

Lake Morey

Aquatic Vegetation Management Program 2007 – Year One Report



North End – Pre-Treatment August 2006



North End – Post-Treatment August 2007

Final Version: December 11, 2007

Prepared for:

**Board of Selectmen
Town of Fairlee
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AQUATIC CONTROL TECHNOLOGY, INC.

POND AND LAKE MANAGEMENT SPECIALISTS

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INTRODUCTION

In 2006 Aquatic Control Technology, Inc. performed a comprehensive aquatic vegetation survey of Lake Morey. After evaluating alternatives, and in consultation with the Lake Morey Protective Association (LMPA) and the Town of Fairlee, a long-term aquatic vegetation management plan was developed to control nuisance growth of Eurasian watermilfoil (*Myriophyllum spicatum*). Specific elements of the recommended integrated management plan were partial lake or shoreline treatment of large milfoil beds using Triclopyr (Renovate 3 liquid and Renovate OTF [On Target Flake] solid formulations) herbicide, along with continuation of diver hand-pulling, suction-harvesting and use of benthic barriers to manage areas with widely scattered milfoil growth.

A permit application was filed under the State of Vermont, Department of Environmental Conservation (DEC), Aquatic Nuisance Control Permit Program. The first year of the program sought approval for treatment of a 30-acre area at the north end of the lake with Renovate 3 liquid and treatment of three separate areas totaling 15 acres with Renovate OTF. DEC issued a permit (ANC 2006-C25) for the proposed 2007 treatment program in May 2007. The treatment was performed on 24 June 2007.

The following report summarizes the results of 2007 management efforts, details findings from the comprehensive aquatic plant survey and provides recommendations for continuation of the program during the 2008 season.

HERBICIDE TREATMENT PROGRAM - 2007

Program Chronology

A chronology of the 2007 treatment program is provided below:

- DEC permit issuance (ANC 2006-C25)..... May 15
- Pre-treatment inspection and finalize treatment areas..... June 18
- Treatment – 30 acres with Renovate 3 and 15 acres with Renovate OTF..... June 24
- Herbicide residue monitoring..... June 26, July 2, July 9, July 31, August 8
- Post-treatment inspection..... July 23
- Comprehensive aquatic plant survey August 22-23

Treatment Areas

The treatment areas were finalized following the pre-treatment inspection performed on 18 June 2007. This was accomplished by navigating to the proposed treatment area locations and mapping the extent of the milfoil beds using a Differential GPS unit. The general location of the proposed treatment beds remained unchanged, but they were slightly reshaped to capture the majority of the targeted milfoil (Figure 1). A final 2007 treatment map was produced and provided to DEC.

Milfoil growth was most advanced in Site C along the western shoreline, where milfoil plants were topped out and had developed flowering spikes out to water depths of 8-10 feet. In the remaining treatment areas, milfoil plants were generally still 1-3 feet below the surface.

Summary of 2007 Treatment

The treatment date of Sunday, 24 June 2007 was selected so that both the Renovate 3 liquid and Renovate OTF flake could be applied on the same day. Condition 3 of ANC 2006-C25 mandated that Renovate OTF be applied before water temperatures in the treatment areas reached 60 degrees or after June 22. Water temperatures were 59 degrees when the permit was issued on May 15, so the treatment was delayed until after June 22. Sunday, June 24 complied with this requirement and allowed for the two-day

swimming restriction (day of treatment and one additional day) to be lifted before the first summer camp sessions began on the lake.

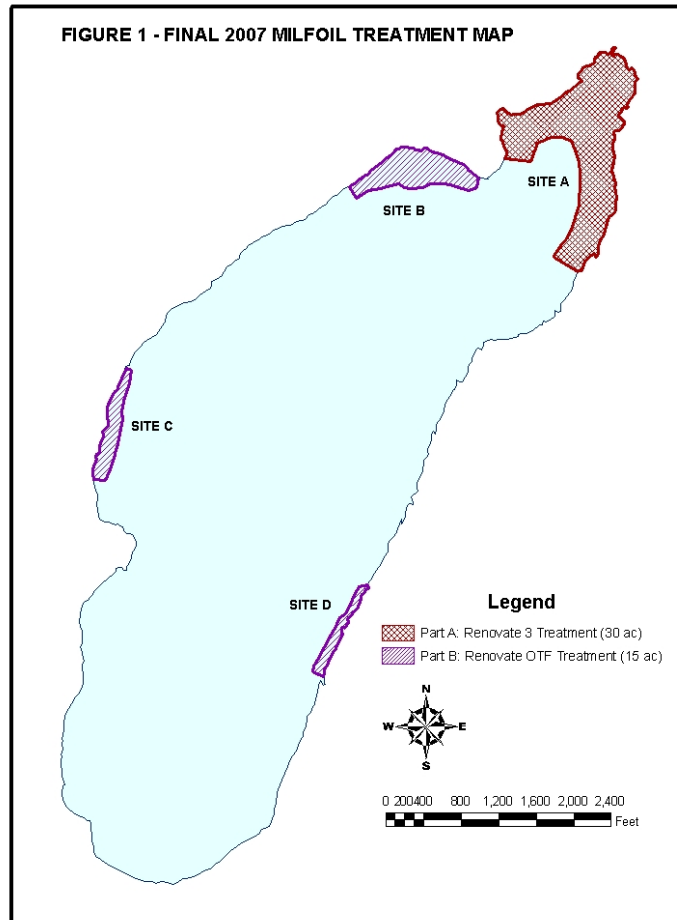
All four areas were treated on one day. Two Airboats were used for the treatment. One Airboat was equipped with a calibrated spray system to inject a diluted solution of Renovate 3 liquid subsurface through weighted hoses. The other Airboat was equipped with two GranBlo granular blowers and Renovate OTF flakes were distributed through delivery tubes that extended off each side towards the stern of the boat. Both Airboats were equipped with GPS navigation systems to insure that the herbicide was evenly applied to the designated treatment areas. Weather conditions on the day of treatment were mostly sunny, with an air temperature of approximately 75 degrees and an occasional light breeze. The herbicide was applied in approximately 4.5 hours.

Herbicide Residue Testing

In compliance with conditions of the ANC 2006-C25, water samples were collected from nine (9) locations in Lake Morey and from one (1) downstream location following treatment for analysis of triclopyr concentrations (Appendix A). Shaun Hyde of SePRO provided sampling instructions and sample bottles to LMPA representatives. Collected samples were shipped via overnight delivery to SePRO's laboratory in Whittakers, North Carolina. Samples were collected on June 26, July 2, July 9, July 30 and August 6. The highest in-lake concentrations were detected two days after treatment in two of the Renovate OTF treatment sites – Site B 234 ppb and Site C 147 ppb (target concentrations applied were 1.5 ppm for Renovate 3 and 1.85 ppm for Renovate OTF). On July 2, all sampled locations showed triclopyr concentrations below 30 ppb and DEC lifted the restriction on drinking lake water. By August 6, 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 Survey

The treatment areas were surveyed on July 23 by Marc Bellaud of Aquatic Control Technology, Shaun Hyde of SePRO and representatives from LMPA. All of the treatment areas were toured by boat to visually evaluate impacts to the targeted milfoil and to the non-target plants.



Milfoil control was most evident in the Renovate 3 liquid treatment area (Site A) where most of the milfoil stems were completely defoliated and had collapsed to the bottom. Non-target plants in this area appeared to be healthy and growth was evident in the one-month period that had elapsed since treatment. Species observed included: *Potamogeton amplifolius*, *P. robbinsii*, *P. illinoensis*, *P. zosteriformis*, *P. praelongus*, *Ceratophyllum demersum*, and *Najas flexilis*. Some visible effects on milfoil plants were evident up to a point approximately 200 feet south of the treatment area along the eastern shoreline.

In the Renovate OTF treatment areas milfoil control was evident at varying degrees. Site B at the north end showed the most complete control, with most of the area looking similar to Site A. There was more evidence of stripped milfoil stalks that were bending over near the bottom. This was particularly evident along the deeper water edges in 10-12 feet of water. Stripped milfoil stalks were more evident in portions of Site D along the southeast shoreline. Significantly less milfoil control was seen in Site C along the western shoreline, where more than half of the milfoil plants remained upright in the water column, many of which only showed limited defoliation. Impact to milfoil located outside of the Renovate OTF treatment areas were difficult to discern and appeared to be minimal. Non-target plants appeared to be healthy in all Renovate OTF treatment areas. Species observed included: *Potamogeton amplifolius*, *P. illinoensis*, *P. pusillus*, *P. gramineus*, *P. zosteriformis*, *P. praelongus*, *Najas flexilis*, and *Ceratophyllum demersum*.

Complete evaluation of the 2007 treatment results follows the findings of the late season comprehensive aquatic vegetation survey.

LATE SEASON COMPREHENSIVE AQUATIC VEGETATION SURVEY

Survey Methods

The late season comprehensive aquatic vegetation survey conducted on 22 August 2007 and 23 August 2007 replicated the methods that were employed during the 2006 season. Details on the specific survey methods are provided in Appendix B.

Survey Findings

The species list of plants encountered during the 2007 survey was consistent with the 2006 survey findings. Four species with limited distribution in 2006 were not recorded in 2007. These species included: *Eleocharis sp.*, *Brasenia screberi*, *Utricularia purpurea* and *Nymphoides cordata*. None of these species were found in more than three locations in 2006. *Potamogeton praelongus* is believed to have been misidentified as *Potamogeton richardsonii* in 2006. Another noteworthy difference was that the frequency of occurrence of *Myriophyllum spicatum* was reduced from 61.2% in 2006 to 43.1% in 2007. This was attributed to the control achieved by the herbicide treatment program. Significant (>10%) increases in frequency of occurrence were noted for several species including: *Zosterella dubia*, *Potamogeton robbinsii*, *Chlorophyta*, and *Nitella*. No significant decreases (<10%) in frequency of occurrence were noted. The other variations noted in the species frequency of occurrence can likely be attributed to sampling variability.

Table 1: Aquatic Plant Species and Frequency of Occurrence – Whole Lake

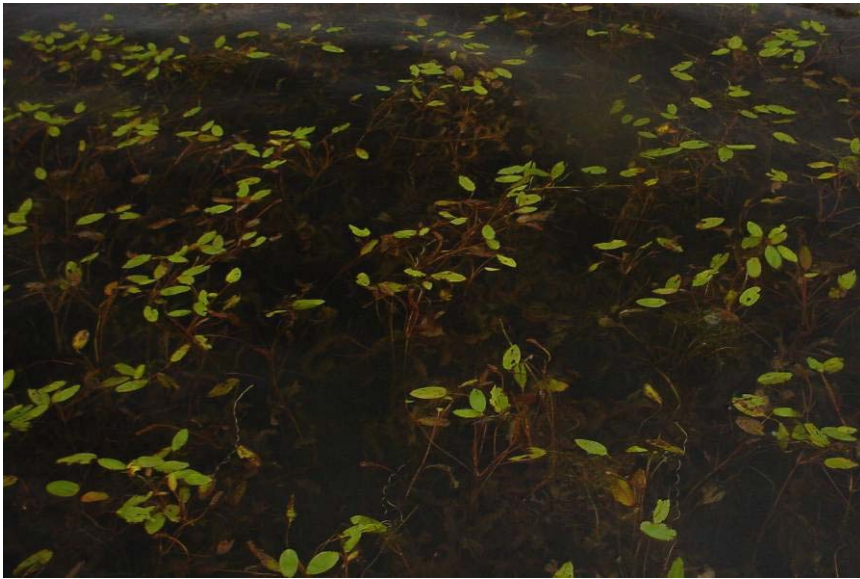
Species	Common Name	Abbreviation (used in field data)	2006 Number of Occurrences	2006 Frequency of Occurrence	2007 Number of Occurrences	2007 Frequency of Occurrence
<i>Ceratophyllum demersum</i>	coontail	Cd	44	37.9%	55	47.4%
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	Ms	71	61.2%	50	43.1%
<i>Najas flexilis</i>	bushy pondweed	Na	35	30.2%	33	28.4%
<i>Zosterella dubia</i>	water stargrass	Zd	21	18.1%	33	28.4%
<i>Potamogeton robbinsii</i>	Robbins' pondweed	Pr	19	16.4%	32	27.6%
<i>Potamogeton amplifolius</i>	largeleaf pondweed	Pa	31	26.7%	27	23.3%
<i>Chlorophyta</i>	filamentous green algae	Fa	15	12.9%	27	23.3%
<i>Vallisneria americana</i>	wild celery	V	31	26.7%	25	21.6%
<i>Megalodonta beckii</i>	water marigold	Mb	13	11.2%	22	19.0%
<i>Nitella sp.</i>	stonewort	Ni	3	2.6%	21	18.1%
<i>Potamogeton gramineus</i>	variable-leaf pondweed	Pg	16	13.8%	14	12.1%
<i>Potamogeton pusillus</i>	small pondweed	Pp	7	6.0%	14	12.1%
<i>Potamogeton praelongus</i>	Whitestem pondweed (misidentified as <i>P. richardonii</i> in 2006)	Pprae	10	8.6%	13	11.2%
<i>Potamogeton illinoensis</i>	Illinois pondweed	Pi	1	0.9%	10	8.6%
<i>Potamogeton zosteriformis</i>	flat-stem pondweed	Pz	17	14.7%	6	5.2%
<i>Elodea canadensis</i>	elodea	Ec	12	10.3%	4	3.4%
<i>Chara sp.</i>	muskgrass	Ca	4	3.4%	4	3.4%
<i>Musci sp.</i>	aquatic moss	Mu	6	5.2%	3	2.6%
<i>Nymphaea odorata</i>	white waterlily	Ny	2	1.7%	3	2.6%
<i>Eleocharis sp.</i>	spikerush (submersed)	Eo	3	2.6%	0	0%
<i>Brasenia screberii</i>	watershield	B	1	0.9%	0	0%
<i>Utricularia purpurea</i>	purple bladderwort	Up	1	0.9%	0	0%
<i>Nymphoides cordata</i>	floating-heart	Nc	1	0.9%	0	0%

Maps depicting the distribution of each species documented during the survey are provided in Appendix B.

Species richness values in 2007 were consistent with 2006 findings across all depth ranges of the sampled data points.

Table 2: Species Richness

Data Point Depth Range (feet)	2006 Species Richness	2007 Species Richness
Less than or equal to 5	5.6	5.1
Greater than 5 and less than or equal to 10	4.5	4.1
Greater than 10 and less than or equal to 20	3.1	3.6
Greater than 20	0.2	0.9
Total	3.1	3.4



Pondweed (*Potamogeton spp.*)
growth at the north end in the
Site A north end - Renovate 3
treatment area (8/23/07)



Native plant growth found in
the Site A north end -
Renovate 3 treatment area:
Potamogeton zosteriformis,
Najas flexilis, *Ceratophyllum*
demersum (8/23/07)



Stripped milfoil stalks found
along the deep edge of Site B
northwest corner - Renovate
OTF treatment area (8/23/07)

Differences Observed in Treatment Areas

In order to better evaluate efficacy and impacts of herbicide treatments performed in 2007, information from survey data points located in the treatment areas were directly compared to 2006 findings at the same locations. Renovate 3 and Renovate OTF herbicide treatment areas were evaluated separately.

Frequency of occurrence data for the two treatment areas follows:

Table 3: Renovate 3 Treatment Areas – Species Frequency of Occurrence (n=24)

Species	2006 # of occurrences	2006 Frequency of occurrence
<i>Myriophyllum spicatum</i>	21	87.5%
<i>Ceratophyllum demersum</i>	15	62.5%
<i>Potamogeton zosteriformis</i>	12	50.0%
<i>Megalodona beckii</i>	9	37.5%
<i>Najas flexilis</i>	9	37.5%
<i>Vallisneria americana</i>	9	37.5%
<i>Potamogeton amplifolius</i>	8	33.3%
<i>Potamogeton robbinsii</i>	7	29.2%
<i>Potamogeton praelongus</i>	6	25.0%
<i>Zosterella dubia</i>	6	25.0%
<i>Chlorophyta - filamentous</i>	6	25.0%
<i>Potamogeton gramineus</i>	3	12.5%
<i>Elodea canadensis</i>	1	4.2%
<i>Nymphaea odorata</i>	1	4.2%
<i>Potamogeton pusillus</i>	1	4.2%
<i>Nymphoides cordata</i>	1	4.2%

Species	2007 # of occurrences	2007 Frequency of occurrence
<i>Potamogeton robbinsii</i>	16	66.7%
<i>Ceratophyllum demersum</i>	15	62.5%
<i>Najas flexilis</i>	13	54.2%
<i>Megalodona beckii</i>	11	45.8%
<i>Chlorophyta - filamentous</i>	11	45.8%
<i>Zosterella dubia</i>	9	37.5%
<i>Potamogeton amplifolius</i>	7	29.2%
<i>Potamogeton gramineus</i>	7	29.2%
<i>Vallisneria americana</i>	7	29.2%
<i>Potamogeton praelongus</i>	5	20.8%
<i>Myriophyllum spicatum</i>	4	16.7%
<i>Nymphaea odorata</i>	2	8.3%
<i>Potamogeton pusillus</i>	2	8.3%
<i>Potamogeton zosteriformis</i>	2	8.3%
<i>Chara sp.</i>	1	4.2%
<i>Nitella sp.</i>	1	4.2%
<i>Potamogeton illionensis</i>	1	4.2%

Table 4: Renovate OTF Treatment Areas – Species Frequency of Occurrence (n=15)

Species	2006 # of occurrences	2006 Frequency of occurrence
<i>Myriophyllum spicatum</i>	13	86.7%
<i>Ceratophyllum demersum</i>	8	53.3%
<i>Potamogeton amplifolius</i>	5	33.3%
<i>Potamogeton robbinsii</i>	5	33.3%
<i>Vallisneria americana</i>	5	33.3%
<i>Elodea canadensis</i>	3	20.0%
<i>Najas flexilis</i>	3	20.0%
<i>Potamogeton gramineus</i>	3	20.0%
<i>Chlorophyta - filamentous</i>	3	20.0%
<i>Megalodona beckii</i>	2	13.3%
<i>Brasenia schreberi</i>	1	6.7%
<i>Potamogeton pusillus</i>	1	6.7%
<i>Potamogeton praelongus</i>	1	6.7%
<i>Potamogeton zosteriformis</i>	1	6.7%
<i>Zosterella dubia</i>	1	6.7%

Species	2007 # of occurrences	2007 Frequency of occurrence
<i>Ceratophyllum demersum</i>	12	80.0%
<i>Myriophyllum spicatum</i>	8	53.3%
<i>Potamogeton robbinsii</i>	6	40.0%
<i>Vallisneria americana</i>	6	40.0%
<i>Nitella sp.</i>	4	26.7%
<i>Potamogeton praelongus</i>	4	26.7%
<i>Najas flexilis</i>	3	20.0%
<i>Potamogeton amplifolius</i>	3	20.0%
<i>Zosterella dubia</i>	3	20.0%
<i>Potamogeton gramineus</i>	2	13.3%
<i>Potamogeton illionensis</i>	2	13.3%
<i>Potamogeton pusillus</i>	2	13.3%
<i>Chlorophyta - filamentous</i>	2	13.3%
<i>Megalodona beckii</i>	1	6.7%
<i>Potamogeton zosteriformis</i>	1	6.7%

The frequency of occurrence values for most species were fairly consistent, especially when considering the limited sample size. The overall species richness for the two treatment areas also compared favorably.

Table 5: Renovate 3 and Renovate OTF Treatment Areas – Species Richness

Sites	2006 Species richness	2007 Species richness
Renovate 3 area	4.8	4.8
Renovate OTF areas	3.9	3.5

Overall, native plant diversity and distribution appeared to be well maintained even within treatment areas. Low density milfoil was still observed in all treatment areas. Using only frequency of occurrence values, the reduction of milfoil distribution in the Renovate 3 area was favorable, while the reduction in Renovate OTF areas was less favorable. The level of milfoil control achieved is probably better illustrated by the milfoil percent cover values that were reported in each area.

Table 6: Renovate 3 and Renovate OTF Treatment Areas – Percent Cover of *Myriophyllum spicatum*

Sites	2006 EWM % cover	2007 EWM % cover
Renovate 3 area	19.9%	0.2%
Renovate OTF areas	86.7%	10.1%

The milfoil percent cover seen in the Renovate 3 area appears to be low in 2006 because this includes several shallow water data points adjacent to the emergent wetland where milfoil was not observed. Out of the 21 occurrences of milfoil in 2006, 13 had percent cover values less than 10%, while milfoil cover values in the deeper water beds ranged between 20-100%.

In the Renovate OTF areas, the 2007 percent cover values broken down by area were:

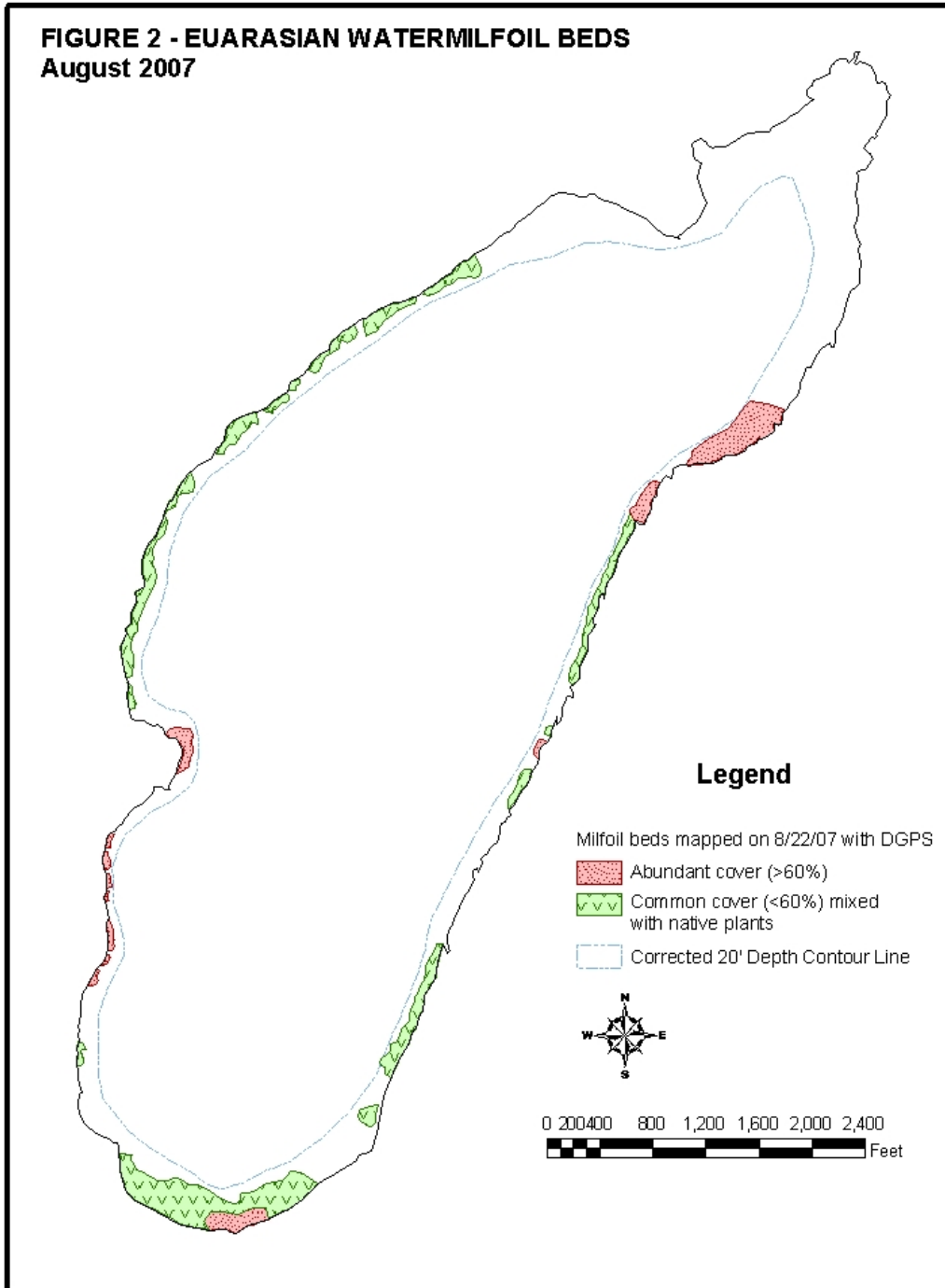
- Site B – Northwest Shore 1.6%
- Site C – West Shore 26.2%
- Site D – East Shore 9.0%

The milfoil frequency of occurrence and percent cover values suggest that the reduced milfoil control seen in Renovate OTF treatment areas, as compared to the Renovate 3 treatment area, is mostly attributable to the incomplete control seen in the Site C – west shore area.

Late Season Milfoil Bed Mapping

Milfoil beds were visually surveyed and mapped during the late season survey. This occurred on 22 August 2007. Visibility was excellent with sunny skies and little or no wind. The entire perimeter of the lake was toured by boat and the deep water extent of milfoil beds were recorded using a Differential GPS. The milfoil beds were categorized as either Common – generally <60% cover and mixed with native species or Abundant – generally >60% cover and less native plant diversity.

The total area of milfoil beds mapped was 27.4 acres. Approximately 8.8 acres were listed as Abundant cover and 18.6 acres were listed as Common cover. No milfoil beds were encountered in the Site A, Site B and Site D 2007 treatment areas. Common milfoil beds did remain in the Site C treatment area along the west shore.



SUMMARY OF 2007 AQUATIC VEGETATION MANAGEMENT PROGRAM

Renovate 3 and Renovate OTF Herbicide Treatments

Overall, the Renovate herbicide treatments performed in 2007 provided effective control of the targeted Eurasian watermilfoil, while maintaining a diverse and robust assemblage of non-target native species. Results of the Renovate 3 liquid applied to the north end were excellent and were consistent with previous large, contiguous block treatments performed in Vermont. Results were mixed in the Renovate OTF treatment areas. Site B on the northwest shore and Site D on the southeast shore yielded favorable milfoil control. Site C on the west shore was the only area where the treatment did not achieve a favorable reduction of milfoil. Dilution and movement of the herbicide away from the targeted plants were initially believed to be the reason for the reduced control seen in Site C; however, this was mostly discounted since Site D was smaller than Site C, and higher residual triclopyr concentrations were detected in Site C during the 2-day post-treatment sampling round. After considerable discussion with technical specialists from SePRO, the most logical reason for the reduced effectiveness seen in Site C is that the milfoil plants were significantly more mature at this location at the time of treatment. Mature plants are less susceptible to herbicide uptake and translocation due to the slowed growth processes. Future treatments should be performed earlier in the year to improve efficacy.

Spread Prevention and Non-Chemical Control Activities

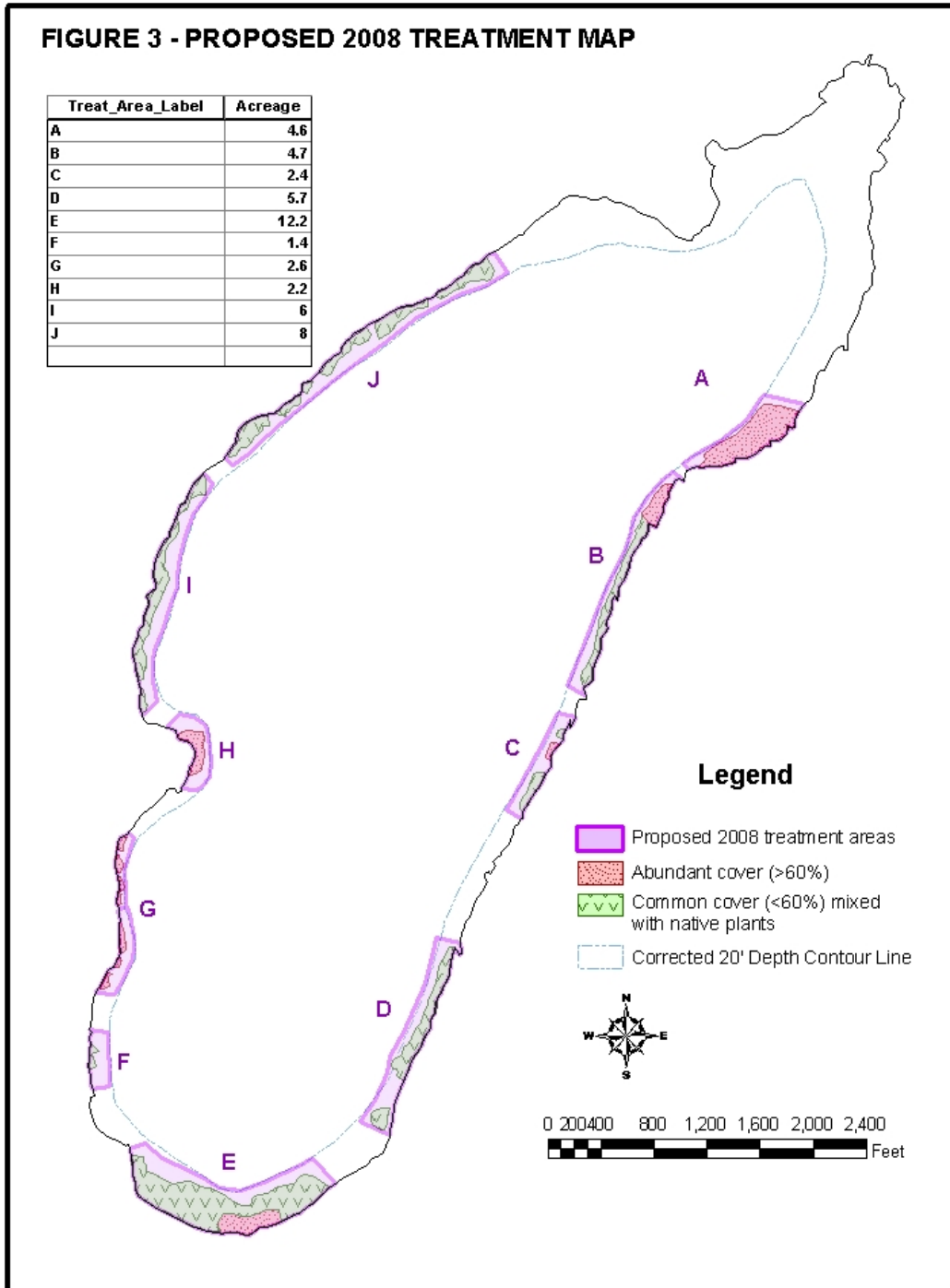
As required by the DEC Permit, non-chemical milfoil control activities continued at Lake Morey during the 2007 season. Bottom weed barrier was removed and relocated as stipulated by ANC Permit 2005-B05. Over 1500 hours of volunteer effort for monitoring, hand harvesting, diver work and floating fragment removal. Details of the non-chemical control efforts are provided in 24 September 2007 letter from Frank Barrett, Jr., Chair of the Fairlee Selectboard (Appendix C).

RECOMMENDATIONS FOR 2008 MANAGEMENT PROGRAM

Based on the success of the 2007 Renovate herbicide treatment program, the Town and LMPA intend seek permit approval for additional herbicide treatment during the 2008 season. The favorable selectivity for non-target plants achieved in 2007 warrants targeting all remaining milfoil beds during the 2008 season. Where most of the remaining beds are located in narrow bands along steeply sloped shorelines Renovate OTF (On Target Flakes) is the recommended triclopyr formulation. The following modifications are recommended to improve treatment efficacy in 2008:

1. Treat earlier in the growing season when all milfoil plants are less than 4 feet tall. This will likely require a mid-late May treatment date.
2. Treat a minimum of 2.5 acres around each milfoil bed to overcome the effects of dilution. The only exceptions to this might be along the southwest shoreline where there are several small milfoil beds isolated very close to shore. Smaller targeted treatments may be considered in these locations.
3. Increase the application rate to 2.0 – 2.5 ppm.

It is expected that these modifications will improve treatment efficacy. Non-chemical control strategies will continue to be utilized to target scattered milfoil regrowth in 2007 treatment areas and any remaining milfoil plants once the full effects of the 2008 treatment are realized.

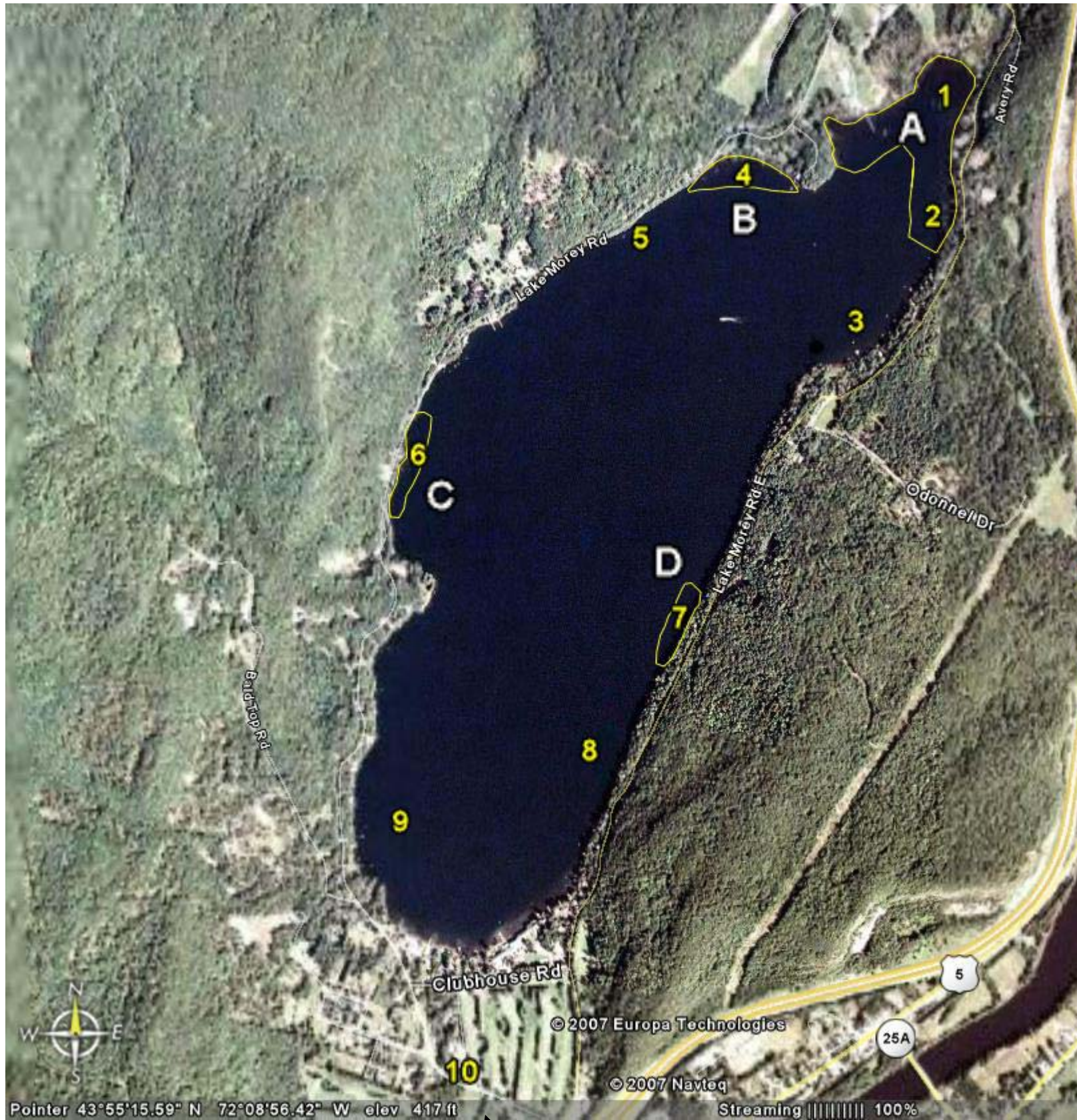


APPENDIX A

Herbicide Residue Testing Results

- Sampling location map – prepared by S. Hyde
- SePRO Laboratory Report – 6/26/07 sampling round
- SePRO Laboratory Report – 7/2/07 sampling round
- SePRO Laboratory Report – 7/9/07 sampling round
- SePRO Laboratory Report – 7/30/07 sampling round
- SePRO Laboratory Report – 8/8/07 sampling round

2007 Lake Morey Renovate Water Sampling Locations (Sites 1-10)



Note: Sample Station 10 is located in the outlet stream at Lake Morey Road.

FastEST Results Confidential - Not For Distribution

Cooperator: Marc Bellaud	Aquatics control Technology Inc.. 11 John Rd Sutton MA 01590-	Phone: (508) 805-1000	Fax:
Territory: Shaun Hyde			

Sample	Date(s) Treated	Sonar	Date Collected	Rate Applied	Acres Treated	Sample Location Description	Results PPB
1.	06/24/07	Renovat	6/26/2007	1.5 ppm	30	LM-1	<1.0
2.	06/24/07	Renovat	6/26/2007	1.5 ppm	30	LM-2	52
3.	06/24/07		6/26/2007		--	LM-3	36.4
4.	06/24/07	Renvate	6/26/2007	1.85	8	LM-4	233.7
5.	06/24/07		6/26/2007	--	--	LM-5	134
6.	06/24/07	Renovat	6/26/2007	1.85	4	LM-6	147
7.	06/24/07	Renovat	6/26/2007	1.85	3	LM-7	<1.0
8.	06/24/07		6/26/2007	--	--	LM-8	<1.0
9.	06/24/07		6/26/2007	--	--	LM-9	<1.0
10.	06/24/07		6/26/2007	--	--	LM-10	<1.0

Depth Sample Collected: Elbow grab	Date Sample Received: 6/27/2007
Storage Conditions: Analyzed upon receipt	Condition of Sample(s) Box/Water Containers: Excellent Excellent
Date Shipped to SePRO: 6/26/2007	Date Analysis was Performed: 6/27/2007
How would you like results sent to you? Fax <input type="checkbox"/> No <input type="checkbox"/> Regular Mail <input type="checkbox"/> Yes <input type="checkbox"/>	Date Results Sent to Cooperator: 6/28/2007

Back of Data Sheet

Name of Waterbody: Lake Morey

Average Depth in Feet: 0

Back of Data Sheet

Size of Waterbody in Acres: Various

Target Plant(s) to Control: Eurasian watermilfoil

FastEST Results Confidential - Not For Distribution

Cooperator: Marc Bellaud	Aquatic Control Technology Inc.. 11 John Rd Sutton MA 01590-	Phone: (508) 805-1000	Fax:
Territory: Shaun Hyde			

Sample	Date(s) Treated	Sonar	Date Collected	Rate Applied	Acres Treated	Sample Location Description	Results PPB
1.	06/24/07	Renovat	7/2/2007	1.5ppm	30	LKM 1	.014 ppm
2.				1.5ppm	30	LKM 2	.017 ppm
3.				outside area		LKM 3	.020 ppm
4.				OTF 1.85ppm	8	LKM 4	.015 ppm
5.						LKM 5	.019 ppm
6.				OTF 1.85ppm	4	LKM 6	.013 ppm
7.				OTF 1.85ppm	3	LKM 7	.030 ppm
8.						LKM 8	.013 ppm
9.						LKM 9	.013 ppm
10.						LKM 10 outlet	<1.0 ppb

Depth Sample Collected: Date Sample Received:

Storage Conditions: Condition of Sample(s) Box/Water Containers:

Date Shipped to SePRO: Date Analysis was Performed:

How would you like results sent to you? Fax Regular Mail Date Results Sent to Cooperator:

Back of Data Sheet	Back of Data Sheet
Name of Waterbody: <input type="text" value="Lake Morey"/>	Size of Waterbody in Acres: <input type="text"/>
Average Depth in Feet: <input type="text" value="0"/>	Target Plant(s) to Control: <input type="text" value="Eurasian watermilfoil"/>

FastEST Results Confidential - Not For Distribution

Cooperator: Marc Bellaud	Aquatic Control Technology Inc.. 11 John Rd Sutton MA 01590-	Phone: (508) 805-1000	Fax:
Territory: Shaun Hyde			

Sample	Date(s) Treated	Sonar	Date Collected	Rate Applied	Acres Treated	Sample Location Description	Results PPB
1.	06/24/07	Renovat	7/9/2007	1.5 ppm	30	LM-1	21.5
2.	06/24/07	Renvoat	7/9/2007	1.5 ppm	30	LM-2	24
3.	06/24/07	Renvoat	7/9/2007	--	-	LM-3	23.25
4.	06/24/07	Renvoat	7/9/2007	OFT 1.85	8	LM-4	20
5.	06/24/07	Renvoat	7/9/2007	--	--	LM-5	24.25
6.	06/24/07	Renvoat	7/9/2007	OFT 1.85	4	LM-6	27.75
7.	06/24/07	Renvoat	7/9/2007	OFT 1.85	3	LM-7	28.5
8.	06/24/07	Renvoat	7/9/2007	--	--	LM-8	25.25
9.	06/24/07	Renvoat	7/9/2007	--	--	LM-9	24.5
10.	06/24/07	Renvoat	7/9/2007	--	--	LM-10	5.25

Depth Sample Collected: Elbow	Date Sample Received: 7/10/2007
Storage Conditions: Refrigerated	Condition of Sample(s) Box/Water Containers: Excellent Excellent
Date Shipped to SePRO: 7/9/2007	Date Analysis was Performed: 7/13/2007
How would you like results sent to you? Fax <input type="checkbox"/> No <input type="checkbox"/> Regular Mail <input type="checkbox"/> Yes <input type="checkbox"/>	Date Results Sent to Cooperator: 7/13/2007

Back of Data Sheet

Name of Waterbody: Lake Morey

Average Depth in Feet: 0

Back of Data Sheet

Size of Waterbody in Acres: Varies

Target Plant(s) to Control: Eurasian watermilfoil

FasTEST Results Confidential - Not For Distribution

Cooperator: Marc Bellaud	Aquatic Control Technology Inc.. 11 John Rd	Phone: (508) 805-1000	Fax:
Territory: Shaun Hyde	Sutton MA 01590-		

Sample	Date(s) Treated	Sonar	Date Collected	Rate Applied	Acres Treated	Sample Location Description	Results PPB
1.		Renovat				LM 4	<1.0ppb
2.						LM 8	<1.0ppb
3.						LM 10	<1.0ppb
4.							
5.							
6.							
7.							
8.							
9.							
10.							

Depth Sample Collected: <input type="text" value="elbow"/>	Date Sample Received: <input type="text" value="7/31/2007"/>
Storage Conditions: <input type="text" value="Analyzed upon receipt"/>	Condition of Sample(s) Box/Water Containers: <input type="text" value="Excellent"/> <input type="text" value="excellent"/>
Date Shipped to SePRO: <input type="text" value="7/30/2007"/>	Date Analysis was Performed: <input type="text" value="7/31/2007"/>
How would you like results sent to you? Fax <input type="checkbox" value="No"/> Regular Mail <input type="checkbox" value="Yes"/>	Date Results Sent to Cooperator: <input type="text" value="7/31/2007"/>

Back of Data Sheet

Name of Waterbody:

Average Depth in Feet:

Back of Data Sheet

Size of Waterbody in Acres:

Target Plant(s) to Control:

FastEST Results Confidential - Not For Distribution

Cooperator: Marc Bellaud	Aquatic Control Technology Inc.. 11 John Rd	Phone: (508) 805-1000	Fax:
Territory: Shaun Hyde	Sutton MA 01590-		

Sample	Date(s) Treated	Sonar	Date Collected	Rate Applied	Acres Treated	Sample Location Description	Results PPB
1.	06/24/07	Renovat	8/6/2007	1.5ppm	30	Site 1	<1.0ppb
2.				1.5ppm	30	Site 2	<1.0ppb
3.				outside area	-	Site 3	<1.0ppb
4.				OTF (1.85ppm)	8	Site 4	<1.0ppb
5.				-	-	Site 5	<1.0ppb
6.				OTF (1.85ppm)	4	Site 6	<1.0ppb
7.				OTF (1.85ppm)	3	Site 7	<1.0ppb
8.				-	-	Site 8	<1.0ppb
9.				-	-	Site 9	<1.0ppb
10.				-	-	Site 10	<1.0ppb

Depth Sample Collected: elbow	Date Sample Received: 8/7/2007
Storage Conditions: Refrigerated	Condition of Sample(s) Box/Water Containers: Excellent excellent
Date Shipped to SePRO: 8/6/2007	Date Analysis was Performed: 8/8/2007
How would you like results sent to you? Fax <input type="checkbox"/> No <input type="checkbox"/> Regular Mail <input type="checkbox"/> Yes <input type="checkbox"/>	Date Results Sent to Cooperator: 8/8/2007

Back of Data Sheet	Back of Data Sheet
Name of Waterbody: Lake Morey	Size of Waterbody in Acres:
Average Depth in Feet: 0	Target Plant(s) to Control: Eurasian watermilfoil

APPENDIX B

Comprehensive Aquatic Vegetation Survey Information

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

COMPREHENSIVE AQUATIC VEGETATION SURVEY METHODS

These survey methods were derived from the point intercept sampling method developed by the U.S. Army Corps of Engineers (Madsen 1999) and the "Point Intercept Rake Toss Relative Abundance Method" introduced by Cornell University and the New York State Department of Environmental Conservation (Lord and Kishbaugh 2005). Survey methods were validated by DEC staff and modified to incorporate the use of SCUBA diver to verify rake toss data. These point intercept methods are intended to document the spatial distribution of species along with quantifiable measures of percent cover and biomass values.

Using ArcView software, point intercept data points were created by the vertices of an 80 meter grid that was superimposed over the lake's littoral zone. This included all areas of Lake Morey where the reported water depth was less than 20 feet, and was based on the 1973 bathymetric contour map drawn by the Vermont Department of Water Resources.

Data points were navigated to by boat using a Trimble Pro XT Differential GPS unit equipped with sub-meter accuracy. At each data point the boat was anchored at bow and stern. Two rake tosses were then performed on opposite sides of the boat. The total quantity of vegetation collected was assigned a biomass based on the PIRTRAM values shown below:

Rake Toss Vegetation Biomass

Abundance Categories	Field Measure	Typical Dry Weight (g/m ²) Ranges Associated with Plant Abundance
"Z" = no plant(s)	Nothing	0
"T" = trace plant(s)	Fingerful	~ 0.0001 - 2.000
"S" = sparse plant(s)	Handful	~ 2.001 - 140.000
"M" = medium plant(s)	Rakeful	~ 140.001 - 230.000
"D" = dense plant(s)	Can't bring in boat	~ 230.001 - 450.000+

Source: (Lord and Kishbaugh 2005)

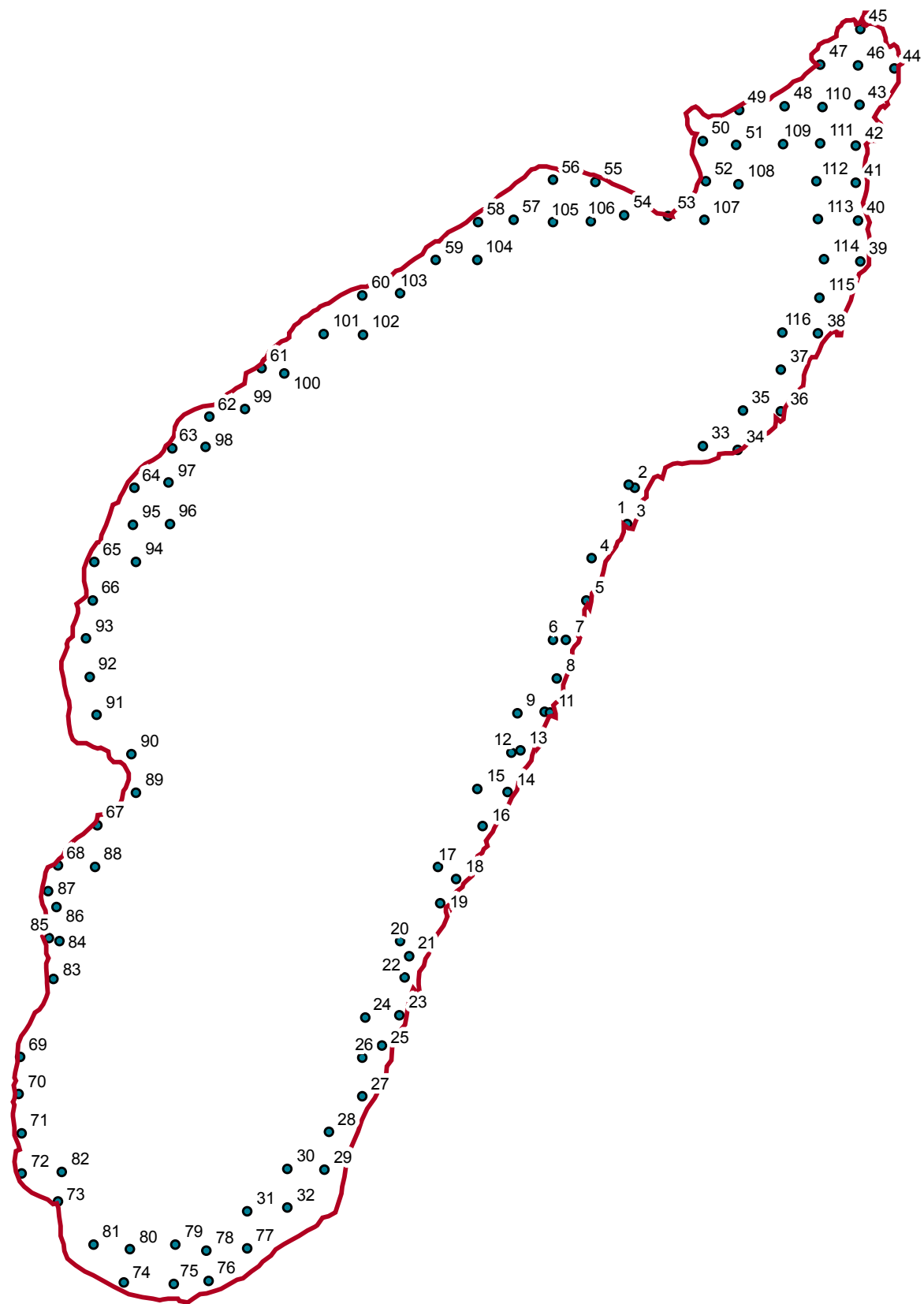
Each rake-full was then separated by plant species and the percent composition of each species was estimated. At data points deeper than five feet a SCUBA diver was used to provide visual verification of the rake toss data.

Water depth was recorded at each data point using a calibrated sounding rod for depths less than 15 feet and a high-resolution fish finder (Lowrance LC X15mt) for depths in excess of 15 feet.

A total of 116 data points were generated based on an 80 meter grid throughout the littoral zone (Figure 1). The depth range of the sampled data points ranged from 2 to 34 feet. Distribution of the data points by depth was fairly uniform.

Depth Distribution of Sampled Data Points

Depth Range (feet)	# Data Points
Less than or equal to 5	25
Greater than 5 and less than or equal to 10	25
Greater than 10 and less than or equal to 20	34
Greater than 20	32
Total	116



Lake Morey

Fairlee, VT

Data Point Location Map

Legend:

- Recorded DGPS survey point locations
Same points sampled during
2006 and 2007 surveys



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FIGURE:	SURVEY DATE:	MAP DATE:
B_1	08/22/07	11/02/07

Lake Morey - Field Survey Data (08/22/07 08/23/07)

SurveyPointID	DEPTH	Lat	Lon	Ca	Cd	Ec	Mb	Ms	Na	Ni	Ny	Pa	Pg	Pi	Pp	Pr	Pprae	Pz	V	Zd	Mu	Fa
1	18	43.92581207	-72.14446799		15			25	1						1							
2	23	43.92586337	-72.14461354		1			1		30												
3	3	43.92512545	-72.14465476					30				1		20				1		20		
4	27	43.92447715	-72.14559436		1															1		
5	4	43.92368493	-72.14574014		1			50	1											40		
6	32	43.92293931	-72.14662664																			
7	15	43.922943	-72.14627401					1						1						20		
8	11	43.92221314	-72.14651721					70				10								20		
9	32	43.92155872	-72.14756296																			
10	13	43.92157626	-72.14684339		1			20	1			40			1					1		
11	3	43.92156755	-72.14670825					10				10								60		
12	29	43.92080985	-72.14772238																			
13	17	43.92084971	-72.14748591						1						40		10					
14	3	43.92005814	-72.14782225		5			20				60								5		
15	33	43.92012606	-72.14861076																			
16	17	43.91942736	-72.14847373					40												10		
17	31	43.91864852	-72.14966185																			
18	13	43.9184169	-72.14917525		30			25											10			
19	14	43.91795856	-72.1495925		60									1					1	20		
20	32	43.91724949	-72.15064503																			
21	16	43.91696865	-72.1504224		30			10	1	5							1		5			
22	14	43.91656028	-72.1505317		1			1	10	10							1					
23	5	43.91584887	-72.15067508		10			60	1			10				1		1	1			
24	32	43.91581274	-72.15157498																			
25	16	43.91527669	-72.15114701		20			50														
26	29	43.91504737	-72.15164884																			
27	6	43.91431011	-72.15166238		20			30				20								5		
28	25	43.91365088	-72.15254343							30												
29	10	43.91292846	-72.15266002		10		1	70				10		1		1						
30	26	43.91295245	-72.15362939							10												10
31	23	43.91215479	-72.15468309		1					10												10
32	9	43.91221295	-72.1536341		1	20	5	5				10		10		5			1			
33	6	43.92659818	-72.14267219				10	5					1			30			1			
34	2	43.92652367	-72.14176789	1			1	5	10	5	5					1				5		
35	10	43.9272716	-72.14162429		5			80					1									
36	3	43.92724031	-72.14062378		40		5	5				10									5	
37	11	43.92803581	-72.14061574		40		1									1	10		5			
38	5	43.92871795	-72.13964087		20		1	1					1	1		10			1	10		1
39	4	43.93008179	-72.13853491		15							5							10	35		

Lake Morey - Field Survey Data (08/22/07 08/23/07)

SurveyPointID	DEPTH	Lat	Lon	Ca	Cd	Ec	Mb	Ms	Na	Ni	Ny	Pa	Pg	Pi	Pp	Pr	Pprae	Pz	V	Zd	Mu	Fa	
40	5	43.93085722	-72.13858511	5			15		5			20					20		5	10			
41	6	43.93156299	-72.13864308				1		1			5	20			30				1	10		
42	7	43.93226375	-72.13862566				10		1				10			20				1			
43	7	43.93304064	-72.13852863													10					5		
44	4	43.93372561	-72.13761874				20	5	5			20				30				1			
45	3	43.93447649	-72.13851001					1	20		20	10				10				5	5		1
46	6	43.93378169	-72.13856653				20		1									20			10		1
47	5	43.93380876	-72.13955073			1		5				10				50							
48	6	43.933025	-72.14048186					15	30				10			15							
49	3	43.9329539	-72.14168843					10	10			10	10			10					5		
50	4	43.93237307	-72.14264465					1								70					5		1
51	10	43.93229993	-72.14175844				30			1													1
52	6	43.93160771	-72.14256378				10		1	10						25		5					
53	4	43.9309567	-72.14354927	1						5										1	5		
54	8	43.93097232	-72.14470464				25		1				15			10					1		
55	4	43.93160735	-72.1454559				20									20				1	5		
56	6	43.93164848	-72.1465701									25				25				5			
57	10	43.93090033	-72.14761094				10			5	5				5		5			1			1
58	6	43.93085846	-72.1485292									40	15	1		10		5					
59	12	43.93013939	-72.14964411					1	1	30	1				1	10				10			
60	10	43.92947499	-72.15157022																				
61	2	43.92810401	-72.15422191				10		40														
62	10	43.92718738	-72.15559295						10										5				
63	5	43.92659508	-72.15656582				1		20		25					5					20		
64	8	43.92584581	-72.15757055				1	1	10	10		5		1		30							
65	7	43.92444811	-72.15862721				20		40							5							
66	6	43.92372655	-72.15866867						35			5											
67	10	43.91947115	-72.15857351						60														
68	11	43.91870827	-72.15960424						15					1		10				5			
69	12	43.91508234	-72.16062001																				
70	6	43.91437983	-72.16065157						35	5													
71	8	43.91364484	-72.16059312						20														1
72	2	43.91287589	-72.16058091				5		1		5		15									1	
73	4	43.91235384	-72.1596486				20	1							20						5		
74	3	43.91080593	-72.15792763					5	5											5	30		
75	4	43.9107856	-72.15661039				30		1	1			1								5		1
76	4	43.91083829	-72.15571393							5		30								5	10	1	
77	5	43.91144623	-72.1546932	10						1		10		10						5			
78	18	43.91141244	-72.15575289				5													5			10

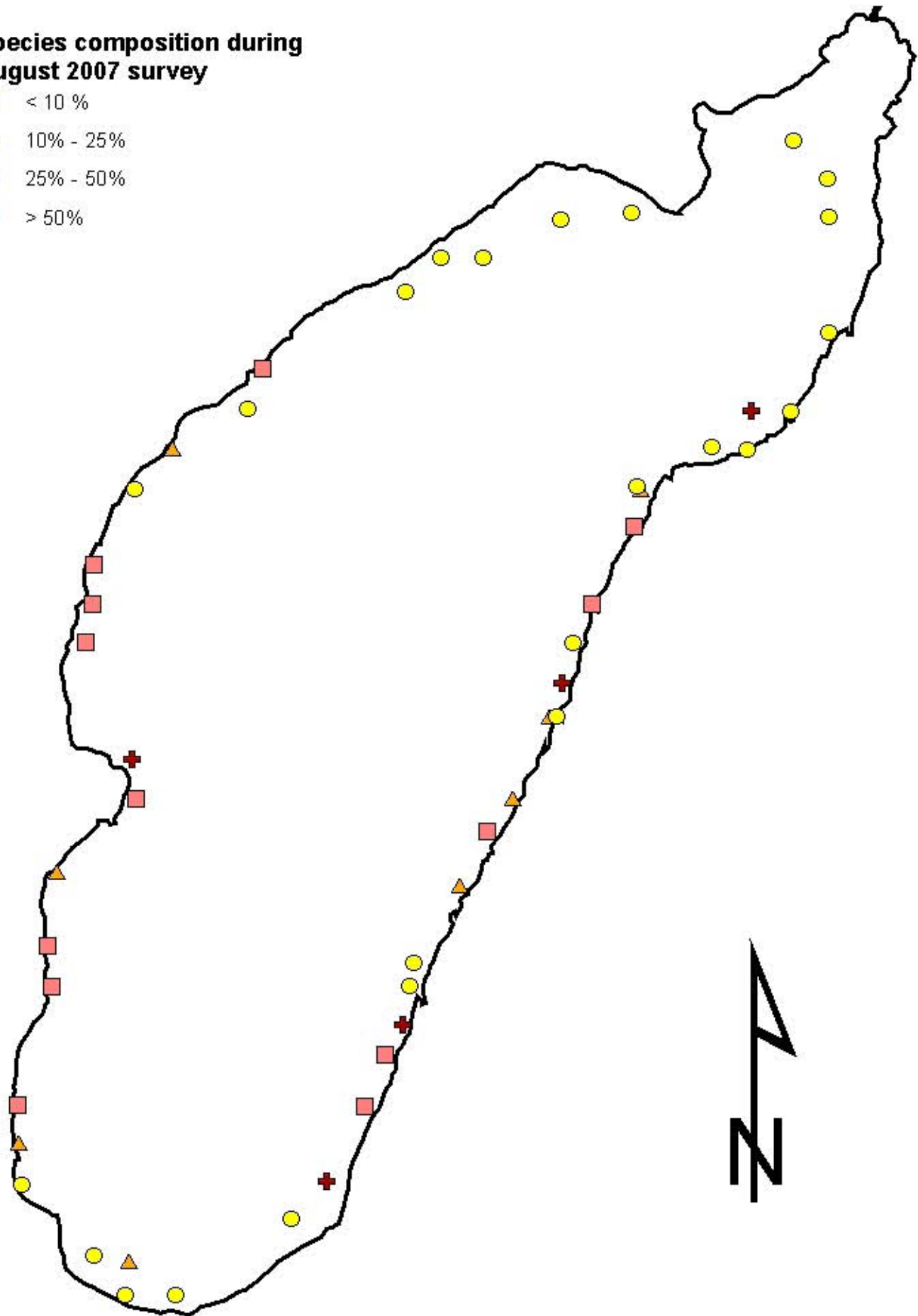
Lake Morey - Field Survey Data (08/22/07 08/23/07)

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79	22	43.91153042	-72.1565656		5					5												20
80	15	43.91143784	-72.1577588		25			25				5					10					
81	9	43.9115313	-72.15872315				25	1				10			1	25						
82	30	43.91290917	-72.15952994																			
83	15	43.91656457	-72.15973277		5			35	5			5									5	
84	32	43.91727776	-72.15957932																			
85	14	43.91733699	-72.15984685					30	5						5							
86	30	43.91791608	-72.15964346																			
87	12	43.91822175	-72.15986344							5					5						5	
88	34	43.91868094	-72.15863895																			
89	18	43.92008136	-72.15754696					50				5										
90	15	43.92081068	-72.15766103					80												5	5	
91	21	43.92155417	-72.15857467																			
92	22	43.92228069	-72.15875759		20					50					5							
93	15	43.92300034	-72.15883892		5			30														
94	28	43.92445394	-72.15752624																			
95	23	43.92515557	-72.15760034		5					90												
96	29	43.9251675	-72.15663379																			
97	24	43.92595127	-72.15666727							70												5
98	23	43.92661959	-72.15569047																			30
99	25	43.92732955	-72.15466319		5			5														20
100	23	43.92800317	-72.15361529							70					25							
101	18	43.92874932	-72.1525883		10					10							15					50
102	26	43.92872847	-72.15155376																			50
103	24	43.92950788	-72.15058374					5														70
104	22	43.93013874	-72.14856385		1			1		30												40
105	11	43.93084333	-72.14656523		1		1	10								5						
106	21	43.93086037	-72.14557414		5												5					20
107	21	43.93087549	-72.14260993		5					5						5						60
108	20	43.93155287	-72.14170179		1				1	30												40
109	20	43.93231011	-72.140539		1			1								1						60
110	17	43.93300378	-72.13950682		10											1	15					
111	17	43.93231664	-72.13957258		25				1						25	1	25					1
112	18	43.93159448	-72.13965922		5			1								5						50
113	20	43.93087876	-72.13962314		1			1					5									50
114	19	43.93012255	-72.13947142		5							5										
115	15	43.92939817	-72.13959941						30				5			5	20					
116	20	43.9287393	-72.14057127												5		5					15

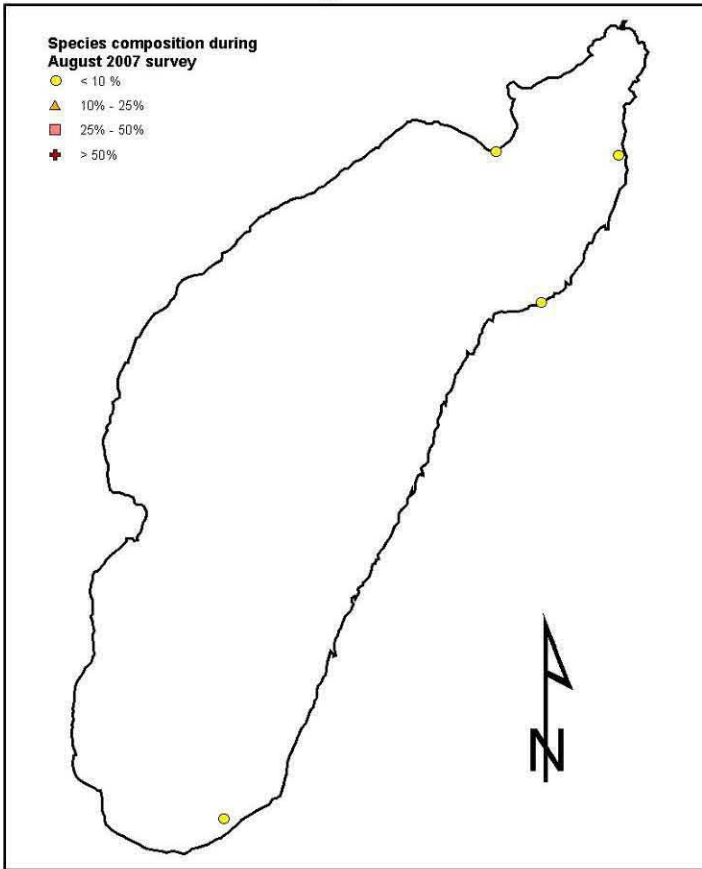
Locations of *Myriophyllum spicatum*

Species composition during August 2007 survey

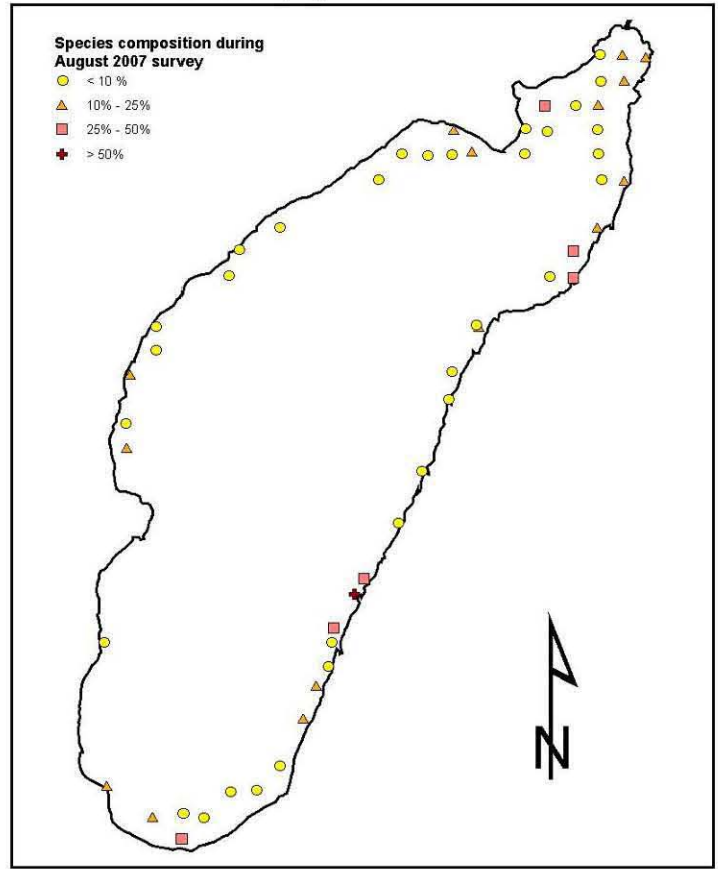
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- ▲ 10% - 25%
- 25% - 50%
- ✚ > 50%



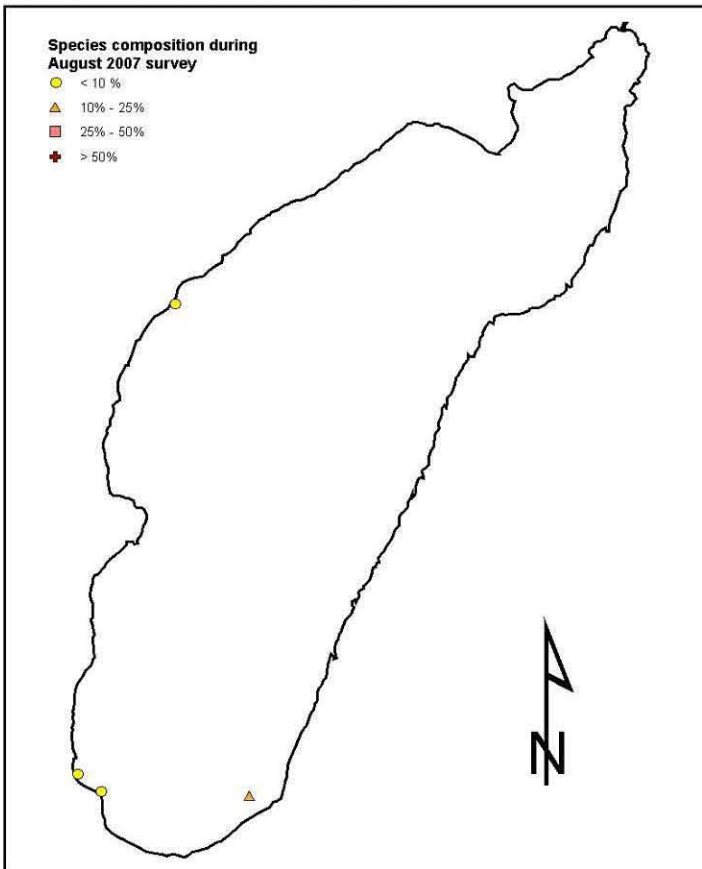
Locations of *Chara vulgaris*



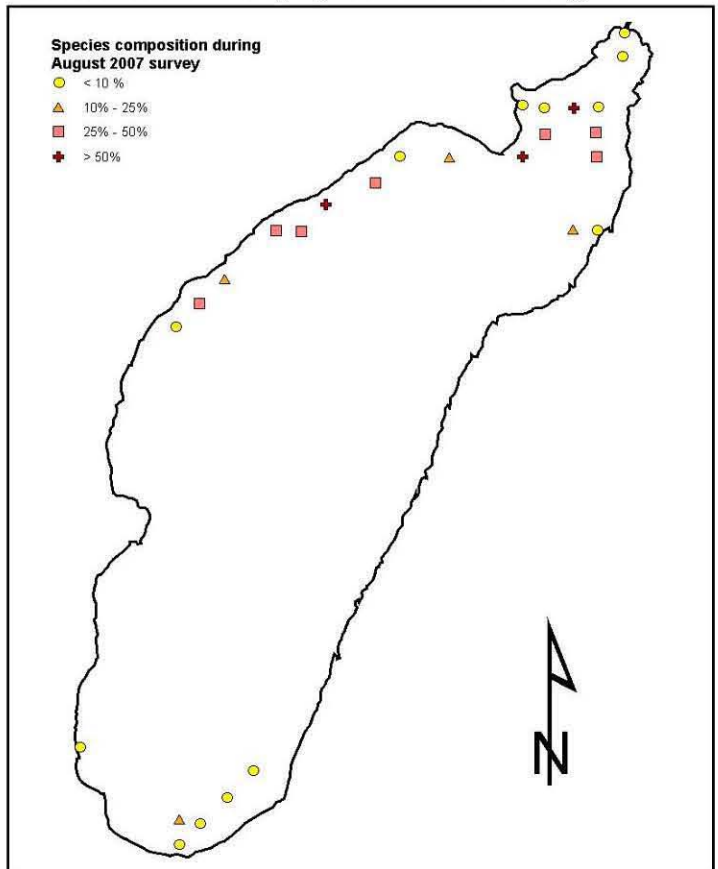
Locations of *Ceratophyllum demersum*



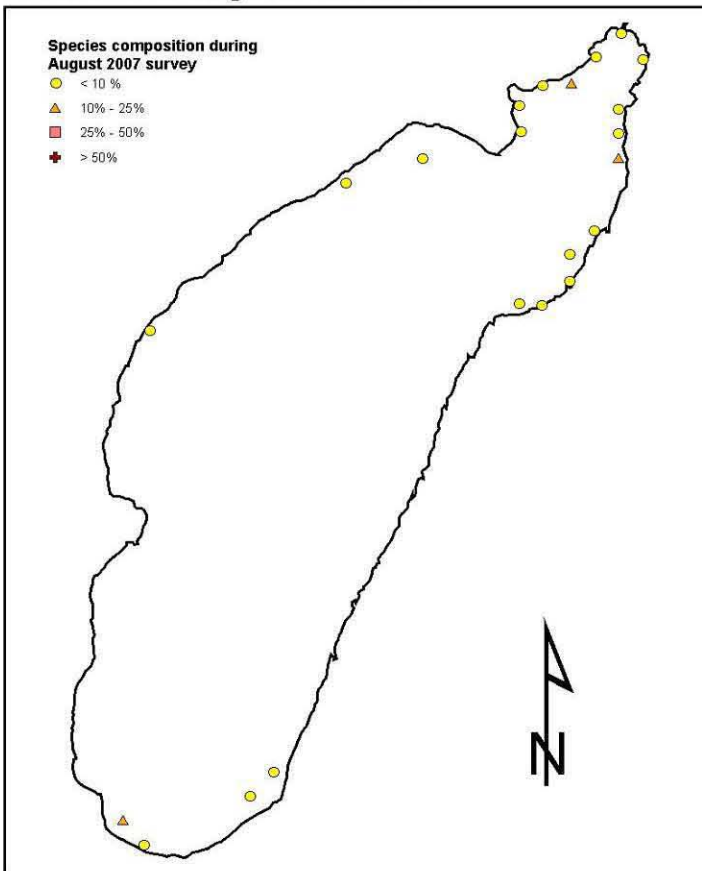
Locations of *Elodea canadensis*



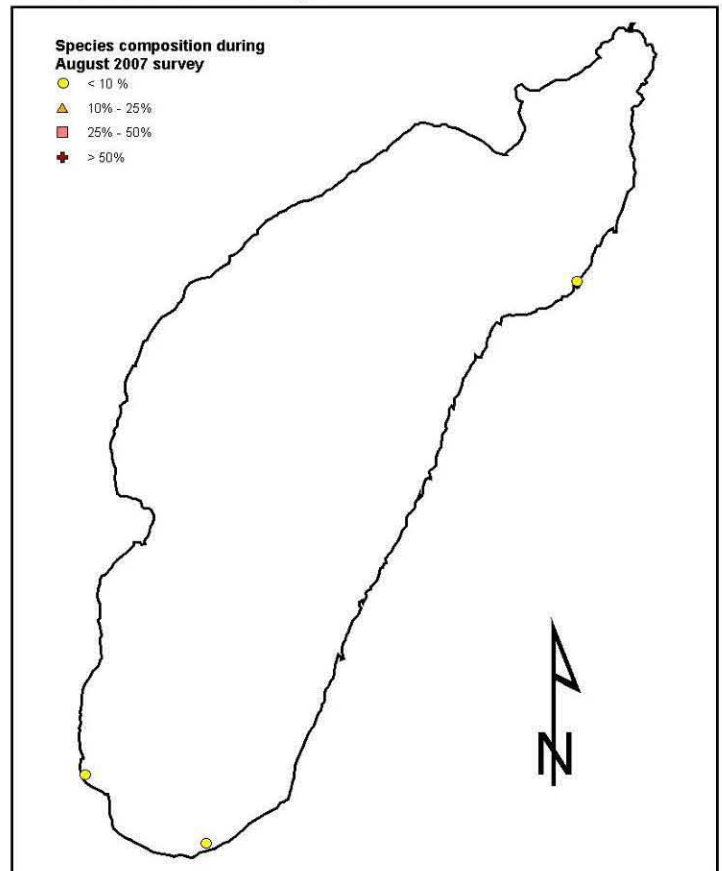
Locations of *Chlorophyta Filamentous algae*



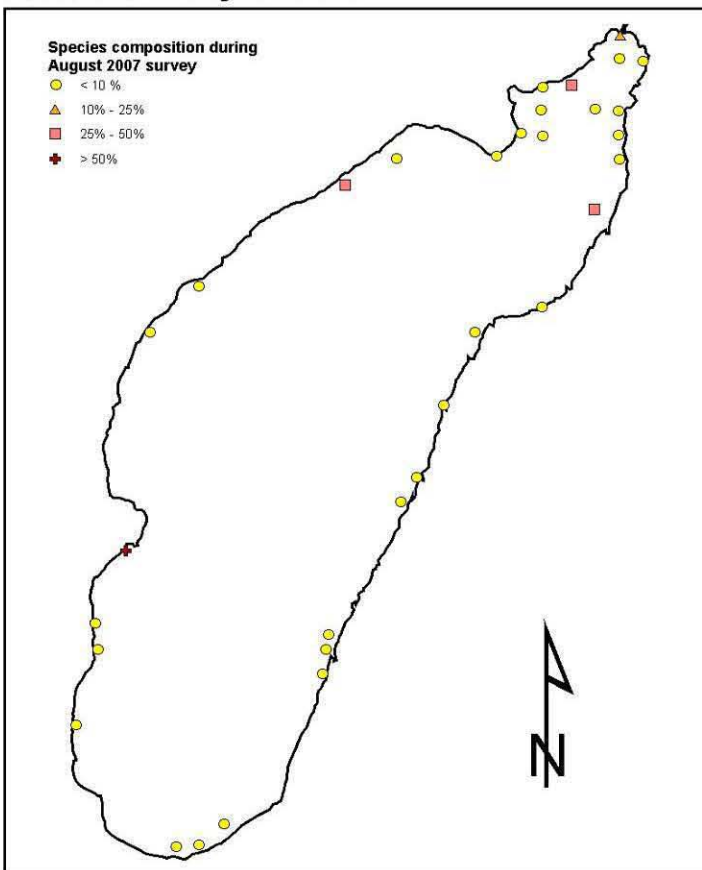
Locations of *Megalodonta beckii*



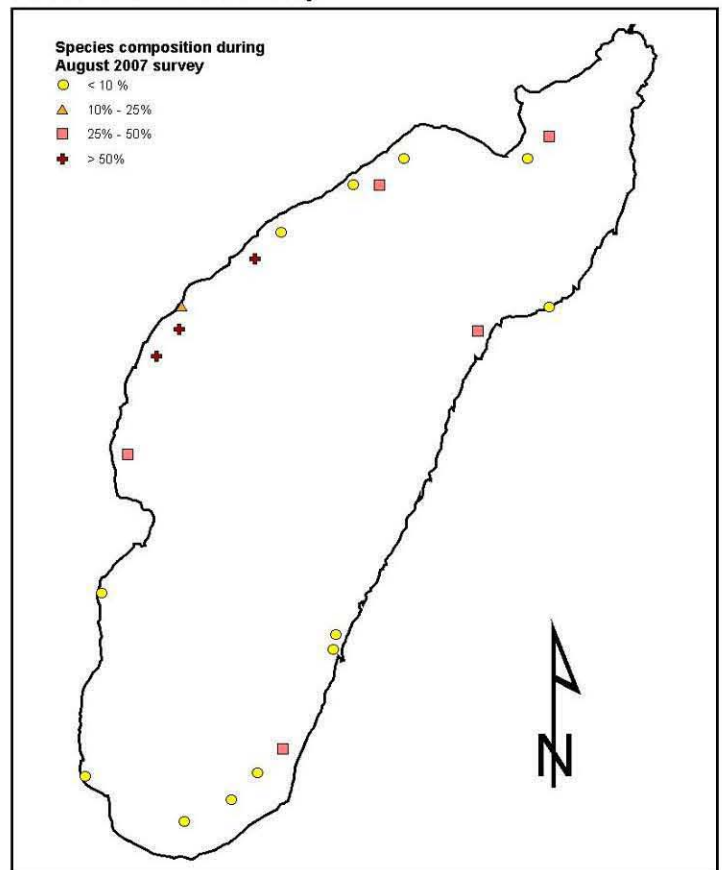
Locations of *Musci* sp.



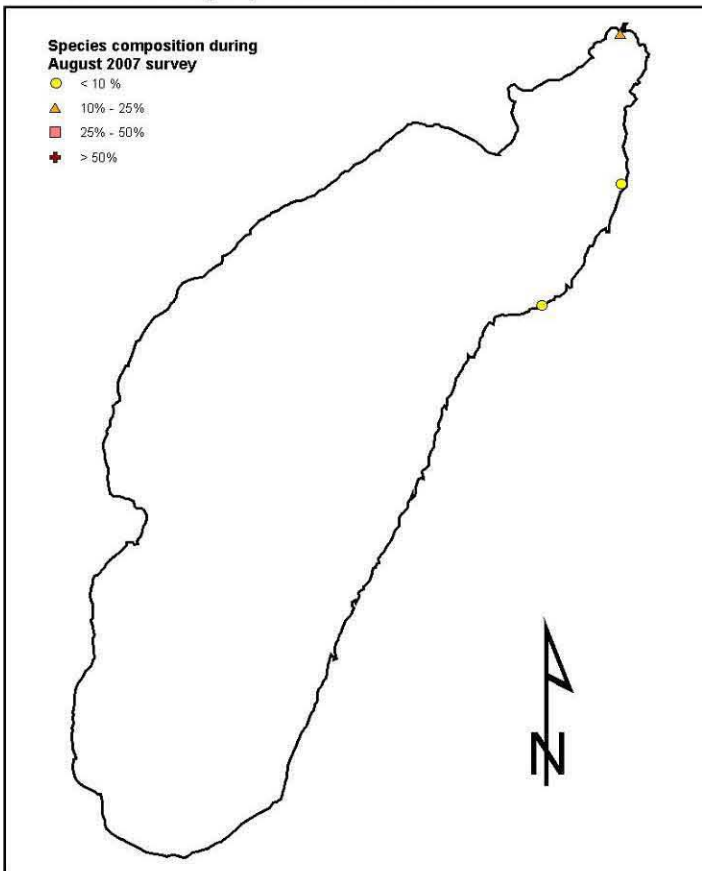
Locations of *Najas flexilis*



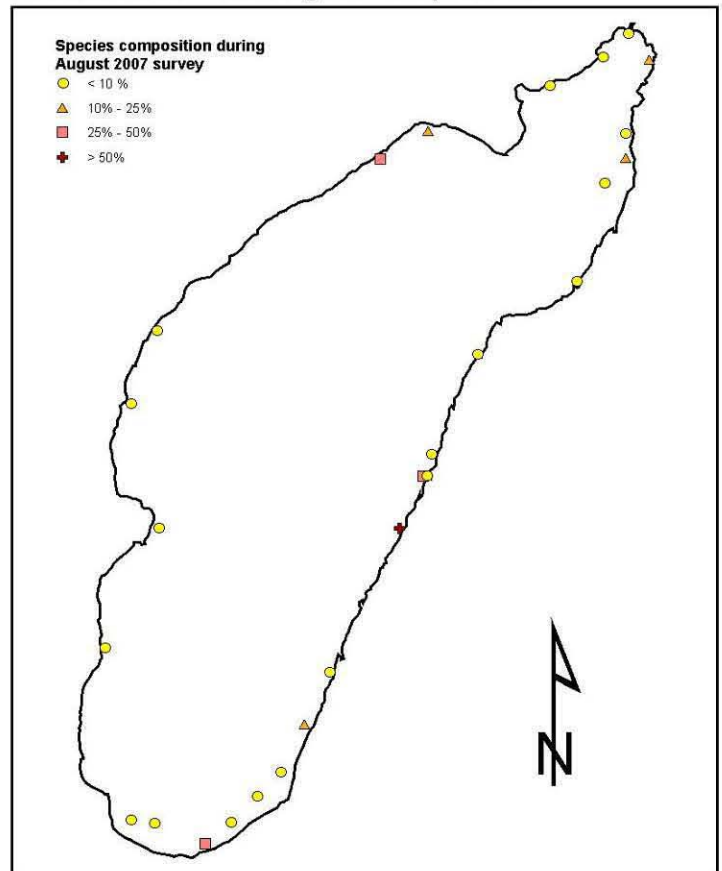
Locations of *Nitella* sp.



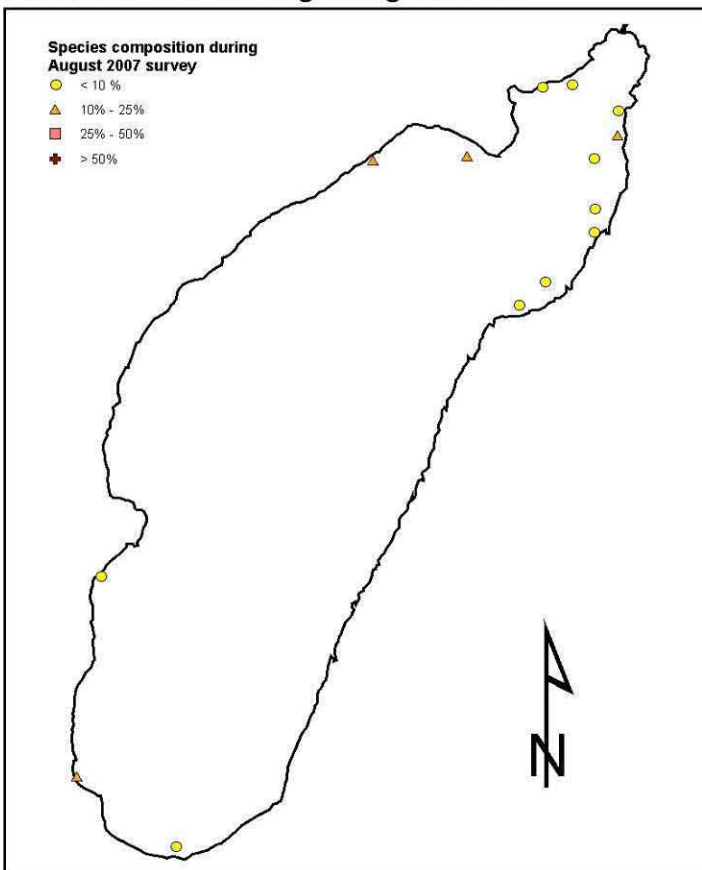
Locations of *Nymphaea odorata*



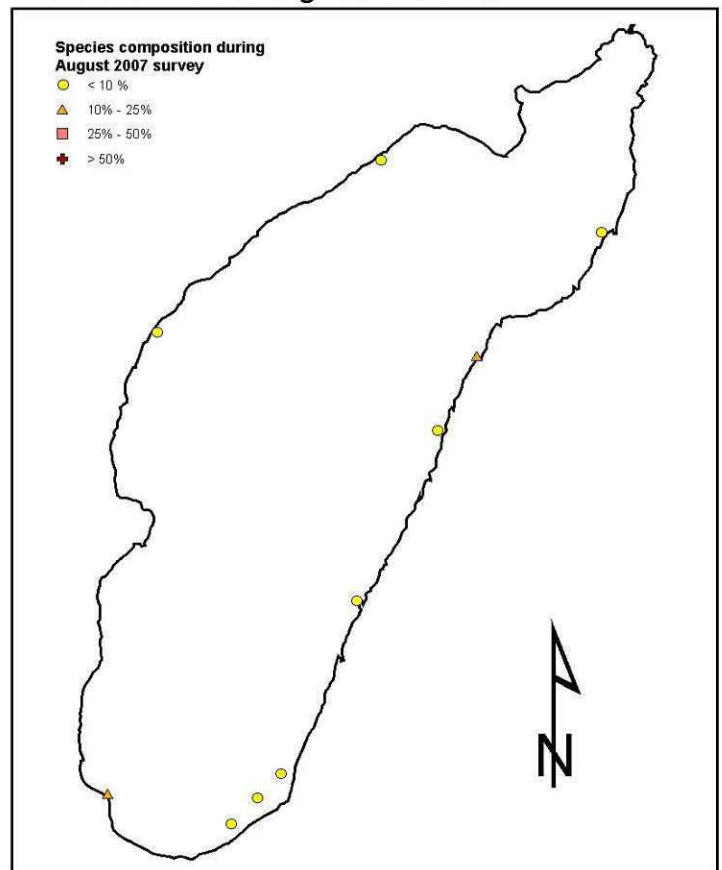
Locations of *Potamogeton amplifolius*



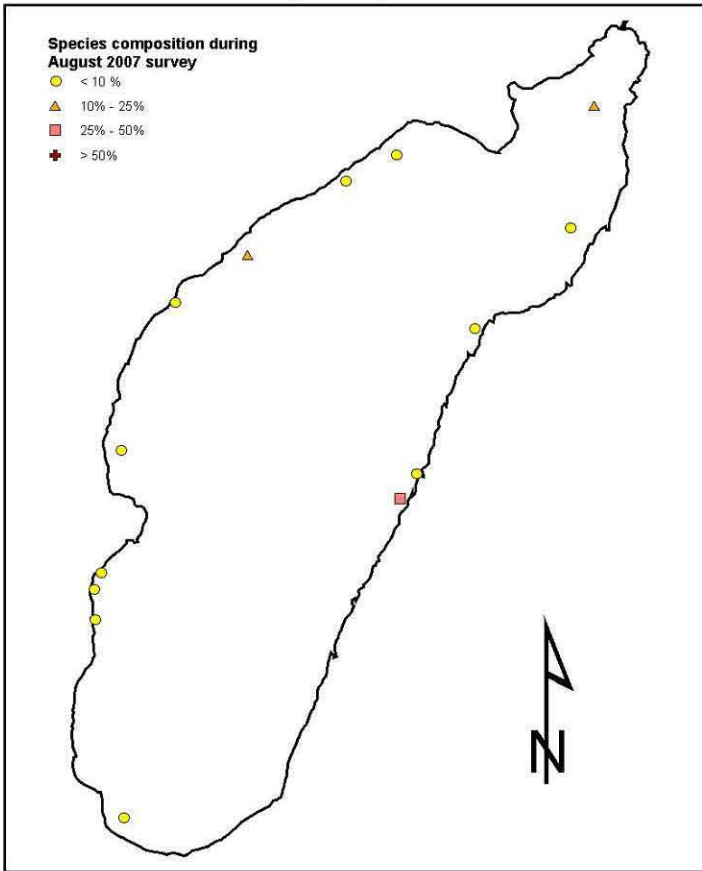
Locations of *Potamogeton gramineus*



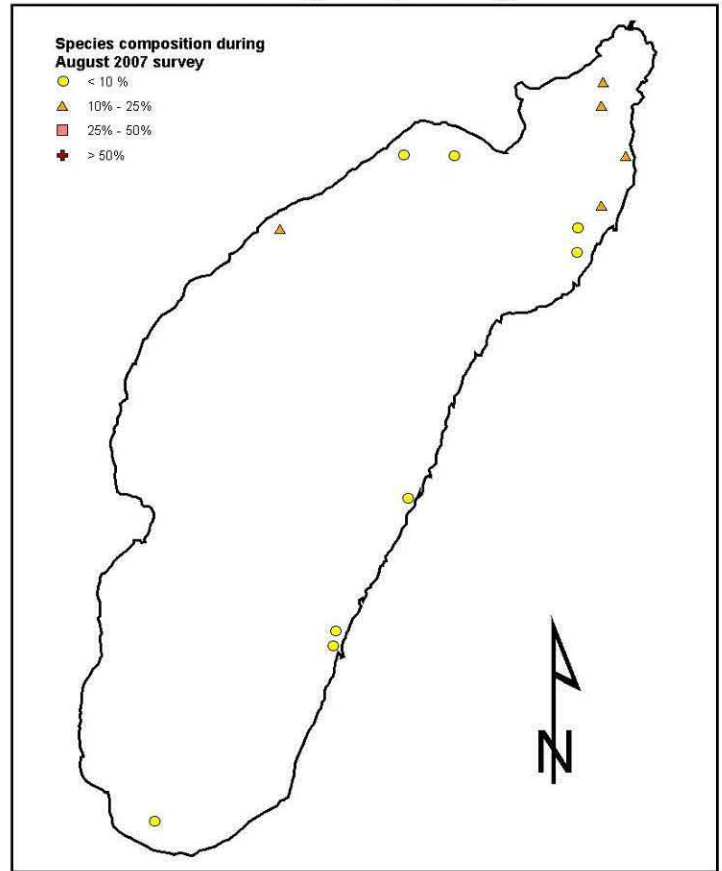
Locations of *Potamogeton illinoensis*



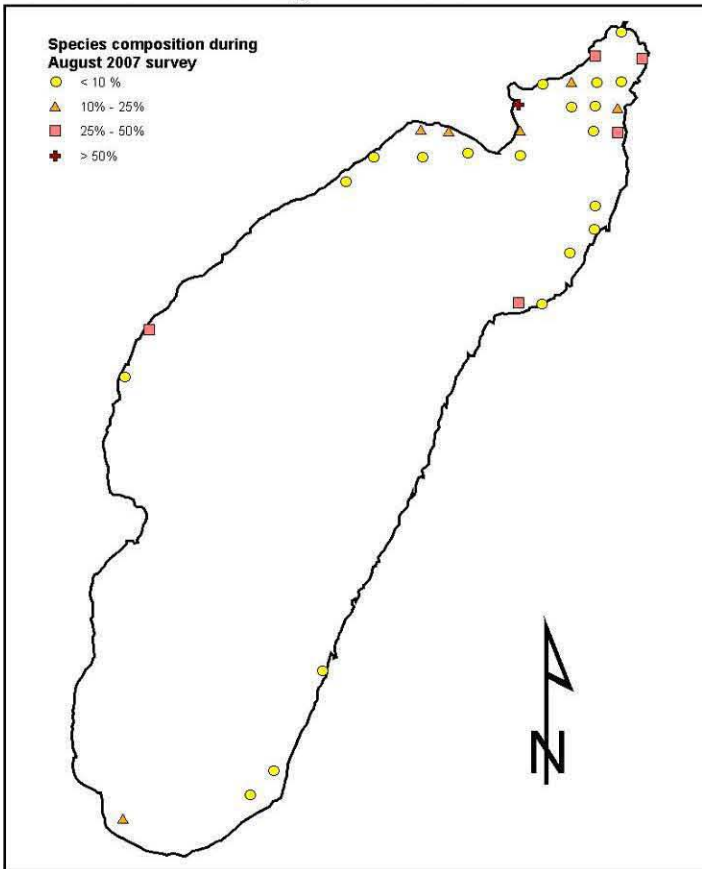
Locations of *Potamogeton pusillus*



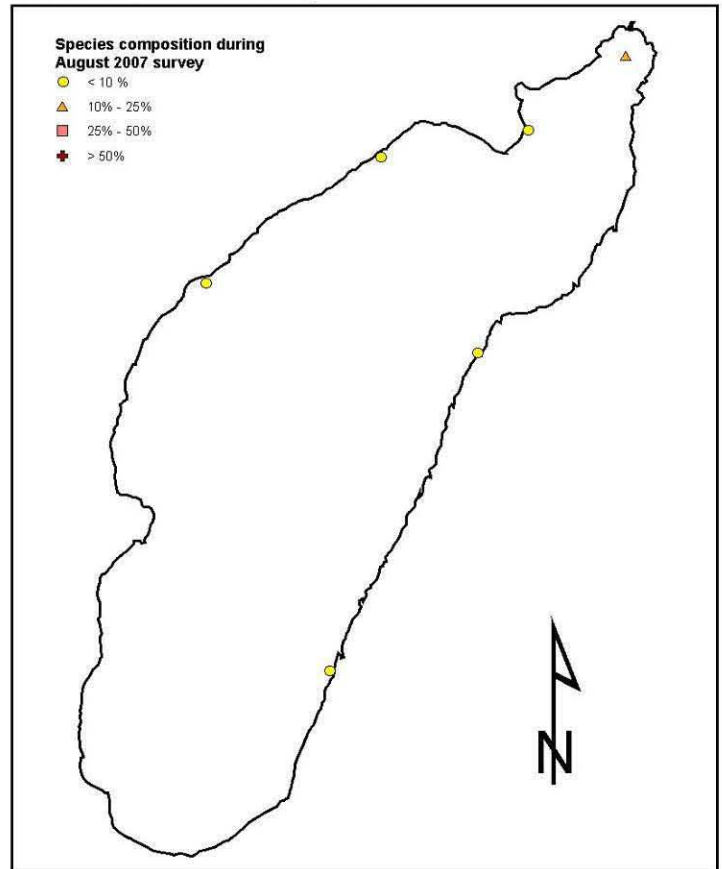
Locations of *Potamogeton praelongus*



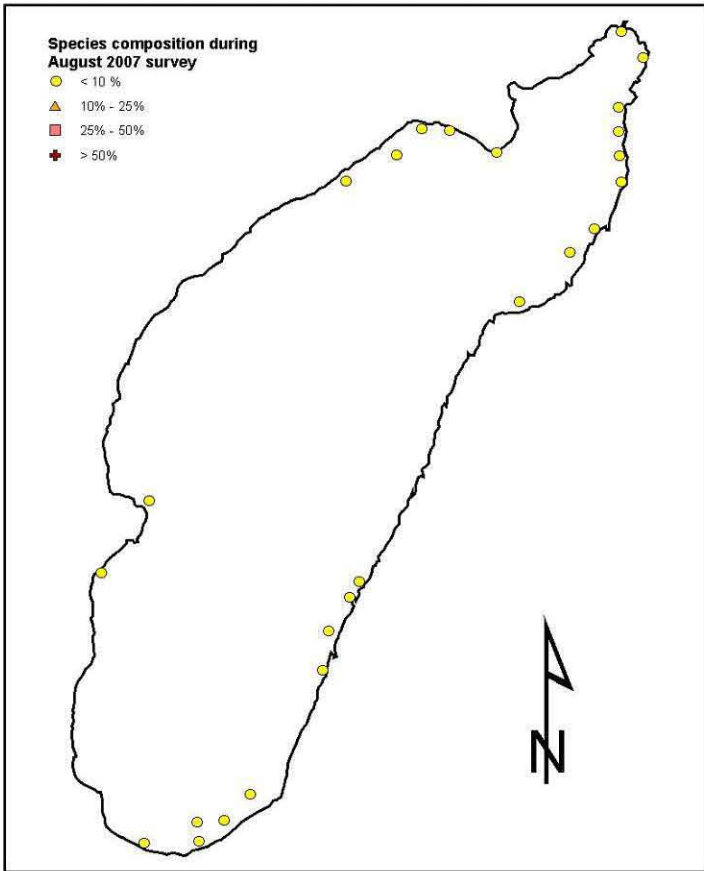
Locations of *Potamogeton robbinsii*



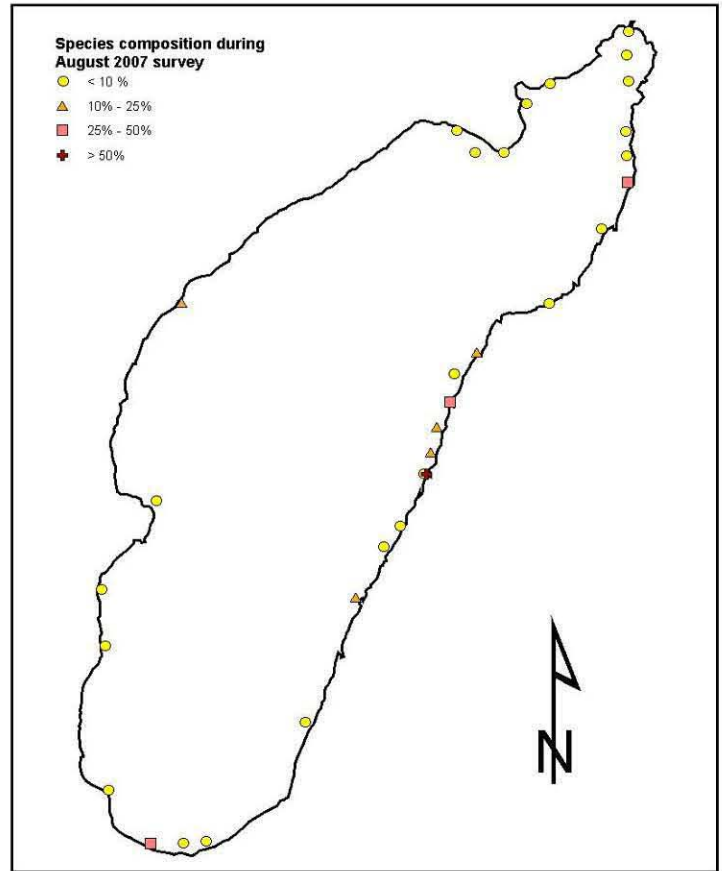
Locations of *Potamogeton zosteriformis*



Locations of *Vallisneria americana*



Locations of *Zosterella dubia*



APPENDIX C

Non-Chemical Control Activities – 2007 Summary

- Letter from Frank Barrett, Jr., Chair, Fairlee Selectboard
- Log, Map and Email clarification of Non-Chemical Controls completed in 2007
– prepared by LMPA

Town Clerk • Treasurer
Tel: (802) 333-4363
Fax: (802) 333-9214
Selectboard Office
Tel: (802) 333-9653



Town Offices

P.O. Box 95 • Fairlee, VT 05045

Zoning Administrator
Planning Commission
Development Review Board
Tel: (802) 333-4158
Listers
Tel: (802) 333-9829

September 24, 2007

Ms. Susan Brittin
Vermont DEC
103 South Main Street
Building 10 North
Waterbury, Vermont 05671

Dear Ms. Brittin,

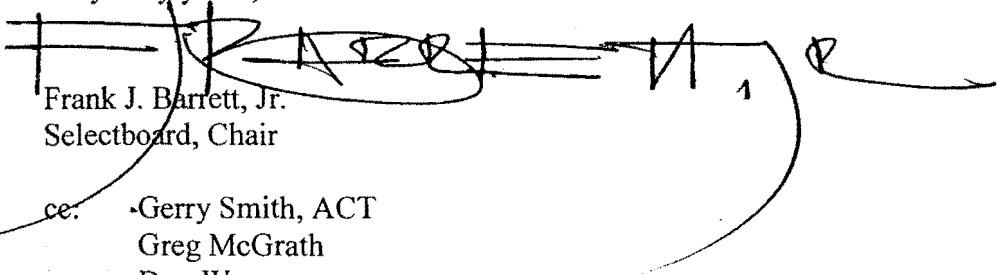
This is in reference to your letter of August 15, 2007 regarding the status of 2007 spread prevention and non-chemical control activities at Lake Morey as stipulated in ANC Permit 2006-C25.

Bottom Barrier Removal and Relocation: As prescribed in the minor modification of ANC Permit 2005-B05, dated May 29, 2007, all bottom barriers and associated anchoring arrangements were removed from Areas 9, 10, 11, 12, and 14. This amounted to 129,200 square feet of material. Of this, 6,000 square feet were relocated to Area 15 and 26,100 square feet to Area 16. The balance was placed in storage.

Hand Harvesting: To date, over 1,500 hours of volunteer effort have been reported for the Adopt-a-Lake Program. This entails monitoring, hand harvesting using diving equipment, and floating fragment removal. In addition, several families engaged professional divers who hand harvested their respective properties.

Should you have any questions regarding the above, please contact Don Weaver at (802) 333-4491 before October 11th or (919) 851-4491 after that date. You can also e-mail him at: donweaver@att.net.

Very truly yours,


Frank J. Barrett, Jr.
Selectboard, Chair

cc: •Gerry Smith, ACT
Greg McGrath
Don Weaver

Log of non-chemical treatment in Renovated treated areas								
Area	Name/ Location	Hand-Puller Hours			Watcher/Searcher Hours			total
		JUL	AUG	SEP	JUL	AUG	SEP	
N	2	14	8					22
W	4	15	20					35
BB	5	4	8		6	8		26
N	6	1						1
BB	7	12	31	7				50
N	8	12	8	4				24
N	9				7	6	2	15
E	10		2	1				3
E	11		2	1		1		4
BB	12	7	7	2				16
N	13	12	13	7	6	4		42
BB	14				5	1		6
W	15	1	1	6				8
N	16				2	3	1	6
BB	17				4	4		8
N	18				5		5	10
W	19				2	3	2	7
	total	78	100	28	37	30	10	283
	Name/ Location							
	2	Hylander + Ozimek			Pine Brook			
	4	McCarty						
	5	Bacigalupo			Pine Lodge			
	6	Handshaw			Windfall			
	7	Low			Lowlock			
	8	T. Southworth			Wawonaissa			
	9	J. Southworth			Wawonaissa			
	10	Gundersen, Sr.			Corsair			
	11	Gundersen, Jr.			Corsair			
	12	Bonneville			Pine Lodge			
	13	Durgin			Sunny Brook			
	14	Armstrong			Breezy Beach			
	15	Weaver			Wychwood			
	16	McGrath+Sherman			Haleohana			
	17	Armstrong			Breezy Beach			
	18	Friedman			Osprey Cove			
	19	Duncan			Flower Hill			

Marc Bellaud

From: Robert McGrath [rgmcgrath@verizon.net]
Sent: Friday, November 16, 2007 10:01 PM
To: Marc Bellaud; ann.bove@state.vt.us; Susan.Brittin@state.vt.us; ginny.garrison@state.vt.us
Cc: Gregory Allen; John Larrabee; Don Weaver
Subject: Non-chemical costs

Upon reviewing last Thursday's discussion I realize there may have been some misunderstanding of the amount of non-chemical treatment of milfoil in Lake Morey this past summer and planned for 2008.

In 2007 total milfoil expenditures were \$136,839.56 of which \$61,647.84 (45%) was for non-chemical treatments and \$75,191.72 (55%) was for chemical treatment. The proposed Town of Fairlee budget for 2008 includes \$51,250 (36%) for non-chemical treatments and \$90,700 (64%) for chemical treatment. When non-Town expenditures by lakeshore owners get included next year the percent of non-chemical treatments will increase.

These figures indicate Lake Morey is making a very substantial non-chemical effort. Of course the chemical treatment is perhaps an order of magnitude more cost effective than the non-chemical treatments in controlling milfoil.

Greg McGrath
802-333-3692