also continued to support fairly robust native plant growth. Four different plant assemblages were mapped in the lake. Floating-leaf waterlily beds were found along the northern and southern shorelines. The waterlily cover was reduced from pre-treatment levels, but the remaining plant beds appeared to be healthy. The adjacent, emergent wetland areas appeared to be unaffected by the treatment. The high density assemblage (>70% cover) of submersed plant growth was most prevalent in Little Lake. This was followed by moderate density (40-70% cover) growth along the western shoreline. Two pockets of low-density (10-40% cover) growth were found along the south western shoreline, where the substrate was largely comprised of sand. This lower density plant growth appeared to fall in the main water flow channel. Robbins pondweed and largeleaf pondweed were the most prevalent submersed species in Little Lake. Common bladderwort and wild celery were also found at several locations. Dead milfoil stems were only found at a few locations.

SUMMARY AND CONCLUSIONS

The whole-lake Sonar AS herbicide treatment was successfully completed during the 2004 season. Average fluridone concentrations were maintained between 5 and 8 ppb for more than 100 days. This was accomplished with five separate applications of Sonar AS herbicide and confirmed through weekly monitoring of in-lake fluridone concentrations.

Response of the aquatic plants to the treatment was fairly predictable. The targeted milfoil plants started showing typical chlorotic effects approximately six weeks post-treatment. These symptoms progressed over the remainder of the summer. By late September, the vast majority of milfoil plants had collapsed and were decomposing on the lake bottom. Some dead milfoil stalks remained standing in the deeper sections (7-14 feet) of the littoral zone in Lake St. Catherine. Most of these stems were almost completely stripped of leaflets and were coated with filamentous algae. Very few dead milfoil stems were seen in Lily Pond and Little Lake. The only area where a few viable milfoil plants were found was in the waterlily and emergent plant beds in the southeast corner of Lily Pond.

Year of treatment impacts were seen on many native species. This was mostly observed in the loss of plant biomass. Of the twenty submersed species that were documented during the pre-treatment inspection in 2001, only three were not observed during the post-treatment inspection. Some milfoil stems did have one or two green leaflets. These lateral buds have been documented late in the season in other fluridone treatments. They appear to represent a final effort of the plant to survive, and will likely succumb and not regrow next year based on our considerable prior treatment experience elsewhere.

Significant milfoil regrowth is not expected in 2005, as this has not been observed following any whole-lake applications where lethal fluridone concentrations have been maintained for over 90 days. Lily Pond is likely to support the most rapid milfoil regrowth, as fluridone concentrations fluctuated the most in this basin and it supports the highest plant densities. Little Lake is probably a close second. Recolonization of native species is expected to occur during in 2005 and should continue through the 2006 and 2007 seasons.

A continued monitoring effort is planned for the 2005 season. An early season milfoil reconnaissance survey will be performed to further determine the extent of control achieved by the 2004 treatment. Any viable milfoil plants will also be marked using GPS and the appropriate non-chemical techniques will be recommended for immediate control. Later in the summer, the comprehensive transect and data point survey will be replicated. This will further document whether or not any milfoil regrowth has occurred and how well the native plant community is recolonizing the lake.

APPENDIX

- Temperature Profiles Data (6 pages)
- FasTEST Summary Data (Table 2 - 2 pages)
- EffecTEST Report from SePRO (2 pages)
- Post-Treatment Aquatic Plant Survey Field Data (Table 3 - 7 pages)
- Photographic Documentation (2 pages)

2004 Temperature/Dissolved Oxygen Profiles for Lake St. Catherine

Site 1 - North End

5/21			5/27			5/30			5/31			6/18			6/20			7/20			8/24		
Depth (ft)	Temp. (C)	D.O. (mg/l)	Depth (ft)	Temp. (C)	D.O. (mg/l)	Depth (ft)	Temp. (C)		Depth (ft)	Temp. (C)		Depth (ft)	Temp. (C)		Depth (ft	Temp. (C)		Depth (ft	Temp. (C)		Depth (ft)	Temp. (C)	
Surface	17.7	9.4	Surface	19.5	10.0	Surface	17.3		Surface	18.9		Surface	24.2		Surface	22.9		Surface	24.4		Surface	21.8	
3.0	17.8	9.5	3	19.2	10.3	3	17.3		2.0	18.9		3	23.0		5.0	22.8		5.0	24.1		7	21.9	
6.0	17.3	10.3	7	18.7	10.3	7	17.2		4.0	19.0		7	21.6		10.0	21.8		10.0	23.9		13	21.8	
9.0	17.2	10.6	10	18.2	10.5	10	17.2		6.0	19.0		10	20.9		15.0	20.7		15.0	23.6		20	21.7	
12.0	17.1	11.0	13	17.4	9.9	13	17.1		8.0	19.0		13	20.5		16.0	20.5		16.0	23.4		21	20.7	
15.0	16.6	10.4	15	16.4	9.8	15	17.1		10.0	18.9		15	18.7		17.0	20.2		17.0	23.1		23	19.7	
16.0	16.1	10.2	16	15.4	10.2	16	16.7		12.0	18.0		16	17.4		18.0	19.9		18.0	22.0		25	17.6	
17.0	15.1	9.8	18	14.5	10.4	18	15.0		13.0	17.8		18	15.6		19.0	18.9		19.0	20.8		26	16.9	
18.0	14.2	10.0	20	13.4	10.7	20	184.8		14.0	17.6		20	14.0		20.0	18.2		20.0	19.2		30	15.8	
19.0	13.6	10.3	21	12.6	11.0	21	13.6		15.0	17.4		21	12.9		21.0	16.8		21.0	17.3		33	13.2	
20.0	13.2	10.0	23	12.3	11.0	23	12.8		16.0	17.3		23	12.4		22.0	14.8		22.0	16.2				
23.0	12.0	10.3	26	11.4	10.9	26	11.1		17.0	17.1		25			23.0	14.2		23.0	15				
26.0	11.5	9.9	30	10.9	10.9	30	10.6		18.0	16.8		26	11.3		24.0	13.7		24.0	14.7				
29.0	10.7	9.5	33	9.7	10.3	33	9.9		19	16.5		30	10.6		25.0	13.2		25.0	14.3				
			36	8.7	9.5				20	14.7		33	9.7		26.0	12.6							
			39	8.3	9.2				21	13.2		36	9.2		27.0	12.54							
			43	8.1	8.8				22	12.6		39	8.7		28.0	12.3							
			46	7.9	8.5				23	12.1		43	8.4										
			49	7.8	8				24	11.6		46	8.2										
									25	11.4													

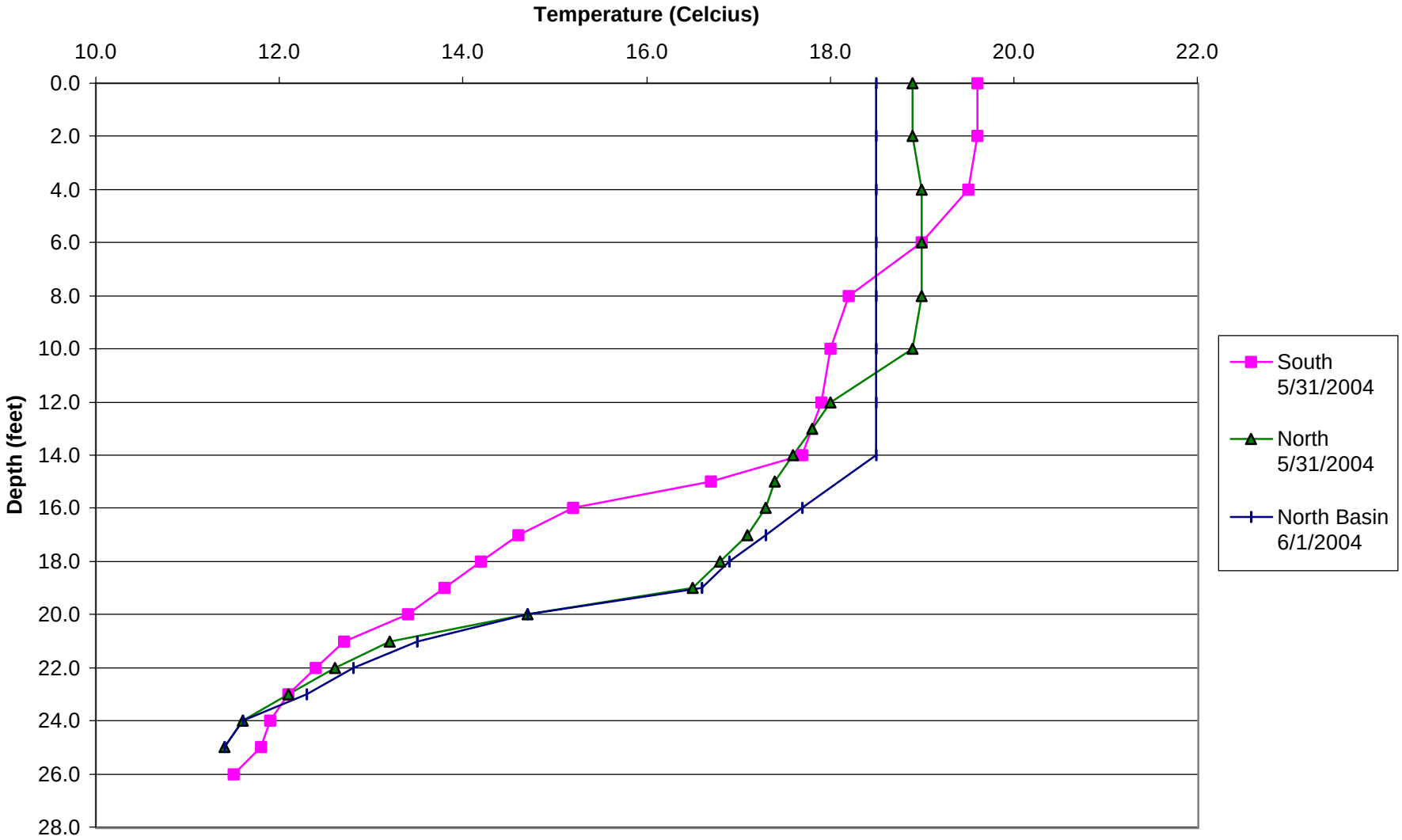
Site 2 - South End

5/17			5/21			5/27			5/30			5/31			6/18			6/20			7/20			8/24			9/21		
Depth (ft)	Temp. (C)	D.O. (mg/l)	Depth (ft)	Temp. (C)	D.O. (mg/l)	Depth (ft)	Temp. (C)	D.O. (mg/l)	Depth (ft)	Temp. (C)		Depth (ft)	Temp. (C)		Depth (ft)	Temp. (C)		Depth (ft	Temp. (C)		Depth (ft	Temp. (C)		Depth (ft)	Temp. (C)		Depth (ft)	Temp. (C)	D.O. (mg/l)
Surface	20.2	10.7	Surface	18.4	9.1	Surface	20.1	9.9	Surface	17.2		Surface	19.6		Surface	23.5		Surface	22.7		Surface	24.5		Surface	22.0		Surface	19.1	8.02
3	18.8	11.2	3.0	18.4	9.0	3	18.6	10.4	3	17.3		2.0	19.6		3	24.0		5.0	22.7		5.0	24.2		7	21.5		3	19.1	8.07
7	18.1	11.3	6.0	18.4	9.2	7	17.7	10.3	7	17.3		4.0	19.5		7	22.7		10.0	22.3		10.0	24.1		13	21.5		7	19.1	8.12
10	17.7	11.2	9.0	18.4	9.4	10	17.0	10.2	10	17.3		6.0	19.0		10	22.4		11.0	22.0		15.0	22.5		20	21.5		10	19.1	8.11
13	15.8	12.1	12.0	18.14	9.6	13	16.2	10.1	13	17.3		8.0	18.2		13	21.1		12.0	21.7		16.0	21.6		23	21.5		13	19.0	8.09
16	13.3	12.7	15.0	18	10.0	16	15.6	10.2	15	17.1		10.0	18.0		15	20.2		13.0	21.3		17.0	20.9		25	19.5		16	18.9	7.94
20	11.9	12.7	16.0	17.7	10.0	18	15.0	10.1	16	15.3		12.0	17.9		16	18.6		14.0	20.6		18.0	20.4		26	19.2		20	18.9	7.86
23	10.7	11.7	17.0	15.9	11.0	20	13.2	10.7	18	14.0		14.0	17.7		18	17.2		15.0	20.4		19.0	20.0		28	16.7		23	18.7	7.80
26	10.0	11.1	18.0	13	11.8	21	12.7	10.7	20	12.7		15.0	16.7		20	15.1		16.0	19.9		20.0	19.9		30	14.9		26	18.4	6.90
30	9.5	10.7	19.0	12.4	12.0	23	11.7	11.1	23	12.5		16.0	15.2		21	14.1		17.0	19.4		21.0	18.7		31	13.2		30	17.7	6.00
33	8.5	9.5	20.0	12.1	12.0	26	11.1	10.8	26	12.4		17.0	14.6		23	13.4		18.0	18.5		22.0	17.8		33	12.6		33	14.0	2.64
36	8.1	9	23.0	11.6	12.1	30	10.7	10.3	30	12.2		18.0	14.2		25			19.0	17.8		23.0	17.6					36	11.5	2.40
39	7.8	8.6	26.0	11.4	12.3	33	10.4	10.3	33	11.0		19.0	13.8		26	12.1		20.0	16.8		24.0	16.7					39	10.0	1.58
43	7.8	8.5	29.0	10.7	10.3	36	10.1	10				20	13.4		30	11.4		21.0	16.2		25.0	16.1							
						39	9.4	9.3				21	12.7		33	10.5		22.0	15.1										
						43	8.7	8				22	12.4		36	9.6		23.0	13.4										
												23	12.1		39	8.9		24.0	13.4										
												24	11.9		43	8.4		25.0	12.3										
												25	11.8					26.0	12.1										
												26	11.5					27.0	11.7										

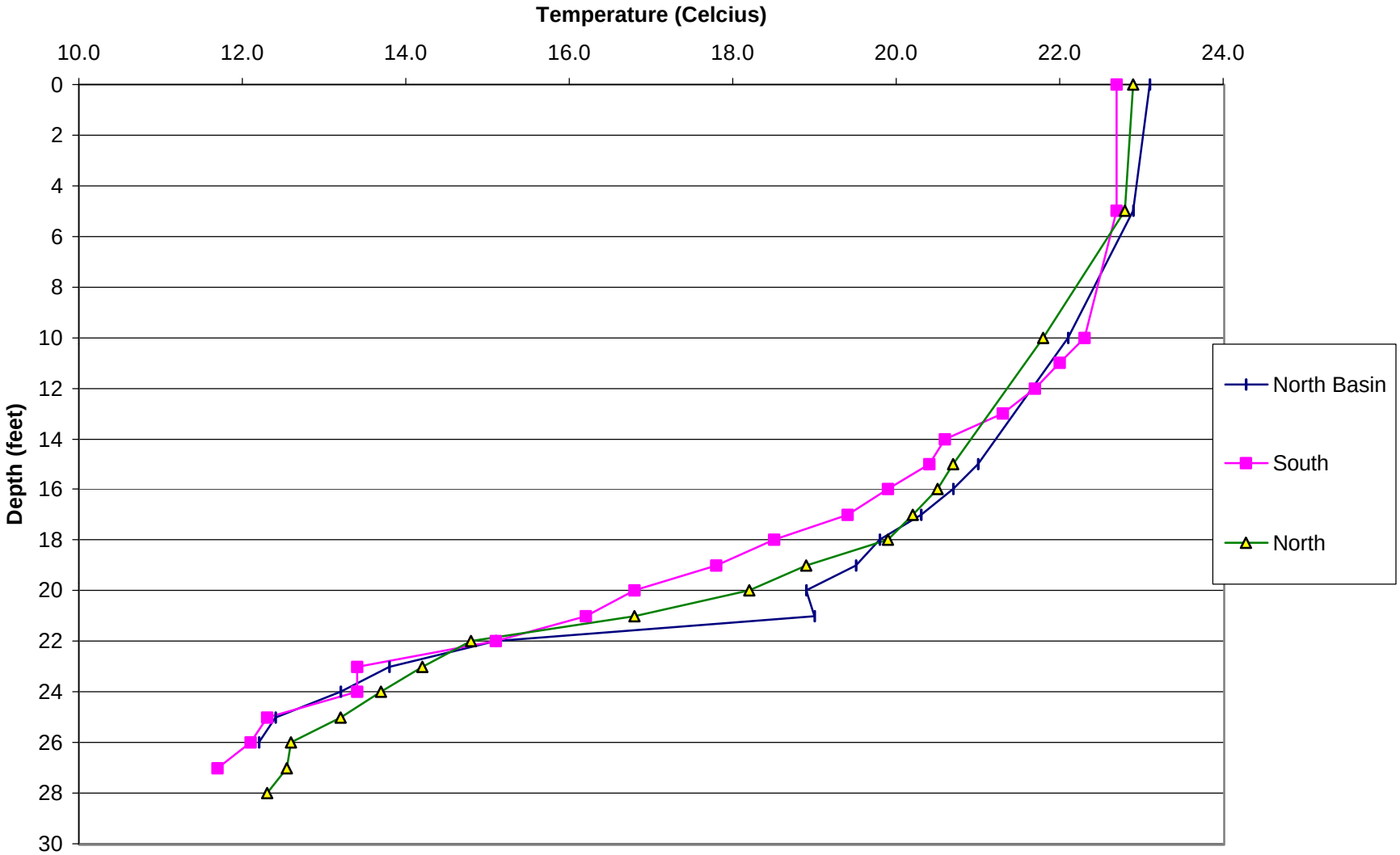
Site 3 - North Bay

Depth (ft)	6/1 Temp. (C)	Depth (ft)	6/18 Temp. (C)	Depth (ft	6/20 Temp. (C)	Depth (ft	7/20 Temp. (C)	Depth (ft)	8/24 Temp. (C)
Surface	18.5	Surface	24.4	Surface	23.1	Surface	23.8	Surface	21.9
2	18.5	3	23.5	5.0	22.9	5.0	23.8	7	21.9
4	18.5	7	21.5	10.0	22.1	10.0	23.7	13	21.5
6	18.5	10	20.9	15.0	21.0	15.0	23.4	16	21.0
8	18.5	13	20.4	16.0	20.7	16.0	23.0	18	20.4
10	18.5	15		17.0	20.3	17.0	23.3	20	20.0
12	18.5	16	19.7	18.0	19.8	18.0	23.0	21	19.6
14	18.5	18	19.1	19.0	19.5	19.0	22.6	23	18.8
16	17.7	20	17.9	20.0	18.9	20.0	22.2	25	17.1
17	17.3	21	16.6	21.0	19.0	21.0	21.4	26	16.9
18	16.9	23	14.5	22.0	15.1	22.0	19.5	30	16.4
19	16.6	25	13.2	23.0	13.8	23.0	17.7		
20	14.7	26	12.2	24.0	13.2	24.0	15.5		
21	13.5	30	11.3	25.0	12.4	25.0	15.8		
22	12.8			26.0	12.2				
23	12.3								
24	11.6								
25	11.4								

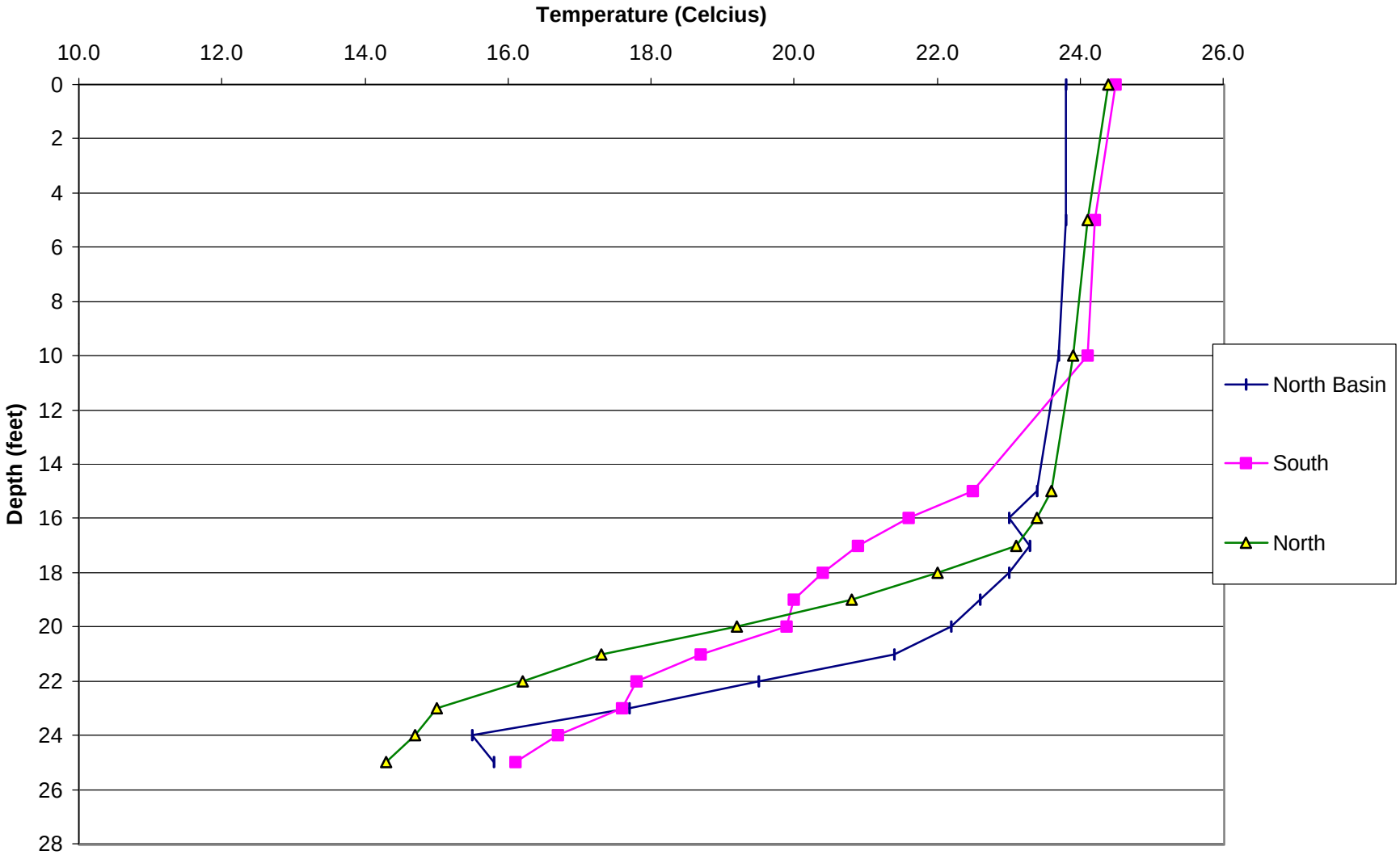
Temperature vs. Depth for Lake St. Catherine 5/31/2004 and 6/1/2004



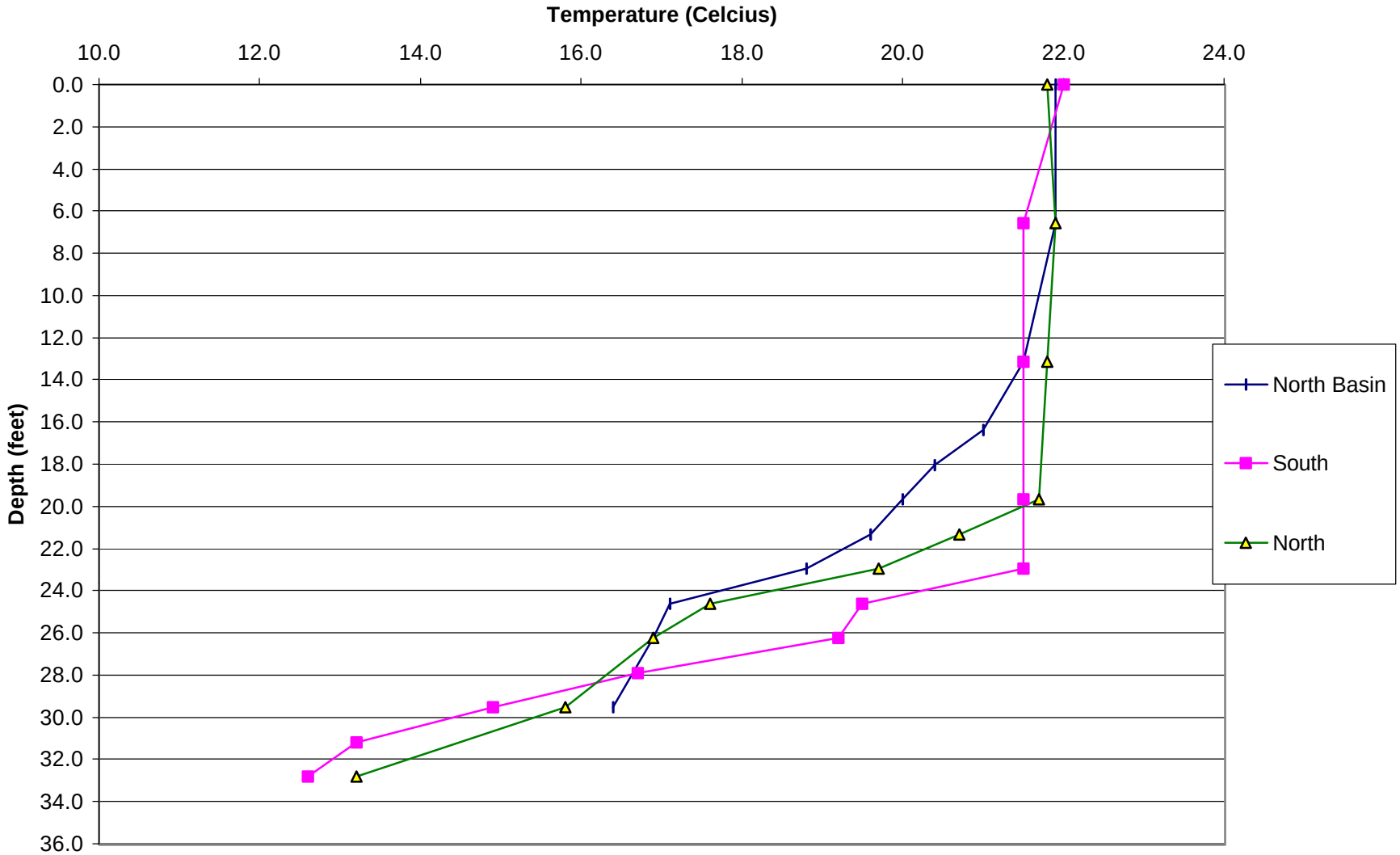
Temperature vs. Depth for Lake St. Catherine 6/20/2004



Temperature vs. Depth for Lake St. Catherine 7/20/2004



Temperature vs. Depth for Lake St. Catherine 8/24/2004



Treatment Dates

June 1st
June 21st
June 29th (Little Lake only)
July 20th
August 24th

Site	2-Jun	7-Jun	13-Jun	22-Jun	29-Jun	30-Jun	6-Jul	13-Jul	21-Jul	27-Jul	3-Aug	10-Aug
1	6.5	5.8	3.1	8.1	5.55		6.3	4.7	8.45	5.9	5.4	4.1
2	8.4	7.65	5.5	8.4	6.65		6	5.95	10.35	7	6.95	5.9
3	9.5	7.35	7.5	7.95	6.15		6.25	5.75	11.15	7.3	7	6.85
4	11.7	7.25	6.1	7.75	6.55		5.25	5.25	9.55	7.05	7	6.1
5	7.7	5.55	6.08	8.4	6.9		5.95	5.45	9.5	7.05	6.95	6.9
6	7.25	6.05	7.35	7	6.25		6.3	5.45	8.55	6.8	7.1	5.85
7	8.15	6.4	6.45	6.95	7.35		6.6	5.75	9.2	6.7	7.35	6.2
8	3.95	7.4	7.1	7.6	7		5.75	5.3	6.25	7.05	7	6.15
9	6.95	6.15	6.37	8.65	4.45		6.8	5.75	5.35	6.4	6.25	6.95
10	5.7	6.25	6.13	8.9	6.85		6.85	5.75	6.4	7.05	6.85	6.5
11	7.75	4.65	4.8	6.3	4.8	7.8	6	5.25	7.65	4.8	5.2	4
12	8.95	5.9	5.85	5.3	5.05	8.9	6.15	5.25	9.25	7.2	5.4	4.7
Outlet 13	6.05	6.45	5.45	0	0	0	0	0	5.3	5.7	4.6	2.5
Outlet 14	5.1	5.25	4.5	2.6	3.65	4.2	4.1	3.65	3.35	4.7	5.2	3.5
Mean												
Basin 1	*6.5*	*5.8*	*3.1*	*8.1*	*5.55*		*6.3*	*4.7*	*8.45*	*5.9*	*5.4*	*4.1*
Basin 2	*8.4*	*7.7*	*5.5*	*8.4*	*6.65*		*6*	*5.95*	*10.35*	*7*	*6.95*	*5.9*
Basin 3,4	*8.1*	*6.9*	*6.9*	*7.5*	*6.7*		*6.0*	*5.5*	*8.9*	*7.0*	*7.1*	*6.2*
Basin 5 & 6	*6.8*	*6.0*	*6.2*	*8.7*	*6.1*		*6.5*	*5.7*	*7.1*	*6.8*	*6.7*	*6.8*
Basin 8	*8.4*	*5.3*	*5.3*	*5.8*	*4.9*	*8.4*	*6.1*	*5.3*	*8.5*	*6.0*	*5.3*	*4.4*

Treatment D
June 1st
June 21st
June 29th (Li
July 20th
August 24th

Site	16-Aug	25-Aug	30-Aug	7-Sep	14-Sep	21-Sep	28-Sep
1	1.6	6.15	4.75	3	2.35		
2	5.9	6.45	6.1	4.75	4.95	4.15	
3	6.1	5.75	5.75	5.55	5.05	4	
4	5.4	7.15	7.05	4.86	5.15	4.6	
5	6.1	6.9	6.25	5.6	4.9	5.25	4.25
6	5.8	7.75	6.55	5.5	5.05	4.45	
7	5.45	6.8	6.6	6.5	4.35	4.6	
8	5.9	7.65	6.65	6.05	4.9	4.3	
9	5.4	8	6.4	6.2	5.05	4.25	
10	6.25	8.5	6.9	6.7	4.95	4.55	
11	6.05	6.05	6	5	3.9	4.45	
12	5.45	6.1	6.05	4.6	4.35	4	
Outlet 13	4.25	4.35	4.55	2.6	2.5	4.5	
Outlet 14	4.45	4.6	4.5	4.05	2.4	2.2	

Mean						
Basin 1	*1.6*	*6.15*	*4.75*	*3*	*2.35*	
Basin 2	*5.9*	*6.45*	*6.1*	*4.75*	*4.95*	*4.15*
Basin 3,4	*5.7*	*7.0*	*6.5*	*5.7*	*4.9*	*4.4*
Basin 5 & 6	*5.9*	*7.8*	*6.5*	*6.2*	*5.0*	*4.7*
Basin 8	*5.8*	*6.1*	*6.0*	*4.8*	*4.1*	*4.2*

FasTEST Program Summary

Site	A	B
1	5.1	4.4
2	6.5	6.0
3	6.8	6.2
4	6.7	6.0
5	6.4	5.9
6	6.4	6.0
7	6.6	6.2
8	6.2	6.2
9	6.2	5.9
10	6.5	6.3
11	5.6	5.0
12	6.0	5.4
Outlet 13	3.3	3.3
Outlet 14	4.0	4.0

Basin 1	5.1	4.4
Basin 2	6.3	6.0
Basin 3,4	6.3	6.1
Basin 5,6	6.4	6.1
Basin 8	5.8	5.2

Aquatics Research

November 23, 2004

EffecTEST Assay Results

Customer: Aquatic Control Technology

Sampled Treatment Site(s): Lake St. Catherine - LSC 1, 2, 3

Tested Species: *Myriophyllum spicatum,* Eurasian watermilfoil

SePRO Point of Contact: Shaun Hyde or Alicia Henson (Dr. Mark Heilman-secondary reviewer)

Methods: Eurasian watermilfoil plants were sampled by Aquatic Control on 7/20/04 and 8/10/04 from 3 sites on Lake St. Catherine. Plants were shipped via overnight express to SePRO RDC Laboratory, and upon receipt, they were cleaned and prepared for analysis. Apical cuttings were analyzed for key biochemical parameters impacted by Sonar exposure to develop injury ratings for site based on a 1-10 scale:

1 - 2: strong, phytotoxic response to fluridone exposure; very good control with sufficient exposure time
3 – 4: major growth regulation with phytotoxicity likely; good to very good control with sufficient exposure time
5 – 7: light to moderate growth regulation; poor control
7 – 10: little or no response by target vegetation; no control

Extensive laboratory and field research has demonstrated that this injury rating system is strongly predictive of final control achieved through Sonar treatment provided sufficient exposure period and other criteria for Sonar use are met.

Sonar History and Treatment Information: Split treatments of Sonar AS were applied on 6/1/04, 6/21/04 and 7/20/04 to 1088 acres to Lake St. Catherine. Three plant samples and fourteen water samples were sent to the laboratory for FasTEST and EffecTEST analysis.

Assay Results:

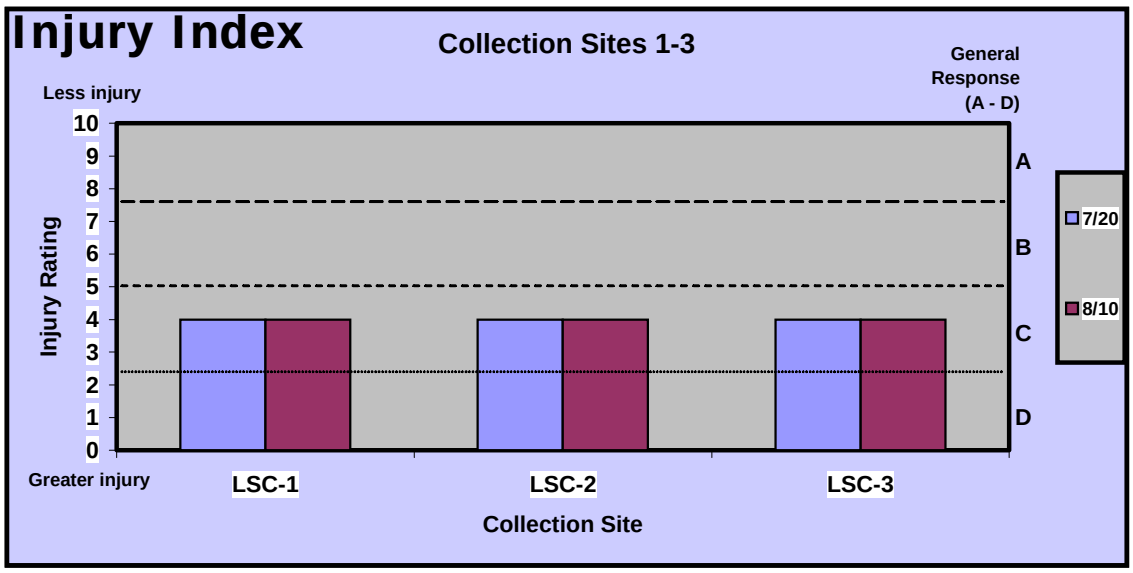
7/20/04 Collection
LSC 1 = Injury rating – 4 – FasTEST = 8.45 ppb
LSC 2 = Injury rating – 4 – FasTEST = 10.35 ppb
LSC 3 = Injury rating – 4 – FasTEST = 11.15 ppb

8/10/04 Collection
LSC 1 = Injury rating – 4 – FasTEST = 6.85 ppb
LSC 2 = Injury rating – 4 – FasTEST = 6.2 ppb
LSC 3 = Injury rating – 4 – FasTEST = 6.15 ppb

Recommendations:

Residue management to date, field survey information, and measured biochemical response suggest very good likelihood of effective control of Eurasian milfoil in Lake St. Catherine using Sonar. While overall target plant injury is consistent and at anticipated levels for both July and August sampling events, continued close monitoring is recommended to observe ongoing trends in the lake's plant populations and residue dissipation to confirm conditions needed for best long-term Eurasian watermilfoil control and overall treatment selectivity.

Lake St. Catherine
2004 Sonar Treatment Monitoring



General Plant Response Ranges:

A - Active Growth; Limited / No Supression
B - Growth Supression; Not Lethal
C - Strong Growth Inhibition; Phytotoxic Response Likely
D - Threshold Response; Phytotoxic

Transect	Data Point & GPS ID	Distance From Shore (ft.)	Water Depth (ft.)	Dominant Vegetation	% Total Plant Cover	% Viable Milfoil (Ms) Cover	% Dead Milfoil (DMs) Cover	Biomass Index		
LILY POND										
1	49	25	4	Pr, Pe, Pa, Uv, L	70	0	0	3.0		
1	50	100	6	Pr, Pa, Fa	90	0	0	2.5		
1	51	midpoint	6	Pr, Pa, Uv	80	0	0	2.5		
1	52	150	6	Pa, Ny, Uv, Nu, Pz, Pr, Fa	90	0	0	3.5		
1	53	30	4	Pr, Pa	50	0	0	2.5		
2	54	25	5	Pr, Pa, Uv	100	0	0	3.0		
2	55	150	7	Pr, U, Pa	70	0	0	2.0		
2	56	180	7	Pr, Pa, Uv	70	0	0	2.0		
2	57	60	7	Pr, Pa, Nu, Ny, Uv	100	0	0	3.0		
2	58	40	7	Pr, Pa	90	0	0	3.0		
3	59	25	4	Pr, Pa, Nu, Dv	60	0	0	2.5		
3	60	120	7	Pr, Pa, Pi	90	0	0	2.0		
3	61	midpoint	7	Pr, Pa, Cd, Pz	90	0	0	2.0		
3	62	15	4	Ny, Pa, Uv, Fa, B, Po	80	0	0	3.0		
4	63	20	4	Pr, Pa, Uv	70	0	0	2.0		
4	64	100	6.5	Pr, Pa	90	0	0	2.0		
4	65	100	6	Pr, Pa	80	0	0	2.0		
4	66	30	3.5	Pr, Pa, Uv	90	0	0	2.5		
5	67	20	2	Pr, Pa, Pe, Fa	70	0	0	3.0		
5	68	50	3	Pr, Pa	90	0	0	2.0		
5	69	60	3.5	Pr, Pa, Fa	90	0	0	2.0		
5	70	15	4	Pr, Pa, Nu, Pe, Ms, Fa	90	5	0	3.0		
6	71	10	1.5	Ny, Fa, Pa, Pc, Ms, L, Po, Dv	60	15	0	3.0		
7	48	midpoint	4.5	Pr, Pa	60	0	0	2.0		
				Averages	**80.0**	**0.8**	**0.0**	**2.5**	[24 data points]	

Transect	Data Point & GPS ID	Distance From Shore (ft.)	Water Depth (ft.)	Dominant Vegetation	% Total Plant Cover	% Viable Milfoil (Ms) Cover	% Dead Milfoil (DMs) Cover	Biomass Index		
LAKE ST. CATHERINE										
7	47	30	2.5	Uv, Pe, Pr, Fa	60	0	0	2.0		
8	44	50	4	Pr, Fa	70	0	0	2.0		
8	45	midpoint	3.5	Pr, Pa, DMs, Fa	70	0	10	2.0		
8	46	25	3.5	Pe, Pr, Pa, DMs, Fa	90	0	10	2.5		
9	41	15	5	Pr, Ca	20	0	0	1.0		
9	42	150	11	DMs	10	0	100	1.5		
9	43	40	6.5	Pr, Pa, DMs	70	0	5	2.0		
10	37	35	8	Pr, DMs, Pa	70	0	30	2.0		
10	38	40	5	Pr, Pa, Fa	70	0	0	2.0		
10	39	150	9	Pr, Pa, DMs	70	0	30	2.0		
10	40	220	12	DMs, Pr	30	0	70	2.0		
11	34	20	3	Pa, Pr, Fa (Ny, B, Nu, Dv, Po)	80	0	0	2.0		
11	35	100	8	Pr, Pi, Fa, DMs	70	0	5	2.0		
11	36	30	6.5	Pr, Pe, Fa	60	0	0	2.0		
12	31	25	7.5	Pr, I	30	0	0	1.0		
12	32	25	3	Pr, Fa, (Ny, B)	90	0	0	2.5		
12	33	75	7	Pr	90	0	0	2.0		
13	28	35	4	Pr, I	50	0	0	1.0		
13	29	120	10	Fa, Pr	20	0	0	1.0		
13	30	25	10	Pr, DMs	30	0	50	1.0		
14	25	20	6	branches - no plants	0	0	0	0.0		
14	26	30	3.5	Pr, I, (Ny, Po)	50	0	0	2.0		
14	27	60	8	Pr, DMs	50	0	10	2.0		
15	22	75	7.5	Ca	10	0	0	1.0		
15	23	50	5.5	Pr, DMs	40	0	50	1.5		
15	24	125	12	DMs, Cd	30	0	70	1.5		
16A	20	100	8.5	Pr, Pa	20	0	0	1.5		
16B	21	70	9	Pr, DMs	30	0	40	1.5		
17A	17A	25	6.5	DMs, Fa	30	0	100	1.0		
17	98	80	8	Pr, DMs, Pz	80	0	20	2.0		
18	72	15	10	DMs, Pr	30	0	60	1.0		
18	73	30	8	Pr	60	0	0	2.0		
19	74	25	8.5	Pr	70	0	0	2.0		
19	75	25	10	DMs	10	0	100	1.0		

Transect	Data Point & GPS ID	Distance From Shore (ft.)	Water Depth (ft.)	Dominant Vegetation	% Total Plant Cover	% Viable Milfoil (Ms) Cover	% Dead Milfoil (DMs) Cover	Biomass Index		
20	76	20	6.5	Pa, Pr, DMs	50	0	30	1.5		
20	77	125	7	DMs, Pr, Cd	50	0	70	1.5		
21	78	40	6	Pr, DMs	80	0	5	1.5		
21	79	80	12	DMs	20	0	100	1.0		
21	80	15	8	Pr, DMs	60	0	30	1.5		
22	81	30	6	DMs, I	30	0	70	1.0		
22	82	30	7	DMs, Fa	20	0	100	1.0		
23	83	25	3	Pr, Ca, V, I	60	0	0	1.0		
23	84	120	6	Pr, DMs	90	0	5	1.0		
23	85	200	8	DMs, Fa	30	0	100	1.5		
23	86	40	8	DMs	20	0	100	1.0		
24	87	40	5		0	0	0	0.0		
24	88	25	4	Ca	10	0	0	1.0		
24	89	100	8.5	DMs, Fa	50	0	100	2.0		
25	92	70	5	Ca	20	0	0	1.0		
25	93	15	3.5	DMs, Pr, Fa	40	0	60	1.0		
25	94	20	9.5	DMs, Fa	50	0	100	1.5		
26	95	50	7	DMs, Fa	60	0	100	2.0		
26	96	100	7.5	DMs, V, Cd	80	0	60	2.0		
26	97	175	13	DMs, Cd	70	0	60	2.0		
27	100	20	7	V, Pr, Ca, DMs	60	0	10	1.0		
27	101	150	8.5	DMs, Pr, Cd, Pa	70	0	50	2.0		
27	102	20	4	Pr, Pa, DMs, Ny, Fa	60	0	10	1.5		
27	103	70	8	Pr, DMs	70	0	10	2.0		
27	104	225	8	DMs, Fa	50	0	100	2.0		
28	127	30	5.5	Pr, Pz, Cd, Fa, DMs	80	0	10	2.0		
28	128	40	4	Pr, Pa, B, Ny, Fa, DMs	80	0	10	2.0		
28	129	midpoint	7	Pr, DMs, Fa	60	0	10	2.0		
29	105	30	8.5	Pr, Ca, Pa	60	0	0	2.0		
29	106	30	6	DMs, Ca, Pr	80	0	60	2.0		
29	107	30	11.5	DMs, Pr	70	0	70	2.0		
30	108	25	4	DMs, Pa, Fa	20	0	70	1.5		
30	109	100	12	Fa	0	0	0	0.0		
30	110	50	10.5	DMs, Pr, Ca	60	0	50	2.0		
30	111	150	11	DMs, Cd	50	0	70	1.5		
31	124	25	6	Pr, Fa	30	0	0	1.0		
31	125	midpoint	10	DMs, Cd, Pr	20	0	40	1.0		

Transect	Data Point & GPS ID	Distance From Shore (ft.)	Water Depth (ft.)	Dominant Vegetation	% Total Plant Cover	% Viable Milfoil (Ms) Cover	% Dead Milfoil (DMs) Cover	Biomass Index		
31	126	30	5	Pr, DMs	90	0	10	2.0		
32	112	30	5	Pr, Ca	40	0	0	1.0		
32	113	125	12	DMs, Cd	60	0	90	2.0		
32	114	15	7	Pr	20	0	0	1.5		
33	120	50	5	Ca, I	30	0	0	1.0		
33	121	125	13	DMs, Cd, Fa	50	0	70	1.0		
33	122	30	10	DMs, I, Pr, Zd	70	0	50	2.0		
33	123	120	13	DMs, Cd, Fa	40	0	70	1.0		
34	115	40	5	Pr, Pa	80	0	0	2.0		
34	116	150	9.5	DMs, Ca, Fa	50	0	60	2.0		
34	117	250	13	Pr, Fa	10	0	0	1.0		
34	118	30	7	DMs, Cd, Pr	60	0	70	1.5		
34	119	150	10	DMs, Fa	20	0	100	1.5		
35	134	50	10.5	DMs, Ca, Pr, Fa	30	0	50	1.0		
35	135	125	8.5	Fa	0	0	0	0.0		
36	130	50	7.5	DMs, Fa, Pz	50	0	70	2.0		
36	131	250	13	DMs, Fa	30	0	100	1.5		
36	132	25	4	Ca	10	0	0	1.0		
36	133	300	13	DMs, Fa	60	0	100	2.0		
37	136	100	10	Pr, DMs, Ca, Fa	70	0	30	2.0		
37	137	25	5.5	Pr, Pa	80	0	0	2.0		
37	138	15	7.5	Ca	5	0	0	1.0		
38	139	10	6		0	0	0	0.0		
38	140	120	7	Pr, DMs, Fa	50	0	50	2.0		
38	141	200	8	DMs, Fa	30	0	100	1.5		
38	142	300	8.5	DMs, Fa	60	0	100	2.0		
39	166	50	5.5	Pr	50	0	0	1.0		
40	143	100	6	Pr, Pa, DMs, Fa	60	0	20	2.0		
40	144	100	12	DMs, Fa	50	0	100	1.5		
40	145	20	5	Pr, DMs, Ca	20	0	50	1.0		
41	168	50	7	Pr, DMs	50	0	50	1.5		
42	146	10	6.5	Ni, Pr, DMs	30	0	30	1.0		
42	147	35	7.5	Pr, DMs	50	0	10	1.5		
43	148	35	6.5	Pr, Fa	70	0	0	2.0		
43	149	100	13	Pr, DMs, Fa	40	0	25	1.5		
43	150	30	5.5	Ca	10	0	0	1.0		
44	151	20	7	Pr, Ni	10	0	0	1.0		

Transect	Data Point & GPS ID	Distance From Shore (ft.)	Water Depth (ft.)	Dominant Vegetation	% Total Plant Cover	% Viable Milfoil (Ms) Cover	% Dead Milfoil (DMs) Cover	Biomass Index		
44	152	175	13	DMs, Fa	30	0	100	1.5		
44	153	75	6.5	Pr, Fa, DMs, (B)	50	0	10	1.5		
45	154	20	6	DMs, Ca, Pr, I	10	0	30	1.0		
45	155	25	5	Pr, DMs, Fa	50	0	20	1.5		
46	156	60	4.5	Pr, Fa	20	0	0	1.0		
46	157	200	12	DMs, Fa	30	0	100	1.0		
46	158	35	6.5	DMs, Pr, Cd	60	0	80	2.0		
46	159	175	8	DMs, Pr, Fa, Cd	60	0	80	2.0		
47	160	100	7	Pr	10	0	0	1.0		
47	161	25	5	Pr, Pa, DMs, Fa	50	0	10	2.0		
47	162	125	12	DMs	20	0	100	1.0		
47	169	150	7.5	DMs	40	0	100	2.0		
48	163	45	5	Pr, DMs, Fa	60	0	25	2.0		
48	164	midpoint	13	DMs	30	0	100	1.0		
48	165	40	4	Pr, Fa	80	0	0	2.0		
49	170	25	3.5	Pr, Ca	60	0	0	1.0		
49	171	midpoint	9	Pr, DMs, Fa	70	0	5	2.0		
49	172	15	3.5	Pr, Fa	50	0	0	1.0		
50	173	20	2.5	Pr, Pe, Fa	20	0	0	1.0		
50	174	midpoint	6.5	Pr, Fa	50	0	0	1.0		
50	175	20	4.5	Pr, Pa	70	0	0	2.0		
				Averages	**45.9**	**0.0**	**35.5**	**1.5**	[129 data points]	

Transect	Data Point & GPS ID	Distance From Shore (ft.)	Water Depth (ft.)	Dominant Vegetation	% Total Plant Cover	% Viable Milfoil (Ms) Cover	% Dead Milfoil (DMs) Cover	Biomass Index		
LITTLE LAKE										
51	176	midpoint	7	Pr, Fa	50	0	0	1.0		
52	177	20	4	Pr, Pa, B, Fa, (Po, Sp, T)	80	0	0	2.0		
52	178	midpoint	5.5	Pr, Fa	40	0	0	1.0		
52	179	30	3.5	Pr, B, Pa, V, Ny, (Po, T)	80	0	0	3.0		
53	180	20	4	B, Nu, Pr, Pa, Uv, Eo, Pe, (Po, Dv)	100	0	0	3.0		
53	181	midpoint	6	Pr	20	0	0	1.0		
53	182	20	4	Nu, B, Uv, Ny, Pr, Eo, (Po)	100	0	0	3.5		
54	183	25	5	Pr, Nu, B	100	0	0	3.0		
54	184	40	4.5	Pr, Pa, Uv	50	0	0	1.5		
54	185	midpoint	5	Pr, Pa, B, Nu	100	0	0	3.0		
54	186	100	5	Pr, Pa, Uv, Ny, B	100	0	0	3.5		
55	187	100	5	Pr, B, Ca, Pa, Ny, Uv, Nu	100	0	0	3.5		
55	188	150	4.5	Pr, Pa, Fa	80	0	0	2.5		
55	189	250	5	Pr, Pa, Fa	60	0	0	2.0		
55	190	75	4	Pr, B, Pa, Uv, Fa	100	0	0	3.0		
56	191	30	3.5	Pr, Pa	80	0	0	2.0		
56	192	400	5.5	Pr, Pa, Pg, DMs	60	0	5	2.0		
56	193	500	5.5	Pr, Pa, Fa	70	0	0	2.0		
56	194	50	5	Pr, Pa, Pe, DMs, V	70	0	5	2.0		
57	195	75	6	Pr, Pa	70	0	0	2.0		
57	196	500	5.5	Pr, Pa	80	0	0	2.0		
57	197	600	5	Pr, Pa	20	0	0	1.0		
57	198	120	4	Pr, B, Pa, Ca, Uv	90	0	0	3.0		
58	199	40	3.5	Pr, Pa, Pe, (B, Sp)	60	0	0	2.0		
58	200	700	5	Pr, Pa, S	50	0	0	1.5		
58	201	600	5	Pr, Pa	80	0	0	2.0		
58	202	60	6.5	Pr, Pa	80	0	0	2.0		
59	203	35	4	Pr, Pa, DMs	70	0	5	2.0		
59	204	700	5	Pr, Pa	80	0	0	2.0		
59	205	500	5.5	Pr, Pa, DMs	70	0	5	2.0		
59	206	125	5	Pr, Pa, S	60	0	0	2.0		
60	207	100	4	Pr, Pe, (B)	20	0	0	1.0		
60	208	500	5	Pr, Pa, Pg	70	0	0	2.0		

Transect	Data Point & GPS ID	Distance From Shore (ft.)	Water Depth (ft.)	Dominant Vegetation	% Total Plant Cover	% Viable Milfoil (Ms) Cover	% Dead Milfoil (DMs) Cover	Biomass Index		
60	209	450	5.5	Pr, Pa	80	0	0	2.0		
60	210	75	6	Pr, Pa, DMs, S	80	0	5	2.0		
61	211	75	4.5	Pr, Pa, Fa	90	0	0	3.0		
61	212	800	5	Pr	10	0	0	1.0		
61	213	300	5	Pr, Fa	10	0	0	1.0		
61	214	40	5	Pr, Pe, B	40	0	0	2.0		
62	215	50	4.5	B, V, Pr	60	0	0	2.5		
62	216	700	4	Pr	5	0	0	1.0		
62	217	120	4	B, Pr	20	0	0	1.5		
62	218	30	3	Pr, B, Nu, Pa, Pz, Uv, Zd	90	0	0	3.0		
				Averages	**65.7**	**0.0**	**0.6**	**2.1**	[43 data points]	

5/22/04 – Lily Pond during pre-treatment inspection

5/22/04 – coontail, largeleaf pondweed and Eurasian watermilfoil during pre-treatment inspection

9/20/04 – floating-leaves of largeleaf pondweed in Lily Pond during post-treatment inspection

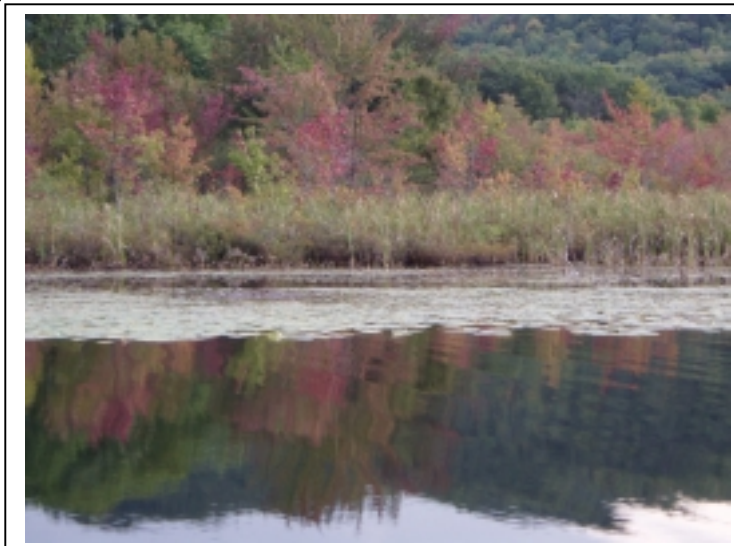
9/20/04 – Viable Robbins pondweed collected in Lake St. Catherine during post-treatment inspection

Lake St. Catherine, Lily Pond & Little Lake

2004 Sonar AS Herbicide Treatment

5/22/04 – Pre-treatment – waterlilies and wetland on northern shoreline of Little Lake

5/22/04 – Pre-treatment – channel leading to Little Lake, looking south



9/21/04 – Post-treatment – waterlilies and wetland on northern shoreline of Little Lake

9/21/04 – Post-treatment – channel leading to Little Lake, looking south