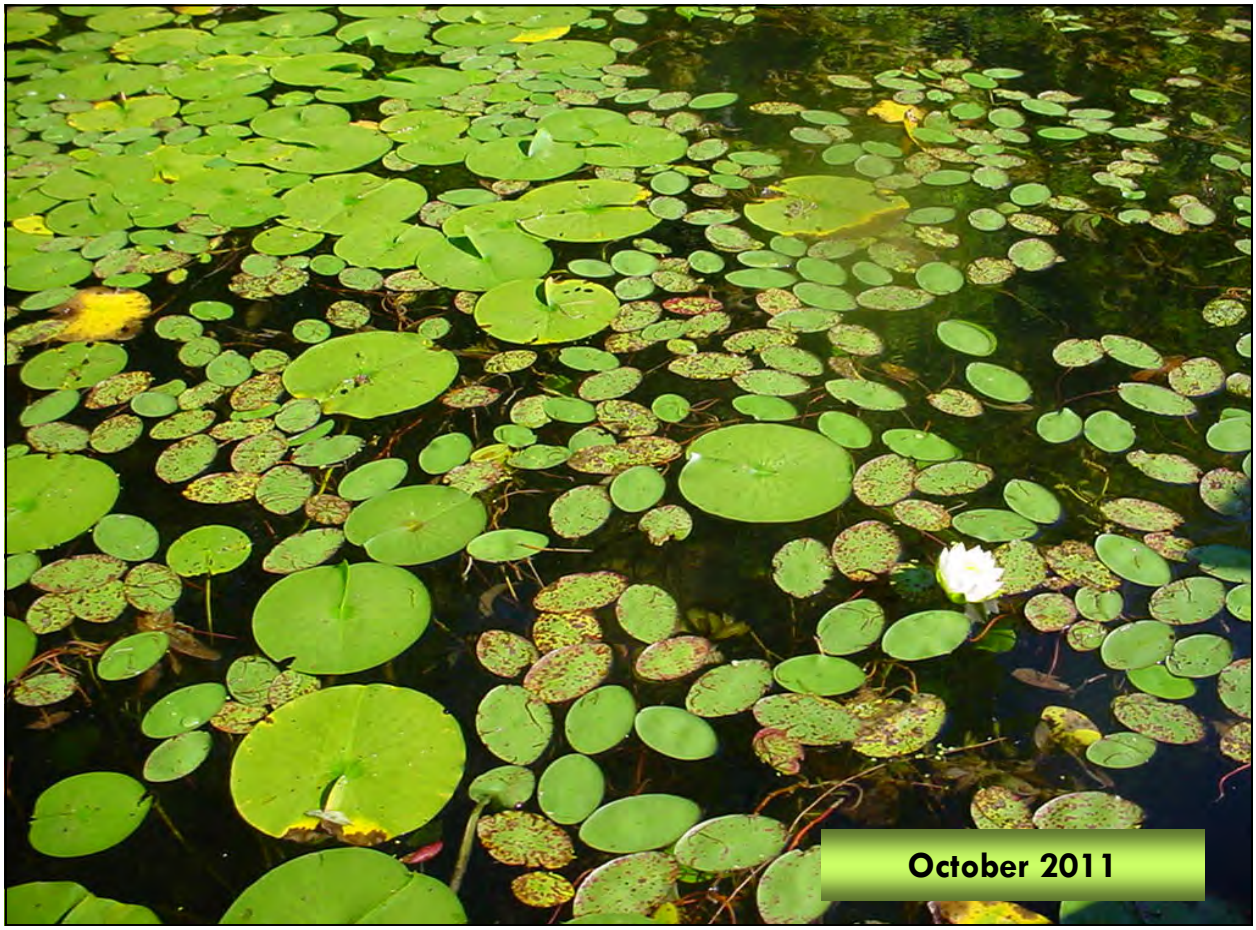
Lake St. Catherine

Aquatic Vegetation Management Program
2011 - Year Eight Report



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INTRODUCTION

The 2011 season marked the eighth year of Aquatic Control's involvement in the Integrated Management Plan at Lake St. Catherine aimed at the control of non-native Eurasian watermilfoil in the lake. Management for milfoil was initiated in 2004 with a whole-lake Sonar (fluridone) application. Consistent with the Management Plans (2004-2008; 2009-2013) developed for Lake St. Catherine, management following the 2004 Sonar application has focused on the control of milfoil in problematic and high-priority areas of the lake using area-specific spot-treatments with Renovate (triclopyr) herbicide and diver assisted suction harvesting and hand-pulling.

Management actions in 2011 included spot-treatment of seven areas totaling approximately 45.8 acres as well as diver hand-pulling and diver assisted suction harvesting. The following report summarizes the results of 2011 Treatment Program and details findings from the comprehensive aquatic plant survey. Recommendations for the 2012 season have also been included based on the results of the work performed in 2011. Specific information on the 2011 diver hand-pulling and diver assisted suction harvesting efforts will be provided by the Lake St. Catherine Association (LSCA) under a separate cover.

HERBICIDE TREATMENT PROGRAM - 2011

Program Chronology

A chronology of the 2011 treatment program is provided below:

- DEC permit issuance (ANC 2009-C02)..... May 2009
- Pre-treatment inspection and finalize treatment areas..... May 18
- Treatment of approximately 45.8 acres with Renovate OTF ..... June 14
- Herbicide residue monitoring..... June 24, , July 1 & August 3
- Post-treatment inspections .....July 20
- Comprehensive aquatic plant survey .....September 22 & 28

Pre-Treatment Inspection

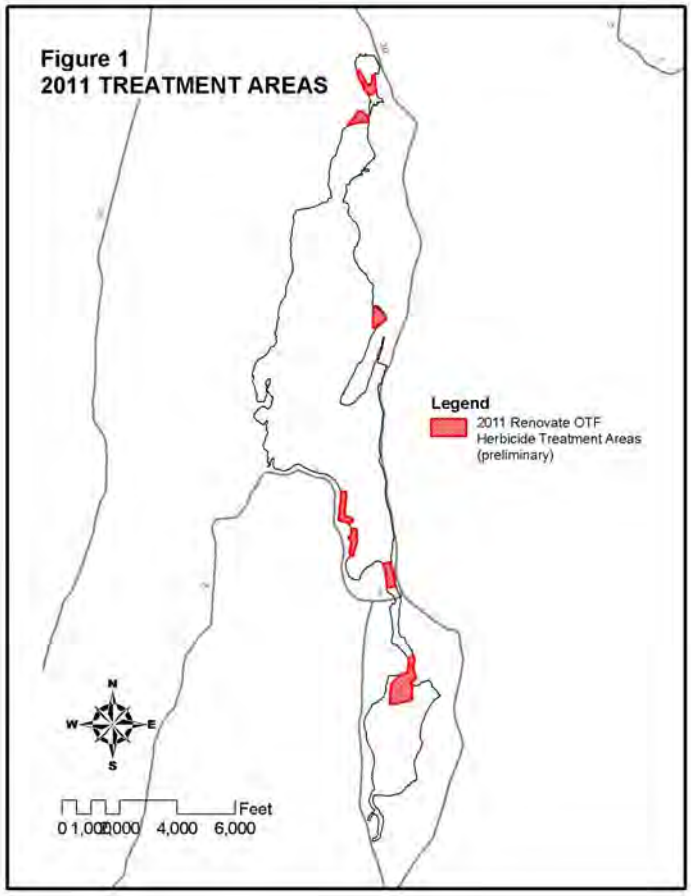
On May 18, 2011 the entire shoreline littoral area of Lake St. Catherine (Lily Pond, Main Lake and Little Lake) was surveyed by Aquatic Control Technology to determine the stage of milfoil growth and to make adjustments to the 2011 treatment scope. Results of the survey were communicated to LSCA for their input and final determination on proposed treatment areas.

Water temperatures ranged from 13.9 °C (57 °F) at the surface to 12.9 °C (55 °F) at a depth of 6 meters. Most of the milfoil growth encountered in Lily Pond and in the Main Lake showed 1-2 feet of active new growth, while 2-3 feet of new growth was seen on milfoil plants in Little Lake.

Ultimately seven areas totaling approximately 45.8 acres were targeted for treatment (Figure 1). Consistent with previous years, each treatment area was evaluated with regards to milfoil cover/distribution as well as 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. A final treatment map was provided to DEC for review and approval.

Summary of 2011 Treatment

The final treatment scope included seven treatment areas ranging in size from 4.2 acres to 16.8 acres and totaling 45.8 acres. The treatment largest block of was located at the northern end of Little Lake. This area was targeted at the recommendation of DEC to reduce the potential for milfoil fragmentation in this area of high boat traffic.



The treatment date of Tuesday, June 14, 2011 was selected to allow enough time to comply with the notification requirements of ANC Permit #2009-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 100% cloud cover with intermittent light rain. The air temperature was roughly 70° F; wind was out of the north estimated at 5-10 mph. Surface water temperature in the main basin was approximately 19.7°C with a dissolved oxygen concentration of 9.8 mg/L; equivalent to an oxygen saturation of roughly 115%.

The treatment was conducted using an aluminum work skiff outfitted with a granular eductor spray system. The eductor system fed the granular herbicide into a stream of water using a calibrated venturi-type eductor. The water/herbicide mixture was sprayed off the stern of the boat using fan-pattern nozzles. The boat was equipped with Differential/WAAS GPS navigation systems to insure that the herbicide was evenly applied to the designated treatment areas. The State Boat Ramp located on the channel between the Main Lake and Little Lake was used as the base of operations.

Treatment was performed as a split application whereby roughly half (50%) of the herbicide was applied to each of the designated areas initially and then the remaining 50% was applied several hours later. Due to the travel distance between the treatment areas and the total amount of product, there was approximately 5-6 hours between each application. This split application approach was used to increase concentration-exposure-time and increase the efficacy of treatment. Consistent with previous Renovate OTF applications, Renovate was applied at a target dose of 2.25 ppm. A total of 10,992 pounds of Renovate OTF (granular) were applied to the seven treatment areas. The herbicide was application took approximately 10 hours.

Post-Treatment Inspection

Aquatic Control Technology performed a post-treatment inspection of the lake on July 20, 2011. All of the treatment areas were inspected to evaluate the efficacy of the treatment. Weather conditions were favorable mostly sunny skies and a light breeze out of the south. No viable, rooted milfoil plants were observed in any of the seven treatment areas. There were several floating fragments found at the northern end of North Bay (Area B), which were likely carried in by the prevailing winds. No milfoil was seen in the treatment area at the northern end of Little Lake (Area G), but there was considerable milfoil growth seen along the southeast and southwest shorelines. Milfoil did appear to have some visible signs of exposure to low levels of triclopyr (epinasty on the leaves and stems), but the milfoil plants did look as if they would recover. Approximately one dozen water chestnut (Trapa natans) rosettes were found at the northern end of Little Lake, west of the channel. This observation was previously communicated to DEC. All of the water chestnut plants observed were hand-pulled and removed from the lake.

Native plant growth appeared to be healthy and flourishing in all of the treatment areas. Numerous species were observed including: *Brasenia schreberi, Ceratophyllum demersum, Chara sp., Elodea canadensis, Megalodonta beckii, Najas flexilis, Nuphar sp., Nymphaea sp., Potamogeton amplifolius, Potamogeton illinoensis, Potamogeton zosteriformis, Vallisneria americana.* The only observable impact on non-target species was impact on waterlilies in the northwest corner of Little Lake. Lost of brown and decomposing leaves were observed within and to the north and west of Area G. It is possible that elevated concentrations were sustained in this area due to the prevailing winds, shallow water depths and density of vegetation. Noticeable recovery of waterlilies in this area was seen during the late season survey.

Herbicide Residue Testing

In compliance with conditions of the ANC Permit #2009-C02, water samples were collected from 9 locations within and immediately downstream of Lake St. Catherine following treatment for analysis of triclopyr concentrations. Sampling was required 24 hours following treatment and then at least monthly until concentrations at all sample locations dropped below 75 ppb, which was the drinking water restriction imposed by DEC. Additional sampling was then conducted to see if in-lake concentrations would drop to <1 ppb, so that the irrigation restriction to be lifted ahead of the 120 day restriction.

A map of the sampling locations is attached to the end of this report (Appendix A). 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.

Samples were collected on June 15, June 22, June 29, July 7 & August 10. The highest in-lake concentration detected during the 24-hour sampling round was 0.732 ppm. The in-lake average for all sampled areas 24-hours post-treatment averaged roughly 0.187 ppm or 187 ppb. On June 22, 8 days post-treatment the average concentrations had dropped significantly to 0.036 ppm or 36 ppb. At the time of the final sampling round on August 10 lake-wide concentrations average 0.0009 ppm or 0.9 ppb. The highest concentration (0.002 ppm) measured during the final round of sampling which was recorded at two sample locations. There was no triclopyr residue in either of the two downstream samples collected on August 10.

LATE SEASON COMPREHENSIVE AQUATIC VEGETATION SURVEY

Survey Methods

The late season comprehensive aquatic vegetation survey conducted on September 22 & 28 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 in 2001. 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

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 and while milfoil cover has fluctuated annually overall vegetative cover and biomass remain relatively static in all three basins.

The composition of the vegetative community has also remained relatively unchanged since 2001 and remains dominated by native pondweed species, most notably: *Potamogeton robbinsii, Potamogeton illinoensii, & Potamogeton zosteriformis*. Diversity has also been maintained throughout the course of management with 24 different aquatic plant species identified this fall.

Comparative data for all three basins from data collected during late season between 2001 and 2011 is listed below (Table 1).

Table 1: Summary of Survey Data

LILY POND	2001	2004	2005	2006	2007	2008	2009	2010	2011
Total Number of Data Points	24	24	24	22	24	24	24	24	24
Total Plant Cover	90%	80%	98%	88%	91%	98%	94%	98%	93%
Milfoil Cover	9%	6%	2%	0%	2%	7%	<1%	<1%	<1%
Plant Biomass Index	3.1	2.5	3.3	2.5	2.8	3.3	2.7	2.3	2.9

LAKE ST. CATHERINE									
Total Number of Data Points	129	129	129	129	129	129	129	129	129
Total Plant Cover	66%	46%	51%	57%	58%	66%	58%	63%	59%
Milfoil Cover	43%	16%	0%	4%	11%	4%	5%	2%	7%
Plant Biomass Index	1.9	1.5	1.6	1.8	2.0	2.0	2.0	1.3	1.8

LITTLE LAKE									
Total Number of Data Points	43	43	43	43	43	43	43	43	43
Total Plant Cover	72%	66%	78%	83%	83%	77%	58%	62%	76%
Milfoil Cover	15%	0%	0%	2%	7%	10%	<1%	5%	9%
Plant Biomass Index	2.3	2.1	2.4	2.9	2.8	2.7	2.2	2.7	3.3

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

Macrophyte Species	Common Name	2001	2004	2005	2006	2007	2008	2009	2010	2011
Potamogeton robbinsii	Pondweed	52%	76%	88%	74%	77%	68%	84%	78%	57%
Myriophyllum spicatum	Eurasian watermilfoil	94%	44%	17%	33%	74%	65%	38%	40%	43%
Potamogeton amplifolius	Large-leaf	33%	38%	43%	49%	52%	53%	51%	56%	23%
Najas flexilis	Naiad	22%	0%	8%	39%	34%	22%	15%	16%	14%
Potamogeton illinoensis	Illinois pondweed	4%	1%	2%	9%	23%	39%	29%	36%	35%
Potamogeton zosteriformis	Flat-stem pondweed	28%	3%	29%	29%	23%	19%	16%	26%	22%
Zosterella dubia	Water stargrass	1%	1%	9%	8%	23%	17%	7%	13%	4%
Ceratophyllum demersum	Coontail	20%	8%	11%	12%	21%	18%	17%	22%	10%
Nitella / Chara	Stonewort	17%	6%	36%	40%	14%	14%	13%	2%	2%
Nymphaea odorata	White waterlily	16%	5%	11%	10%	11%	11%	10%	7%	7%
Vallisneria americana	Wild celery/Tapegrass	29%	13%	2%	4%	9%	8%	15%	15%	14%
Brasenia schreberi	Watershield	4%	8%	7%	7%	7%	6%	5%	5%	5%
Utricularia vulgaris	Common bladderwort	8%	9%	2%	6%	7%	7%	11%	8%	2%
Elodea canadensis	Waterweed	32%	1%	1%	1%	5%	43%	60%	30%	10%
Chlorophyta	Filamentous green algae	2%	37%	26%	7%	4%	8%	3%	2%	3%
Potamogeton crispus	Curly-leaf pondweed	2%	1%	7%	5%	3%	1%	0%	0%	1%
Potamogeton epihydrus	Ribbon-leaf pondweed	2%	6%	7%	3%	3%	5%	1%	1%	1%
Nuphar variegatum	Yellow waterlily	5%	5%	5%	2%	2%	1%	2%	1%	2%
Potamogeton gramineus	Variable pondweed	23%	1%	6%	6%	2%	4%	4%	4%	11%
Isoetes sp.	Quillwort	2%	6%	2%	5%	2%	3%	1%	0%	1%
Utricularia gibba	Creeping bladderwort	2%	0%	1%	5%	1%	1%	4%	1%	0%
Eleocharis sp.	Spikerush	1%	1%	1%	0%	0%	0%	0%	0%	0%
Lemna minor	Duckweed	7%	1%	0%	1%	0%	1%	1%	0%	0%
Megalodonta beckii	Water marigold	3%	0%	0%	0%	0%	0%	0%	0%	1%

Lily Pond

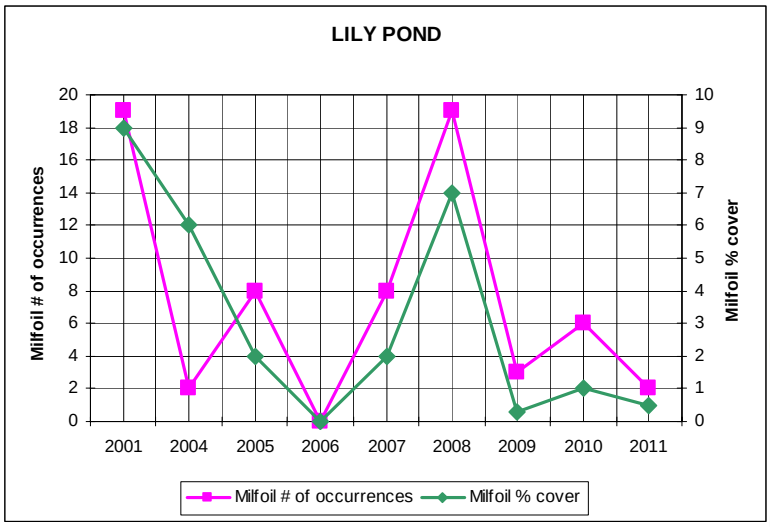
Milfoil frequency in little lake was reduced from 25% in 2010 to 8.3%following spot-treatment in this area in 2011. While milfoil was encountered with the treated area, growth was limited to only a few plants. More significant (<10% cover) milfoil growth was found in the channel area between Little Lake and the main basin, however this area has been historically difficult to treat effectively due to the dilution caused by the flow of water.

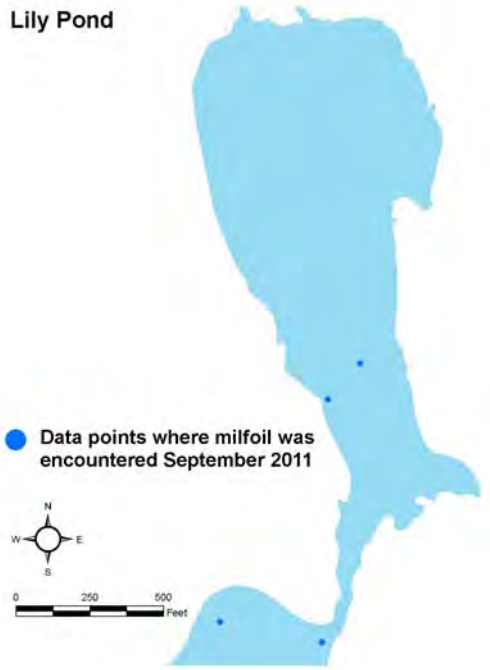
Native species in Lily Pond remained healthy with both cover and distribution similar to what has been recorded in previous years. *Potamogeton robbinsii* (87.5%) remained the most abundant plant in the basin followed closely by *Ceratophyllum demersum (75.0%).* *Potamogeton zosteriformis* and *Potamogeton illinoensis* were also abundant and were encountered at almost half of the surveyed locations. Declines in *Elodea canadensis* and *Zosterella dubia* cover were realized between 2010 and 2011.

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

Macrophyte Species	**Lily Pond**								
	2001	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Potamogeton robbinsii	95.8%	91.7%	95.8%	95.5%	91.7%	87.5%	95.8%	95.8%	87.5%
Ceratophyllum demersum	70.8%	4.2%	50.0%	45.5%	83.3%	83.3%	83.3%	79.2%	75.0%
Potamogeton amplifolius	33.3%	100.0%	91.7%	77.3%	79.2%	87.5%	91.7%	87.5%	37.5%
Potamogeton illinoensis	0.0%	4.2%	8.3%	9.1%	45.8%	41.7%	25.0%	16.7%	45.8%
Myriophyllum spicatum	79.2%	8.3%	33.3%	0.0%	33.3%	79.2%	12.5%	25.0%	8.3%
Potamogeton zosteriformis	58.3%	8.3%	62.5%	0.0%	25.0%	45.8%	12.5%	66.7%	45.8%
Zosterella dubia	4.2%	0.0%	37.5%	0.0%	25.0%	20.8%	8.3%	50.0%	0.0%
Nymphaea odorata	62.5%	16.7%	29.2%	9.1%	20.8%	25.0%	33.3%	16.7%	25.0%
Potamogeton crispus	4.2%	4.2%	4.2%	4.5%	12.5%	0.0%	0.0%	0.0%	4.2%
Chlorophyta	0.0%	29.2%	95.8%	31.8%	8.3%	29.2%	12.5%	4.2%	16.7%
Elodea canadensis	29.2%	0.0%	8.3%	0.0%	8.3%	29.2%	45.8%	79.2%	16.7%
Utricularia vulgaris	29.2%	37.5%	0.0%	27.3%	4.2%	12.5%	16.7%	4.2%	16.7%
Chara sp. / Nitella sp.	0.0%	0.0%	0.0%	4.5%	4.2%	0.0%	0.0%	0.0%	0.0%
Wolffia sp.	0.0%	0.0%	0.0%	4.5%	4.2%	0.0%	0.0%	0.0%	0.0%
Potamogeton epihydrus	0.0%	12.5%	4.2%	0.0%	4.2%	4.2%	4.2%	0.0%	4.2%
Potamogeton gramineus	16.7%	0.0%	8.3%	0.0%	4.2%	0.0%	8.3%	0.0%	8.3%
Utricularia gibba	0.0%	0.0%	0.0%	40.9%	0.0%	0.0%	4.2%	0.0%	0.0%
Potamogeton natans	0.0%	0.0%	0.0%	9.1%	0.0%	8.3%	8.3%	12.5%	8.3%
Lemna minor	45.8%	8.3%	0.0%	4.5%	0.0%	0.0%	0.0%	0.0%	0.0%
Brasenia schreberi	4.2%	4.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Isoetes sp.	0.0%	4.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Najas flexilis	4.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nuphar variegatum	16.7%	16.7%	16.7%	0.0%	0.0%	0.0%	0.0%	4.2%	4.2%
Vallisneria americana	33.3%	45.8%	0.0%	0.0%	0.0%	0.0%	8.3%	4.2%	4.2%

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 recent years. While the distribution of *Potamogeton robbinsi*i dropped slightly from 2010 it remains the most abundant species in the main basin and was encountered at 58% (75 of 129 data points); it was also the dominant species recorded at 56 (43%) of the data points in the main basin. Frequency of occurrence also dropped for cover on *Potamogeton amplifolius* by almost 20 percent but remained common and was observed in low to moderate densities outside of the surveyed data points. Cover of other native plants remained relatively consistent with only minor fluctuations between 2010 and 2011.

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

Macrophyte Species	Lake St. Catherine								
	2001	2004	2005	2006	2007	2008	2009	2010	2011
Myriophyllum spicatum	98.4%	65.1%	14.7%	35.7%	76.7%	58.9%	44.2%	27.9%	49.6%
Potamogeton robbinsii	31.0%	65.1%	82.2%	62.0%	66.7%	58.1%	78.3%	72.9%	58.1%
Najas flexilis	19.4%	0.0%	12.4%	56.6%	50.4%	34.1%	21.7%	24.8%	20.2%
Potamogeton amplifolius	28.7%	14.7%	25.6%	34.1%	38.8%	38.0%	41.1%	44.2%	25.6%
Potamogeton zosteriformis	24.0%	2.3%	31.0%	41.9%	27.9%	18.6%	19.4%	23.3%	30.2%
Zosterella dubia	0.0%	0.8%	4.7%	11.6%	27.9%	21.7%	7.8%	8.5%	5.4%
Chara sp. / Nitella sp.	1.6%	17.1%	62.0%	57.4%	20.9%	21.7%	19.4%	2.3%	0.8%
Potamogeton illinoensis	6.2%	0.8%	0.8%	8.5%	15.5%	34.1%	23.3%	31.0%	32.6%
Potamogeton pusillus	0.0%	0.0%	0.0%	5.4%	12.4%	6.3%	5.4%	11.6%	12.4%
Ceratophyllum demersum	10.9%	10.9%	6.2%	7.0%	10.9%	10.1%	7.8%	14.0%	6.2%
Vallisneria americana	14.0%	3.1%	0.8%	3.1%	8.5%	9.3%	13.2%	13.2%	10.1%
Elodea canadensis	27.9%	0.0%	0.0%	0.8%	4.7%	51.9%	71.3%	14.7%	8.5%
Nymphaea odorata	3.1%	1.6%	2.3%	3.1%	3.1%	3.1%	3.1%	1.6%	2.3%
Brasenia schreberi	0.0%	0.8%	0.8%	2.3%	2.3%	2.3%	2.3%	1.6%	2.3%
Chlorophyta	0.0%	43.4%	14.7%	3.1%	2.3%	3.9%	0.8%	0.8%	3.1%
Isoetes sp.	2.3%	8.5%	0.8%	6.2%	2.3%	4.7%	0.0%	0.0%	0.8%

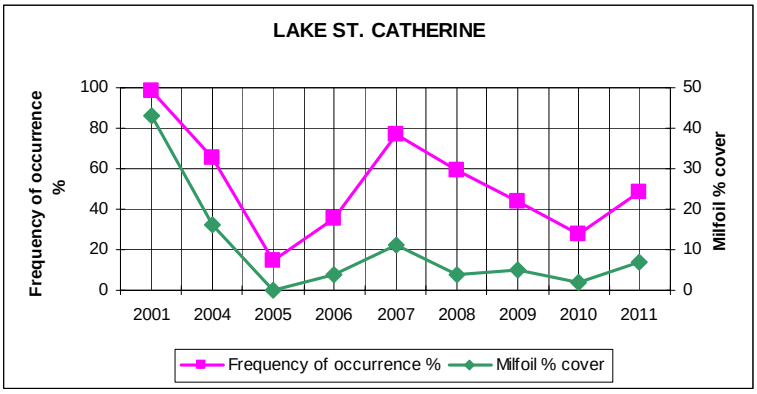
Macrophyte Species	Lake St. Catherine								
	2001	2004	2005	2006	2007	2008	2009	2010	2011
Potamogeton gramineus	17.8%	0.0%	4.7%	1.6%	2.3%	6.2%	3.1%	6.2%	14.7%
Potamogeton crispus	1.6%	0.0%	9.3%	5.4%	1.6%	0.8%	0.0%	0.0%	0.0%
Potamogeton epihydrus	2.3%	3.1%	5.4%	2.3%	0.8%	3.9%	0.8%	0.8%	0.8%
Nuphar variegatum	0.8%	0.0%	0.0%	0.8%	0.8%	0.0%	0.0%	0.8%	0.8%
Utricularia vulgaris	0.8%	0.8%	0.8%	0.0%	0.0%	1.6%	0.8%	3.1%	0.0%
Lemna minor	1.6%	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%	0.0%	0.0%
Megalodonta beckii	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

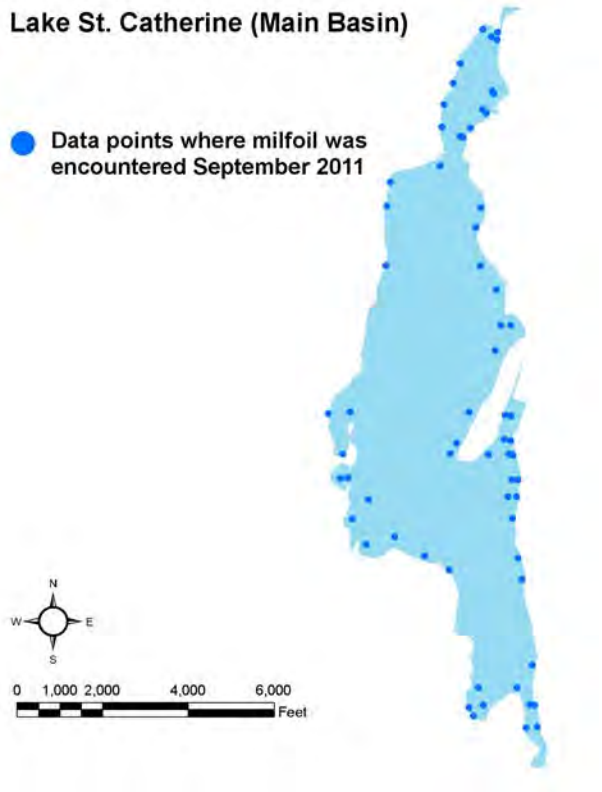
The most notable change in the vegetative community in the main basin was the increase in frequency of occurrence of *Myriophyllum spicatum*, which increased from 28% in 2010 to nearly 50% in 2011, representing an additional 28 survey point locations where milfoil was observed. Where found, cover of milfoil also increased where found from roughly 2.1% in 2010 to 14.4% in 2011. Scattered and sometimes moderate-dense growth of milfoil was also recoded outside the pre-established data points. Locations of milfoil were recorded with GPS and can be found on page 11 of this report (Figure 2).

While milfoil remains widespread in the main basin annual treatments and diver suction hand-pulling have helped curb re-growth of milfoil in the lake and have maintained acceptable milfoil control in high-use areas of the lake. Save for a few large patches, most of the milfoil observed in 2011 remained low-density growth, averaging just 7.2% cover throughout the main basin.

Chart 2 (below) represents year-to-year change in milfoil frequency and cover in the main basin.

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





Little Lake

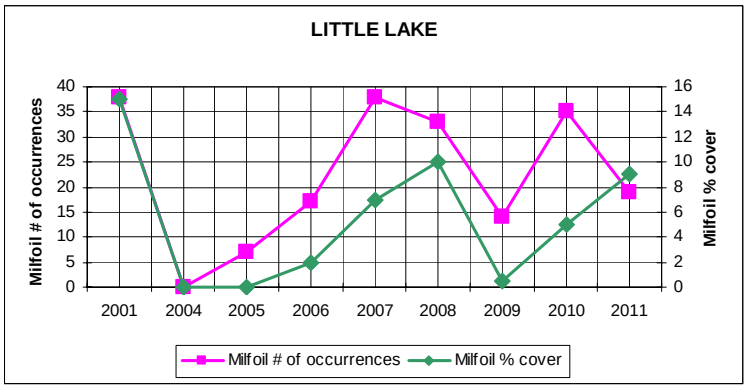
Potamogeton robbinsii and *Potamogeton illinoensis* dominated the aquatic plant community in Little Lake accounting for a large percentage of the plant density recorded during the September 2011 survey. *Vallisneria americana, Potamogeton amplifolius, Elodea canadensis,* and *Ceratophyllum demersum* were also common, encountered at 35%, 28%, 28% & 21% of the surveyed data points, respectively. With the exception of the significant decrease in distribution of *Potamogeton amplifolius* and *Elodea canadensis* the frequency of occurrence for most other native plants recorded in Little Lake remained consistent with previous years.

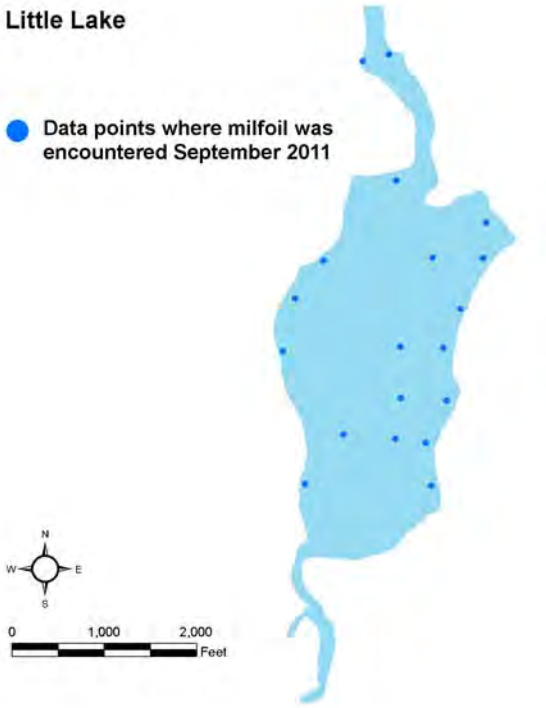
Table 5: Little Lake – Species List and Frequency of Occurrence

Macrophyte Species	Little Lake								
	2001	2004	2005	2006	2007	2008	2009	2010	2011
Potamogeton robbinsii	88.4%	100.0%	100.0%	100.0%	100.0%	88.4%	95.3%	81.4%	86.0%
Myriophyllum spicatum	88.4%	0.0%	16.3%	39.5%	88.4%	76.7%	32.6%	81.4%	44.2%
Potamogeton amplifolius	44.2%	72.1%	69.8%	76.7%	74.4%	76.7%	55.8%	72.1%	27.9%
Potamogeton illinoensis	0.0%	0.0%	0.0%	9.3%	32.6%	46.5%	48.5%	36.2%	62.8%
Utricularia vulgaris	16.3%	18.6%	7.0%	11.6%	30.2%	18.6%	34.9%	25.6%	4.7%
Nymphaea odorata	30.2%	9.3%	25.6%	30.2%	27.9%	10.1%	18.6%	18.6%	23.3%
Brasenia schreberi	14.0%	30.2%	30.2%	23.3%	25.6%	20.9%	14.0%	11.6%	14.0%
Ceratophyllum demersum	20.9%	0.0%	2.3%	9.3%	16.3%	7.0%	9.3%	16.3%	27.9%
Vallisneria americana	72.1%	25.6%	7.0%	9.3%	14.0%	9.3%	25.6%	25.6%	34.9%
Potamogeton zosteriformis	23.3%	2.3%	4.7%	4.7%	7.0%	4.7%	7.0%	9.3%	9.3%
Zosterella dubia	2.3%	2.3%	4.7%	0.0%	7.0%	2.3%	4.7%	4.7%	2.3%
Potamogeton pusillus	0.0%	0.0%	0.0%	2.3%	7.0%	2.3%	0.0%	0.0%	0.0%
Chlorophyta	7.0%	20.9%	20.9%	4.7%	7.0%	9.3%	2.3%	2.3%	2.3%
Nuphar variegatum	9.3%	14.0%	11.6%	7.0%	7.0%	2.3%	7.0%	2.3%	4.7%
Potamogeton epihydrus	0.0%	11.6%	14.0%	7.0%	7.0%	7.0%	0.0%	0.0%	2.3%
Utricularia gibba	7.0%	0.0%	2.3%	0.0%	4.7%	2.3%	14.0%	4.7%	0.0%
Najas flexilis	39.5%	0.0%	0.0%	4.7%	2.3%	0.0%	4.7%	0.0%	4.7%
Elodea canadensis	46.5%	4.7%	0.0%	0.0%	2.3%	23.3%	34.9%	46.5%	20.9%
Chara sp. / Nitella sp.	7.0%	4.7%	7.0%	11.6%	0.0%	0.0%	2.3%	0.0%	4.7%
Potamogeton gramineus	41.9%	4.7%	9.3%	23.3%	0.0%	0.0%	4.7%	0.0%	4.7%
Isoetes sp.	0.0%	0.0%	4.7%	2.3%	0.0%	0.0%	2.3%	0.0%	0.0%
Potamogeton crispus	0.0%	0.0%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%
Polygonum sp.	0.0%	0.0%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%
Eleocharis sp.	4.7%	4.7%	4.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Megalodonta beckii	7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.3%

While the frequency of occurrence of milfoil dropped significantly between 2010 (82%) and 2011 (44%), cover of milfoil actual increased by 5.6% in the basin, indicating that milfoil density was increasing outside the 2011 treatment area. Milfoil growth was particularly robust along the eastern shoreline of Little Lake where it was matted to the surface nearly halfway across the lake and often comprised 25-50% of the plant growth found at the data points.

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

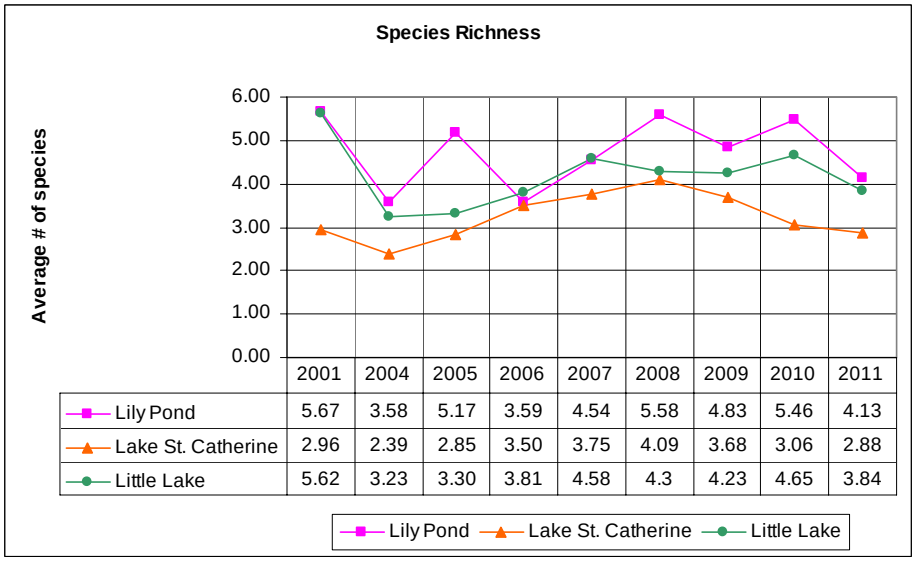




Species Richness

Species richness in all three basins was consistent with findings from the past four 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	2009	2010	2011
Lily Pond	5.67	3.58	5.17	3.59	4.54	5.58	4.83	5.46	4.13
Lake St. Catherine	2.96	2.39	2.85	3.50	3.75	4.09	3.68	3.06	2.88
Little Lake	5.62	3.23	3.30	3.81	4.58	4.3	4.23	4.65	3.84

Evaluation of 2011 Treatment Areas

Comparing 2010 and 2011 late season survey data from the 32 data points located within the 2011 treatment areas, it is apparent that treatment provided reductions of both distribution and density of milfoil in all of the treated areas, however the decrease in milfoil (59.7%-2010; 37.5%-2011) cover in the treated areas is not well represented by the percent frequency of occurrence because of the scattered, low-density growth observed at a number of data points.

With the exception of *Elodea canadensis* which decreased by roughly 20%, the frequency of occurrence for other documented species generally remained within ±10% of the values recorded in 2010 within the treated areas.

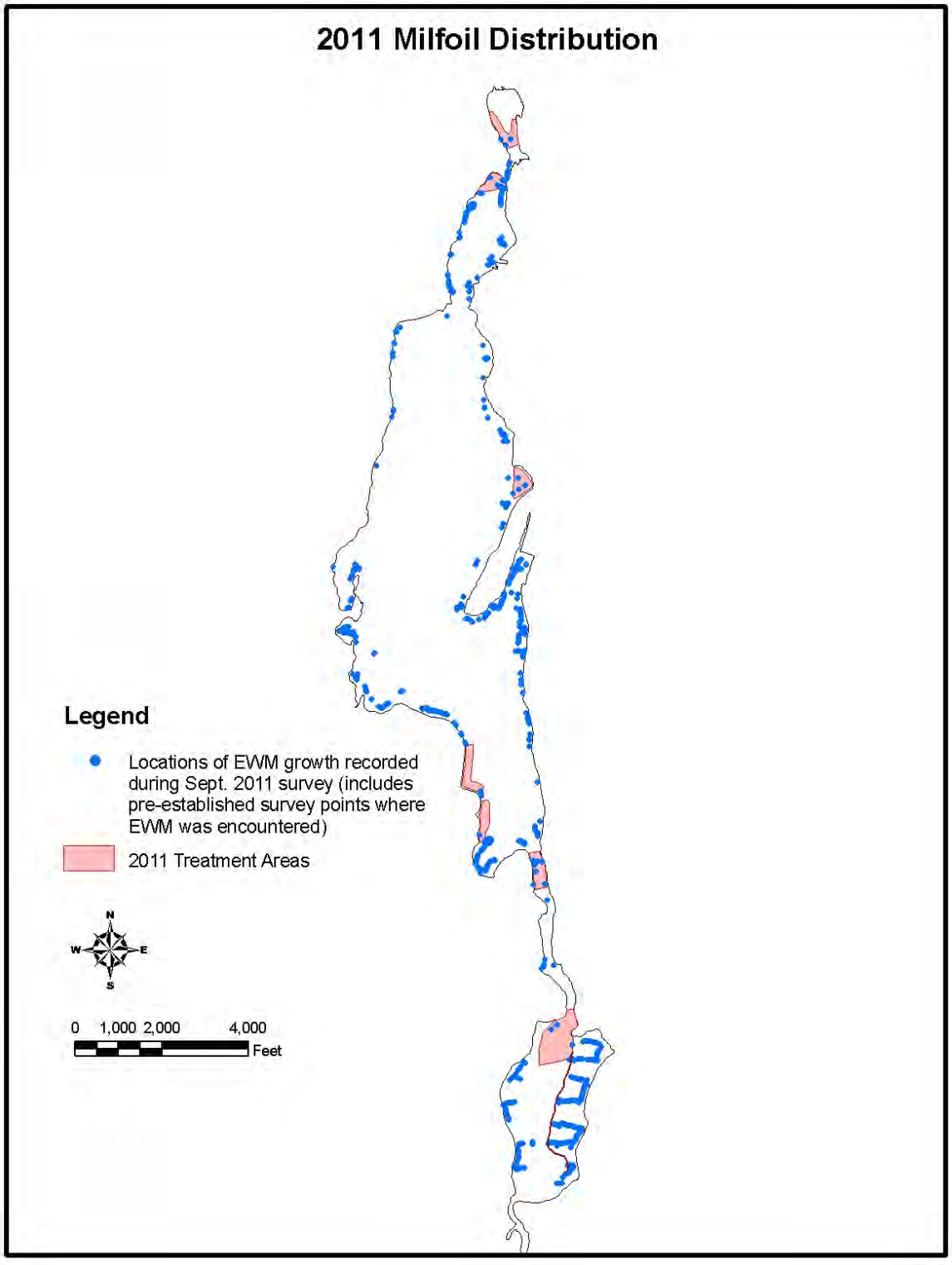
Overall, the 2011 treatment program appears to have achieved successful milfoil control in treated areas. When the lake was inspected in mid-July, no viable milfoil was found rooted in the treated areas and most of the targeted milfoil had collapsed and decomposed on the bottom. The initial control appeared to be improved from what was seen in prior years, especially in some of the smaller treatment areas located in the Main Lake, which suggests that split-application approach may have increased the herbicide concentration-exposure-time and helped to improve the treatment efficacy.

Consistent with earlier treatments some widely scattered milfoil plants did recover or become reestablished in some of the treatment areas by the time of the late season survey was performed in September. This is commonly seen following treatment with triclopyr and other auxin-type herbicides like 2,4-D. Low-density, recovering milfoil should be targeted for suction-harvesting or hand-pulling in the years following treatment.

Late Season Milfoil Bed Mapping

Milfoil beds were visually surveyed and mapped during the late season survey. Rain and heavy cloud cover made visibility difficult in some exposed areas, but generally visibility for milfoil identification was fair to good. As with past mapping efforts areas of milfoil growth were visually identified or found using a high-resolution depth finder and an underwater camera. Locations where milfoil was encountered were recorded using a GPS unit. A map of the GPS referenced milfoil locations is shown in Figure 2.

Figure 2: Late season Eurasian watermilfoil distribution



SUMMARY OF 2011 AQUATIC VEGETATION MANAGEMENT PROGRAM

Renovate Herbicide Treatments

Results of the 2011 Renovate OTF herbicide treatments were similar and possibly somewhat better than the results of similar treatment efforts in prior years. Approximately one month after treatment, rooted milfoil could not be found in any of the treatment areas. Two months later, during the late season survey in mid-late September, scattered milfoil was found in a few of the treatment areas, particularly in high flow areas by the channel to Lily Pond and the channel to Little Lake. Similar late-season recovery of milfoil has been seen prior years.

Renovate remained highly selective for milfoil and measured indices of native plant cover were consistent with previous years. While there were some fluctuations in the frequency of occurrence and species richness indices, no major shifts in plant composition were documented following treatment.

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 2011 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 2012 AND BEYOND

Milfoil cover remains significantly reduced from what was documented in Lake St. Catherine prior to the 2004 Sonar treatment, (estimated total milfoil cover in all three basins was 49% in 2001 and was 6.8% in 2011), but milfoil presence has been persistent and widespread. Continued management will be required to prevent milfoil from returning to nuisance-level densities and different management approaches should be considered in different sections of the lake.

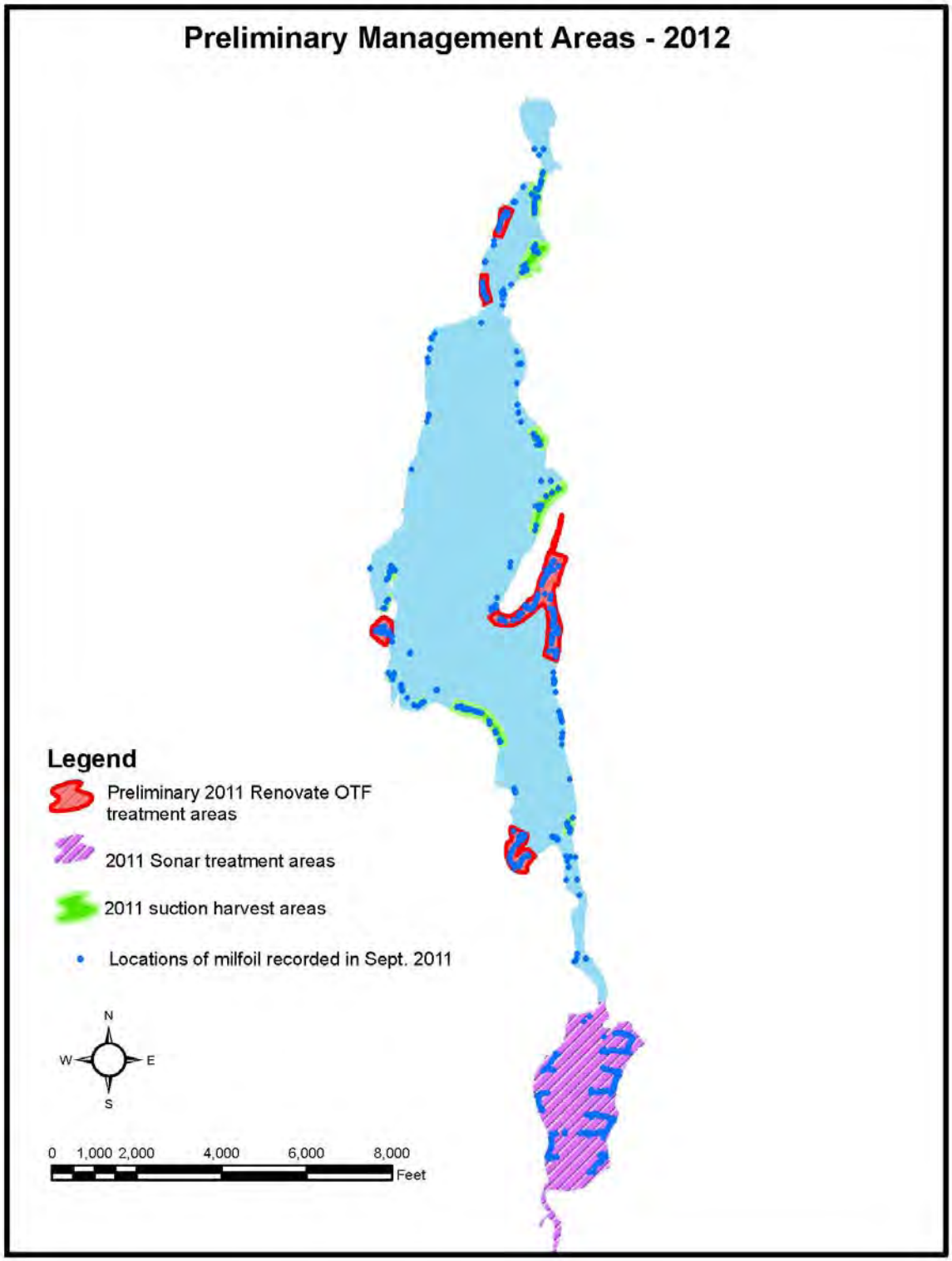
To date, spot-treatments with Renovate OTF (granular) herbicide performed at Lake St. Catherine have been reasonably successful although some limitations have been realized. It is apparent that treatment of cove areas or larger treatment blocks (both reduce the edge to treatment area ratio and help limit the effects of dilution) yielded more effective results. Narrow shoreline bands of milfoil continue to be more challenging to treat effectively. The split-application approach used in 2011 appeared to help further increase the concentration-exposure-time and improve the level of control.

Ongoing management recommendations for 2012 and beyond include:

- Renovate OTF herbicide treatments should focus on cove areas and large-block treatment areas where herbicide concentrations can be most effectively maintained.
- A split-application approach should continue to be utilized to increase herbicide concentration-exposure-time.
- New formulations of Renovate should be evaluated and considered for use.

- Non-chemical control strategies, specifically diver hand-pulling and suction harvesting, should be utilized along steeply sloped and exposed areas and for areas with lower density milfoil growth.
- Management efforts should focus on developed shorelines and other high-use areas of the lake. Areas that harbor milfoil growth that prove to be especially challenging (expensive) for management due to bottom type, location, water depth, etc. and are not prone to excessive fragmentation may warrant being left unmanaged.
- Sonar (fluridone) herbicide, specifically the time release pellet formulations, should be considered for use in Little Lake and possibly in Lily Pond to provide more complete milfoil control and suppression of overabundant native plant growth.

Figure 3: Preliminary 2012 management areas

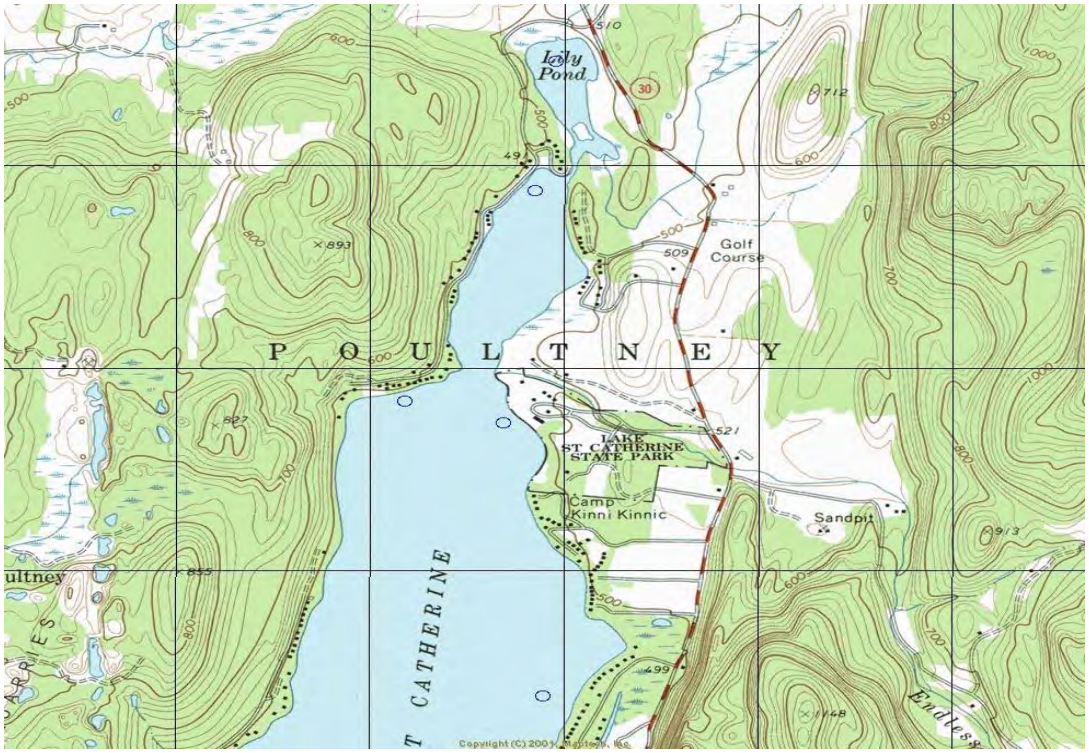


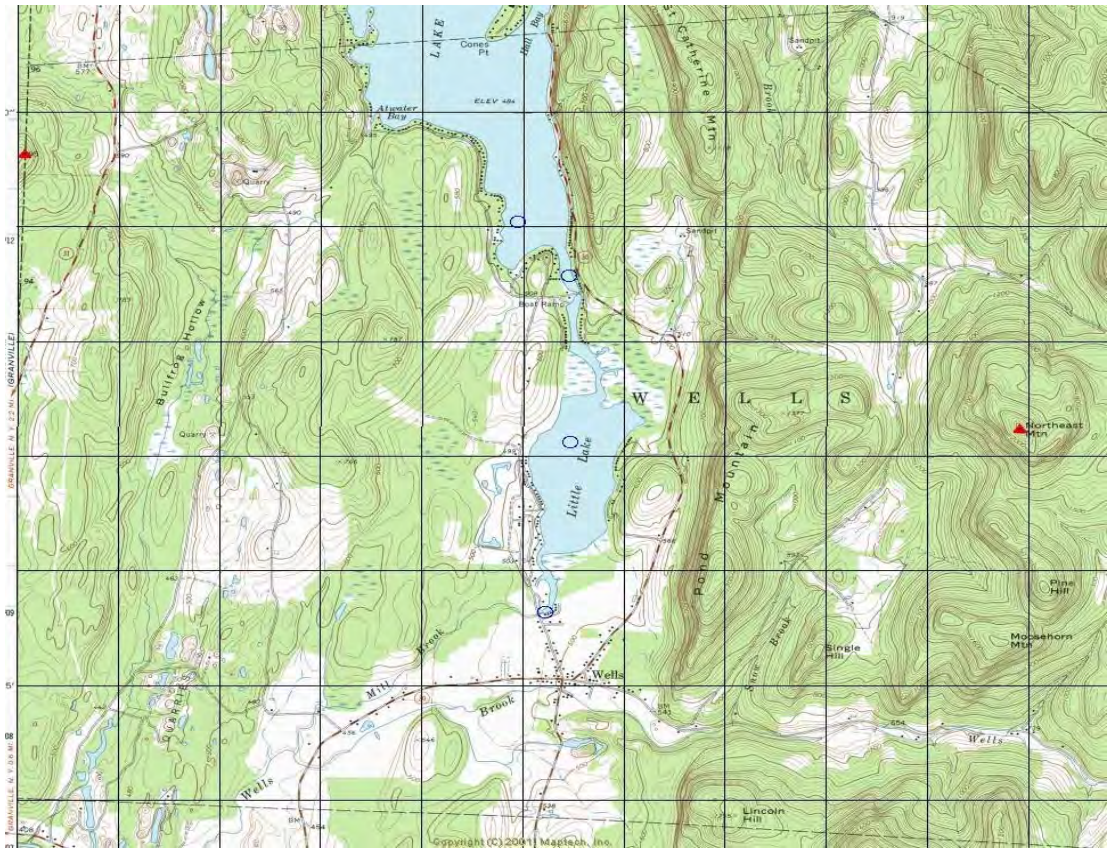
APPENDIX A

Herbicide Residue Testing Results

- Sampling Location Map – prepared by DEC
- Sampling Results Summary
- SePRO Laboratory Report – 6/15/11 sampling round
- SePRO Laboratory Report – 6/22/11 sampling round
- SePRO Laboratory Report – 6/29/11 sampling round
- SePRO Laboratory Report – 7/4/11 sampling round
- SePRO Laboratory Report – 8/10/11 sampling round

Attachment D - Sampling Site Locations (to be updated as needed)
Specific Sampling Locations for 2011





O denotes 9 Sample Sites (note 5 sites in upper map/4 sites in lower map)

Lake St. Catherine 2011 Renovate Assay Results

Treatment date: 6/14/2011

	Residue (ppm)				
Collection Date	**6/15**	**6/22**	**6/29**	**7/4**	**8/10**
1	0.002	0.007	0.004		0.002
2	0.270	0.023	0.019		0.000
3	0.002	0.009	0.005		0.000
4	0.006	0.007	0.005		0.001
5	0.047	0.006	0.007		0.000
6	0.732	0.007	0.006		0.001
7	0.426	0.212	0.070		0.002
8	0.008	0.020	0.030		0.001
9			0.020		0.000
10				0.012	0.000
Lake Average (1-8)	0.187	0.036	0.018	0.012	<1 ppb
Days after treatment	1	8	15	20	57

SRTC SePRO Research & Technology Campus

Chain of Custody 52689B93-9

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

Payment Information

Payment Type:	Invoice	Card Number/Expiration Num:	

Waterbody Information

Waterbody:	Lake St. Catherine	Waterbody Size (acres):	0.00
Depth Average:	0.00		
Target Plants	Eurasian Watermilfoil,		

Sample Information

Sample Site ID	Date Treated	Date Sample Collected	Sample Location	Products	Acres Treated	Rate	Active	Result
1	06/14/2011	06/15/2011	time- 10:33 am	Renovate OTF	45.8	2.5	Triclopyr	**0.002 ppm**
2	06/14/2011	06/15/2011	time- 10:37 am	Renovate OTF	45.8	2.5	Triclopyr	**0.270 ppm**
3	06/14/2011	06/15/2011	time- 10:43 am	Renovate OTF	45.8	2.5	Triclopyr	**0.002 ppm**
4	06/14/2011	06/15/2011	time-10:48 am	Renovate OTF	45.8	2.5	Triclopyr	**0.006 ppm**
5	06/14/2011	06/15/2011	time-10:55 am	Renovate OTF	45.8	2.5	Triclopyr	**0.047 ppm**
6	06/14/2011	06/15/2011	time- 10:59 am	Renovate OTF	45.8	2.5	Triclopyr	**0.732 ppm**
7	06/14/2011	06/15/2011	time-11:08 am	Renovate OTF	45.8	2.5	Triclopyr	**0.426 ppm**
8	06/14/2011	06/15/2011	time-12:04 pm	Renovate OTF	45.8	2.5	Triclopyr	**0.008 ppm**

Laboratory Information

Date Received:	6/20/2011	Date Analysis Performed:	6/20/2011
Date Results Sent:	6/20/2011	Storage Conditions	Analyzed Immediately

SRTC SePRO Research & Technology Campus

Chain of Custody C1682E09-1

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

Payment Information

Payment Type:	Invoice	Card Number/Expiration Num:	

Waterbody Information

Waterbody:	Lake St. Catherine	Waterbody Size (acres):	0.00
Depth Average:	0.00		
Target Plants	Eurasian Watermilfoil,		

Sample Information

Sample Site ID	Date Treated	Date Sample Collected	Sample Location	Products	Acres Treated	Rate	Active	Result
1		06/22/2011	time- 10:37 am	Renovate OTF	45.8	2.25	Triclopyr	**0.007 ppm**
2		06/22/2011	time- 10:30 am	Renovate OTF	45.8	2.25	Triclopyr	**0.023 ppm**
3		06/22/2011	time- 10:39 am	Renovate OTF	45.8	2.25	Triclopyr	**0.009 ppm**
4		06/22/2011	time-10:49 am	Renovate OTF	45.8	2.25	Triclopyr	**0.007 ppm**
5		06/22/2011	time-10:55 am	Renovate OTF	45.8	2.25	Triclopyr	**0.006 ppm**
6		06/22/2011	time- 10:59 am	Renovate OTF	45.8	2.25	Triclopyr	**0.007 ppm**
7		06/22/2011	time-11:08 am	Renovate OTF	45.8	2.25	Triclopyr	**0.212 ppm**
8		06/22/2011	time-12:04 pm	Renovate OTF	45.8	2.25	Triclopyr	**0.020 ppm**

Laboratory Information

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

SRTC SePRO Research & Technology Campus

Chain of Custody 4D09D9EE-2

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

Payment Information

Payment Type:	Invoice	Card Number/Expiration Num:	

Waterbody Information

Waterbody:	Lake St. Catherine	Waterbody Size (acres):	0.00
Depth Average:	0.00		
Target Plants	Eurasian Watermilfoil,		

Sample Information

Sample Site ID	Date Treated	Date Sample Collected	Sample Location	Products	Acres Treated	Rate	Active	Result
1	06/14/2011	06/29/2011	time- 10:28 am	Renovate OTF	45.8	2.25	Triclopyr	**0.004 ppm**
2	06/14/2011	06/29/2011	time- 10:33 am	Renovate OTF	45.8	2.25	Triclopyr	**0.016 ppm**
3	06/14/2011	06/29/2011	time- 10:39 am	Renovate OTF	45.8	2.25	Triclopyr	**0.005 ppm**
4	06/14/2011	06/29/2011	time-10:45 am	Renovate OTF	45.8	2.25	Triclopyr	**0.005 ppm**
5	06/14/2011	06/29/2011	time-10:51 am	Renovate OTF	45.8	2.25	Triclopyr	**0.007 ppm**
6	06/14/2011	06/29/2011	time- 10:54 am	Renovate OTF	45.8	2.25	Triclopyr	**0.006 ppm**
7	06/14/2011	06/29/2011	time-11:06 am	Renovate OTF	45.8	2.25	Triclopyr	**0.070 ppm**
8	06/14/2011	06/29/2011	time-11:50 am	Renovate OTF	45.8	2.25	Triclopyr	**0.030 ppm**
9	06/14/2011	06/29/2011	time- 12:00pm	Renovate OTF	45.8	2.25	Triclopyr	**0.020 ppm**

Laboratory Information

Date Received:	7/1/2011	Date Analysis Performed:	7/1/2011
Date Results Sent:	7/1/2011	Storage Conditions	Analyzed Immediately

SRTC SePRO Research & Technology Campus

Chain of Custody E20299E2-D

Customer Company		Customer Contact	
Company Name:	Aquatic Control Technology, Inc.	Contact Person:	Gerald N
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City:	Sutton	Phone:	
State:	MA 01590-2509	Fax:	

Payment Information

Payment Type:	Invoice	Card Number/Expiration Num:	

Waterbody Information

Waterbody:	Lake St. Catherine	Waterbody Size (acres):	0.00
Depth Average:	0.00		
Target Plants	Eurasian Watermilfoil,		

Sample Information

Sample Site ID	Date Treated	Date Sample Collected	Sample Location	Products	Acres Treated	Rate	Active	Result
10	06/14/2011	07/04/2011	Route 149 & Millbrook	Renovate OTF	45.8	2.25	Triclopyr	**0.012 ppm**

Laboratory Information

Date Received:	7/6/2011	Date Analysis Performed:	7/7/2011
Date Results Sent:	7/7/2011	Storage Conditions	Analyzed Immediately

SRTC SePRO Research & Technology Campus

Chain of Custody 9C19055F-1

Customer Company		Customer Contact	
Company Name:	Aquatic Control Technology, Inc.	Contact Person:	Gerald N
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City:	Sutton	Phone:	
State:	MA 01590-2509	Fax:	

Payment Information

Payment Type:	PO Number	Card Number/Expiration Num:	ACT

Waterbody Information

Waterbody:	Lake St. Catherine	Waterbody Size (acres):	0.00
Depth Average:	0.00		
Target Plants	Eurasian Watermilfoil,		

Sample Information

Sample Site ID	Date Treated	Date Sample Collected	Sample Location	Products	Acres Treated	Rate	Active	Result
1	06/14/2011	08/10/2011		Renovate OTF	45.8	2.25	Triclopyr	**0.002 ppm**
2	06/14/2011	08/10/2011		Renovate OTF	45.8	2.25	Triclopyr	**0.000 ppm**
3	06/14/2011	08/10/2011		Renovate OTF	45.8	2.25	Triclopyr	**0.000 ppm**
4	06/14/2011	08/10/2011		Renovate OTF	45.8	2.25	Triclopyr	**0.001 ppm**
5	06/14/2011	08/10/2011		Renovate OTF	45.8	2.25	Triclopyr	**0.000 ppm**
6	06/14/2011	08/10/2011		Renovate OTF	45.8	2.25	Triclopyr	**0.001 ppm**
7	06/14/2011	08/10/2011		Renovate OTF	45.8	2.25	Triclopyr	**0.002 ppm**
8	06/14/2011	08/10/2011		Renovate OTF	45.8	2.25	Triclopyr	**0.001 ppm**
9	06/14/2011	08/10/2011		Renovate OTF	45.8	2.25	Triclopyr	**0.000 ppm**
10	06/14/2011	08/10/2011		Renovate OTF	45.8	2.25	Triclopyr	**0.000 ppm**

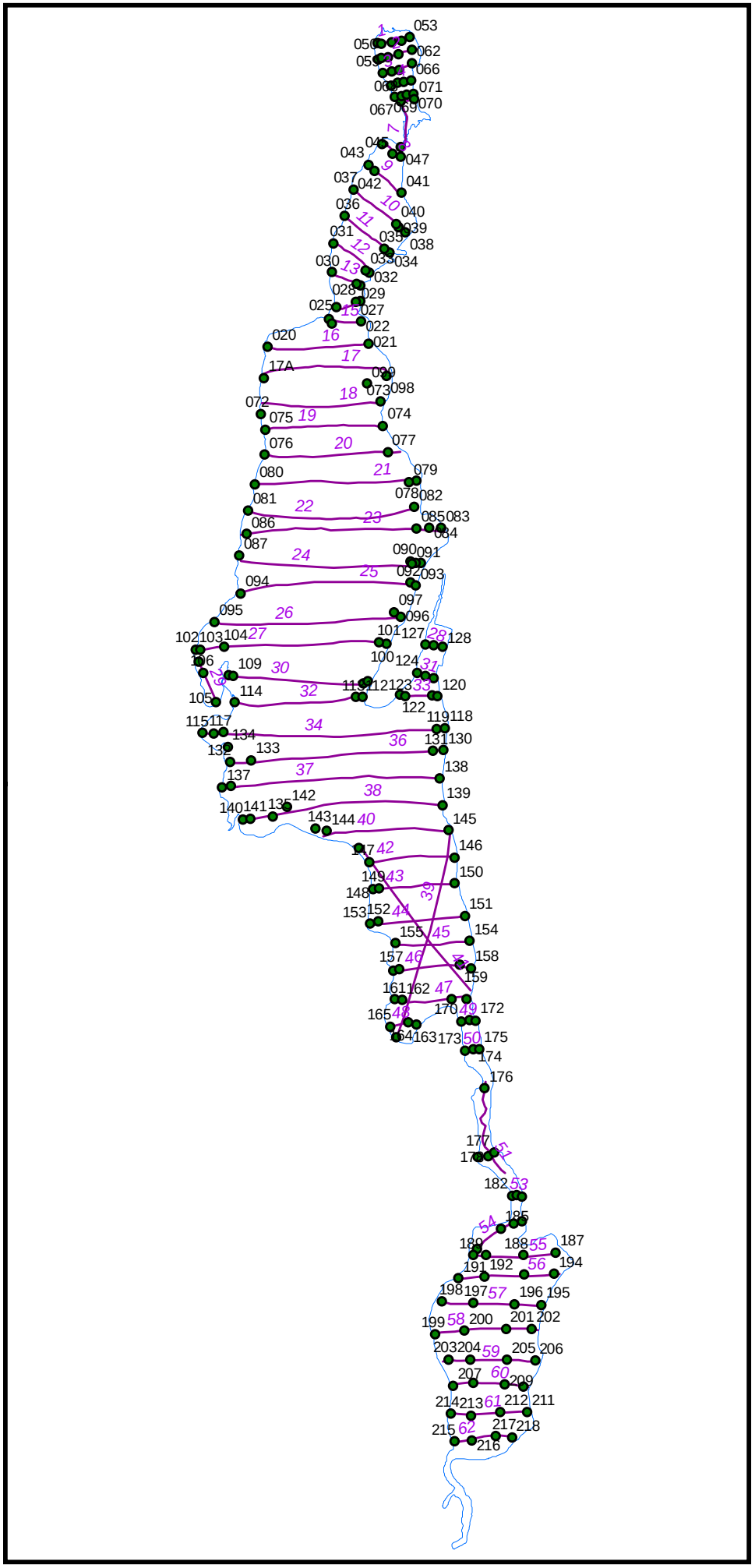
Laboratory Information

Date Received:	8/12/2011	Date Analysis Performed:	8/15/2011
Date Results Sent:	8/15/2011	Storage Conditions	Analyzed Immediately

APPENDIX B

Comprehensive Aquatic Vegetation Survey Information

- Data Point Sampling Location Map
- Field Data Table
- Overall Vegetation Density Map
- Vegetation Species Distribution Maps
- Late Season Milfoil Distribution - 2011
- Proposed Treatment Areas - 2012



Lake St. Catherine

Poultney & Wells, VT

Transects & Data Point Locations for Vegetation Survey

FIGURE:	SURVEY DATE:	MAP DATE:
B-1	9/22 & 9/28/11	10/17/11

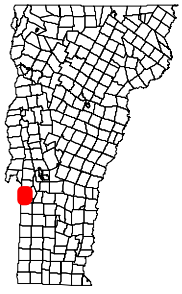
Legend

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



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Lily Pond

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	Uv	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Ngram	Mb
1	49	25	3	100	0	4	2	D						X																				
1	50	100	3	100	0	4	5	D		X				X	X			X																
1	51	MID	3	100	0	3	3	D		X				X																				
1	52	150	3	100	0	4	6	D		X				X	X											X		X						
1	53	30	3	100	0	4	4	D				X						X								X								
2	54	40	3	100	0	3	5	D			X	X			X			X																
2	55	25	3	100	0	3	4	X				X		X	D																			
2	56	180	5	85	0	3	4	D		X				X	X																			
2	57	60	3	90	0	3	6	D			X	X		X	X													X						
2	58	150	6	100	0	3	3	X				X			D																			
3	59	25	3	100	0	2	3	D				X			X																			
3	60	120	4	100	0	2	3	X				X			D																			
3	61	MID	4	95	0	3	3	D			X				X																			
3	62	15	3	90	0	4	7			X		X		X	D			X					X		X									
4	63	20	4	100	0	2	3	D				X			X																			
4	64	100	5	0	0	0	0																											
4	65	100	4	100	0	2	4	D				X			X								X											
4	66	30	3	100	0	2	3	D							X						X													
5	68	60	3	100	0	2	4	D		X		X									X													
5	69	50	3	100	1	1	4	D	X	X					X																			
5	71	15	1	100	0	4	5	X			X				D			X													X			
6	67	10	2	100	0	4	4	D		X				X	X																			
6	70	20	3	80	0	4	8	D		X				X				X		X	X		X								X			
7	47	30	3	90	10	3	6	D	X					X	X						X		X											
		Average	**3.3**	**92.9**	**0.5**	**2.9**	**4.13**																											

Lily Pond Totals

	Pr	Ms	Pa	Ec	Pi	Nf	Pz	Cd	Zd	Ca	Ny	Mu	V	Fa	Pp	Uv	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Ngram	Mb
Present	4	2	9	4	11	0	11	13	0	0	6	0	1	4	0	4	0	1	2	0	2	0	1	1	0	0	0
Dominant	17	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	21	2	9	4	11	0	11	18	0	0	6	0	1	4	0	4	0	1	2	0	2	0	1	1	0	0	0
% frequency	87.5%	8.3%	37.5%	16.7%	45.8%	0.0%	45.8%	75.0%	0.0%	0.0%	25.0%	0.0%	4.2%	16.7%	0.0%	16.7%	0.0%	4.2%	8.3%	0.0%	8.3%	0.0%	4.2%	4.2%	0.0%	0.0%	0.0%

Lake St. Cathreine

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	Uv	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Ngram	Mb
7	48	MID	4	85	5	3	6	X	X						X						X		D		X									
8	44	50	3	100	5	2	3	D	X	X																								
8	45	MID	4	85	5	2	6	D	X	X	X				X						X													
8	46	25	3	100	5	2	4	D	X	X											X													
9	41	15	3	0	0	0	0																											
9	42	150	10	100	0	1	6	D				X	X	X	X							X												
9	43	40	1	100	0	1	3	D		X				X																				
10	38	40	4	100	0	3	4	D		X	X									X														
10	39	150	9	100	1	1	3	X	X	D																								
10	40	220	12	90	10	2	2	D	X																									
11	34	20	3	55	5	4	5		X									X						D		X				X			
11	35	100	7	85	5	2	4	D	X			X														X								
11	36	30	5	60	1	4	4		X	X		D		X																				
11	37	35	6	90	5	1	4	D	X	X										X														
12	31	25	6	10	5	2	2		X																	X								
12	32	25	4	95	5	4	5	D	X	X								X						X										
12	33	75	8	90	0	1	2	D		X																								
13	28	35	4	85	5	4	3	X	X			D																						
13	29	120	8	100	10	3	4	D	X	X		X																						
13	30	25	7	75	5	1	2	D	X																									
14	25	20	4	20	0	1	1			D																								
14	26	30	3	100	0	3	5				X	X		X					X							D								
14	27	60	12	65	0	1	2	D		X																								
15	22	75	5	0	0	0	0																											
15	23	50	4	90	0	4	3	X		X		D																						
15	24	125	10	20	10	2	2		D						X																			
16A	20	100	7	40	5	3	4	X	X		X	D																						
16B	21	70	8	20	0	1	2	X					D																					
17A	17A	25	8	100	5	2	4	D	X			X	X																					
17	98	80	8	70	20	3	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	Uv	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Ngram	Mb
18	72	15	9	20		2	3	D					X	X																				
18	73	30	10	95	5	2	6	D	X			X		X						X						X								
19	74	25	5	85	0	1	2	X																		D								
19	75	25	13	0	0	0	0																											
20	76	20	7	1	1	1	1		D																									
20	77	125	11	100	10	2	4		X			X								D						X								
21	78	40	6	5	0	1	1																			D								
21	79	80	9	90	30	2	3	D	X					X																				
21	80	15	6	100	0	1	2	D				X																						
22	81	30	6	55	0	3	3					D		X												X								
22	82	30	8	15	0	2	2							X												D								
23	83	25	3	50	0	1	3	X					D														X							
23	84	120	5	100	5	2	5		X	X		X				X				D														
23	85	200	6	90	20	2	4		X			X	D													X								
23	86	40	10	0	0	0	0																											
24	87	40	8	0	0	0	0																											
24	88	25	3	20	0	1	3				D	X										X												
24	90	100	10	65	10	2	4		X			D		X								X												
25	92	70	11	60	0	2	3	D				X														X								
25	93	15	4	65	0	1	3													X	X					D								
25	94	20	11	0	0	0	0																											
26	95	50	5	0	0	0	0																											
26	96	100	4	1	0	2	1																			X								
26	97	175	12	80	0	1	4	X					D	X								X												
27	102	20	4	80	5	3	4	X	X			D						X																
27	103	70	10	25	0	1	1	D																										
27	104	225	10	90	90	2	1		D																									
27	100	20	5	55	0	2	4					X	X									X				D								
27	101	150	8	30	10	3	3		D			X										X												
28	127	30	4	65	1	1	3	D	X	X																								
28	129	MID	6	100	5	2	4	D	X			X		X																				
28	128	40	4	100	0	4	4	D				X		X										X										
29	107	30	5	100	0	2	3	D		X		X																						
29	106	30	13	75	0	1	1	D																										
29	105	30	6	100	5	1	3	D	X			X																						
30	108	25	5	5	0	3	1																			D								
30	109	100	12	0	0	0	0																											
30	111	150	10	95	5	2	5	D	X			X	X																					
30	110	50	4	20	0	1	1												D															
31	124	25	5	60	0	2	6	X		D		X	X	X								X												
31	125	MID	8	100	20	3	3	D	X					X																				
31	126	30	5	100	10	4	5	X	X	X		D		X																				
32	114	15	6	0	0	0	0																											
32	113	125	8	90	20	2	7	X	D			X	X	X		X						X												
32	112	30	4	40	0	2	3	D				X		X																				
33	122	30	4	0	0	0	0																											
33	123	120	10	90	80	2	2		D			X																						
33	121	125	13	80	10	2	5	X	X				X	X		D																		
33	120	50	6	85	15	2	4		X			X		X		D																		
34	115	40	5	100	0	2	3	D		X				X																				
34	116	150	10	100	25	3	4		X			X		X								D												
34	117	250	12	90	5	2	3	D	X					X																				
34	119	150	6	10	10	3	1		D																									
34	118	30	3	90	60	3	4	X	D					X								X												
35	134	50	7	15	0	1	2				D		X																					
35	135	125	14	65	0	2	3	D						X								X												
36	132	25	8	0	0	0	0																											
36	133	300	10	65	25	2	5	X	D	X	X			X																				
36	131	250	12	100	50	3	4	X	D			X	X									X												
36	130	50	7	100	60	3	4		D			X	X	X																				
37	138	15	10	5	5	2	1		D																									
37	136	100	13	70	30	2	3		D				X									X												
37	137	25	6	75	0	1	4	D		X		X		X																				
38	140	120	5	0	0	0	0																											
38	141	300	6	85	25	2	3		D				X									X												
38	142	300	6	10	10	2	1		D																									
38	139	10	7	0	0	0	0																											
39	166	50	3	80	5	3	7	D	X	X	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	Uv	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Ngram	Mb
40	143	100	6	60	0	2	3	D		X				X																				
40	144	100	10	100	20	2	3	D	X					X																				
40	145	20	10	85	5	2	2	D	X																									
41	168	50	6	80	40	3	4		D			X		X												X								
42	147	35	9	100	0	1	2	D		X																								
42	146	10	12	1	1	2	1		D																									
43	148	35	7	75	0	2	4	D				X	X	X																				
43	149	100	13	75	0	2	2	D									X																
43	150	30	7	20	0	1	3						D						X			X												
44	153	75	5	80	0	2	3	D		X				X																				
44	152	175	10	65	0	2	3	D					X			X																		
44	151	20	7	15	0	1	1	D																										
45	155	25	8	80	0	3	2	D				X																						
45	154	20	6	0	0	0	0																											
46	156	60	4	10	0	1	3	D					X							X														
46	157	200	9	65	0	1	2	D							X																			
46	159	175	13	10	0	1	1						D																					
46	158	35	7	40	5	2	4		X		X		D						X															
47	161	25	4	55	0	2	3	D		X	X																							
47	162	125	10	60	5	2	4	X	X				D	X																				
47	169	150	7	100	30	3	4		X			X	D	X																				
47	160	100	3	5	0	2	1																			D								
48	165	40	5	85	5	3	6	D	X	X	X			X	X																			
48	164	MID	11	35	5	2	3	D	X				X																					
48	163	45	5	60	0	3	7	D		X		X		X	X	X				X														
49	170	25	5	100	0	2	3	D		X										X														
49	171	MID	8	45	5	1	3	D	X					X																				
49	172	15	4	100	5	2	4	X	X	X										D														
50	173	20	3	80	5	2	4	D	X	X										X														
50	174	MID	7	5	0	1	1	D																										
50	175	20	6	75	5	2	4		X	X				X						D														
		Average	**7.1**	**59.2**	**7.2**	**1.8**	**2.88**																											

St. Catherine Totals

	Pr	Ms	Pa	Ec	Pi	Nf	Pz	Cd	Zd	Ca	Ny	Mu	V	Fa	Pp	Uv	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Ngram	Mb
Present	19	47	30	9	34	17	39	8	5	1	3	3	9	4	15	0	2	1	11	1	0	0	1	0	0	0	0
Dominant	56	17	3	2	8	9	0	0	2	0	0	1	4	0	1	0	1	0	8	0	0	0	0	0	0	0	0
Total	75	64	33	11	42	26	39	8	7	1	3	4	13	4	16	0	3	1	19	1	0	0	1	0	0	0	0
% frequency	58.1%	49.6%	25.6%	8.5%	32.6%	20.2%	30.2%	6.2%	5.4%	0.8%	2.3%	3.1%	10.1%	3.1%	12.4%	0.0%	2.3%	0.8%	14.7%	0.8%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%

Little Pond

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	Uv	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Ngram	Mb
51	176	MID	6	60	0	3	2	X												D														
52	179	30	3	95	20	4	5	D	X	X			X											X										
52	178	MID	5	100	0	3	4	D		X				X	X																			
52	177	20	4	90	10	4	6	D	X									X		X				X		X								
53	182	20	3	100	0	4	5				X				X			D						X	X									
53	181	MID	5	30	0	2	2			X							D																	
53	180	20	3	100	0	4	7	X			X				X			D						X						X				X
54	183	25	3	100	0	3	5	D				X			X			X												X				
54	184	40	5	95	0	2	2	D							X																			
54	185	MID	4	90	1	4	5	D	X						X			X		X														
54	186	100	3	95	0	4	4	D				X			X			X																
55	190	75	3	95	0	4	4	D				X			X			X																
55	189	250	3	95	0	3	5	D		X		X								X			X											
55	188	150	3	95	0	3	5	D		X		X			X					X														
55	187	100	3	100	10	4	4	D	X		X							X																
56	194	50	3	95	10	4	6	X	X			X		X		X				D														
56	193	500	3	85	10	3	5	D	X	X		X								X														
56	192	400	3	80	0	3	3	X				D								X														
56	191	30	3	75	20	4	4	D	X	X	X																							
57	198	120	3	70	5	4	6	D	X	X	X	X														X								
57	197	600	3	45	0	3	4	X		X		D								X														
57	196	500	3	80	0	3	4	D		X		X								X														
57	195	75	4	95	30	3	4	D	X		X				X																			
58	202	60	6	95	50	4	4	X	D		X			X																				
58	201	600	3	85	15	3	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	Uv	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Ngram	Mb
58	200	700	3	100	0	3	3	D				X								X														
58	199	40	3	90	15	4	4	D	X			X								X														
59	203	35	3	90	0	3	3	D				X								X														
59	204	700	3	90	0	3	3	D		X		X																						
59	205	500	4	90	30	4	3	X	D			X																						
59	206	125	5	100	60	4	4	X	D		X				X																			
60	210	75	5	85	30	4	3	D	X			X																						
60	209	450	4	90	50	4	3	X	D			X																						
60	208	500	4	40	5	3	4	X	X			D								X														
60	207	100	4	15	0	1	2								X		D																	
61	214	40	3	35	10	2	3	X	D												X													
61	213	300	4	25	0	3	4	D			X	X	X																					
61	212	800	5	10	0	1	2	X				D																						
61	211	75	3	95	20	4	4	D	X			X		X																				
62	215	50	3	75	1	4	2					X						D																
62	216	700	5	20	0	2	4	X				X											D	X										
62	217	120	4	5	0	2	1					D																						
62	218	30	3	80	0	4	4					D						X		X				X										
		Average	**3.7**	**76.3**	**9.3**	**3.3**	**3.84**																											

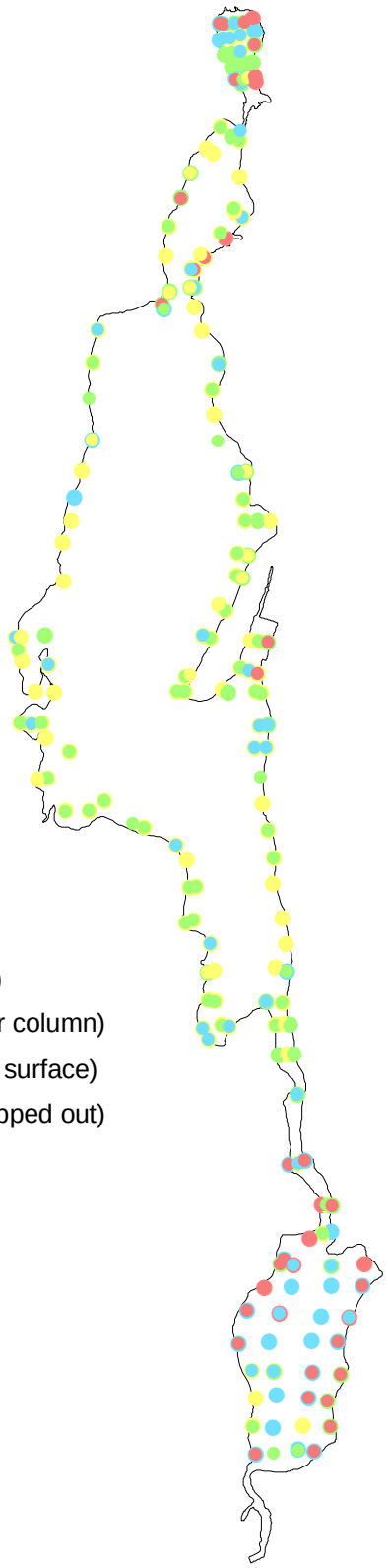
Little Lake Totals

	Pr	Ms	Pa	Ec	Pi	Nf	Pz	Cd	Zd	Ca	Ny	Mu	V	Fa	Pp	Uv	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Ngram	Mb
Present	13	14	12	9	21	2	4	12	1	0	7	0	13	1	0	1	6	1	2	0	0	0	2	0	0	0	1
Dominant	24	5	0	0	6	0	0	0	0	2	3	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Total	37	19	12	9	27	2	4	12	1	2	10	0	15	1	0	2	6	1	2	0	0	0	2	0	0	0	1
% frequency	86.0%	44.2%	27.9%	20.9%	62.8%	4.7%	9.3%	27.9%	2.3%	4.7%	23.3%	0.0%	34.9%	2.3%	0.0%	4.7%	14.0%	2.3%	4.7%	0.0%	0.0%	0.0%	4.7%	0.0%	0.0%	0.0%	2.3%

LAKE TOTALS

	Pr	Ms	Pa	Ec	Pi	Nf	Pz	Cd	Zd	Ca	Ny	Mu	V	Fa	Pp	Uv	B	Pe	Pg	I	Pn	Ug	Nu	Pc	Lm	Ngram	Mb
Present	36	63	51	22	66	19	54	33	6	1	16	3	23	9	15	5	8	3	15	1	2	0	4	1	0	0	1
Dominant	97	22	3	2	14	9	0	5	2	2	3	1	6	0	1	2	1	0	8	0	0	0	0	0	0	0	0
Total	133	85	54	24	80	28	54	38	8	3	19	4	29	9	16	7	9	3	23	1	2	0	4	1	0	0	1
% frequency	67.9%	43.4%	27.6%	12.2%	40.8%	14.3%	27.6%	19.4%	4.1%	1.5%	9.7%	2.0%	14.8%	4.6%	8.2%	3.6%	4.6%	1.5%	11.7%	0.5%	1.0%	0.0%	2.0%	0.5%	0.0%	0.0%	0.5%

2011 TOTAL VEGETATION BIOMASS



Legend

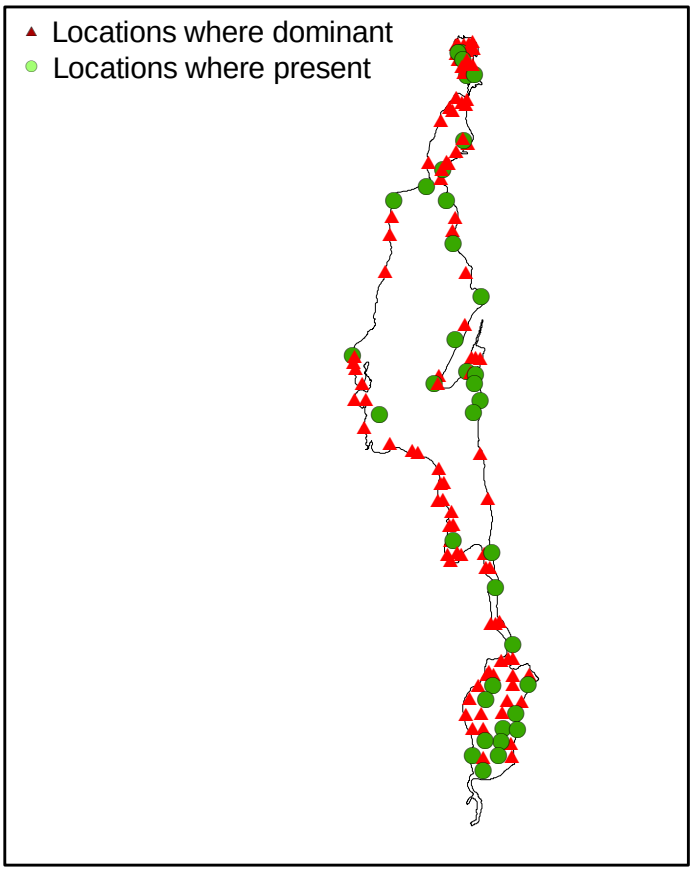
Biomass indices reported
during 9/22 & 9/28/11 survey

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

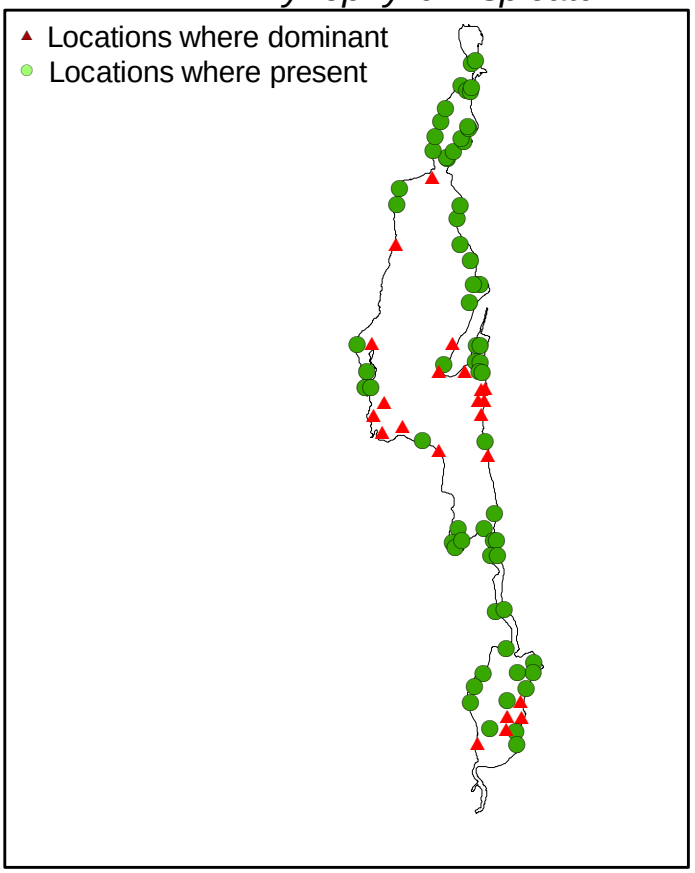
N
W E
S

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

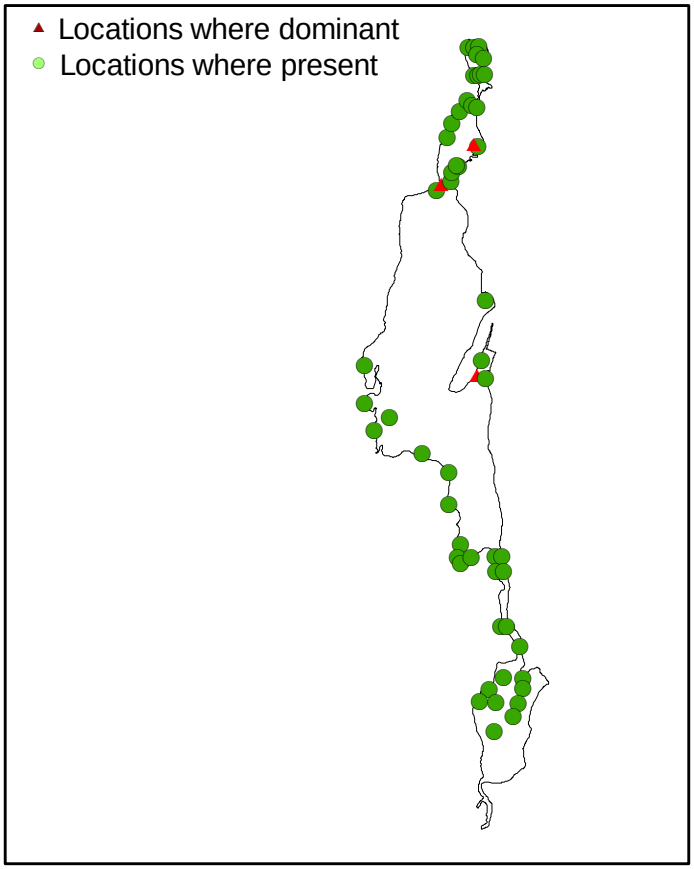
Distribution of *Potamogeton robbinsii*



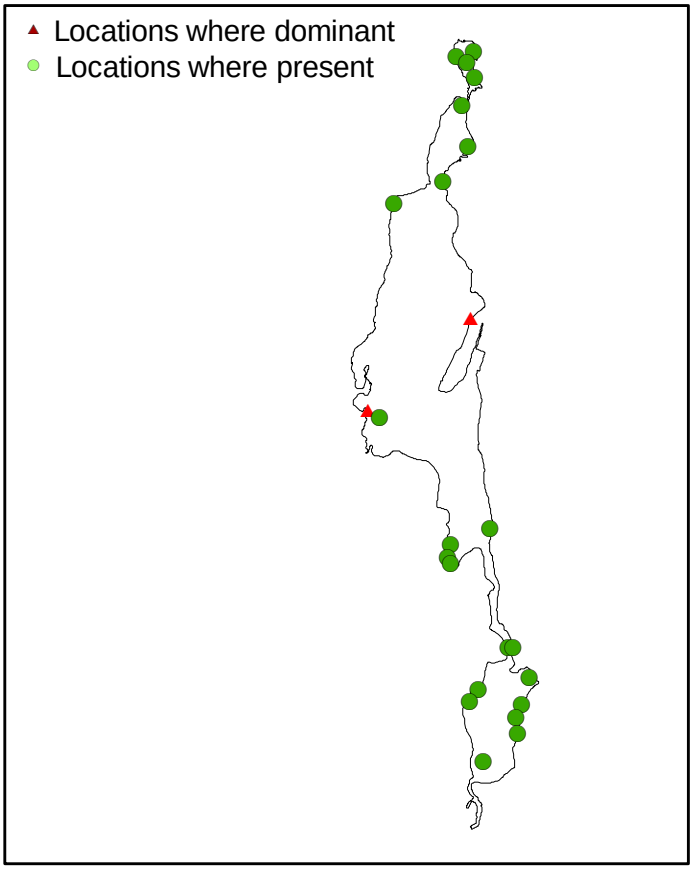
Distribution of *Myriophyllum spicatum*



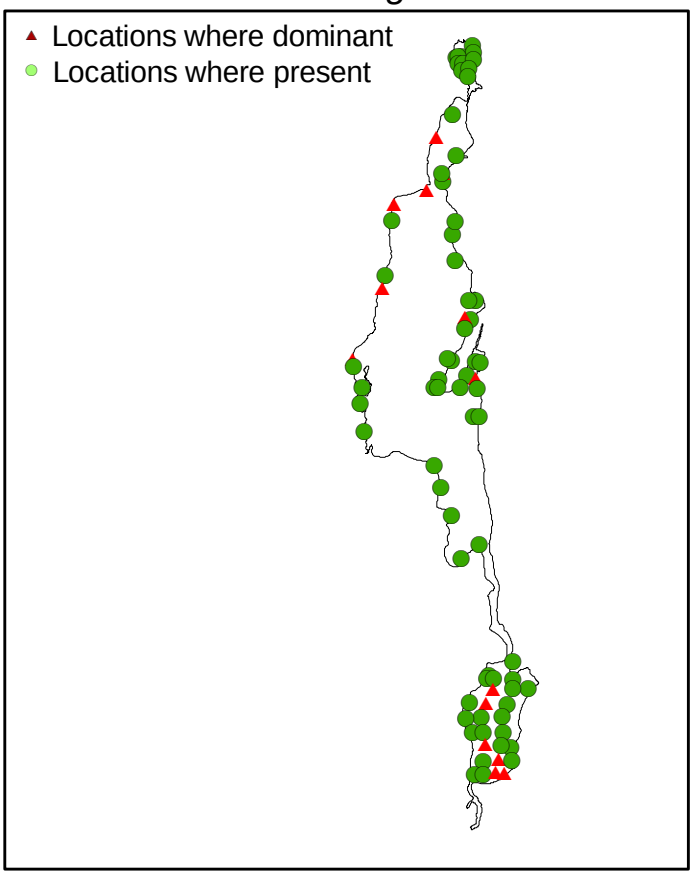
Distribution of *Potamogeton amplifolius*



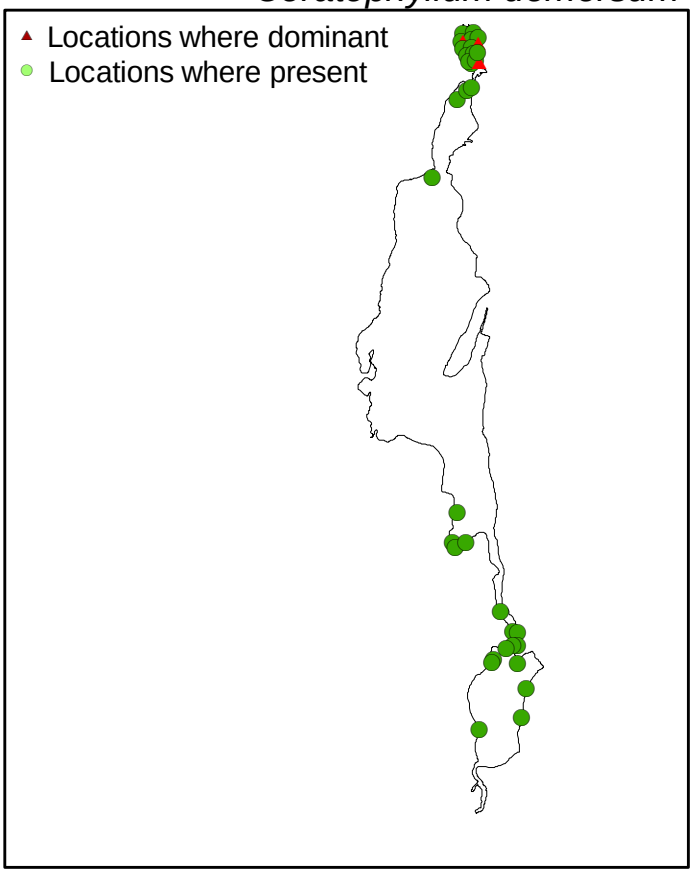
Distribution of *Elodea canadensis*



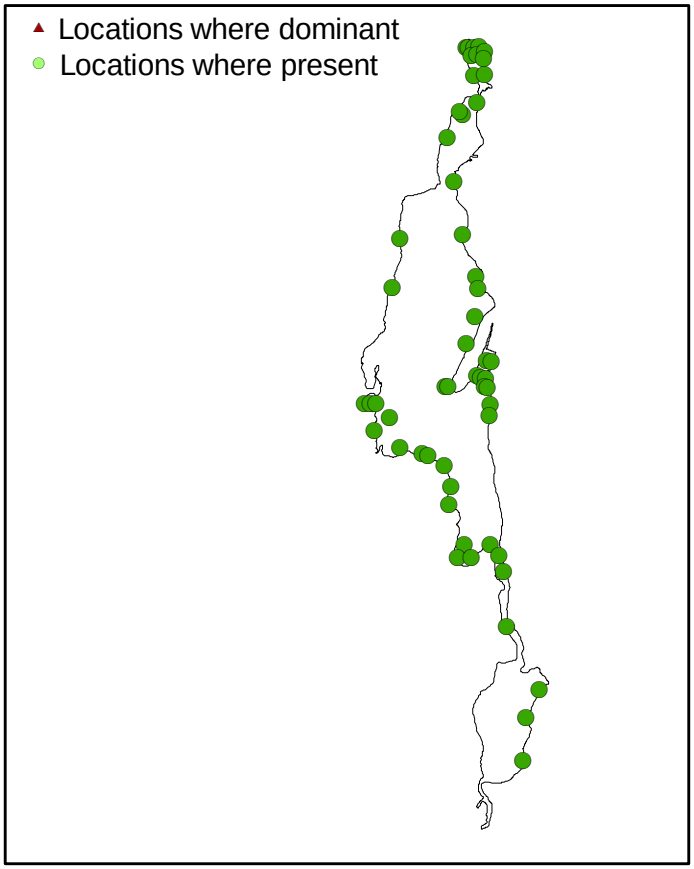
Distribution of *Potamogeton illionensis*



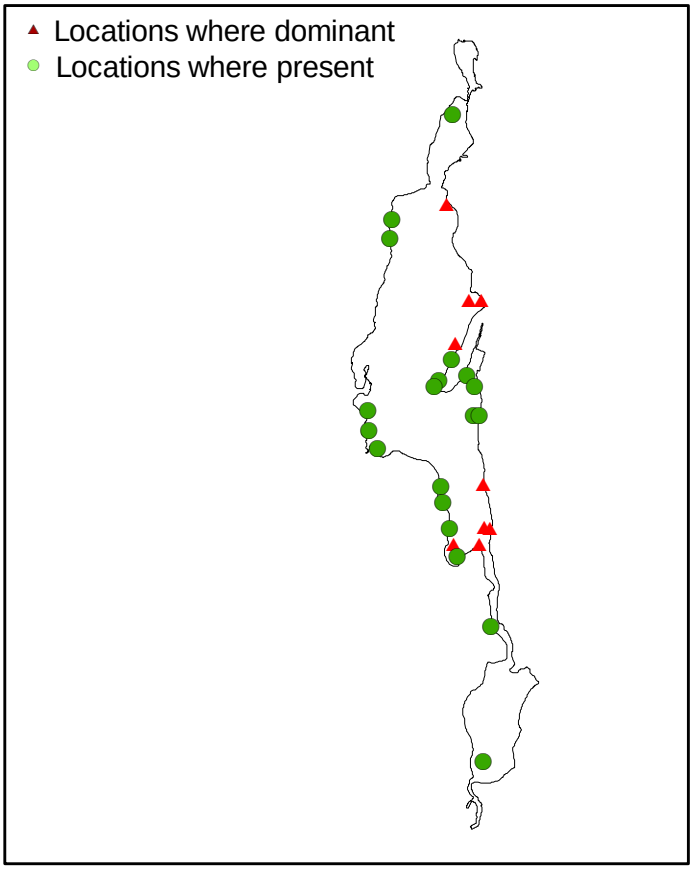
Distribution of *Ceratophyllum demersum*



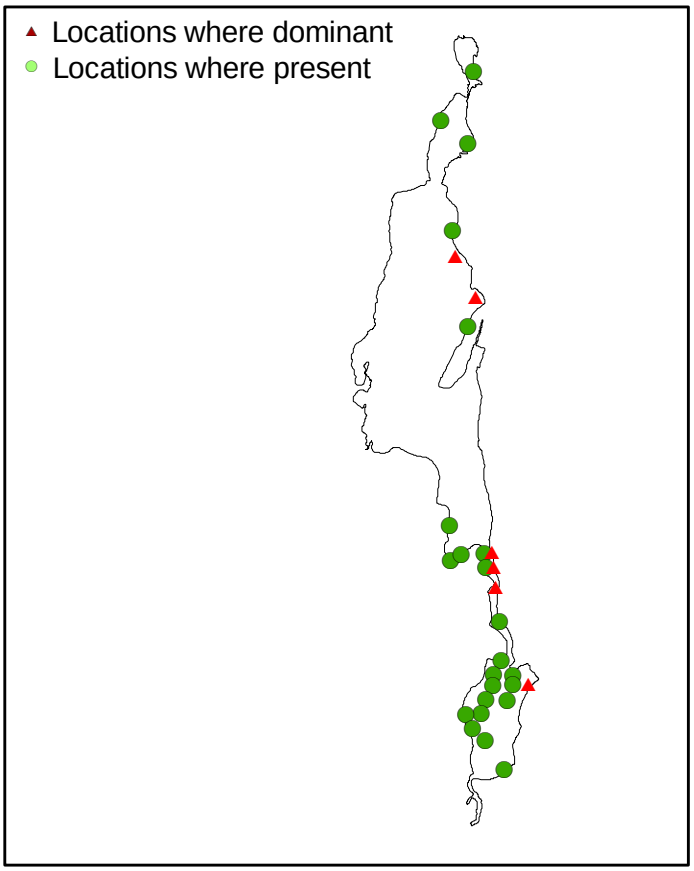
Distribution of *Potamogeton zosterformis*



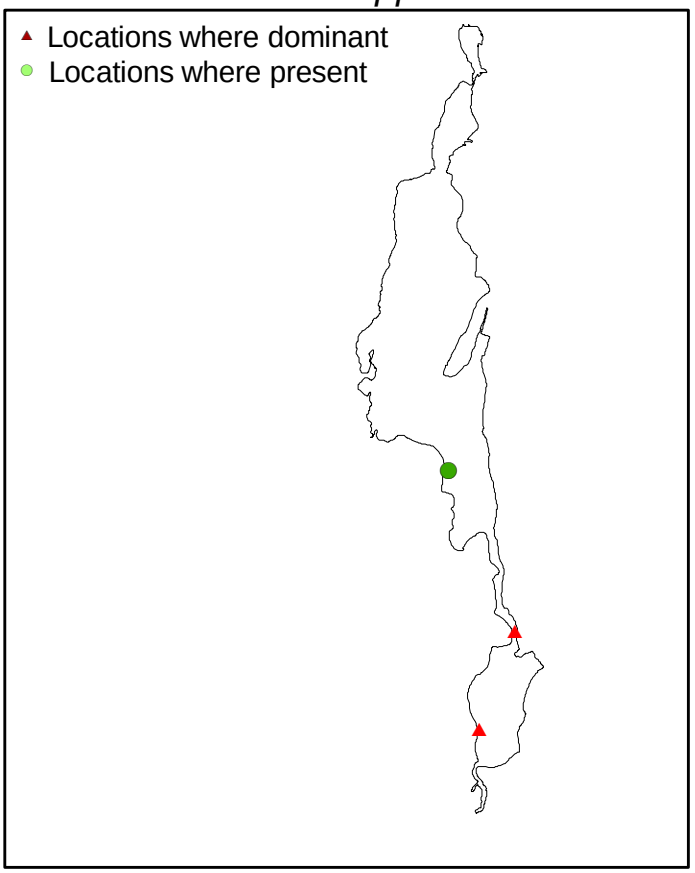
Distribution of *Najas flexilis*



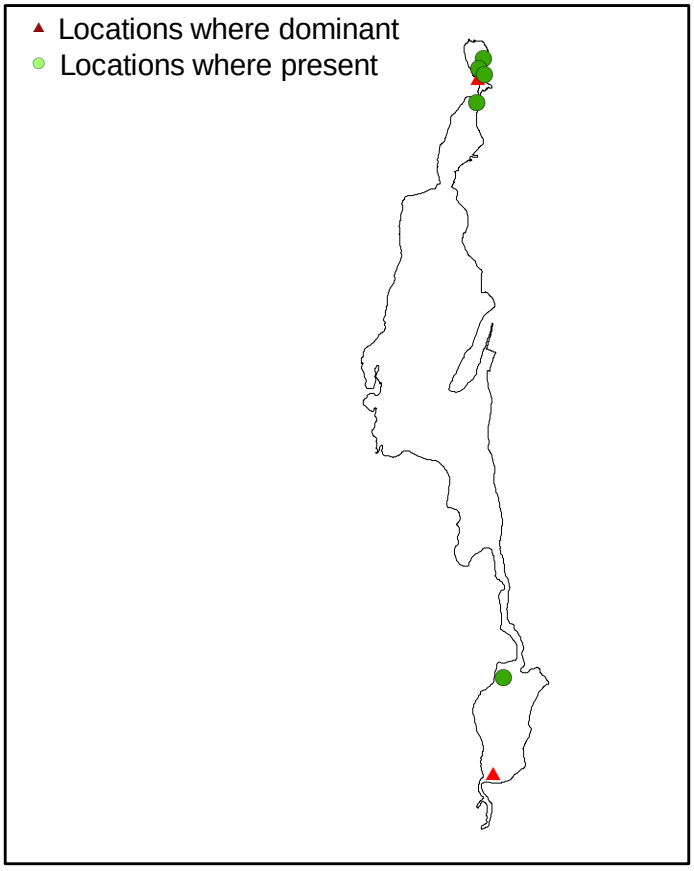
Distribution of *Vallisneria americana*



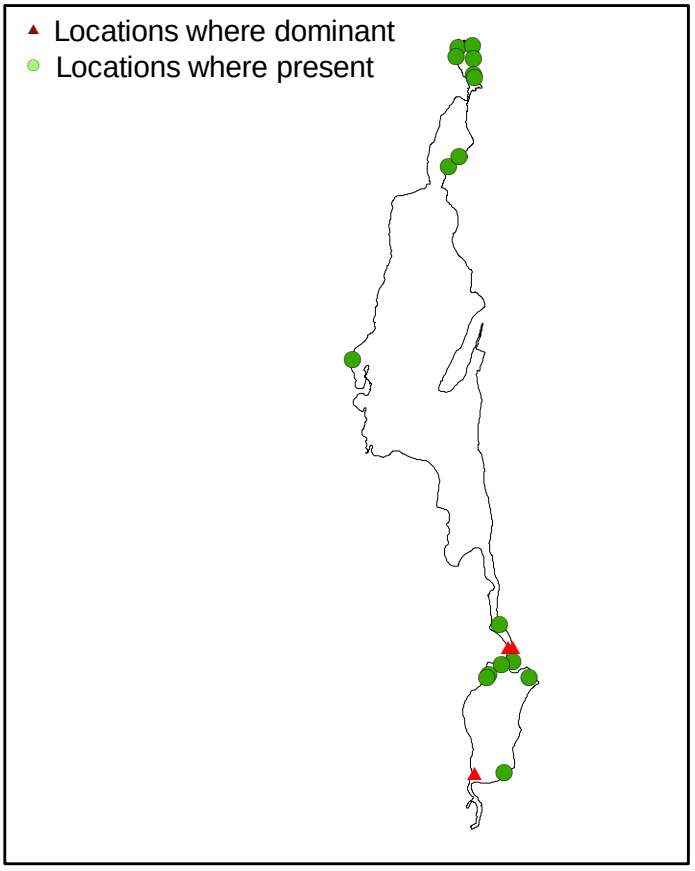
Distribution of *Chara spp.*



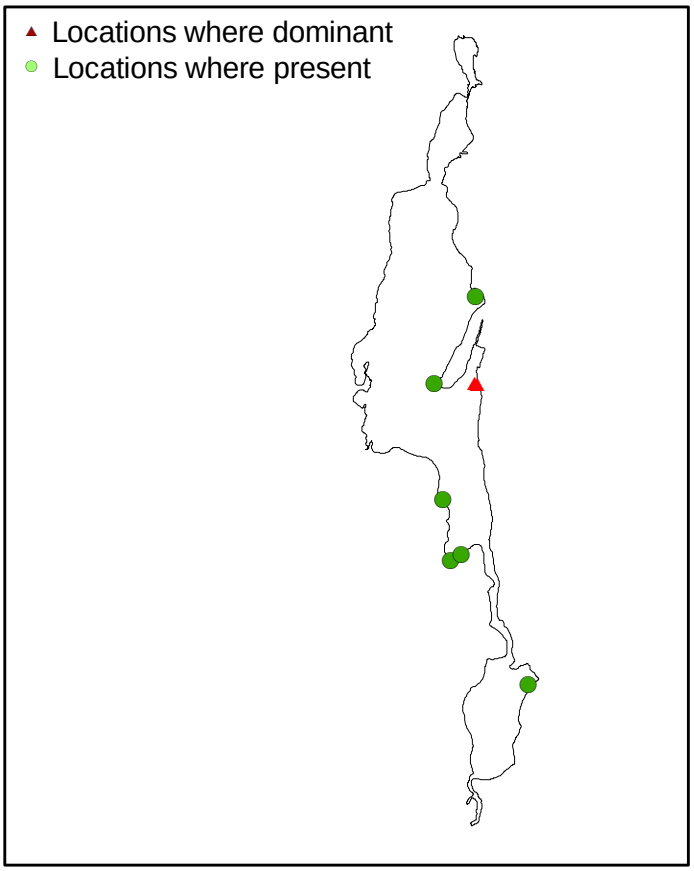
Distribution of *Utricularia vulgaris*



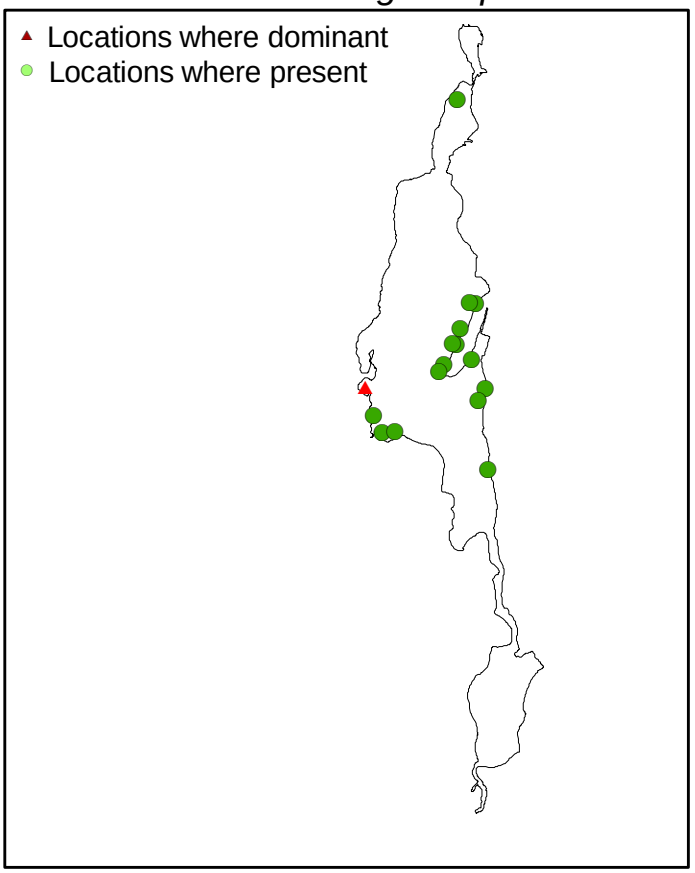
Distribution of *Nymphaea odorata*



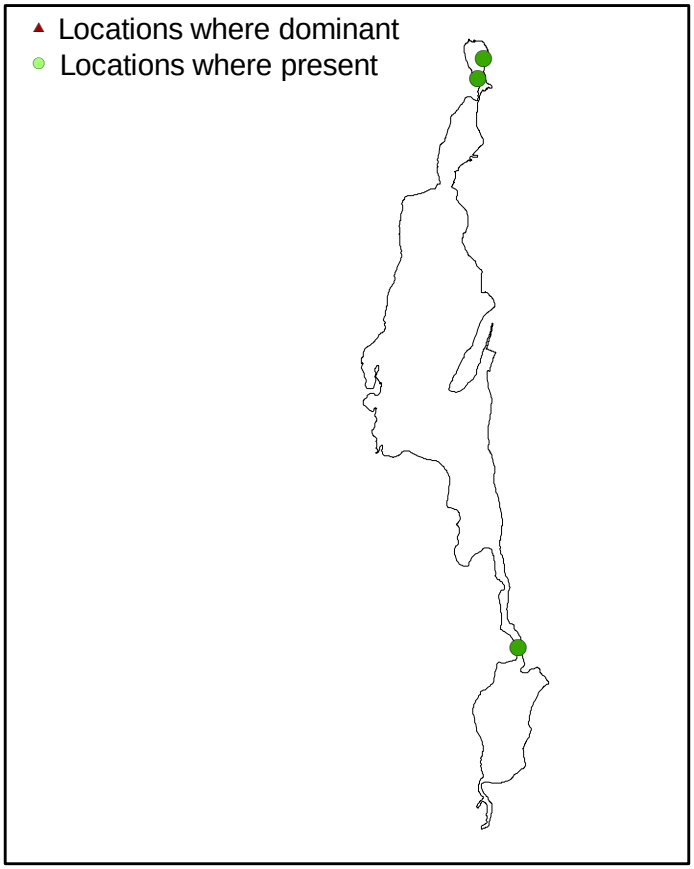
Distribution of *Zosterella dubia*



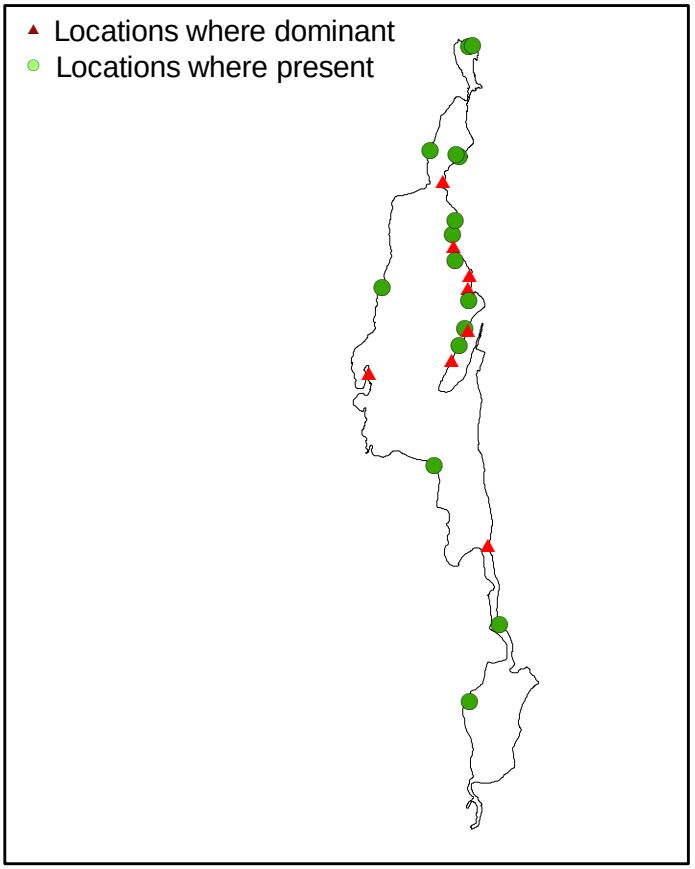
Distribution of *Potamogeton pusillus*



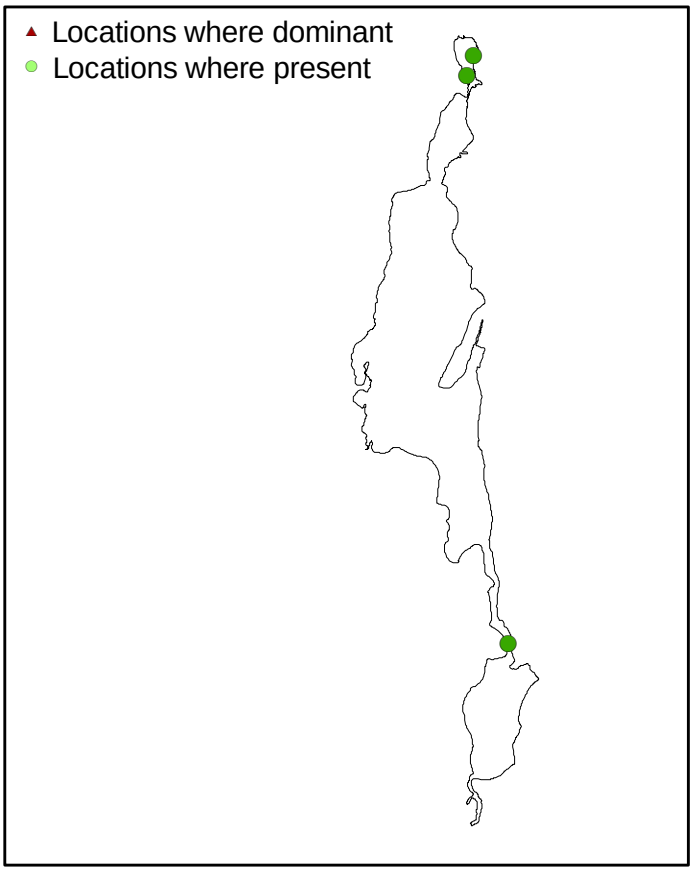
Distribution of *Brasenia schreberi*



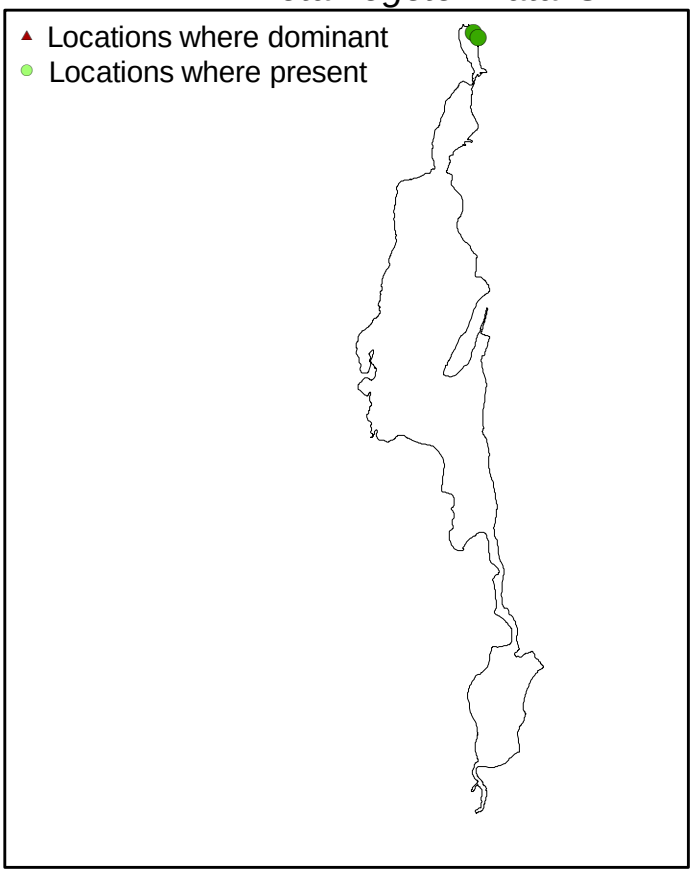
Distribution of *Potamogeton gramineus*



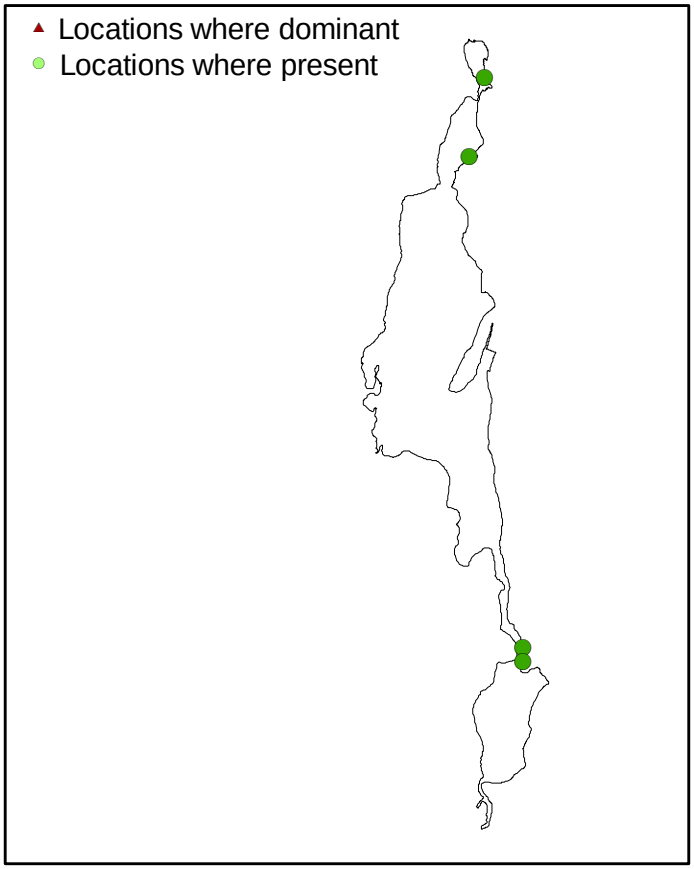
Distribution of *Potamogeton epihydrus*



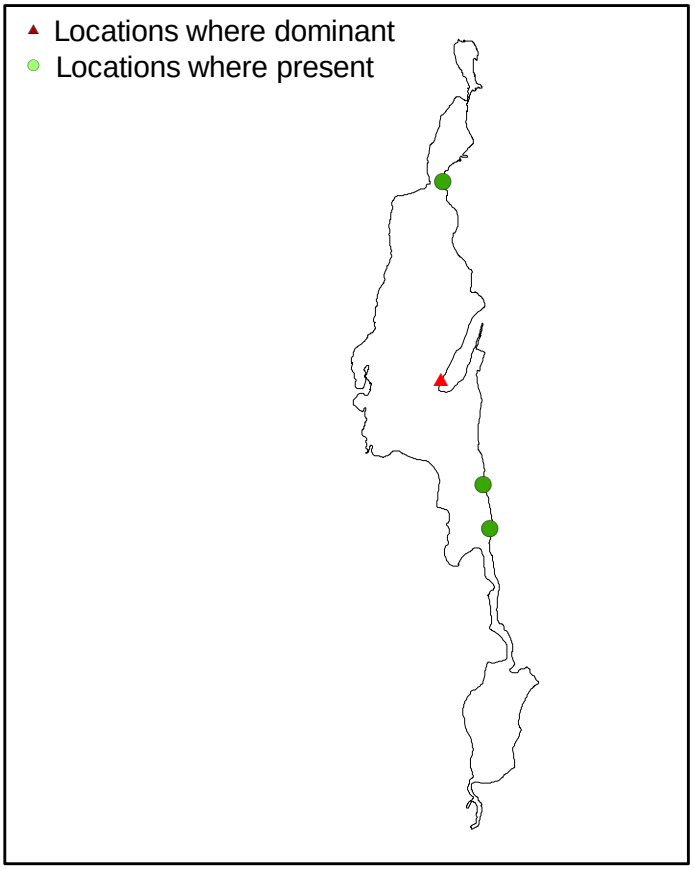
Distribution of *Potamogeton natans*



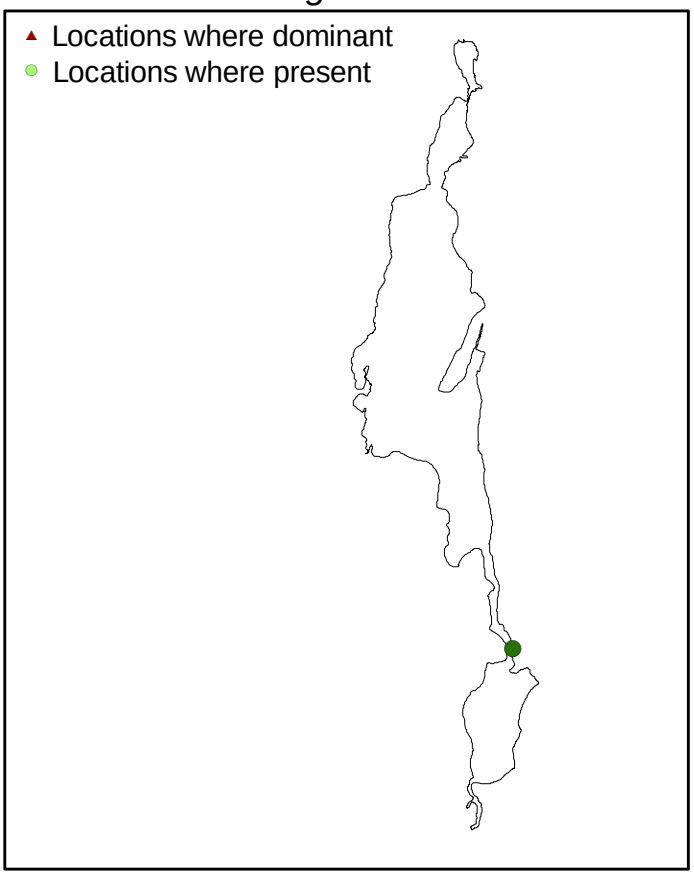
Distribution of *Nuphar variegatum*



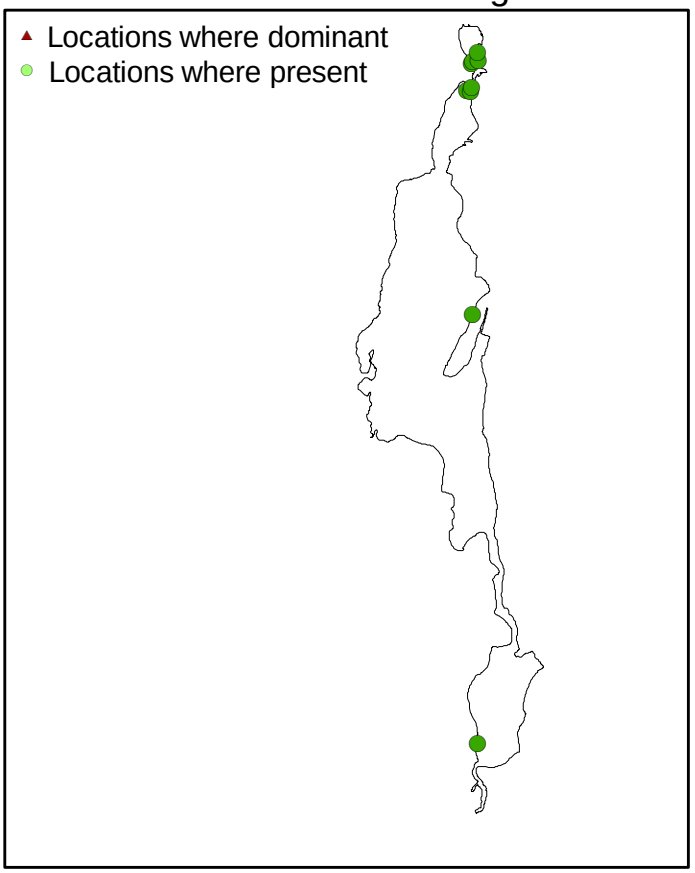
Distribution of *Musci spp.*



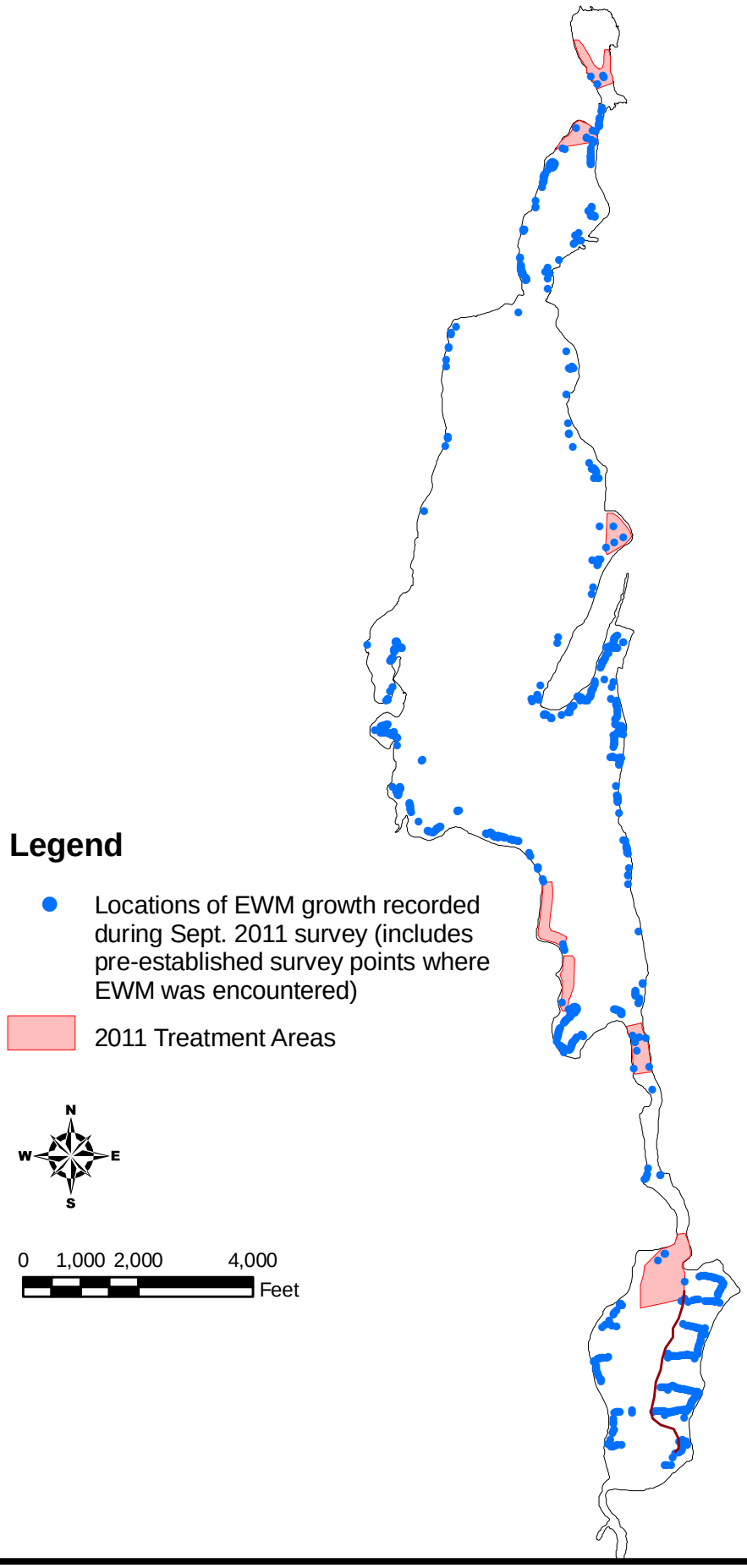
Distribution of *Megalodonta beckii*



Distribution of Filamentous algae



2011 Milfoil Distribution



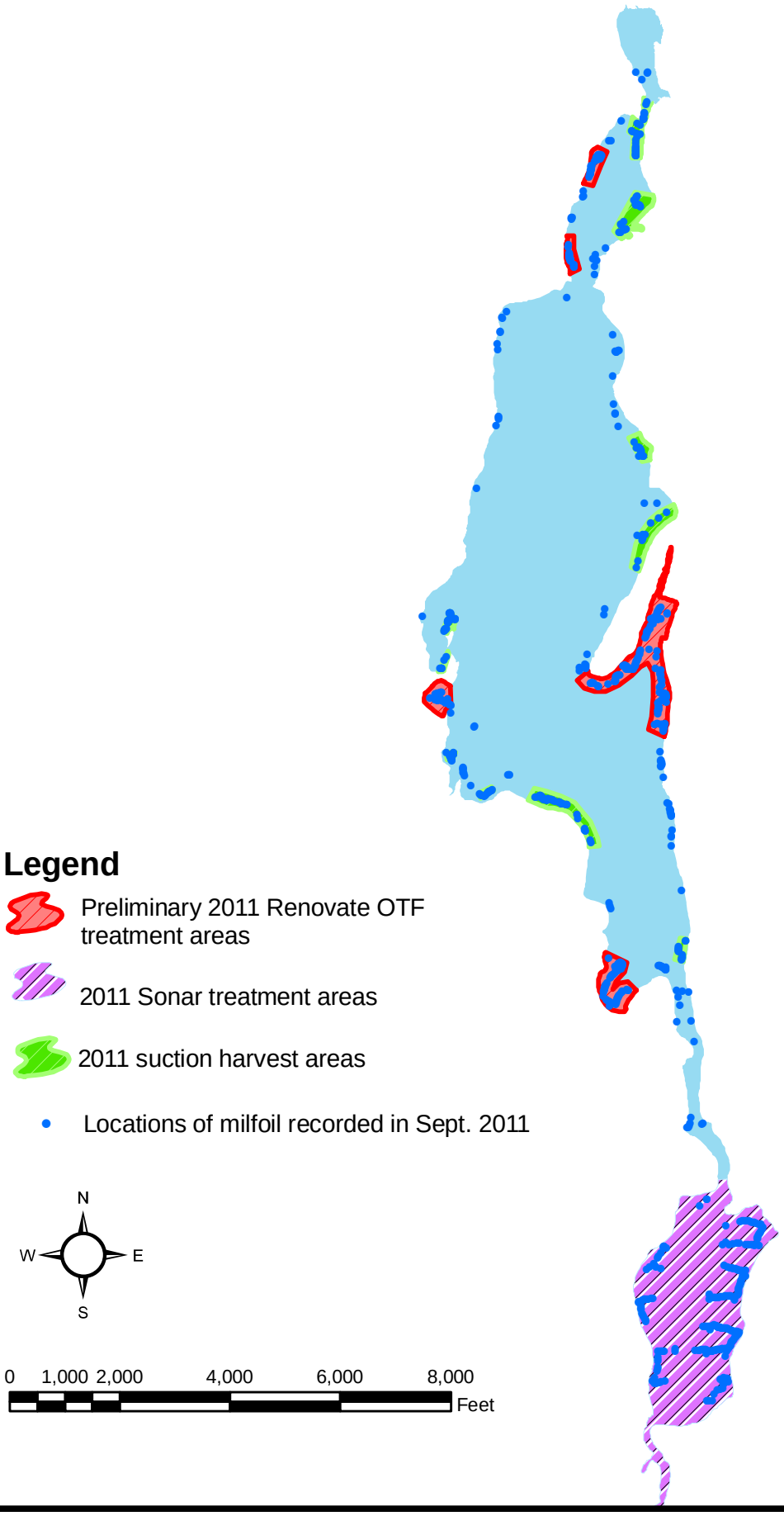
Legend

- Locations of EWM growth recorded during Sept. 2011 survey (includes pre-established survey points where EWM was encountered)
- 2011 Treatment Areas

N
W E
S

0 1,000 2,000 4,000
Feet

Preliminary Management Areas - 2012



Legend

- Preliminary 2011 Renovate OTF treatment areas
- 2011 Sonar treatment areas
- 2011 suction harvest areas
- Locations of milfoil recorded in Sept. 2011

N
W E
S

0 1,000 2,000 4,000 6,000 8,000
Feet