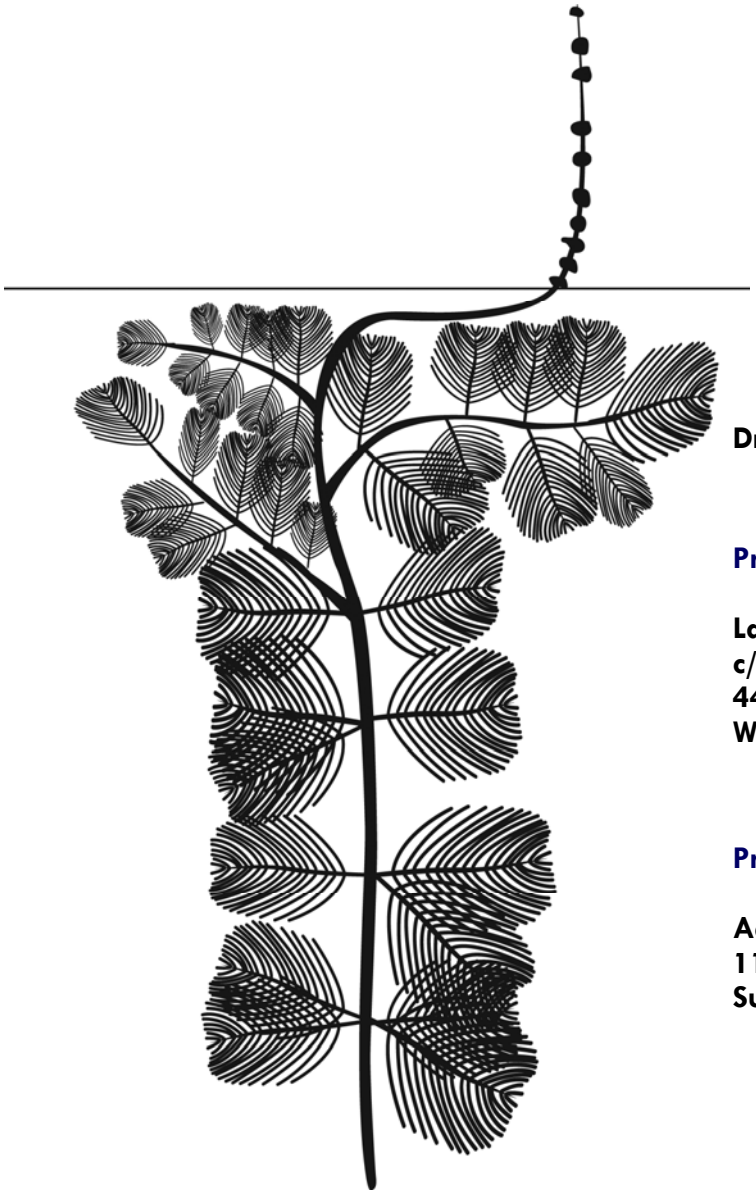
Lake St. Catherine

Aquatic Vegetation Management Program
2008 - Year Five Report



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Prepared for:

Lake St. Catherine Association
c/o Jim Canders, President
443 Old Best Road
West Sand Lake, NY 12199

Prepared by:

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

AQUATIC CONTROL TECHNOLOGY, INC.
POND AND LAKE MANAGEMENT SPECIALISTS

TABLE OF CONTENTS

TABLE OF CONTENTS ..... **i**

INTRODUCTION **1**

HERBICIDE TREATMENT PROGRAM - 2008 ..... **1**

Program Chronology *1*
2008 Treatment Scope *1*
Summary of 2008 Treatment *2*
Herbicide Residue Testing *2*
Post –Treatment Surveys *2*

LATE SEASON COMPREHENSIVE AQUATIC VEGETATION SURVEY **3**

Survey Methods *3*
Survey Findings *4*
Lily Pond *5*
Lake St. Catherine (Main Basin) *7*
Little Lake *8*
Species Richness *9*
Evaluation of 2008 Treatment Areas *10*
Late Season Milfoil Bed Mapping *10*

SUMMARY OF 2008 AQUATIC VEGETATION MANAGEMENT PROGRAM **12**

Renovate OTF Herbicide Treatments *12*
Spread Prevention and Non-Chemical Control Activities *13*

RECOMMENDATIONS FOR 2009 AND BEYOND **13**

LIST OF FIGURES

Figure 1: 2008 Treatment Areas 1
Figure 2: Milfoil Bed Map September 2008 11

LIST OF TABLES

Table 1: Summary of Survey Data 4
Table 2: Species List and Frequency of Occurrence 5
Table 3: Lily Pond – Species List and Frequency of Occurrence 6
Table 4: Lake St. Catherine – Species List and Frequency of Occurrence 7
Table 5: Little Lake – Species List and Frequency of Occurrence 8
Table 6: Species Richness by Basin 9

LIST OF CHARTS

Chart 1: *Myriophyllum spicatum* Number of Occurrences and Percent Cover 6
Chart 2: *Myriophyllum spicatum* Frequency of Occurrences and Percent Cover 8
Chart 3: *Myriophyllum spicatum* Number of Occurrences and Percent Cover 9

APPENDICES

Appendix A: Herbicide Residue Testing Results
Appendix B: Comprehensive Aquatic Vegetation Survey Information

INTRODUCTION

The 2008 season represented the final year of the five-year Integrated Management Plan that was initiated in 2004 with a whole-lake Sonar (fluridone) treatment to control Eurasian watermilfoil. Management activities performed in 2008 included spot-treatment of eight areas totaling approximately 79 acres with Renovate OTF herbicide, diver hand-pulling, diver assisted suction harvesting and aquatic vegetation monitoring.

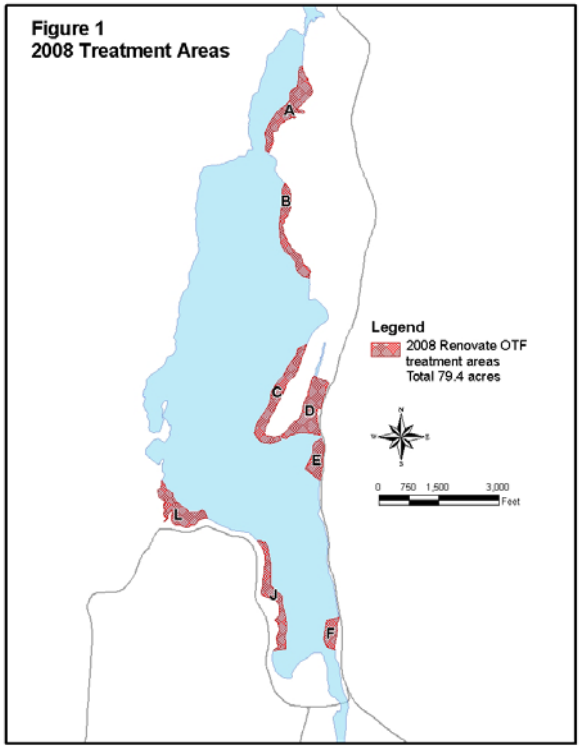
The following report summarizes the results of 2008 Renovate OTF treatment, details findings from the comprehensive aquatic plant survey and provides recommendations for the 2009 season. Specific information on the 2008 diver hand-pulling and diver assisted suction harvesting efforts will be provided by the Lake St. Catherine Association (LSCA) under separate cover.

HERBICIDE TREATMENT PROGRAM - 2008

Program Chronology

A chronology of the 2008 treatment program is provided below:

- DEC permit issuance (ANC 2008-C02)..... April 28
- Pre-treatment inspection and finalize treatment areas..... May 1
- Treatment of approximately 79 acres with Renovate OTF ..... May 20
- Herbicide residue monitoring.....May 21, May 28/29, July 2
- Post-treatment inspections .....July 11, August 7
- Comprehensive aquatic plant survey ..... September 24-25



2008 Treatment Scope

Potential treatment areas for the 2008 season were based on the milfoil distribution identified during the late season survey in 2007 and several other factors including: the potential for increased milfoil spread; the potential for effective treatment; and the overall benefit of milfoil control with respect to the lake, lake residents and other potential users.

Initially 14 areas, totaling approximately 131 acres were identified as priority treatment areas. There were also three contingency treatment areas in North Bay and along the northwest shoreline of the main lake that totaled an additional 19.2 acres. No treatment work was proposed for Lily Pond or Little Lake.

A pre-treatment survey was performed on May 1, 2008. Water temperatures were in the 53° F range to depths of 15 feet. Active milfoil growth was observed, but milfoil plants were generally within 1-3 feet of the bottom. There was not enough growth to warrant making any changes to the proposed treatment areas.

Final decisions on the 2008 treatment areas were based on the milfoil distribution and density recorded during 2007 late season survey. Additional factors considered included: targeting high-use areas to reduce the potential for fragmentation and further milfoil spread; targeting areas that were not judged to be effective for hand-pulling or suction harvesting; and priority areas identified by LSCA in consideration of budgetary constraints. Final treatment areas (Figure 1) were mostly found along the eastern shoreline and in two areas along the southwest shoreline. There were eight individual treatment areas that ranged from 4.5 acres to 16.3 acres. In total, approximately 79 acres were targeted for treatment.

Summary of 2008 Treatment

The treatment date of Tuesday, May 20, 2008 was selected to allow enough time to comply with the notification requirements of ANC Permit #2008-C02 and so that the two-day swimming restriction (day of treatment and one additional day) would not be imposed over a weekend.

Weather conditions on the day of treatment were partly sunny, with an air temperature ranging between 55-60° F. Wind was out of the south/southwest, estimated at 5 mph and did not interfere with treatment. Prior to treatment, water temperature was measured using a YSI Temperature/Dissolved Oxygen meter. Within proposed treatment areas along the west shore and at the south end of the lake, water temperature was nearly uniform at 57-58° F to depths of 15 feet.

The treatment was conducted using two boats, one airboat and one fiberglass work skiff. 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 using fan-pattern nozzles. This system allowed for the granular herbicide to be evenly distributed throughout the treatment areas and "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. The herbicide was applied in approximately 9 hours.

Herbicide Residue Testing

In compliance with conditions of the ANC Permit #2008-C02, water samples were collected from nine (9) locations in Lake St. Catherine following treatment for analysis of triclopyr concentrations (Appendix A). Samples were collected from each treatment plot and from one downstream location that was in the channel just north of Little Lake. Sampling instructions and sample bottles were provided to LSCA representatives by ACT and SePRO. Collected samples were shipped via overnight delivery to SePRO's laboratory in Whittakers, North Carolina.

The highest in-lake concentration detected during the 24-hour sampling round (May 21) was 0.48 ppm (target concentrations applied were 1.75 ppm) in Hall's Bay on the eastern shoreline, which was the most enclosed treatment area. One-week after treatment during the May 28/29 sampling round, the in-lake concentration was below 0.05 ppm at all tested locations and the drinking restriction was lifted. On July 2, the concentration was below the detectable limit of <1.0 ppb at all sampled sites and DEC lifted the restriction of using lake water for irrigation.

Post –Treatment Surveys

Treatment areas were surveyed on July 11 by Marc Bellaud and again on August 7 with representatives from SePRO and LSCA. All of the treatment areas were toured by boat to visually evaluate impacts to the targeted milfoil and to the non-target plants.

On July 11, milfoil density appeared to be reduced by 70-80% or more in all treatment areas. Better milfoil control appeared to be achieved in larger treatment plots along the east shoreline, Hall's Bay in

particular. Remaining milfoil plants had lost leaflets or showed signs of epinasty (bending and twisting associated with triclopyr exposure). In general, the native plant community within the respective treatment areas appeared to be healthy and not adversely impacted by the treatment. Several species were observed including but not limited to: *Potamogeton amplifolius*, *P. Illinoensis, Elodea canadensis, P. epihydrus, P. zosteriformis* and *P. robbinsii*.

On August 7, no additional milfoil reductions were noted in the treatment areas that were inspected. In fact, there appeared to active or new growth on some plants suggesting that they were recovering. The native plant community looked equally diverse and robust.

LATE SEASON COMPREHENSIVE AQUATIC VEGETATION SURVEY

Survey Methods

The late season comprehensive aquatic vegetation survey conducted on September 24 and 25, 2008 replicated the methods that were employed in the previous years of this management program.

All three major lake basins were systematically toured by boat. Transect and data point locations established in 2001, were relocated using a Differential GPS system (Appendix B – Figure 1). The following information was recorded at each data point: aquatic plants present, dominant species, 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

At a number of data points “0.5” was added to the biomass value recorded during the late season survey to indicate a discrepancy in the height of plant species at that point. In general, points where a “0.5” was added harbored growth of either *P. amplifolius* and/or *M. spicatum* that was considerably higher in the water column than other more dominant plants. For example, a data point dominated by low-growing *P. robbinsii* mixed with taller growing milfoil would be marked: “1.5”.

Field data recorded at each transect and data point location is provided in the Field Survey Data Table found in Appendix B.

Survey Findings

The overall distribution and quantitative measures of the aquatic plant community were comparable to prior years.

Table 1: Summary of Survey Data

LILY POND	2001	2004	2005	2006	2007	2008
Total Number of Data Points	24	24	24	22	24	24
Total Plant Cover	90%	80%	98%	88%	91%	98%
Milfoil Cover	9%	6%	2%	0%	2%	7%
Plant Biomass Index	3.1	2.5	3.3	2.5	2.8	3.3

LAKE ST. CATHERINE						
Total Number of Data Points	129	129	129	129	129	129
Total Plant Cover	66%	46%	51%	57%	58%	66%
Milfoil Cover	43%	16%	0%	4%	11%	4%
Plant Biomass Index	1.9	1.5	1.6	1.8	2.0	2.0

LITTLE LAKE						
Total Number of Data Points	43	43	43	43	43	43
Total Plant Cover	72%	66%	78%	83%	83%	77%
Milfoil Cover	15%	0%	0%	2%	7%	10%
Plant Biomass Index	2.3	2.1	2.4	2.9	2.8	2.7

With the exception of the marked increase in cover and distribution of *Elodea canadensis*, the species encountered and their frequency of occurrence were largely unchanged from previous years (Table 2). Distribution maps for individual species are provided in Appendix B.

Table 2: Species List and Frequency of Occurrence (entire lake system)

Macrophyte Species	Common Name	Abbreviation (used in field data table)	2001 pre	2004 YOT	2005 YAT	2006 2YAT	2007 3YAT	2008 4YAT
Potamogeton robbinsii	Pondweed	Pr	52%	76%	88%	74%	77%	68%
Myriophyllum spicatum	Eurasian watermilfoil	Ms	94%	44%	17%	33%	74%	65%
Potamogeton amplifolius	Large-leaf	Pa	33%	38%	43%	49%	52%	53%
Najas flexilis	Naiad	Nf	22%	0%	8%	39%	34%	22%
Potamogeton illinoensis	Illinois pondweed	Pi	4%	1%	2%	9%	23%	39%
Potamogeton zosteriformis	Flat-stem pondweed	Pz	28%	3%	29%	29%	23%	19%
Zosterella dubia	Water stargrass	Zd	1%	1%	9%	8%	23%	17%
Ceratophyllum demersum	Coontail	Cd	20%	8%	11%	12%	21%	18%
Nitella / Chara	Stonewort	Ni	17%	6%	36%	40%	14%	14%
Nymphaea odorata	White waterlily	Ny	16%	5%	11%	10%	11%	11%
Valisneria americana	Wild celery/Tapegrass	Va	29%	13%	2%	4%	9%	8%
Brasenia schreberi	Watershield	B	4%	8%	7%	7%	7%	6%
Utricularia vulgaris	Common bladderwort	Uv	8%	9%	2%	6%	7%	7%
Elodea canadensis	Waterweed	Ec	32%	1%	1%	1%	5%	43%
Chlorophyta	Filamentous green algae	Fa	2%	37%	26%	7%	4%	8%
Potamogeton crispus	Curly-leaf pondweed	Pc	2%	1%	7%	5%	3%	1%
Potamogeton epihydrus	Ribbon-leaf pondweed	Pe	2%	6%	7%	3%	3%	5%
Nuphar variegatum	Yellow waterlily	Nu	5%	5%	5%	2%	2%	1%
Potamogeton gramineus	Variable pondweed	Pg	23%	1%	6%	6%	2%	4%
Isoetes sp.	Quillwort	I	2%	6%	2%	5%	2%	3%
Utricularia gibba	Creeping bladderwort	Ug	2%	0%	1%	5%	1%	1%
Eleocharis sp.	Spikerush	Eo	1%	1%	1%	0%	0%	0%
Lemna minor	Duckweed	L	7%	1%	0%	1%	0%	1%
Megalodonta beckii	Water marigold	Mb	3%	0%	0%	0%	0%	0%

Lily Pond

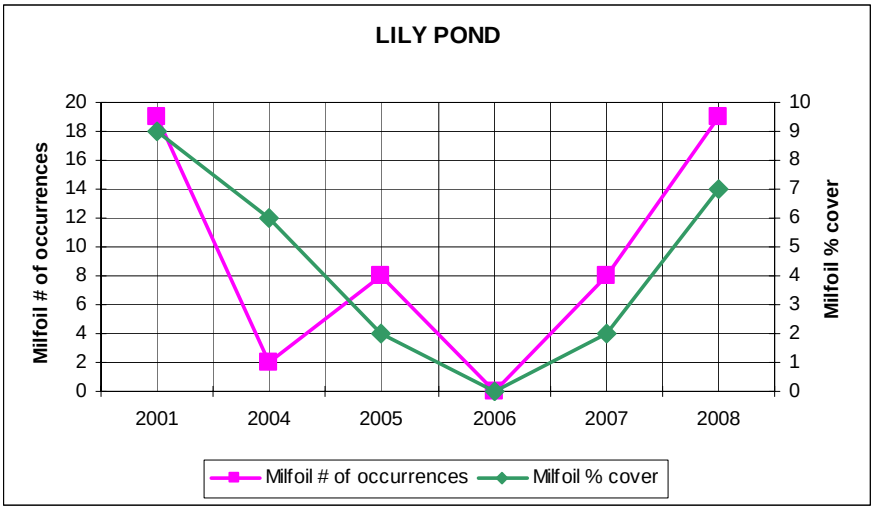
No herbicide treatments were performed in Lily Pond in 2008. Native species in this basin appeared similar to what was recorded in 2005 and additional gains in the distribution and cover of some native species were apparent, following the reduced frequency of native plants recorded after the 2006 Renovate 3 treatment. The most noteworthy increases in this regard were exhibited by increases in *P. zosteriformis*, *Utricularia vulgaris* and *Elodea canadensis*.

Table 3: Lily Pond – Species List and Frequency of Occurrence

Macrophyte Species	Lily Pond					
	2001 pre	2004 YOT	2005 YAT	2006 2YAT	2007 3YAT	2008 3YAT
Potamogeton robbinsii	95.8%	91.7%	95.8%	95.5%	91.7%	87.5%
Ceratophyllum demersum	70.8%	4.2%	50.0%	45.5%	83.3%	83.3%
Potamogeton amplifolius	33.3%	100.0%	91.7%	77.3%	79.2%	87.5%
Potamogeton illinoensis	0.0%	4.2%	8.3%	9.1%	45.8%	41.7%
Myriophyllum spicatum	79.2%	8.3%	33.3%	0.0%	33.3%	79.2%
Potamogeton zosteriformis	58.3%	8.3%	62.5%	0.0%	25.0%	45.8%
Zosterella dubia	4.2%	0.0%	37.5%	0.0%	25.0%	20.8%
Nymphaea odorata	62.5%	16.7%	29.2%	9.1%	20.8%	25.0%
Potamogeton crispus	4.2%	4.2%	4.2%	4.5%	12.5%	0.0%
Chlorophyta	0.0%	29.2%	95.8%	31.8%	8.3%	29.2%
Elodea canadensis	29.2%	0.0%	8.3%	0.0%	8.3%	29.2%
Utricularia vulgaris	29.2%	37.5%	0.0%	27.3%	4.2%	12.5%
Chara sp. / Nitella sp.	0.0%	0.0%	0.0%	4.5%	4.2%	0.0%
Wolffia sp.	0.0%	0.0%	0.0%	4.5%	4.2%	0.0%
Potamogeton epihydrus	0.0%	12.5%	4.2%	0.0%	4.2%	4.2%
Potamogeton gramineus	16.7%	0.0%	8.3%	0.0%	4.2%	0.0%
Utricularia gibba	0.0%	0.0%	0.0%	40.9%	0.0%	0.0%
Potamogeton natans	0.0%	0.0%	0.0%	9.1%	0.0%	8.3%
Lemna minor	45.8%	8.3%	0.0%	4.5%	0.0%	0.0%
Brasenia schreberi	4.2%	4.2%	0.0%	0.0%	0.0%	0.0%
Isoetes sp.	0.0%	4.2%	0.0%	0.0%	0.0%	0.0%
Najas flexilis	4.2%	0.0%	0.0%	0.0%	0.0%	0.0%
Nuphar variegatum	16.7%	16.7%	16.7%	0.0%	0.0%	0.0%
Vallisneria americana	33.3%	45.8%	0.0%	0.0%	0.0%	0.0%

Milfoil was again widespread throughout Lily Pond being encountered at 19 of the 24 (79%) data point locations. Milfoil density was still fairly low (7% cover), but has nearly returned to the pre-management distribution and density that was documented in 2001.

Chart 1: *Myriophyllum spicatum* Number of Occurrences and Percent Cover



Lake St. Catherine (Main Basin)

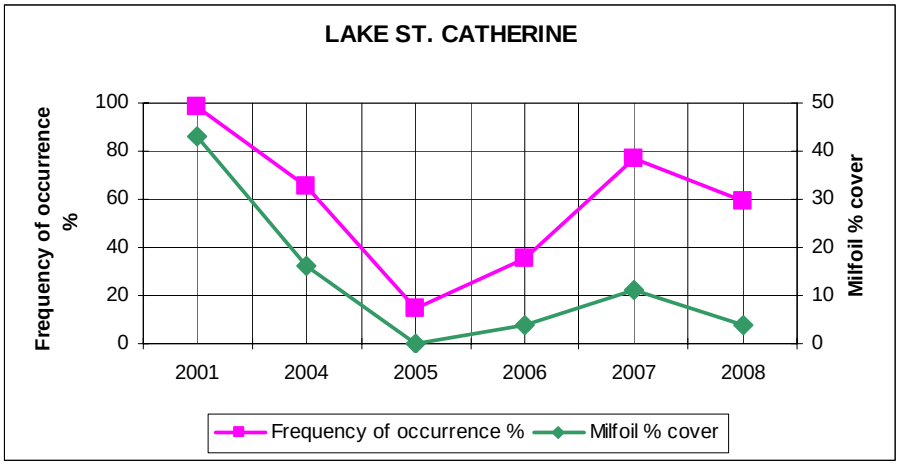
The distribution of native plant species in the main basin of Lake St. Catherine was consistent with previous findings. Again, the most notable change in the vegetative community was the increased density and distribution of *Elodea canadensis* which increase in frequency from almost 5% in 2007 to over 50% in 2008.

Table 4: Lake St. Catherine – Species List and Frequency of Occurrence (main basin)

Macrophyte Species	Lake St. Catherine					
	2001 pre	2004 YOT	2005 YAT	2006 2YAT	2007 3YAT	2008 4YAT
Myriophyllum spicatum	98.4%	65.1%	14.7%	35.7%	76.7%	58.9%
Potamogeton robbinsii	31.0%	65.1%	82.2%	62.0%	66.7%	58.1%
Najas flexilis	19.4%	0.0%	12.4%	56.6%	50.4%	34.1%
Potamogeton amplifolius	28.7%	14.7%	25.6%	34.1%	38.8%	38.0%
Potamogeton zosteriformis	24.0%	2.3%	31.0%	41.9%	27.9%	18.6%
Zosterella dubia	0.0%	0.8%	4.7%	11.6%	27.9%	21.7%
Chara sp. / Nitella sp.	1.6%	17.1%	62.0%	57.4%	20.9%	21.7%
Potamogeton illinoensis	6.2%	0.8%	0.8%	8.5%	15.5%	34.1%
Potamogeton pusillus	0.0%	0.0%	0.0%	5.4%	12.4%	6.3%
Ceratophyllum demersum	10.9%	10.9%	6.2%	7.0%	10.9%	10.1%
Vallisneria americana	14.0%	3.1%	0.8%	3.1%	8.5%	9.3%
Elodea canadensis	27.9%	0.0%	0.0%	0.8%	4.7%	51.9%
Nymphaea odorata	3.1%	1.6%	2.3%	3.1%	3.1%	3.1%
Brasenia schreberi	0.0%	0.8%	0.8%	2.3%	2.3%	2.3%
Chlorophyta	0.0%	43.4%	14.7%	3.1%	2.3%	3.9%
Isoetes sp.	2.3%	8.5%	0.8%	6.2%	2.3%	4.7%
Potamogeton gramineus	17.8%	0.0%	4.7%	1.6%	2.3%	6.2%
Potamogeton crispus	1.6%	0.0%	9.3%	5.4%	1.6%	0.8%
Potamogeton epihydrus	2.3%	3.1%	5.4%	2.3%	0.8%	3.9%
Nuphar variegatum	0.8%	0.0%	0.0%	0.8%	0.8%	0.0%
Utricularia vulgaris	0.8%	0.8%	0.8%	0.0%	0.0%	1.6%
Lemna minor	1.6%	0.0%	0.0%	0.0%	0.0%	0.8%
Megalodonta beckii	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%

Some decrease in milfoil cover was realized between 2007 and 2008 (likely a result of the 2008 Renovate OTF treatments), however, milfoil was still regularly encountered, found at nearly 60% of the data points surveyed in the main basin. However, most of the milfoil was scattered, low-density growth, averaging only 4% cover across the 129 data points surveyed in the main basin. This represents less than half of the milfoil cover that was recorded in 2007 (11%) and a ten-fold reduction from the 2001 milfoil cover (43%).

Chart 2: *Myriophyllum spicatum* Frequency of Occurrence and Percent Cover



Little Lake

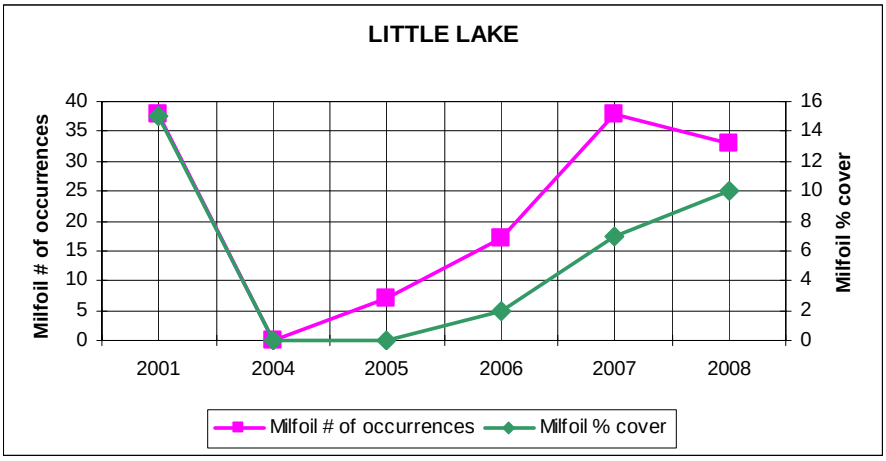
The aquatic plant community in Little Lake continues to be dominated by abundant growth of *Potamogeton robbinsii* and *P. amplifolius.* These two broad-leaved pondweeds were found throughout the basin and accounted for a majority of the plant density recorded during the survey. In general growth of these two plants was nearing or at the water surface throughout the basin.

Table 5: Little Lake – Species List and Frequency of Occurrence

Macrophyte Species	Little Lake					
	2001 pre	2004 YOT	2005 YAT	2006 2YAT	2007 3YAT	2008 4YAT
Potamogeton robbinsii	88.4%	100.0%	100.0%	100.0%	100.0%	88.4%
Myriophyllum spicatum	88.4%	0.0%	16.3%	39.5%	88.4%	76.7%
Potamogeton amplifolius	44.2%	72.1%	69.8%	76.7%	74.4%	76.7%
Potamogeton illinoensis	0.0%	0.0%	0.0%	9.3%	32.6%	46.5%
Utricularia vulgaris	16.3%	18.6%	7.0%	11.6%	30.2%	18.6%
Nymphaea odorata	30.2%	9.3%	25.6%	30.2%	27.9%	10.1%
Brasenia schreberi	14.0%	30.2%	30.2%	23.3%	25.6%	20.9%
Ceratophyllum demersum	20.9%	0.0%	2.3%	9.3%	16.3%	7.0%
Vallisneria americana	72.1%	25.6%	7.0%	9.3%	14.0%	9.3%
Potamogeton zosteriformis	23.3%	2.3%	4.7%	4.7%	7.0%	4.7%
Zosterella dubia	2.3%	2.3%	4.7%	0.0%	7.0%	2.3%
Potamogeton pusillus	0.0%	0.0%	0.0%	2.3%	7.0%	2.3%
Chlorophyta	7.0%	20.9%	20.9%	4.7%	7.0%	9.3%
Nuphar variegatum	9.3%	14.0%	11.6%	7.0%	7.0%	2.3%
Potamogeton epihydrus	0.0%	11.6%	14.0%	7.0%	7.0%	7.0%
Utricularia gibba	7.0%	0.0%	2.3%	0.0%	4.7%	2.3%
Najas flexilis	39.5%	0.0%	0.0%	4.7%	2.3%	0.0%
Elodea canadensis	46.5%	4.7%	0.0%	0.0%	2.3%	23.3%
Chara sp. / Nitella sp.	7.0%	4.7%	7.0%	11.6%	0.0%	0.0%
Potamogeton gramineus	41.9%	4.7%	9.3%	23.3%	0.0%	0.0%
Isoetes sp.	0.0%	0.0%	4.7%	2.3%	0.0%	0.0%
Potamogeton crispus	0.0%	0.0%	0.0%	2.3%	0.0%	0.0%
Polygonum sp.	0.0%	0.0%	0.0%	2.3%	0.0%	0.0%
Eleocharis sp.	4.7%	4.7%	4.7%	0.0%	0.0%	0.0%
Megalodonta beckii	7.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Consistent with the other two basins, milfoil was widely distributed throughout Little Lake at low densities. Only a few areas of higher density milfoil growth (≥20% cover) were encountered and were confined to the northeastern and northwestern extent of the basin where milfoil growth has historically been problematic. However, the overall milfoil cover was increased from 2007 and this trend is expected to continue in subsequent years.

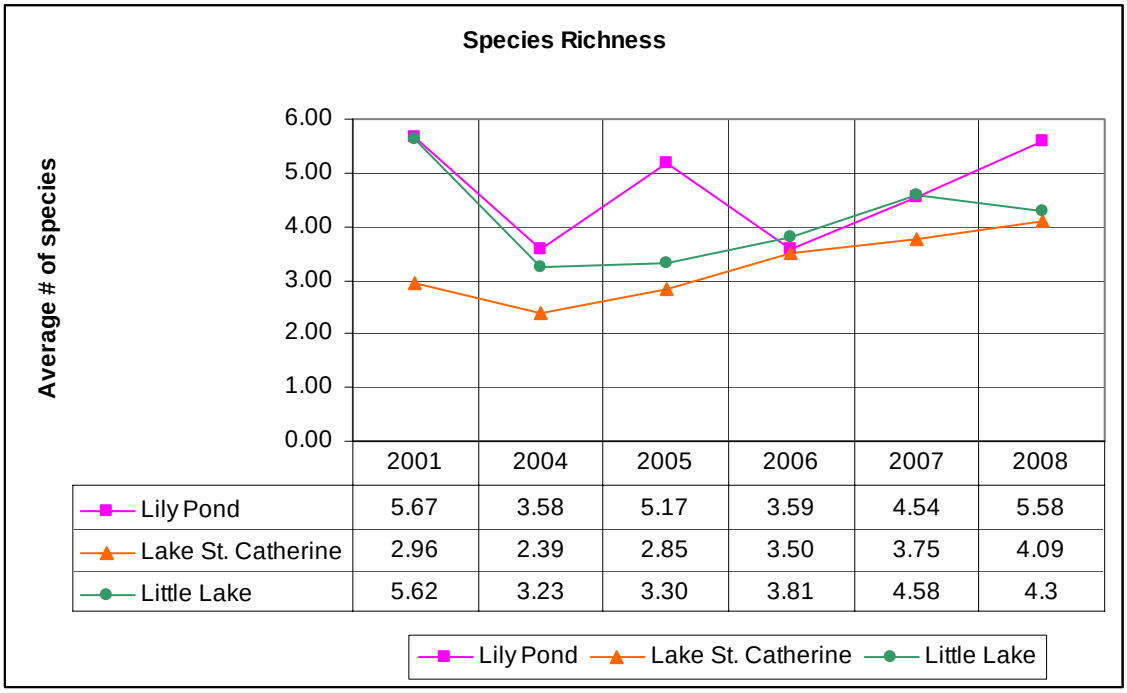
Chart 3: *Myriophyllum spicatum* Number of Occurrences and Percent Cover



Species Richness

Species richness was consistent in all three basins findings from the past two years. It does not appear that the triclopyr herbicide treatments have adversely impacted species richness or native plant diversity.

Table 6: Species Richness by Basin



	2001	2004	2005	2006	2007	2008
Lily Pond	5.67	3.58	5.17	3.59	4.54	5.58
Lake St. Catherine	2.96	2.39	2.85	3.50	3.75	4.09
Little Lake	5.62	3.23	3.30	3.81	4.58	4.3

Evaluation of 2008 Treatment Areas

As previously stated, during the July 11 inspection milfoil appeared to be responding favorably to the treatment. However, instead of seeing additional milfoil die-back on August 7, many of the milfoil plants appeared to be showing signs of recovery. Milfoil recovery was further confirmed by findings of the comprehensive late season aquatic plant survey.

Comparing 2007 and 2008 late season survey data from the 60 data points located within the 2008 treatment areas, it is apparent that the 2008 Renovate OTF treatment did reduce both distribution and density of milfoil. Milfoil frequency of occurrence was reduced from 81.7% (2007) frequency to 49.2% (2008). Average milfoil cover was reduced from approximately 13.3% (2007) to 2.6% (2008). This represents a 40% reduction in milfoil distribution and an 80% reduction in milfoil density (cover).

Aside from a significant increase in frequency of *Elodea canadensis* (from 8.3% to 57.6%), native plant cover within the treatment areas remained relatively unchanged between 2007 & 2008, consisting largely of *P. robbinsii*, *P. amplifolius*, *Najas flexilis*, *P. zosteriformis*, *Zosterella dubia*. And, although a slight drop in biomass was recorded (from 2.2 to 1.8) both overall plant cover and species richness increased in the treatment areas from 65.3% (2007) to 72.2% (2008) and 3.98 (2007) to 4.12 (2008), respectively.

Late Season Milfoil Bed Mapping

Milfoil beds were visually surveyed and mapped during the late season survey. This occurred on September 25. Visibility was excellent with sunny skies and little or no wind. The entire perimeter of the main basin of Lake St. Catherine was toured by boat. The deep water extent of milfoil bed areas were recorded using a Differential GPS. In areas where milfoil was more widely scattered, locations of individual plants were recorded. The milfoil beds were categorized as either Scattered – generally 1-10% cover, Common – generally 10-25% cover and Abundant – generally 25-75% cover. A map of the milfoil beds located during the course of this effort follows.

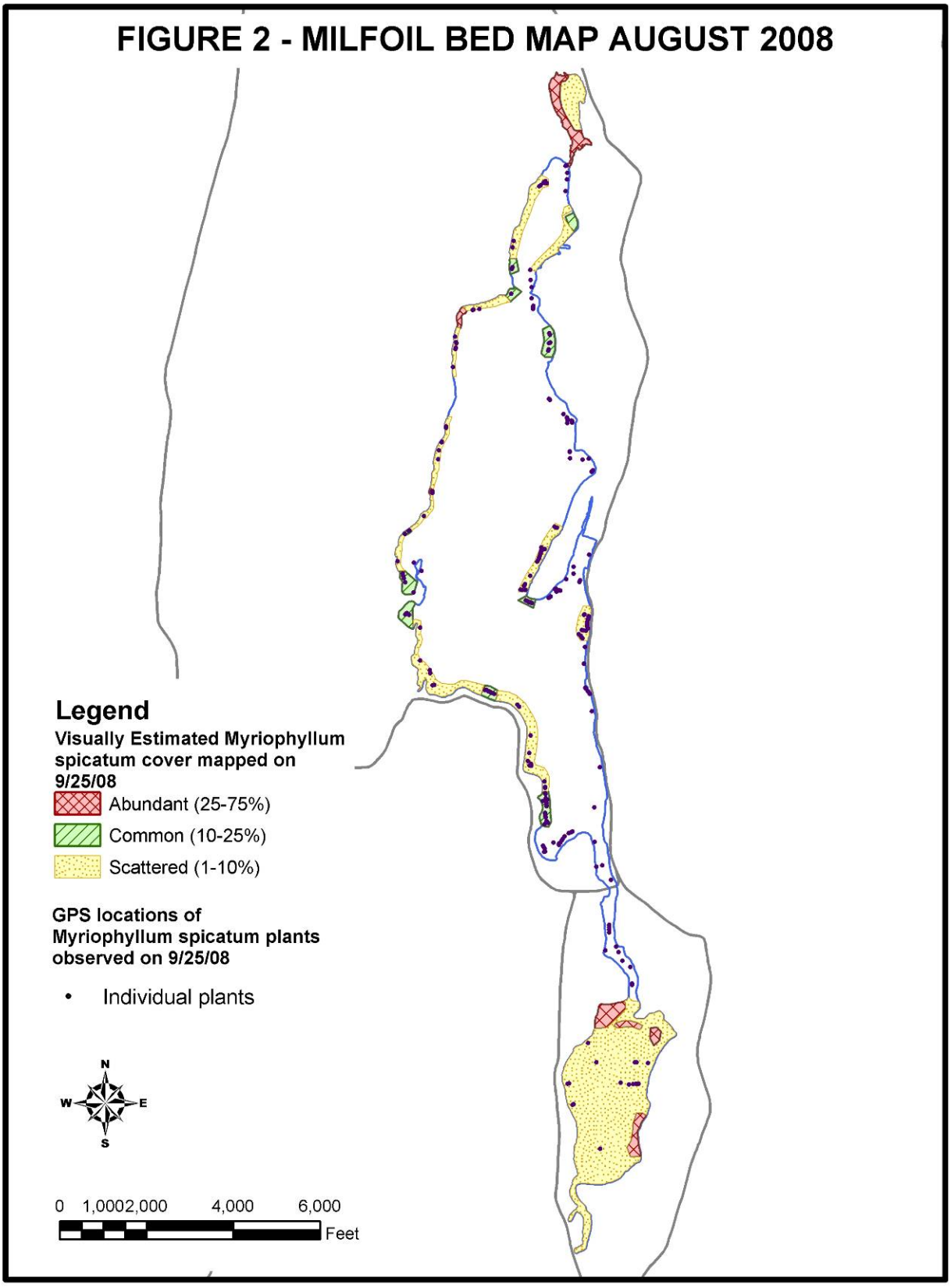


FIGURE 2 - MILFOIL BED MAP AUGUST 2008
Legend
Visually Estimated Myriophyllum spicatum cover mapped on 9/25/08
Abundant (25-75%)
Common (10-25%)
Scattered (1-10%)
GPS locations of Myriophyllum spicatum plants observed on 9/25/08
Individual plants
N
W
E
S
0 1,0002,000 4,000 6,000
Feet

SUMMARY OF 2008 AQUATIC VEGETATION MANAGEMENT PROGRAM

Renovate OTF Herbicide Treatments

The 2008 Renovate OTF treatments did reduce milfoil density and distribution, but were less effective than anticipated. The reduced level of response seen in 2008 is believed to be the result of two factors:

1. Exposure to a sub-lethal dose of triclopyr
2. Insufficient active milfoil growth to insure adequate triclopyr uptake

Comparing the results of all the triclopyr treatments performed at Lake St. Catherine, Lake Morey, Lake Hortonia, and Burr Pond during the 2006, 2007 and 2008 seasons, it is evident that both dose and treatment timing are critical when using triclopyr herbicide due to the relatively short period of exposure that the plants have for herbicide uptake.

The 2007 Renovate OTF treatments performed at Lake St. Catherine provided good milfoil control during the year-of-treatment and good carryover milfoil control through the year-after-treatment. Milfoil cover recorded in Cold Spring Bay and Forest House Bay (both treated in 2007) was less than 1% at the time of the 2008 survey. For proposes of comparison it is important to recognize that these areas were treated later in the season (July 17, 2007) when there was more mature (but not flowering) milfoil plants and response was favorable during both the year-of-treatment and year-after-treatment.

It was hoped that early season treatment with Renovate OTF in 2008 would provide more effective milfoil control than previous treatments, reduce conflicts with lake users, and pose less potential impact on non-target plants, not yet in their most active phase of growth. At the time of treatment milfoil plants were actively growing, but were generally within 2-4 feet of the bottom. Similar growth of milfoil was observed at Lake Morey and Lake Hortonia, both of which were treated approximately the same time (mid May) as Lake St. Catherine, and yielded similar results. By contrast, the 2007 Renovate OTF treatments at all three waterbodies were performed between late June and late July when the milfoil plants were generally within 1-2 feet of the surface in water depths of 7-10 feet.

The target application rate remained the same all three waterbodies for the 2007 and 2008 treatments (1.85 ppm at Lake Morey; and 1.75 ppm at Lake Hortonia and Lake St. Catherine – all calculated based on the bottom 4 feet of the water column). The treatment areas were expanded beyond the extent of the milfoil beds to help overcome the effects of dilution. Treatment timing or stage of plant growth was probably the most significant difference between the 2008 treatments and prior triclopyr treatments in Vermont.

The request to increase the Renovate OTF application rate to 2.0-2.5 ppm (to be determined on a site by site basis) was not approved in the 2008 permit (ANC Permit #2008-C02) due to stated concerns over the potential for adverse impacts to non-target plants. Ultimately, the milfoil was either exposed to sub-lethal triclopyr concentrations or did not have enough active tissue growth to absorb sufficient levels of triclopyr. We expect that both were causes of the reduced treatment efficacy seen in 2008.

Probably our best regional comparison of a Renovate OTF treatment for Eurasian watermilfoil control comes from Saratoga Lake, New York where approximately 300 acres of this 4000-acre lake were treated in 2008. Even though one contiguous bed along the eastern shoreline was treated, the treatment area still represented less 10% of the Saratoga Lake's total surface area. The principal differences with the 2008 Renovate OTF treatments in Vermont were the treatment timing and application rate. At Saratoga, milfoil plants were estimated to be between 5-7 feet tall and rapidly growing at the time of treatment

during the last week of May. The application rate also ranged between 2.0 ppm and 2.25 ppm (calculated on the bottom 4 feet) throughout the treatment area, as compared to the 1.75 ppm to 1.85 ppm rates used in Vermont. Treatment response was excellent. Milfoil plants had collapsed and almost completely decomposed within six weeks of the treatment and no significant regrowth had occurred by the end of the summer. There was no obvious adverse impact to non-target plants. Robust growth of several pondweed (*Potamogeton spp.)* species, coontail (*Ceratophyllum demersum),* elodea (*Elodea canadensis)*, wild celery (*Vallisneria americana)* and water starwort (*Zosterella dubia)* was evident within six weeks of treatment and persisted throughout the summer. Vegetation was surveyed lake-wide by the Darrin Fresh Water Institute in August 2008, but the final report is not yet available. Native plant growth was so dense in some areas that mechanical weed harvesters were used to cut boating lanes for shoreline residents. During the year-of-treatment, it would appear that the higher triclopyr application rate and later treatment date used at Saratoga Lake resulted in significantly better milfoil control without causing adverse impacts to non-target native plants.

Spread Prevention and Non-Chemical Control Activities

As required by the DEC Permit, non-chemical milfoil control activities continued at Lake St. Catherine during the 2008 season. Efforts included volunteer monitoring, volunteer and paid hand harvesting and diver assisted suction harvesting. Details of the non-chemical control efforts will be provided by LSCA under separate cover.

RECOMMENDATIONS FOR 2009 AND BEYOND

Milfoil cover remains significantly reduced from what was documented in Lake St. Catherine prior to the 2004 Sonar treatment, (estimated total cover of all three basins 2001 - 49%, 2008 – 5%), but the spatial distribution of milfoil has increased steadily over the past four years. The spot-treatments with Renovate 3 (liquid) and Renovate OTF (flake) performed over the past thee years have demonstrated the potential for effective and highly-selective milfoil control. However, the 2008 treatment results were somewhat disappointing. Still spot-treatment with triclopyr herbicide continues to be the recommended strategy for management of widespread, high density milfoil growth at Lake St. Catherine. Continued use of non-chemical control strategies, specifically diver hand-pulling and suction harvesting, are recommended for areas of lower-density milfoil growth.

The following recommendations should be considered to improve efficacy for future triclopyr treatments performed at Lake St. Catherine:

1. Delay treatment until there is more active milfoil growth to improve herbicide uptake. Treatment timing cannot be dictated by the 60° F water temperature guideline. Milfoil plants need to be actively growing, with substantial new growth of stems and foliage. Additional milfoil biomass is expected to provide more surface area for herbicide uptake and may help limit dilution caused by water movement.
2. Increase the Renovate OTF (flake) application rate to at least 2.0-2.5 ppm calculated on the bottom 4 feet (rate to be determined by application site). This is especially critical if deeper (>7 ft.) exposed areas are to be treated where potential for dilution is increased. The current Renovate OTF label now allows for the treatment dose to be calculated on the entire water volume of the area being treated; it is no longer limited to the bottom 4 feet.
3. Continue to evaluate the flake and liquid formulations of triclopyr. The flake formulation has only been available since 2007 and information is still being learned on its field dissipation rates. It is clear that sufficient exposure to lethal concentrations of triclopyr will provide highly-

selective control of milfoil, but the narrow shoreline beds of milfoil found throughout much of Lake St. Catherine have proven to be especially challenging. See if any additional concentration-exposure-time data from actual field treatments is available, to help determine which formulation or combination offers the greatest potential for success at Lake St. Catherine.

Future milfoil management efforts in the Lake St. Catherine system will be further complicated by the dense growth of native plants that are creating nuisance conditions for residents in Lily Pond, Little Lake and in the northern portion of North Bay. Milfoil is found in these areas, but is mixed in with robust growth of broad-leaved pondweeds and water lilies. Milfoil could be selectively controlled in these areas with triclopyr herbicide, but the remaining native plant growth is still expected to reach nuisance densities. The demonstration suction harvesting performed around boat docks in Little Lake in 2008 was reportedly successful, but it did not address the middle of the lake or the heavy water lily growth found along the northwest and northeast shorelines.

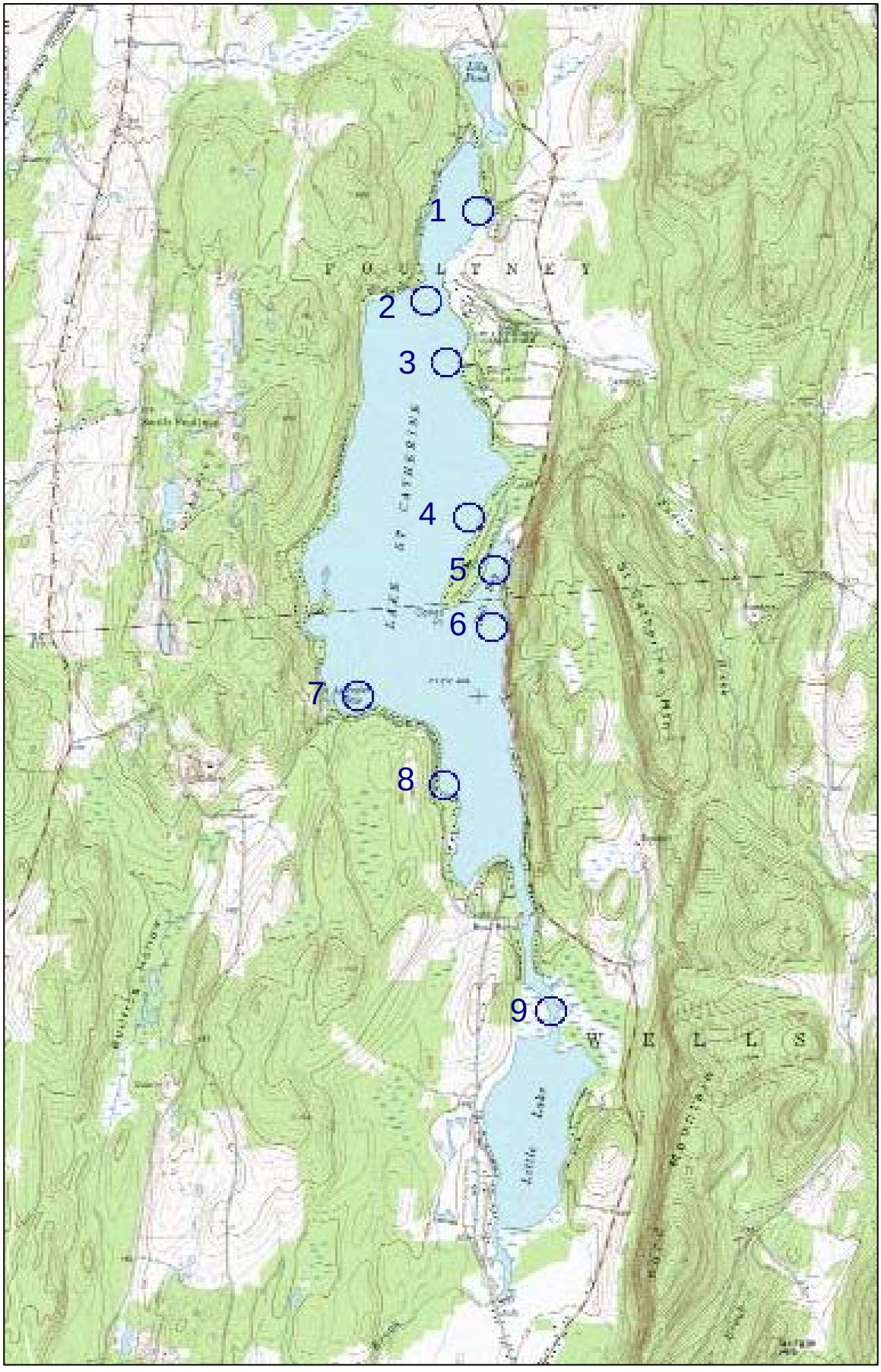
Areas with abundant native plant growth will need to be managed with either (1) an integrated approach using triclopyr herbicide to selectively control milfoil and mechanical techniques (suction harvesting, hydro-raking or conventional harvesting) to manage native plant growth, or (2) use of alternate herbicides that will control milfoil and provide some suppression of native plant growth.

APPENDIX A

Herbicide Residue Testing Results

- Sampling Location Map – Attachment D of ANC 2008-C02 prepared by DEC
- SePRO Laboratory Report – 5/21/08 sampling round
- SePRO Laboratory Report – 5/28 & 5/29/08 sampling round
- SePRO Laboratory Report – 7/2/08 sampling round

APPENDIX D – Sample Site Locations (Permit #2008-C02)
Revised by DEC and annotated by ACT



FasTEST Results Confidential - Not For Distribution

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	Sonar	Date Collected	Rate Applied	Acres Treated	Sample Location Description	Results PPB
1.						run #TR0005 correlation 0.999 recovery 92%	
2.	05/20/08		5/21/2008	1.75 ppm	15	1	.30 ppm
3.	05/20/08		5/21/2008	1.75 ppm	2	2	.03 ppm
4.	05/20/08		5/21/2008	1.75 ppm	10.4	3	.02 ppm
5.	05/20/08		5/21/2008	1.75 ppm	14.5	4	.12 ppm
6.	05/20/08		5/21/2008	1.75 ppm	16.3	5	.48 ppm
7.	05/20/08		5/21/2008	1.75 ppm	6.3	6	.24 ppm
8.	05/20/08		5/21/2008	1.75 ppm	6.5	7	.02 ppm
9.	05/20/08		5/21/2008	1.75 ppm	7.6	8	.03 ppm
10.	05/20/08		5/21/2008	1.75 ppm		9	<1 ppb

Depth Sample Collected:		**Date Sample Received:**	5/22/2008
Storage Conditions:	Analyzed upon receipt	**Condition of Sample(s) Box/Water Containers:**	Excellent
Date Shipped to SePRO:	5/21/2008	**Date Analysis was Performed:**	5/21/2008
How would you like results sent to you?	**Fax** No **Regular Mail** Yes	**Date Results Sent to Cooperator:**	5/23/2008

Back of Data Sheet

Name of Waterbody:	Lake St. Catherine	**Size of Waterbody in Acres:**	
Average Depth in Feet:	10	**Target Plant(s) to Control:**	Eurasian watermilfoil

Back of Data Sheet

FasTEST Results Confidential - Not For Distribution

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

Territory: Sarah Miller

Sample	Date(s) Treated	Sonar	Date Collected	Rate Applied	Acres Treated	Sample Location Description	Results PPB
1.						run #TR0011 correlation 0.999 recovery 88%	
2.	05/20/08	Renovat	5/28/2008	1.75 ppm	15	1	.03 ppm
3.	05/20/08	Renovat	5/29/2008	1.75 ppm		2	.03 ppm
4.	05/20/08	Renovat	5/29/2008	1.75 ppm		3	<1.0 ppb
5.	05/20/08	Renovat	5/28/2008	1.75 ppm	10.4	4	.03 ppm
6.	05/20/08	Renovat	5/28/2008	1.75 ppm	16.3	5	.03 ppm
7.	05/20/08	Renovat	5/28/2008	1.75 ppm	6.3	6	.03 ppm
8.	05/20/08	Renovat	5/29/2008	1.75 ppm		7	.02 ppm
9.	05/20/08	Renovat	5/29/2008	1.75 ppm		8	.02 ppm
10.	05/20/08	Renovat	5/29/2008	1.75 ppm		9	.03 ppm

Depth Sample Collected: 4 ft from bottom

Date Sample Received: 6/2/2008

Storage Conditions: Analyzed upon receipt

Condition of Sample(s) Box/Water Containers: Excellent

Date Shipped to SePRO: 5/30/2008

Date Analysis was Performed: 6/2/2008

How would you like results sent to you? **Fax** No **Regular Mail** Yes

Date Results Sent to Cooperator: 6/3/2008

Back of Data Sheet

Name of Waterbody: Lake St. Catherine

Average Depth in Feet: 10

Back of Data Sheet

Size of Waterbody in Acres:

Target Plant(s) to Control: Eurasian watermilfoil

Cooperator: Gerald Smith

Aquatic Control Technology, Inc
11 John Rd
Sutton MA 01590-

Phone: (508) 865-1000

Fax: (508) 865-1220

Territory: Sarah Miller

Sample	Date(s) Treated	Herbicide	Date Collected	Rate Applied	Acres Treated	Sample Location Description	Results	UOM
1.	05/20/08	Renovate 3	7/2/2008	1.75ppm		2	<1.0	ppb
2.						6	<1.0	ppb
3.						8	<1.0	ppb
4.						9	<1.0	ppb
5.								
6.								
7.								
8.								
9.								
10.								

Depth Sample Collected: 10

Date Sample Received: 7/3/2008

Storage Conditions: Refrigerated

Condition of Sample(s) Box/Water Containers: Excellent excellent

Date Shipped to SePRO: 7/2/2008

Date Analysis was Performed: 7/8/2008

Run #: 34 **% Control Rec:** 97 **Correlation:** 0.999

Date Results Sent to Cooperator: 7/10/2008

Back of Data Sheet

Name of Waterbody: Lake St Catherine

Average Depth in Feet: 4

Back of Data Sheet

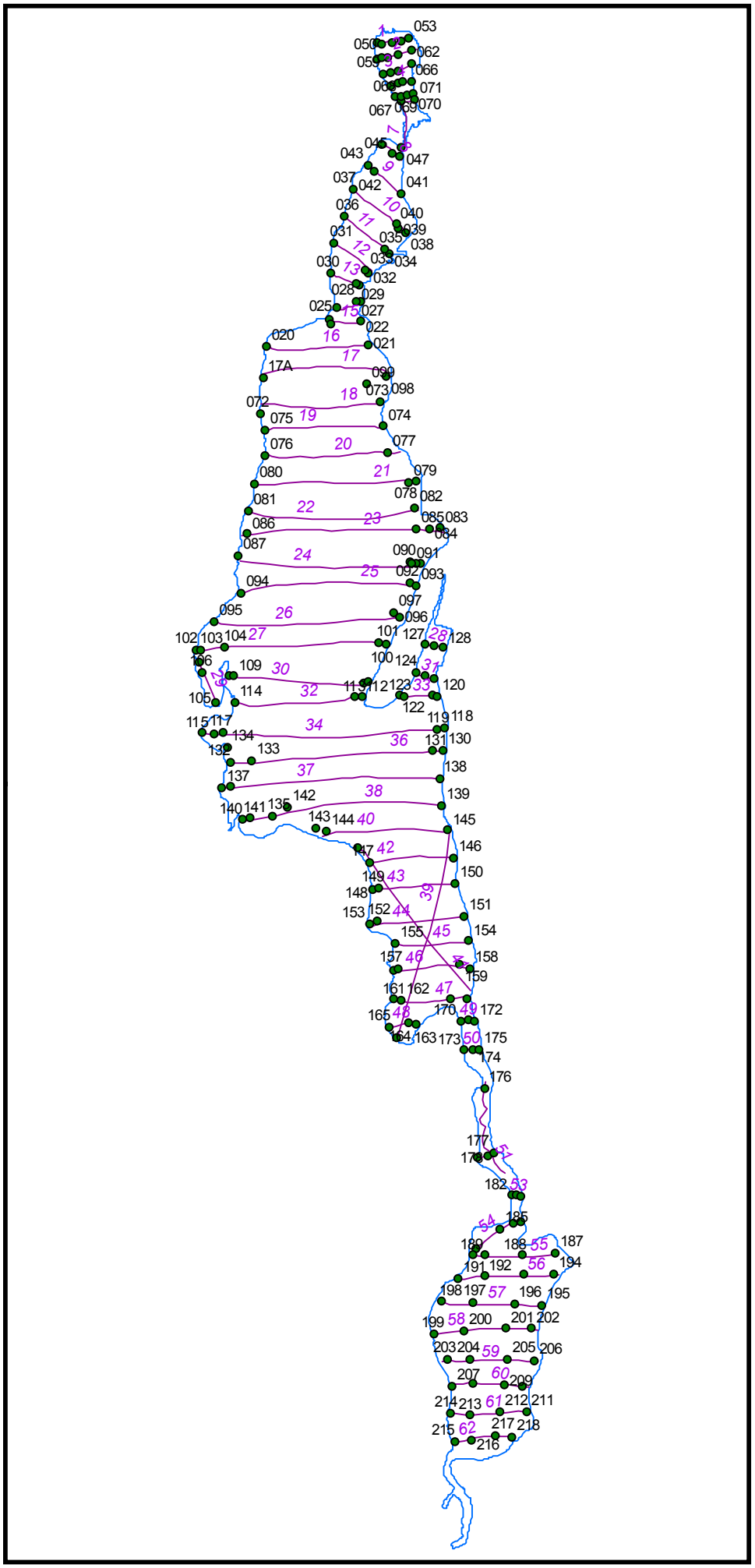
Size of Waterbody in Acres:

Target Plant(s) to Control: Eurasian watermilfoil

APPENDIX B

Comprehensive Aquatic Vegetation Survey Information

- Data Point Sampling Location Map
- Field Data Table
- Overall Vegetation Density Map
- Vegetation Species Distribution Maps



Lake St. Catherine

Poultney & Wells, VT

Transects & Data Point Locations for Vegetation Survey

FIGURE:	SURVEY DATE:	MAP DATE:
B-1	9/24 - 9/25/08	10/27/08

Legend

Data point locations recorded with GPs unit during ACT/ ReMetrix 2001 survey. Sampling replicated during ACT 2007 survey. Data points relocated with DGPS unit with sub-meter accuracy.

Transects recorded during ACT/ ReMetrix 2001 survey using DGPS.

N
W E
S

0 500 1,000 2,000 3,000
Feet

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

PLANTS ENCOUNTERED DURING SURVEYS (2001-2008)

Macrophyte Species	Common Name	Abbreviation used in Field Data Table
Brasenia schreberi	Watershield	B
Ceratophyllum demersum	Coontail	Cd
Chara sp.	Muskgrass	Ca
Chlorophyta	Filamentous green algae	Fa
Eleocharis sp.	Spikerush	Eo
Elodea canadensis	Waterweed	Ec
Isoetes sp.	Quillwort	I
Lemna minor	Duckweed	Lm
Megalodonta beckii	Water marigold	Mb
Musci spp.	Aquatic moss	Mu
Myriophyllum spicatum - viable	Eurasian watermilfoil	Ms
Najas flexilis	Naiad	Nf
Najas guadalupensis		Ng
Nitella sp.	Stonewort	Ni
Nuphar variegatum	Yellow waterlily	Nu
Nymphaea odorata	White waterlily	Ny
Polygonum sp.	Smartweed	Po
Potamogeton amplifolius	Large-leaf	Pa
Potamogeton crispus	Curly-leaf pondweed	Pc
Potamogeton epihydrus	Ribbon-leaf pondweed	Pe
Potamogeton gramineus	Variable pondweed	Pg
Potamogeton illinoensis	Illinois pondweed	Pi
Potamogeton natans	Floatingleaf pondweed	Pn
Potamogeton praelongus	Whitestem pondweed	Pprae
Potamogeton pusillus	Thin-leaf pondweed	Pp
Potamogeton robbinsii	Pondweed	Pr
Potamogeton zosteriformis	Flat-stem pondweed	Pz
Utricularia gibba	Creeping bladderwort	Ug
Utricularia vulgaris	Common bladderwort	U
Valisneria americana	Wild celery/Tapegrass	V
Wolffia sp.	Watermeal	W
Zosterella (Heteranthera) dubia	Water stargrass	Hd / Zd

Transect	Point #	Distance from Shore	Depth (ft)	% Cover	% Ms Cover	Biomass	Species/Point (Richness)	Pr	Ms	Pa	Ec	Pi	Nf	Pz	Cd	Zd	Ca	Ny	Mu	V	Fa	Pp	U	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Pprae
Lily Pond																																	
1	49	25	3	100	20	4	6	D	X	X				X	X						X												
1	50	100	3	100	20	4	5	D	X	X	X				X																		
1	51	MID	3	100	1	3.5	7	D	X	X				X	X			X					X										
1	52	150	3	100	1	3.5	6	D	X	X				X	X			X															
1	53	30	3	100	0	4	7	X		X		X			X			D					X					X					
2	54	40	3	100	5	2.5	5	D	X	X		X		X																			
2	55	25	3	100	1	2.5	7	X	X	X	X	X			D	X																	
2	56	180	5	100	1	2	4	D	X	X					X																		
2	57	60	3	100	1	4	8	D	X	X				X	X	X		X										X					
2	58	150	6	100	0	2	4	D		X		X			X																		
3	59	25	3	100	40	3.5	5	D	X	X				X							X												
3	60	120	4	100	20	3.5	7	D	X	X	X	X			X	X																	
3	61	MID	4	100	0	2.5	4			X		X		X	D																		
3	62	15	3	60	5	3.5	7		X			X			D	X		X			X				X								
4	63	20	4	100	1	3.5	4	D	X	X					X																		
4	64	100	5	100	1	2.5	6	D	X	X	X	X		X																			
4	65	100	4	100	5	3.5	6	X	X	X	X	X			D																		
4	66	30	3	100	1	3	6	X	X	X		X		X	D																		
5	68	60	3	100	0	3	4	D		X					X						X												
5	69	50	3	100	10	3	6	D	X	X				X	X							X											
5	71	15	1	100	0	4	5	X		X	X				D						X												
6	67	10	2	100	5	4	3	D	X					X																			
6	70	20	3	100	20	4	7	X	X	X					D	X		X			X												
7	47	30	3	100	1	2.5	5		X		X				X						D		X										
		Average	**3.3**	**98.33**	**6.63**	**3.25**	**5.58**																										

Lily Pond Totals

	Pr	Ms	Pa	Ec	Pi	Nf	Pz	Cd	Zd	Ca	Ny	Mu	V	Fa	Pp	U	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Pprae
Present	6	19	21	7	10	0	11	13	5	0	5	0	0	6	1	3	0	1	0	0	2	0	0	0	0	0
Dominant	15	0	0	0	0	0	0	7	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Total	21	19	21	7	10	0	11	20	5	0	6	0	0	7	1	3	0	1	0	0	2	0	0	0	0	0
% frequency	88%	79%	88%	29%	42%	0%	46%	83%	21%	0%	25%	0%	0%	29%	4%	13%	0%	4%	0%	0%	8%	0%	0%	0%	0%	0%

Transect	Point #	Distance from Shore	Depth (ft)	% Cover	% Ms Cover	Biomass	Species/Point (Richness)	Pr	Ms	Pa	Ec	Pi	Nf	Pz	Cd	Zd	Ca	Ny	Mu	V	Fa	Pp	U	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Pprae
Lake St. Cathrine																																	
7	48	MID	4	100	10	3.5	6	D	X		X				X								X		X								
8	44	50	3	60	1	1	2		X		D																						
8	45	MID	4	100	0	3	7	X		D	X			X		X							X		X								
8	46	25	3	100	1	3	7	X	X	X	D				X			X							X								
9	41	15	3	60	0	1.5	5				X	X							D			X			X								
9	42	150	10	100	20	3	5	D	X		X	X			X																		
9	43	40	1	100	0	3	6	X		X	D	X		X	X																		
10	38	40	4	100	0	2	3	X		X	D																						
10	39	150	9	100	0	1.5	2	D		X																							
10	40	220	12	100	0	1	2								X		D																
11	34	20	3	100	0	1.5	4	D		X	X													X									
11	35	100	7	100	0	2.5	2	D		X																							
11	36	30	5	60	1	3	5	D	X	X	X	X																					
11	37	35	6	80	1	3	5	X	X	D	X							X															
12	31	25	6	50	1	2	5	D	X	X	X	X																					
12	32	25	4	100	0	2.5	4	D		X		X												X									
12	33	75	8	100	0	3	3	X		D	X																						
13	28	35	4	60	0	2.5	4	X		X	X	D																					
13	29	120	8	60	20	2.5	4	X	X				D									X											
13	30	25	7	50	1	2	6	D	X	X	X	X																	X				
14	25	20	4	70	0	3	4	D			X	X				X																	
14	26	30	3	100	0	3.5	4			X	D			X											X								
14	27	60	12	100	0	1	4	D		X	X			X																			
15	22	75	5	30	1	1	3	D	X	X																							
15	23	50	4	50	1	2	5	X	X	X		D	X																				
15	24	125	10	80	10	2	3		X		X				D																		
16A	20	100	7	60	5	2	4	D	X	X	X																						
16B	21	70	8	30	0	1	1														D												
17A	17A	25	8	30	1	1	4	D	X							X			X														
17	98	80	8	100	1	2.5	5	D	X	X		X								X													
18	72	15	9	60	10	2.5	4		X			X					X					D											
18	73	30	10	100	0	1	4	D		X	X					X																	

Transect	Point #	Distance from Shore	Depth (ft)	% Cover	% Ms Cover	Biomass	Species/Point (Richness)	Pr	Ms	Pa	Ec	Pi	Nf	Pz	Cd	Zd	Ca	Ny	Mu	V	Fa	Pp	U	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Pprae
19	74	25	5	50	0	1.5	7	D		X	X	X	X			X				X													
19	75	25	13	20	0	1	3			D			X									X											
20	76	20	7	25	5	2.5	2		X								D																
20	77	125	11	90	15	2.5	6	X	X		X	X		D		X																	
21	78	40	6	80	1	1	3	D	X											X													
21	79	80	9	100	5	1.5	4	D	X					X																	X		
21	80	15	6	60	0	3.5	2	D				X																					
22	81	30	6	70	40	3.5	5	X	D		X	X		X																			
22	82	30	8	80	0	1.5	6				X	X	X			X			D							X							
23	83	25	3	80	1	2	5	X	X		X	X								D													
23	84	120	5	100	1	2	4	X	X			X								D													
23	85	200	6	50	1	1	3	D	X																	X							
23	86	40	10	55	15	2	3	D	X					X																			
24	87	40	8	10	1	1	3		X		D						X																
24	88	25	3	60	0	1	3						X						D							X							
24	90	100	10	50	0	2	5					X	X	X			D									X							
25	92	70	11	20	0	1	2						X						D														
25	93	15	4	70	0	1	2						X						D														
25	94	20	11	50	1	2	5	D	X		X	X								X													
26	95	50	5	20	0	1	1										D																
26	96	100	4	60	5	2.5	5		X			X	D			X										X							
26	97	175	12	100	0	1	2						D				X																
27	102	20	4	90	10	3.5	8	D	X	X		X		X			X	X		X													
27	103	70	10	60	5	2.5	3	D	X			X																					
27	104	225	10	40	1	2	4		X					X			D					X											
27	100	20	5	50	0	1	4						X			X			D								X						
27	101	150	8	60	1	1.5	3		X			X	D																				
28	127	30	4	80	0	1	6	X		X	D				X	X																X	
28	129	MID	6	100	0	2	5	D		X	X	X			X																		
28	128	40	4	100	0	3	6	D		X			X					X			X		X										
29	107	30	5	75	5	2.5	7	D	X	X				X		X	X					X											
29	106	30	13	80	5	2	5	X	X		X		D	X																			
29	105	30	6	60	20	3	6	D	X	X	X	X				X																	
30	108	25	5	25	0	1	3				X					D				X													
30	109	100	12	30	1	1	4		X				X	X			D																
30	111	150	10	100	0	1	2					D				X																	
30	110	50	4	40	0	1	2									X			D														
31	124	25	5	50	0	2	5			X	D	X	X			X																	
31	125	MID	8	70	1	1	4	X	X		D					X																	
31	126	30	5	60	0	2	3	D		X		X																					
32	114	15	6	15	0	1	2						D				X																
32	113	125	8	100	0	2	3				X		D									X											
32	112	30	4	60	5	3	5		X			D				X			X								X						
33	122	30	4	50	1	2.5	7	X	X		X	X	X						D								X						
33	123	120	10	30	10	2	4		X		X	X	D																				
33	121	125	13	80	0	1	3	X			X		D																				
33	120	50	6	30	0	1	5	X			X		X			X			D														
34	115	40	5	90	1	2	4	X	X	D	X																						
34	116	150	10	80	20	2.5	5		X		X		X				D					X											
34	117	250	12	60	5	2	3	D	X																								X
34	119	150	6	90	0	1	3	X					D				X																
34	118	30	3	90	5	2.5	5	X	X	X	D					X																	
35	134	50	7	60	5	2	5		X		X		D			X	X																
35	135	125	14	60	1	2	5	X	X		D		X									X											
36	132	25	8	0	0	0	0																										
36	133	300	10	60	5	2.5	4		X			X	X				D																
36	131	250	12	80	5	2.5	3		X			X	D																				
36	130	50	7	80	10	3	8	X	X	X	D	X	X			X			X														
37	138	15	10	5	0	1	3							X					D			X											
37	136	100	13	70	10	2	4		X		D			X			X																
37	137	25	6	80	5	2.5	5	D	X	X		X														X							
38	140	120	5	10	1	1	2		X								D																
38	141	300	6	10	1	1	2		X								D																
38	142	300	6	10	1	1.5	3		X				X				D																
38	139	10	7	60	0	1	4				D					X				X		X											
39	166	50	3	100	1	3	5	X	X	X	D									X													
40	143	100	6	80	50	3.5	3	X	D	X																							
40	144	100	10	90	40	3.5	2		X					D																			
40	145	20	10	60	1	2	4	D	X					X			X																
41	168	50	6	60	5	2.5	5		X	X			D	X	X																		

Transect	Point #	Distance from Shore	Depth (ft)	% Cover	% Ms Cover	Biomass	Species/Point (Richness)	Pr	Ms	Pa	Ec	Pi	Nf	Pz	Cd	Zd	Ca	Ny	Mu	V	Fa	Pp	U	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Pprae
42	147	35	9	60	1	2	4	D	X	X	X																						
42	146	10	12	60	1	1	6	X	X		X					X	X		D														
43	148	35	7	100	1	1	4	D	X	X				X				X															
43	149	100	13	40	1	1	4		X					X			D				X												
43	150	30	7	40	0	1	4				X	X	D						X														
44	153	75	5	100	0	2.5	4	X		X	D			X																			
44	152	175	10	100	5	1.5	4		X		D		X									X											
44	151	20	7	20	0	1	2	X											D														
45	155	25	8	60	1	4	5	X	X		X	D				X																	
45	154	20	6	40	0	1	1												D														
46	156	60	4	50	5	1.5	5	D	X	X	X		X																				
46	157	200	9	100	15	2.5	7		X	X	X		X		D	X	X																
46	159	175	13	50	0	1	5	X			D	X					X				X												
46	158	35	7	30	0	1	5	X			X		X		X		D																
47	161	25	4	90	1	1	6	D	X	X	X	X															X						
47	162	125	10	100	20	3	4		X		D	X			X																		
47	169	150	7	70	1	2	6	X	X		D		X	X			X																
47	160	100	3	10	0	1	2						X				X																
48	165	40	5	100	0	2	4	X		X	D	X																					
48	164	MID	11	100	1	2	3		X		D				X																		
48	163	45	5	50	1	2.5	5		X	X		D	X	X																			
49	170	25	5	60	5	2.5	5		X	X	X		D			X																	
49	171	MID	8	100	1	2	2	D		X																							
49	172	15	4	70	1	3.5	4		X											X						D	X						
50	173	20	3	80	5	2	7	X	X		X		D			X			X							X							
50	174	MID	7	100	5	2.5	4	X	X		X		D																				
50	175	20	6	80	0	2.5	6	D		X			X							X	X						X						
		Average	**7.1**	**66.43**	**3.75**	**1.94**	**4.09**																										

St. Cathrine Totals

	Pr	Ms	Pa	Ec	Pi	Nf	Pz	Cd	Zd	Ca	Ny	Mu	V	Fa	Pp	U	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Pprae
Present	36	74	44	45	38	27	22	11	27	15	4	5	10	4	11	2	3	5	7	6	0	1	0	1	1	1
Dominant	39	2	5	22	6	17	2	2	1	13	0	13	2	1	1	0	0	0	1	0	0	0	0	0	0	0
Total	75	76	49	67	44	44	24	13	28	28	4	18	12	5	12	2	3	5	8	6	0	1	0	1	1	1
% frequency	58%	59%	38%	52%	34%	34%	19%	10%	22%	22%	3%	14%	9%	4%	9%	2%	2%	4%	6%	5%	0%	1%	0%	1%	1%	1%

Transect	Point #	Distance from Shore	Depth (ft)	% Cover	% Ms Cover	Biomass	Species/Point (Richness)	Pr	Ms	Pa	Ec	Pi	Nf	Pz	Cd	Zd	Ca	Ny	Mu	V	Fa	Pp	U	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Pprae
Little Pond																																	
51	176	MID	6	20	0	1	4			D										X	X			X									
52	179	30	3	100	1	4	6	D	X	X				X				X						X									
52	178	MID	5	80	1	2.5	5	D	X	X	X				X																		
52	177	20	4	100	10	3.5	7	D	X	X	X			X				X						X									
53	182	20	3	80	0	4	5	X		X														X	X					D			
53	181	MID	5	50	0	1.5	2	D															X										
53	180	20	3	100	5	3.5	9	X	D	X	X			X	X			X					X	X									
54	183	25	3	100	5	3.5	6	D	X	X	X							X					X										
54	184	40	5	40	0	1	3	D															X		X								
54	185	MID	4	100	70	4	6		D	X	X	X						X						X									
54	186	100	3	100	20	4	4	D	X			X						X															
55	190	75	3	100	1	4	5	D	X	X		X						X															
55	189	250	3	100	60	4	8	X	D	X	X	X						X		X				X									
55	188	150	3	70	40	4	6	X	D		X	X						X			X												
55	187	100	3	100	1	3	5	D	X	X	X											X											
56	194	50	3	70	30	4	5	D	X	X		X											X										
56	193	500	3	70	25	4	5	X	D	X		X									X												
56	192	400	3	90	5	2.5	4	D	X	X		X																					
56	191	30	3	100	1	2.5	3	D	X	X																							
57	198	120	3	100	0	4	4	D		X								X						X									
57	197	600	3	80	5	4	3	X	X			D																					
57	196	500	3	80	5	1.5	4	D	X	X		X																					
57	195	75	4	80	10	3	4	D	X	X		X																					
58	202	60	6	100	1	1.5	4	D	X	X					X																		
58	201	600	3	100	5	2.5	4	D	X	X		X																					
58	200	700	3	80	0	2.5	3	D		X		X																					
58	199	40	3	80	30	2.5	4	D	X									X					X										
59	203	35	3	100	30	2.5	6	D	X	X	X	X											X										
59	204	700	3	100	1	1.5	4	D	X	X		X																					
59	205	500	4	100	1	2.5	5	D	X	X	X	X																					

Transect	Point #	Distance from Shore	Depth (ft)	% Cover	% Ms Cover	Biomass	Species/Point (Richness)	Pr	Ms	Pa	Ec	Pi	Nf	Pz	Cd	Zd	Ca	Ny	Mu	V	Fa	Pp	U	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Pprae
59	206	125	5	90	1	1.5	4	D	X	X													X										
60	210	75	5	90	15	1.5	3	D	X	X																							
60	209	450	4	100	1	1.5	3	D	X	X																							
60	208	500	4	60	0	1.5	2	D		X																							
60	207	100	4	70	1	1.5	6	D	X	X		X				X					X												
61	214	40	3	50	20	1.5	3	D	X	X																							
61	213	300	4	50	1	1.5	3	D	X	X																							
61	212	800	5	10	1	1.5	2	D	X																								
61	211	75	3	100	5	2.5	4	D	X	X		X																					
62	215	50	3	50	1	4	6	X	X			X						D		X									X				
62	216	700	5	10	0	4	1																	D									
62	217	120	4	0	0	0	0																										
62	218	30	3	40	0	4	5			X		X						X		X				D									
		Average	**3.7**	**76.51**	**9.51**	**2.67**	**4.30**																										

Little Lake Totals

	Pr	Ms	Pa	Ec	Pi	Nf	Pz	Cd	Zd	Ca	Ny	Mu	V	Fa	Pp	U	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Pprae
Present	7	28	32	10	19	0	2	3	1	0	12	0	4	4	1	8	7	3	0	0	0	1	0	7	0	0
Dominant	31	5	1	0	1	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	1	2	0	0
Total	38	33	33	10	20	0	2	3	1	0	13	0	4	4	1	8	9	3	0	0	0	1	1	9	0	0
% frequency	52%	45%	45%	14%	27%	0%	3%	4%	1%	0%	18%	0%	5%	5%	1%	11%	12%	4%	0%	0%	0%	1%	1%	12%	0%	0%

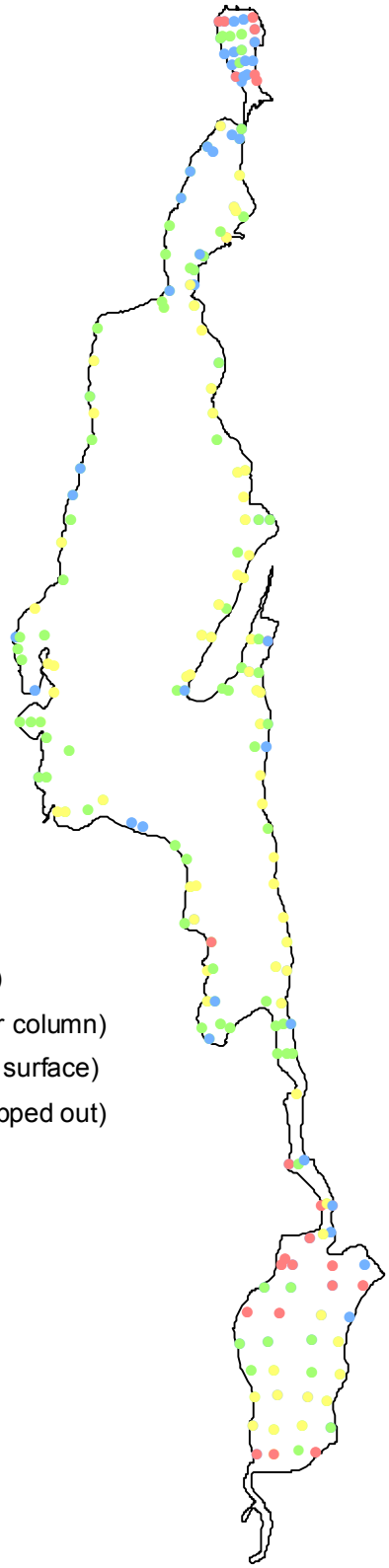
Averages for entire waterbody

Depth (ft)	% Cover	Biomass	% Ms	Richness
5.88	72.55	2.26	5.37	4.32

LAKE TOTALS

	Pr	Ms	Pa	Ec	Pi	Nf	Pz	Cd	Zd	Ca	Ny	Mu	V	Fa	Pp	U	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Pprae
Present	49	121	97	62	67	27	36	27	33	15	21	5	14	14	13	13	10	9	7	6	2	2	0	1	1	1
Dominant	85	7	6	22	7	17	2	9	1	13	2	13	2	2	1	0	2	0	1	0	0	0	1	0	0	0
Total	134	128	103	84	74	44	38	36	34	28	23	18	16	16	14	13	12	9	8	6	2	2	1	1	1	1
% frequency	68%	65%	53%	43%	38%	22%	19%	18%	17%	14%	12%	9%	8%	8%	7%	7%	6%	5%	4%	3%	1%	1%	1%	1%	1%	1%

2008 TOTAL VEGETATION BIOMASS



Legend

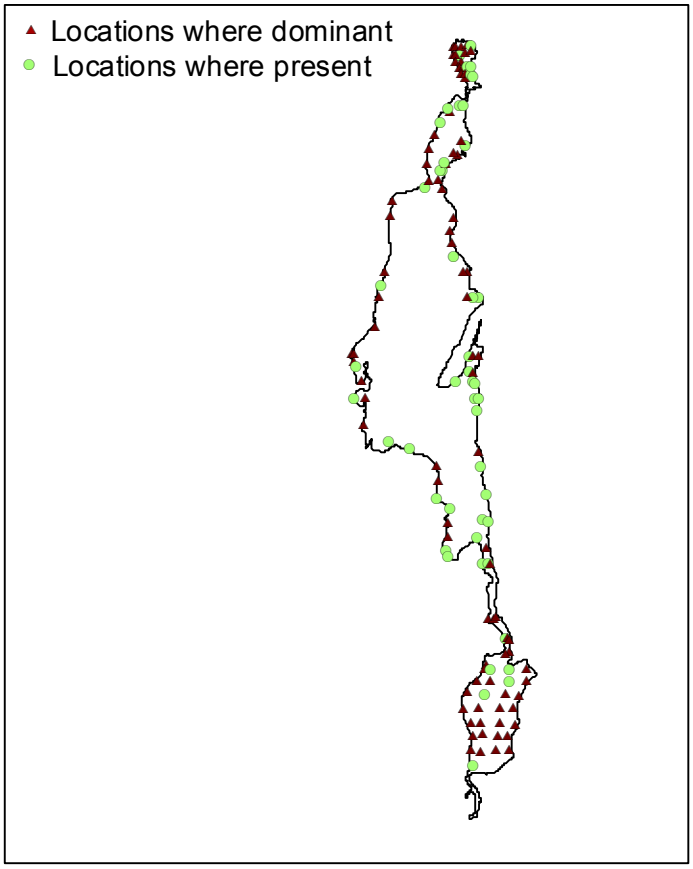
Biomass indices reported
during 9/24/08 and 9/25/08 survey

- 1 - low biomass (along bottom)
- 2 - moderate biomass (in water column)
- 3 - high biomass (approaching surface)
- 4 - extremely high biomass (topped out)

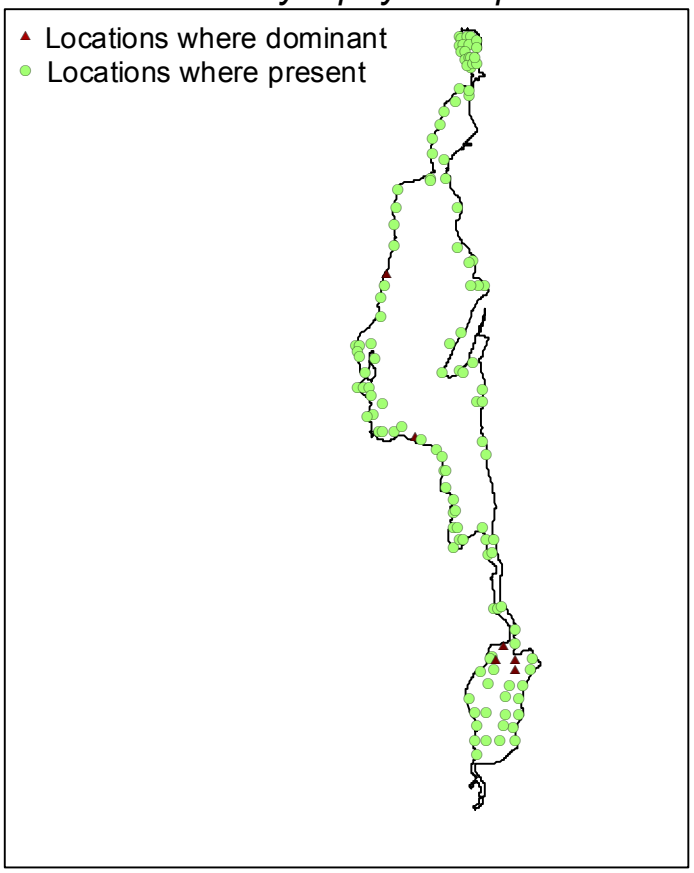
N
W E
S

0 1,000 2,000 4,000 6,000
Feet

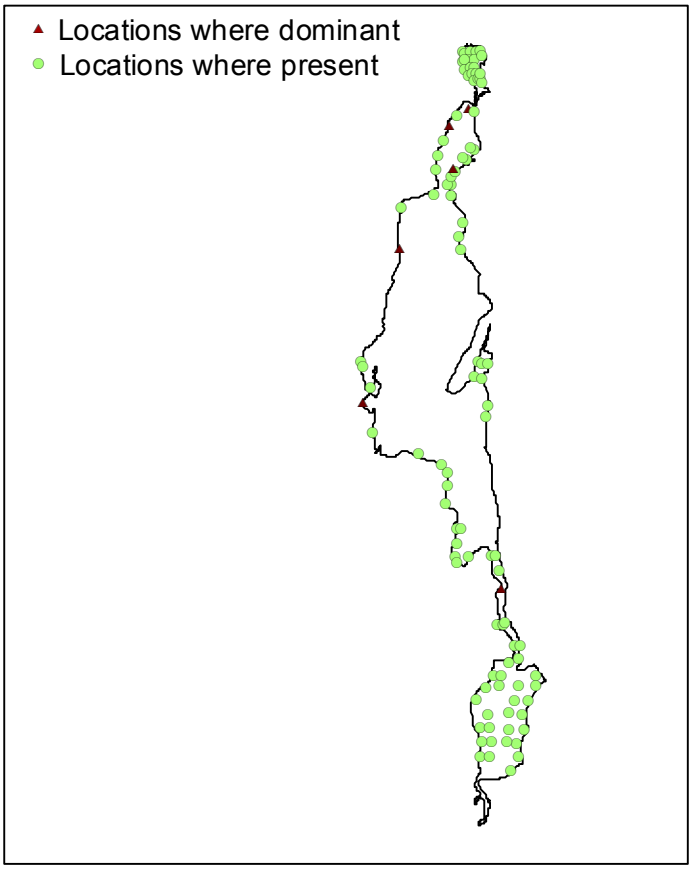
Distribution of *Potamogeton robbinsii*



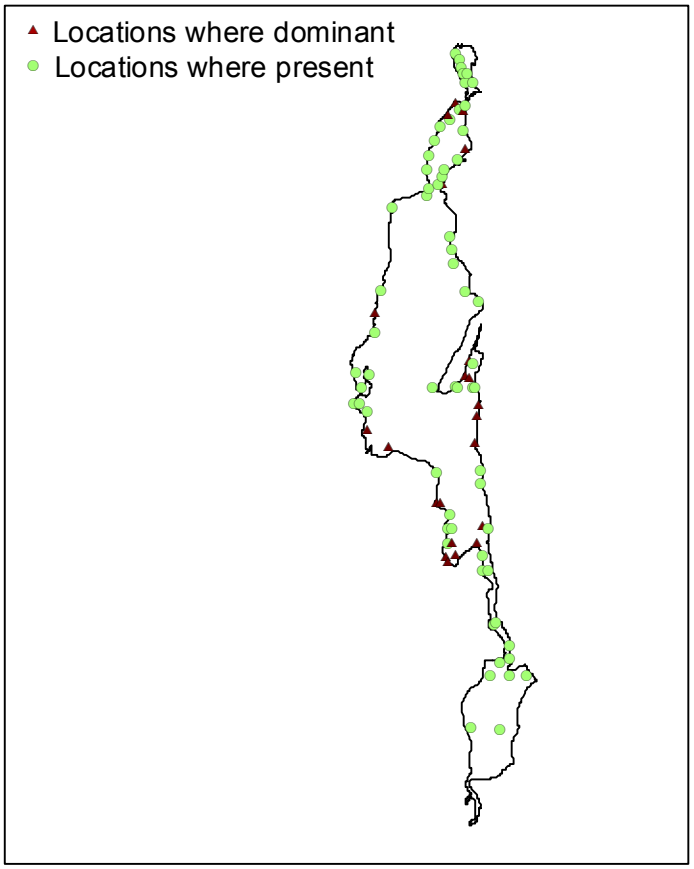
Distribution of *Myriophyllum spicatum*



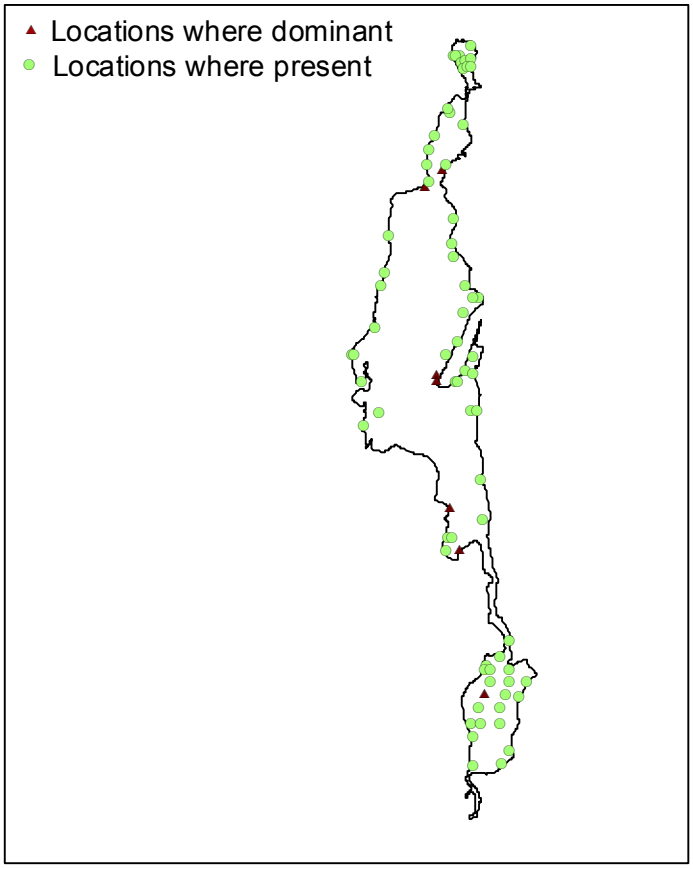
Distribution of *Potamogeton amplifolius*



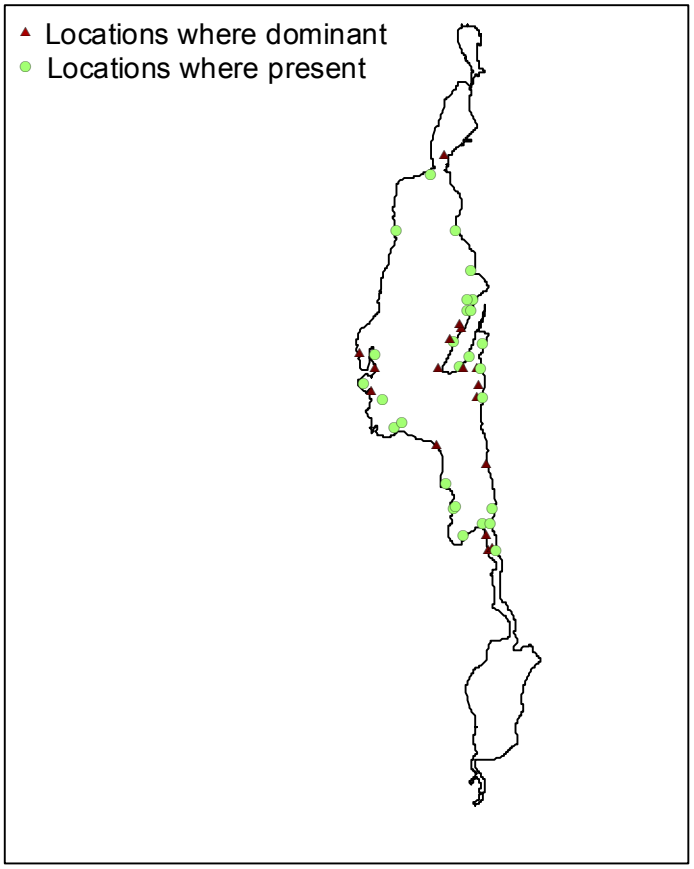
Distribution of *Elodea canadensis*



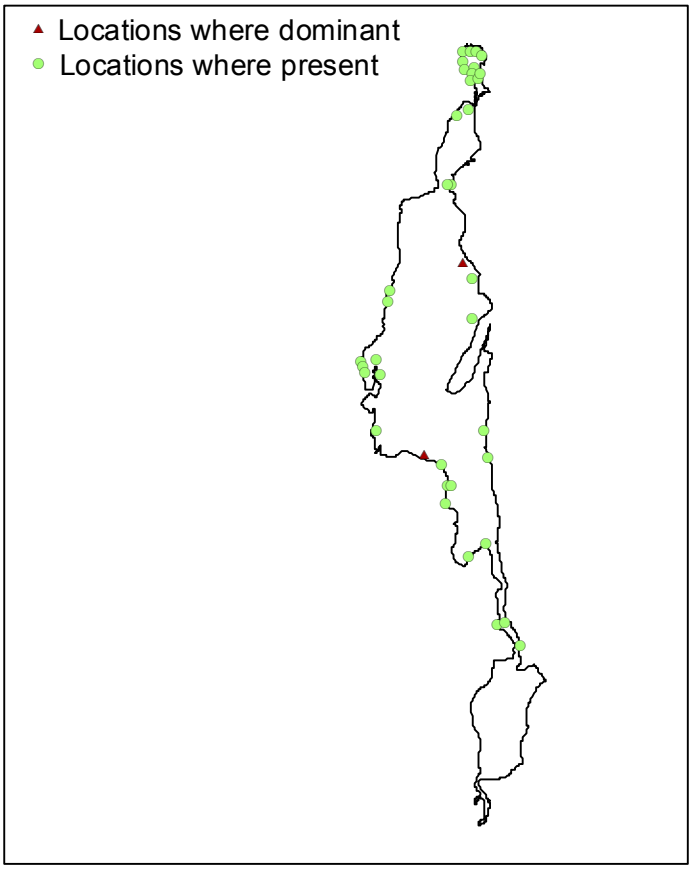
Distribution of *Potamogeton illionensis*



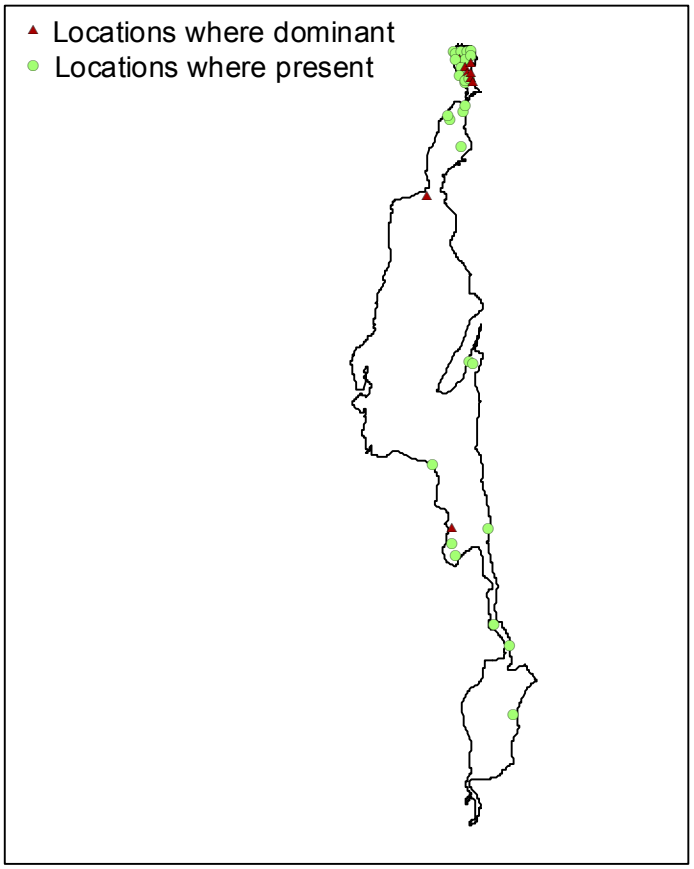
Distribution of *Najas flexilis*



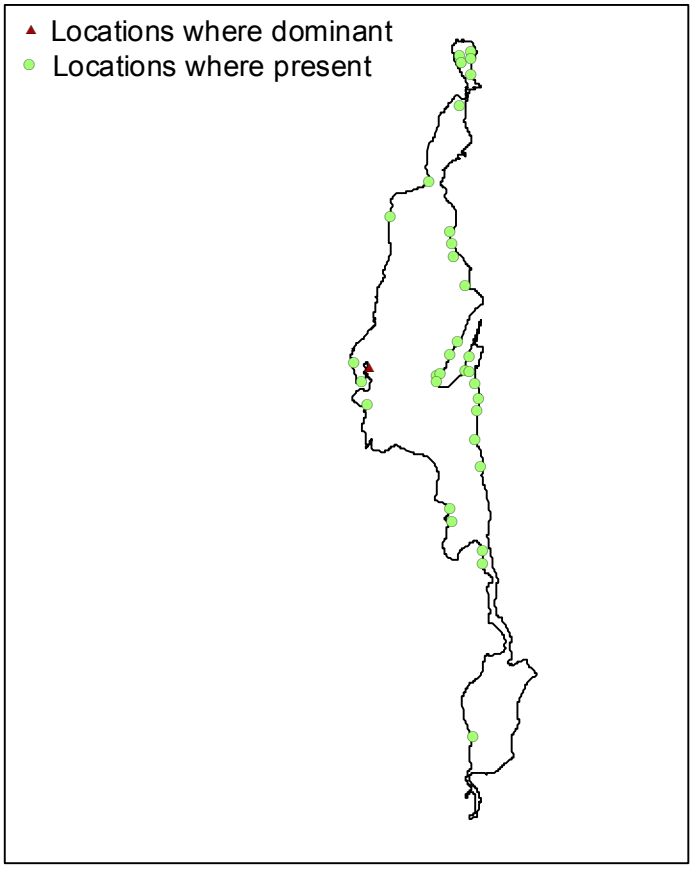
Distribution of *Potamogeton zosterformis*



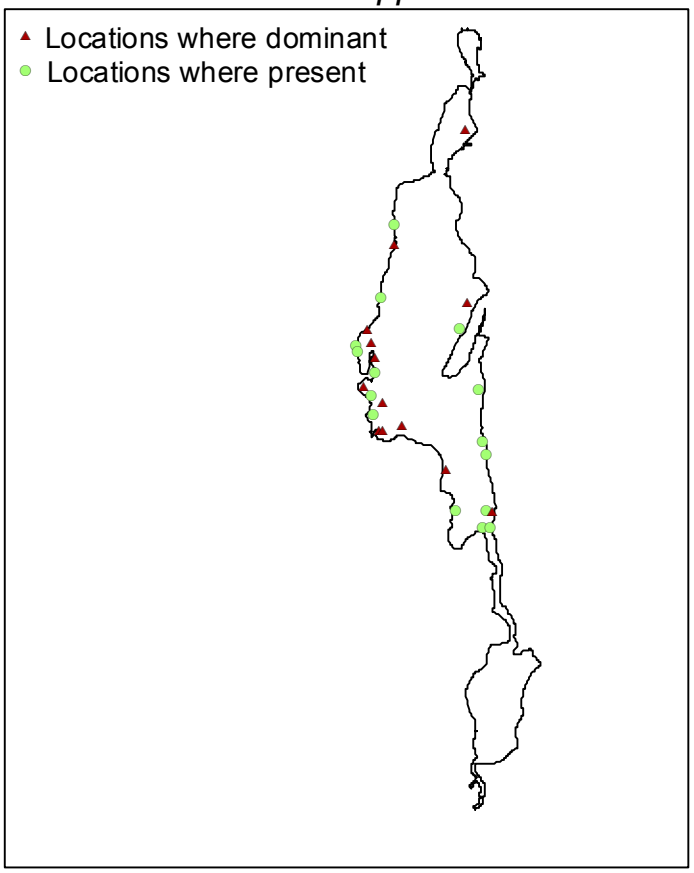
Distribution of *Ceratophyllum demersum*



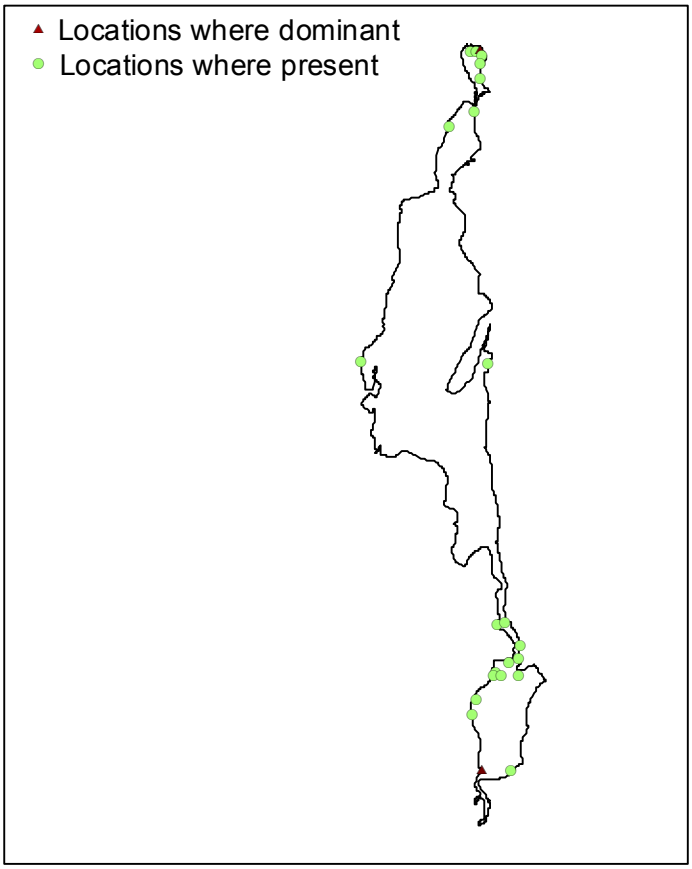
Distribution of *Zosterella dubia*



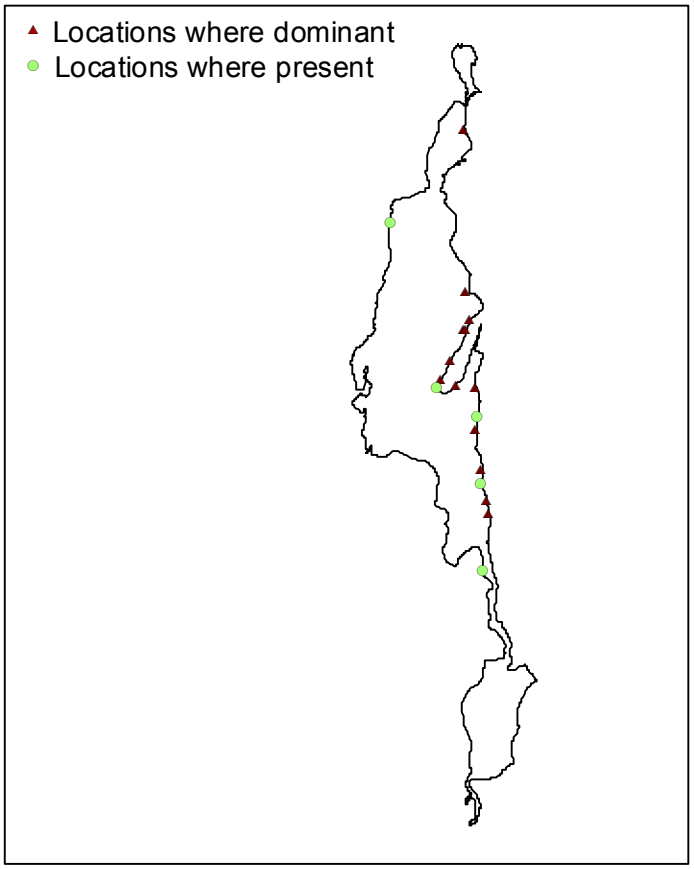
Distribution of *Chara spp.*



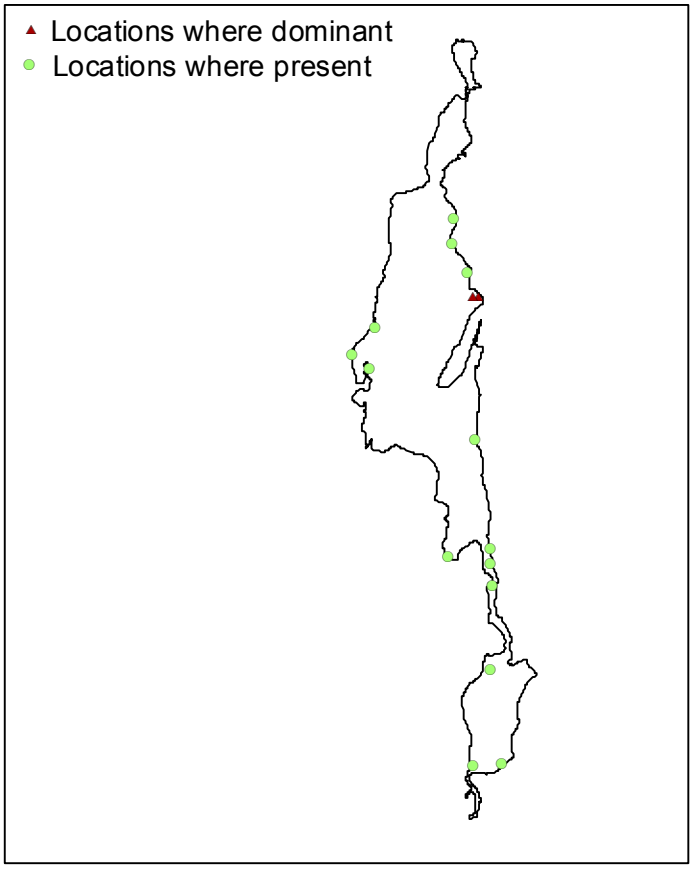
Distribution of *Nymphaea odorata*



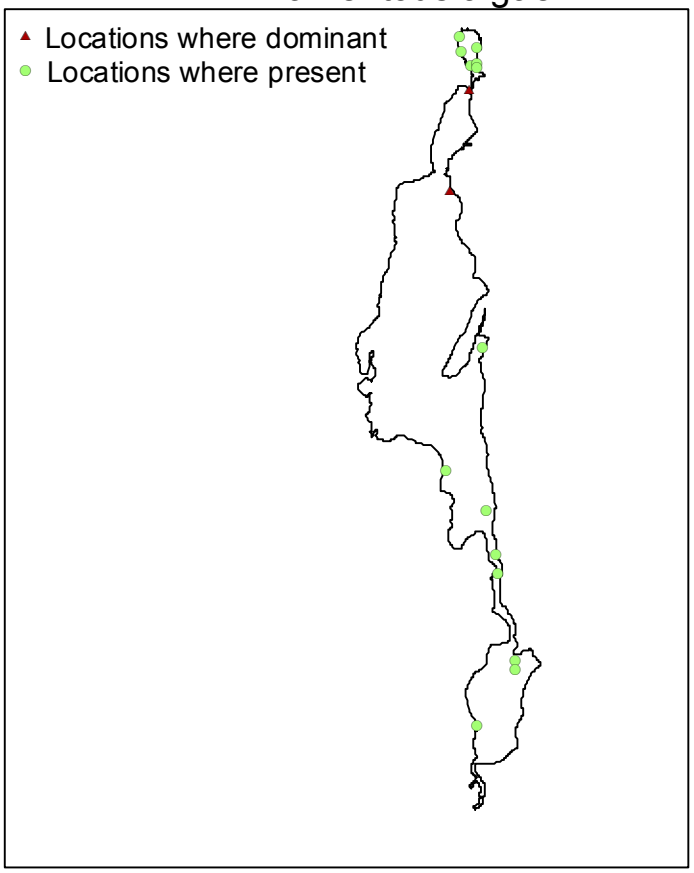
Distribution of *Musci spp.*



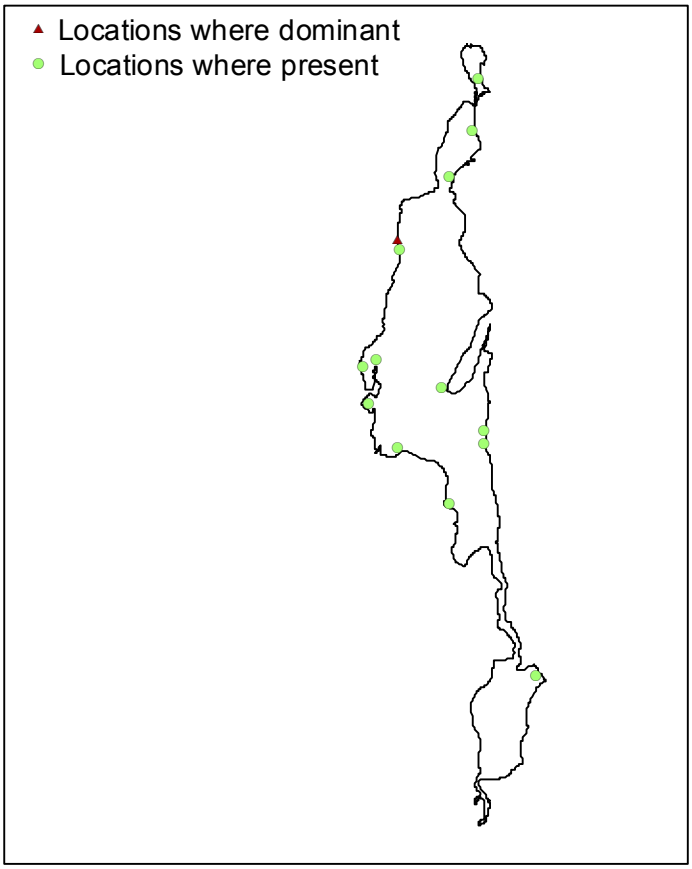
Distribution of *Vallisneria americana*



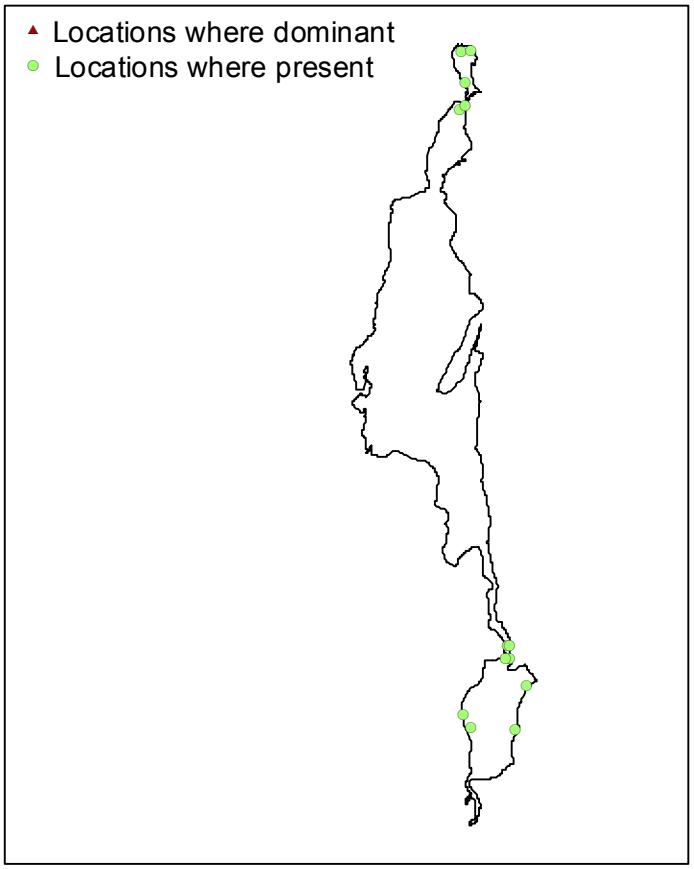
Distribution of Filamentous algae



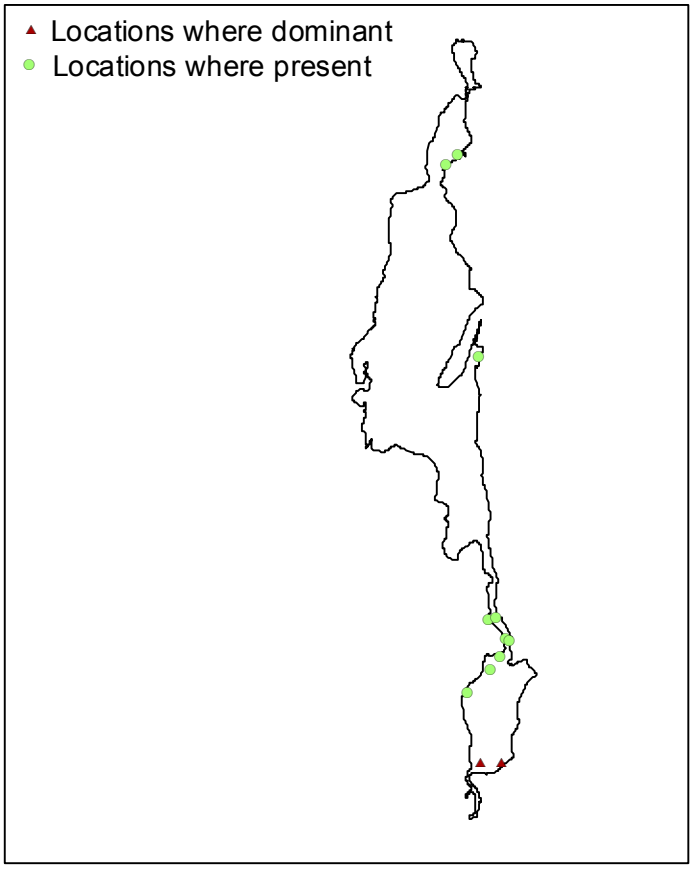
Distribution of *Potamogeton pusillus*



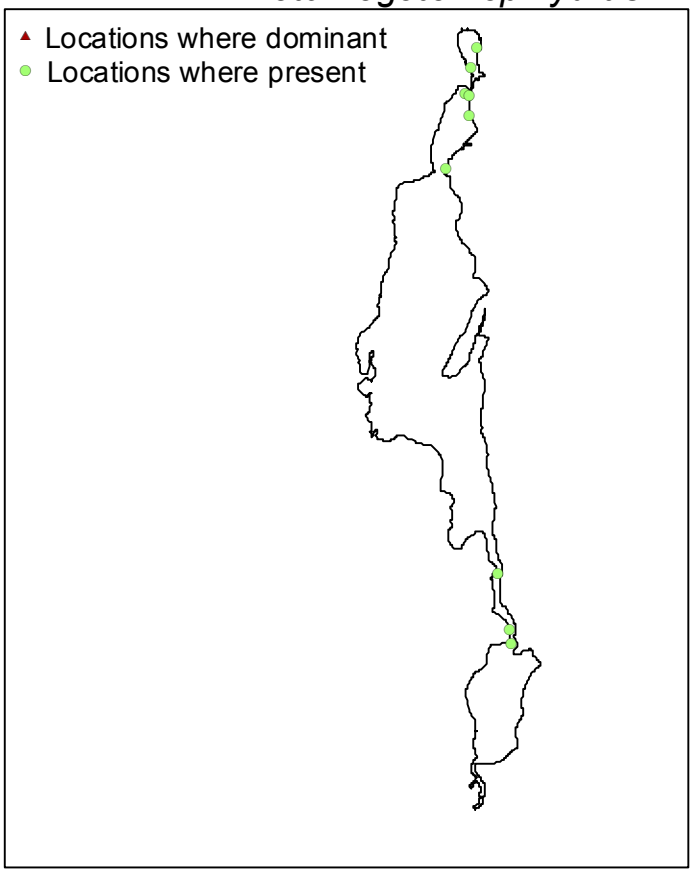
Distribution of *Utricularia vulgaris*



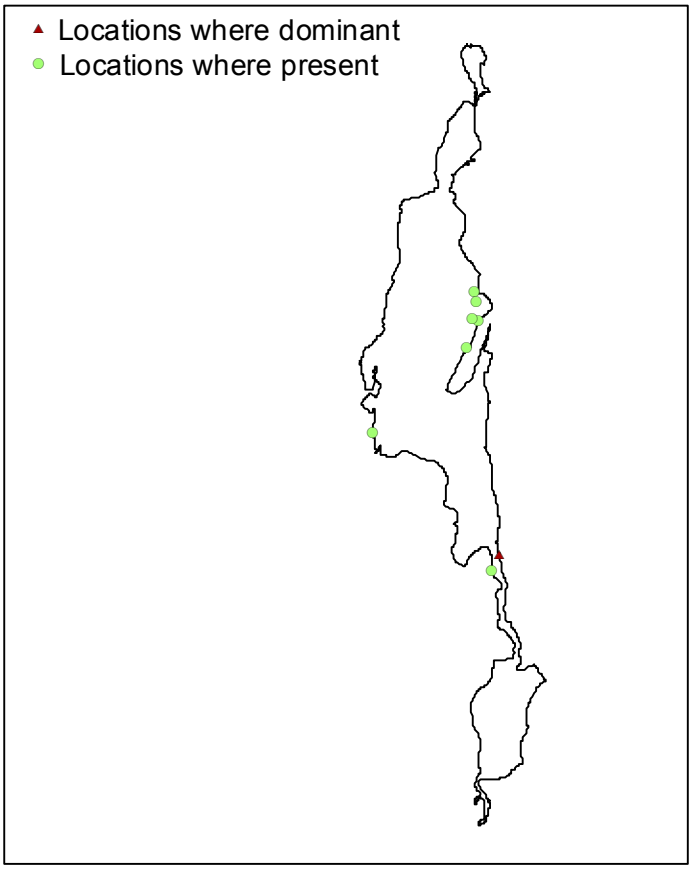
Distribution of *Brasenia schreberi*



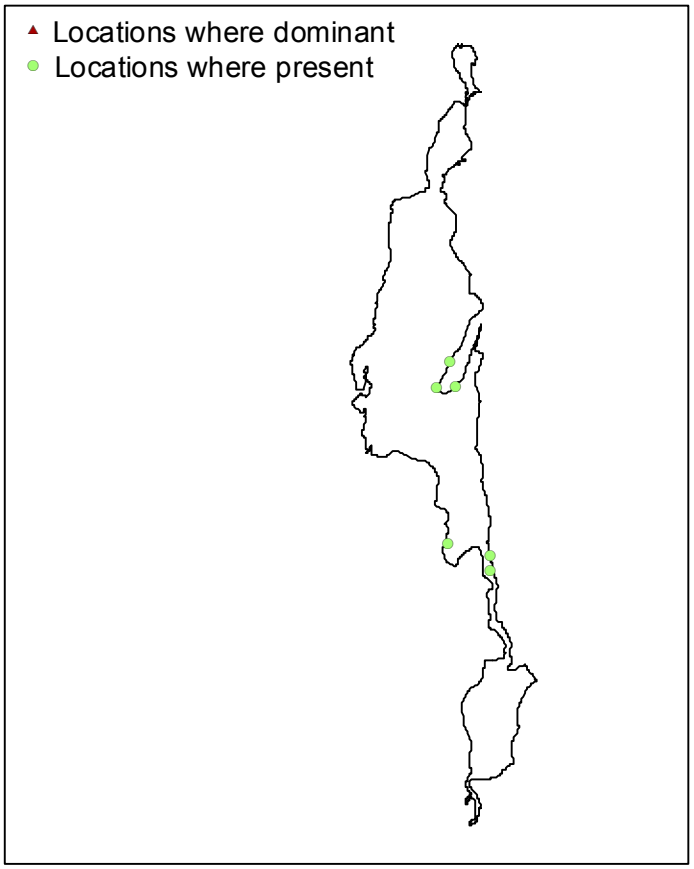
Distribution of *Potamogeton epihydrus*



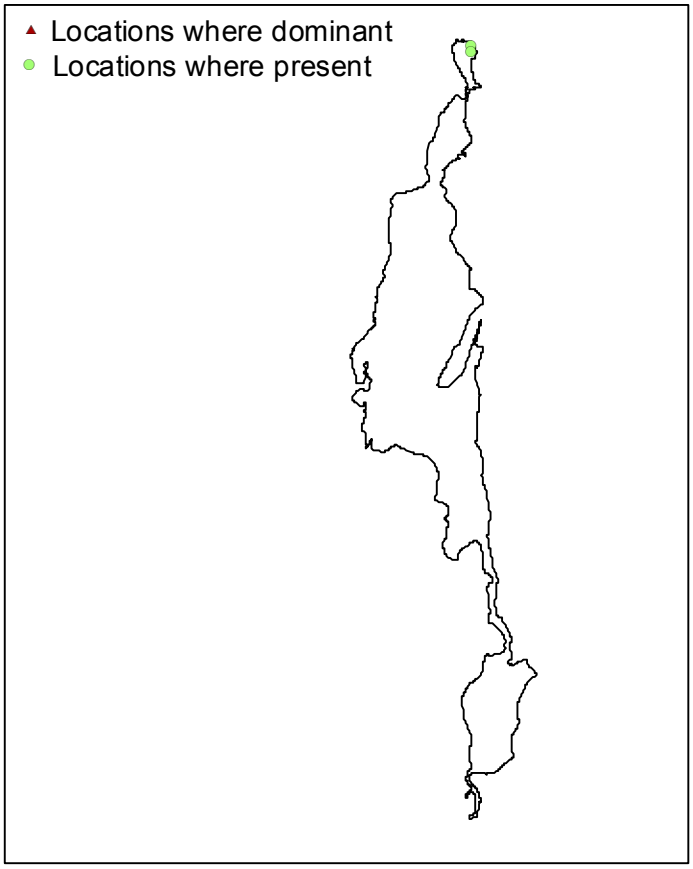
Distribution of *Potamogeton gramineus*



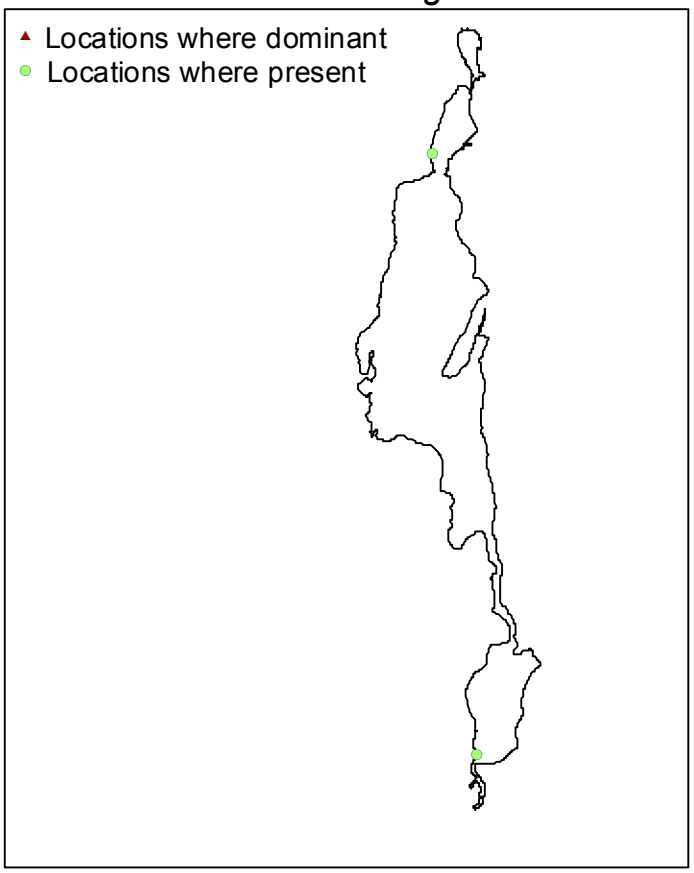
Distribution of *Isoetes spp.*



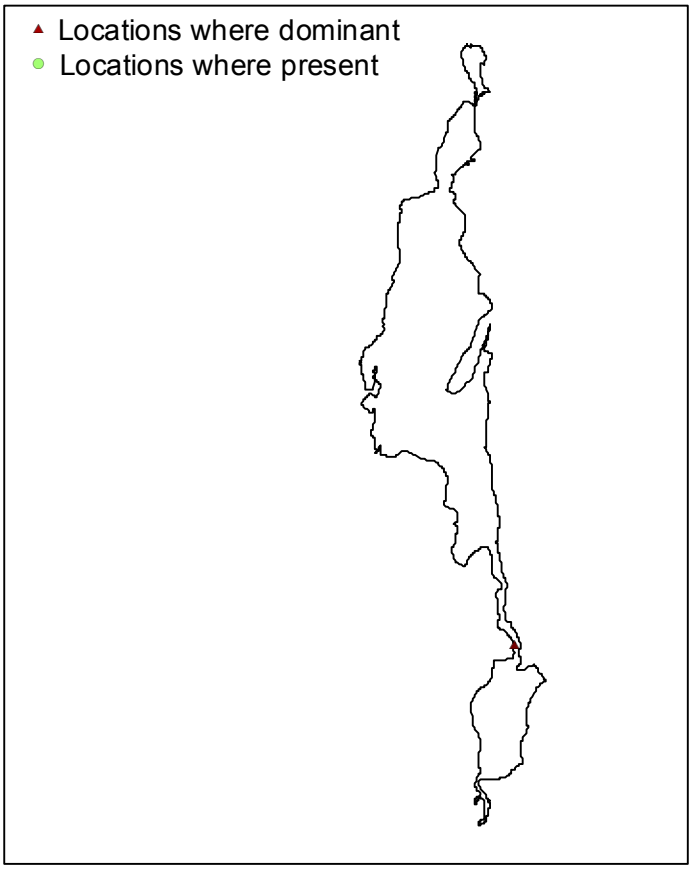
Distribution of *Potamogeton natans*



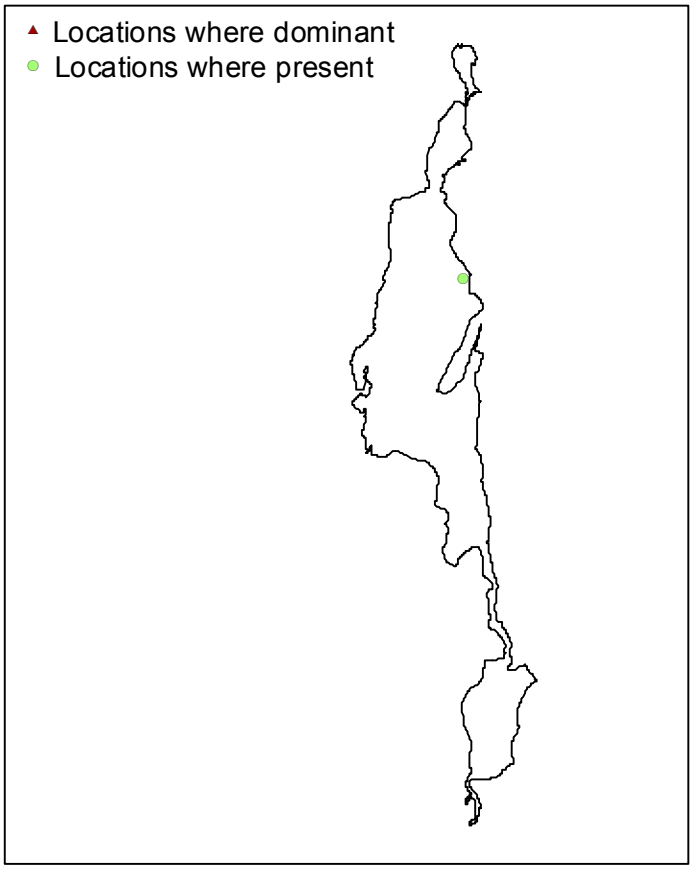
Distribution of *Utricularia gibba*



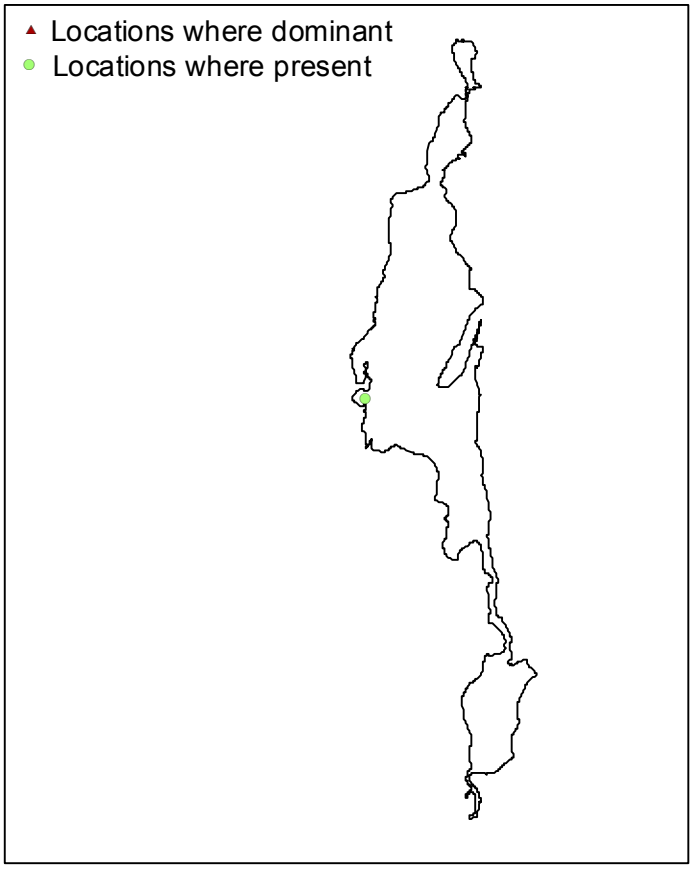
Distribution of *Nuphar variegatum*



Distribution of *Potamogeton crispus*



Distribution of *Potamogeton praelongus*



Distribution of *Lemna spp.*