

Lake George Eurasian Watermilfoil Management Program
Physical Plant Management Evaluation - 2002



DARRIN
Fresh Water Institute

Lake George, New York
Adirondack Field Station at Bolton Landing

**A REVIEW OF
PHYSICAL AQUATIC PLANT MANAGEMENT EFFORTS
FOR LAKE GEORGE, NEW YORK IN 2002**

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EXECUTIVE SUMMARY

In 2002, the Lake George Park Commission (LGPC) secured the services of a consultant, Lycott Environmental Services (LES), to replace the Darrin Fresh Water Institute (DFWI) as the primary contractor for the Lake George Eurasian watermilfoil Management Program. While assured of the capabilities of LES, the LGPC requested the DFWI to evaluate the efforts of the consultant during their first year of physical management efforts and to provide services to assist the consultant in the implementation of the aquatic plant control efforts.

The staff of the DFWI conducted an evaluation of the physical management efforts of the staff of LES during the 2002 management effort. The evaluation took the form of site inspections following completion of management efforts by LES. A total of 43 sites were visited by the staff of the DFWI. Milfoil density at the sites reviewed included: no milfoil present (12 sites), scattered milfoil plants (13 sites), moderate density milfoil growth (2 sites) and dense or bed growth (16 sites).

As part of the evaluation of the hand harvesting effort, 25 sites with variable numbers of Eurasian watermilfoil plants harvested by Lycott Environmental were visited by the staff of the DFWI between July 30th and October 9, 2002. The staff of the DFWI harvested a total of 50 Eurasian watermilfoil plants compared to the initial harvest of 1283 by the staff of Lycott Environmental Services. This translates to 96% removal efficiency when Eurasian watermilfoil was present at hand harvestable levels. Hand harvesting efficiency ranged from 50 to 100%, with a mean value of 90%. This compares favorably with published values of approximately 85% efficiency in historical reports.

The suction harvester was employed by LES at a single location – Shepards Park (M-7). A total of 46 barrels of milfoil were removed from this site during 5 days of suction harvesting. A barrel consists of a 30 gallon garbage can packed tightly with Eurasian watermilfoil. The staff of the DFWI visited this site on October 23, 2002 and prepared a map of the area of dense growth of Eurasian watermilfoil. A substantial amount of Eurasian watermilfoil was removed by suction harvesting during the 2002 management season. While numerous scattered Eurasian watermilfoil plants remain, the overall suction harvesting effort was effective. Dense growth of Eurasian watermilfoil along the perimeter of Shepards Park beach was effectively reduced to low and moderate density scattered growth. Dense growth of Eurasian watermilfoil, however continues to expand at this location, with a small area of newly located dense growth to the northeast of the suction harvest area as well as the near continuous dense growth of Eurasian watermilfoil extending north from the Sheriff's Dock area.

Three sites managed with benthic barrier during 2002 by LES were inspected. In all cases, benthic barrier placement was in a neat and orderly manner, with no gas pockets or excess sediment overburden. A total of 6650 ft² of benthic barrier was reclaimed from several locations and redeployed to manage Eurasian watermilfoil at Clark Hollow, North Jenkins Brook, and Camp Andrew Bay, West. At all three locations, scattered growth of

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Eurasian watermilfoil remains on the margins of the barrier, which should be manageable by hand harvesting in future years.

Overall, the 2002 Lake George Eurasian watermilfoil Management Program continued to build on the efforts of past programs. The staff of the DFWI would like to acknowledge the diligence and skill shown by Rich King and the staff of Lycott Environmental Services during the 2002 Lake George Aquatic Plant Management Program.

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Introduction

In 1994, a proposal for integrated aquatic plant management was developed by the Darrin Fresh Water Institute (DFWI) and submitted to the Lake George Park Commission (LGPC). The proposal involved a cooperative effort by LGPC and DFWI personnel to apply physical control methods for aquatic plant management. In 1995, a multi-year program incorporating hand harvesting, suction harvesting and benthic barrier was initiated. As of the end of 2001, a total of 141 sites were identified which had supported Eurasian watermilfoil in at least one prior survey. Half of these sites are located in the southern basin, with high concentrations near human population centers and boat-use areas including: Lake George Village, Bolton Landing, and the southeastern shallow bays (Dunhams, Harris and Warner). In the north basin, clusters of Eurasian watermilfoil populations are found near Huletts Landing, Putnam, Hague, and the outlet.

In 2002, the LGPC secured the services of a consultant, Lycott Environmental Services (LES), to replace the DFWI as the primary contractor for the physical aquatic plant management programs. While assured of the capabilities of LES, the LGPC requested the DFWI to prepare a work plan to evaluate the efforts of the consultant during their first year of physical management efforts and to provide services to assist the consultant in the implementation of the aquatic plant control efforts. The following report describes the efforts by the DFWI to meet these requests.

Physical Plant Management Techniques – Training and Assistance

In May of 2002, staff of the DFWI met with Richard King, on-site coordinator for LES, to share experiences and data from the 2001 Lake George Eurasian Watermilfoil Management Program. DFWI staff provided electronic versions of existing reports, GPS/GIS references for each management location, assistance on aquatic plant identification, detailed descriptions of harvesting techniques, suggested reporting requirements, and appropriate disposal protocols and suggested general operations. At this time, logistics were discussed and DFWI staff involvement tentatively scheduled for suction harvester operation and benthic barrier removal and installation.

The Lake George Eurasian Watermilfoil Management Program for 2002 was initiated on July 1, 2002. Staff of the Darrin Fresh Water Institute provided support to the consultant in the identification of native aquatic plant species, site access and in-the-water milfoil search patterns. Data log sheets, parameters to be recorded and updated milfoil site maps were also provided. Latitude and longitude coordinates were also provided to the consultant for GPS location of each of the recorded milfoil sites for Lake George. Between July 30 and October 23, 2002, DFWI staff visited 42 sites to conduct evaluation of plant management efforts completed by LES.

On July 31, staff of the DFWI (2 divers) assisted the consultant on the first day of benthic barrier installation, regarding site location, barrier removal and cleaning, equipment setup, supplies, and barrier installation logistics. LES and staff of the DFWI installed five panels of Palco Pond Liner on this day, covering a portion of the dense growth of

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Eurasian watermilfoil at this location. Experiences of the DFWI staff in logistics of benthic barrier installation were shared, including barrier acquisition, transport, layout and installation to cover dense growth of Eurasian watermilfoil. Methods to limit milfoil fragment dispersal were also discussed and skimming techniques to capture milfoil fragments were demonstrated.

On August 5, staff of the DFWI (1 diver) assisted the consultant on the first day of operation of the suction harvesting system, regarding equipment setup, startup and operation, handling of harvested materials and harvesting logistics. Methods to limit milfoil fragment dispersal were also discussed and skimming techniques to capture milfoil fragments were demonstrated.

Evaluation of Physical Management Efforts

The staff of the DFWI conducted an evaluation of the physical management efforts of the staff of LES during the 2002 management effort. The evaluation took the form of site inspections following completion of management efforts by LES. A total of 43 sites were visited by the staff of the DFWI (Table 1). Milfoil density at the sites reviewed included: no milfoil present (12 sites), scattered milfoil plants (13 sites), moderate density milfoil growth (2 sites) and dense or bed growth (16 sites). At 31 of the 43 sites (72%), LES and the staff of the DFWI agreed on the density of Eurasian watermilfoil growth. For an additional 9 sites (14%), differences in assignment of Eurasian watermilfoil density were the result of management activities by LES, reducing density of growth prior to inspection by the staff of the DFWI. At two sites, DFWI staff found a small number of Eurasian watermilfoil plants (less than 10) where LES reported no Eurasian watermilfoil present, and at a single site (Whale Rock), DFWI staff reported bed density while LES reported moderate density Eurasian watermilfoil growth. This high level of consistency in reporting of density levels of Eurasian watermilfoil growth, and thus selection of management practices is encouraging.

Table 1. Sites surveyed

Site #	Site Name	DFWI SURVEY		LYCOTT SURVEY		2002 Action
		Density of Milfoil	Number of Milfoil Plants	Density of Milfoil	Number of Milfoil Plants	
1	NWB-Brook inflow	bed	tntc	bed	tntc	observed
6	Sunset Bay	bed	tntc	bed	tntc	observed
7	Shepard's Park	beds	tntc	bed	tntc	SH
8	West Brook Delta	bed	tntc	bed	tntc	observed
13	NE Mossy Point	moderate	tntc	moderate	tntc	observed
15	Finkle Bk-FWI	none	0	scattered	6	cleared
18	Hague Boat Launch	scattered	visual only	scattered	12	cleared
21	Sheriff's Dock	bed	observed	bed	tntc	observed
24	NWB- W Tongue Mtn	bed	tntc	bed	tntc	observed
41	Paradise Bay	bed	tntc	bed	tntc	observed

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Site #	Site Name	DFWI SURVEY		LYCOTT SURVEY		2002 Action
		Density of Milfoil	Number of Milfoil Plants	Density of Milfoil	Number of Milfoil Plants	
47	Smith Bay	none	0	scattered	29	cleared
48	Gull Bay	bed	tntc	bed	tntc	observed
49	S Burnt Point	none	0	none	0	none
50	Clark Hollow T5	bed	tntc	bed	tntc	BB/HH
51	Eichlerville Bay T11n	bed	tntc	bed	tntc	observed
52	Rogers Rock Beach	none	0	none	0	none
54	Cook's Bay, HL/T11	none	0 (2 frags)	none	0	none
56	S. Sawmill Bay	bed	tntc	bed	tntc	observed
61	Harbor Is-Moonlight	bed	tntc	bed	tntc	observed
63	S. Agnes Island	scattered	1	scattered	7	cleared
66	N. Sawmill Bay	bed	tntc	bed	tntc	observed
67	Bluff Head Creek/T8	scattered	2	scattered	4	cleared
68	Rock Dunder Island	scattered	1	scattered	13	cleared
69	Kitchal Bay Hulets	none	0	none	0	none
70	S Trib W Halfway Is	none	0	none	0	none
71	Hague Brook/T86	bed	tntc	bed	tntc	observed
72	S Cooks Bay/T89	scattered	5	scattered	12	cleared
73	Trib Dark Bay/T91A	scattered	1	scattered	189	cleared
99	Holman Hill Creek	scattered	2	none	0	none
100	Temple Island	scattered	2	scattered	16	cleared
101	Brook. N Green Point	none	0	scattered	2	cleared
102	S Trib. 5 Mile Mtn Bk	scattered	17	scattered	111	cleared
112	Whale Rock-E. Agnes Is.	bed	tntc	moderate	tntc	observed
115	Cape Cod Village Bay	none	0	scattered	9	cleared
117	Glenbernie-Blairs Bay	bed	tntc	bed	tntc	observed
129	Camp Sagamore (T91)	scattered	3	scattered	337	cleared
130	N Trib 5 Mile Mtn Brook	scattered	4	none	0	none
131	N. Steere Island (T75)	none	0	scattered	68	cleared
132	Lamb Shanty Bay	none	0	none	0	none
134	Saint Sacrement Island	none	0	scattered	1	cleared
137	West Dollar Island	scattered	12	moderate	467	cleared
141	Camp Andrew Bay, West	scattered		bed	tntc	BB/HH
144	N. Jenkins Brook	scattered	tntc	bed	tntc	BB

Site Descriptions

The history of Eurasian watermilfoil growth, physical conditions, and management efforts are described on a site-by-site basis in this section. Three different designations for the degree of milfoil infestation are used in the following summaries; beds, moderate density, and scattered plants. Beds are considered to be areas where 50 percent or more of the total macrophyte community by percent cover was milfoil. Moderate density areas are considered to be communities composed of significant amounts of milfoil, but totaling less than 50 percent cover. Zones of scattered plants were defined as macrophyte

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communities composed of less than 10 percent milfoil as determined by percent cover estimates.

Northwest Bay (M-1). The number of Eurasian watermilfoil plants has increased at this site since its discovery in 1986, and the bed has also increased in size to cover a substantial portion of the littoral zone. This site has fine, organic-rich bottom sediments, due to wetland runoff from Northwest Bay Brook and wetland. Slope is moderately flat, except adjacent to the navigation channel into the wetland. The once diverse native aquatic flora has become severely impacted by the development of the dense bed of Eurasian watermilfoil. No management has occurred at this site. This site is designated as a control location in the Supplemental Environmental Impact Statement for a Sonar Pilot Program for Lake George. The staff of the DFWI visited this site on July 30, 2002 and prepared a map of the area of dense growth of Eurasian watermilfoil. Dense growth of Eurasian watermilfoil continues to expand at this location (Table 2). The staff of Lycott Environmental also visited this location and designated it to be of 'bed' density.

Sunset Bay (M-6). The moderate density area surrounding the small bed of milfoil reported in 1989 has increased in density and merged with the small milfoil bed. A majority of this area was covered with benthic barrier in 1992 and 1993. The remainder of this small bay contains scattered plants. A small patch of scattered plants to the north of the principal milfoil area has increased to bed density. The slope is gradual, with a silty bottom. Eurasian watermilfoil was found from 1 to 4 meters water depth with densest milfoil growth in 2 to 3 meters depth. Substantial accumulations of silt on top of the benthic barrier were observed annually from 1998 through 2002. Eurasian watermilfoil continues to spread southward along the shore, mixed with a native pondweed, *Potamogeton amplifolius*. The staff of the DFWI visited this site on August 7, 2002 and prepared a map of the area of dense growth of Eurasian watermilfoil. Dense growth of Eurasian watermilfoil continues to expand at this location (Table 2). Sedimentation had also allowed Eurasian watermilfoil and native plant growth to accumulate on the surface of the existing benthic barrier. The staff of Lycott Environmental also visited this location and designated it to be of 'bed' density. Their report erroneously lists this site as part of the Sonar Pilot Program.

Shepard's Park (M-7). Substantial beds of Eurasian watermilfoil have become established to the north of the dock and along the shoreline outside the swim buoys. The milfoil beds increased in size from 1989 until 1992, and a large population of Curly-leaf Pondweed was also observed. The three beds were controlled using benthic barrier and suction harvesting in 1992. Much of the remaining area had either low-density scattered plants, or small clumps of moderate to dense growth, too small to be considered a bed. Hand harvesting removed a number of scattered plants. Sand imported for the public swimming beach was the predominant bottom sediment, but some areas of exposed silt were found at deeper depths. This site is a heavily used public beach. Additional panels (3500 ft²) of benthic barrier were installed in 1996 to cover the majority of the remaining dense bed areas. In 1998, 3 moderate to large beds were observed off the northern section of the beach area, with many scattered plants along the perimeters of the beds. By 2000, the milfoil beds in this area had spread to such extent that milfoil was visible

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from the northern end of the beach area southward along the shore, joining with the Sheriff's Dock site (M-21) and spreading to the far side of the town docks. The staff of Lycott Environmental designated this site to be of 'bed' density in 2002 and conducted extensive suction harvesting operations at this location. Their report states "In 2002, 46 barrels of milfoil were suction harvested from this site. In addition, four panels of Palco were removed from within and near the swim area in anticipation of a proposed dredging project in and around the old pier. Milfoil was cleared starting in the northern section of the site near the swim buoys south to within 20' of the northern tip of the McDonald Pier. Suction harvesting will likely continue at this site in 2003 along with Palco removal and placement as an extensive continuous bed remains here and at Sheriff's Dock (M-21)". The staff of the DFWI visited this site on October 23, 2002 and prepared a map of the area of dense growth of Eurasian watermilfoil. A substantial amount of Eurasian watermilfoil was removed by suction harvesting during the 2002 management season. While numerous scattered Eurasian watermilfoil plants remain, the overall suction harvesting effort was effective. Dense growth of Eurasian watermilfoil, however continues to expand at this location (Table 2), with a small area of newly located dense growth to the northeast of the suction harvest area as well as the near continuous dense growth of Eurasian watermilfoil extending north from the Sheriff's Dock area.

West Brook Delta (M-8). Dense and moderately dense areas of milfoil growth extended in a semicircle from the outlet of West Brook to the western end of the cement seawall, with some low density scattered plants. Numerous Curly-leaf Pondweed plants were also found. This is a heavy use area, which is highly disturbed due to sediment deposition. Eurasian watermilfoil was found in a band from 2 to 4 meters depth, on the delta formed where West Brook enters Lake George. In 1992 and 1993 benthic barrier was installed in this area, however groundwater and surface water flow negatively affected the stability of the benthic barrier. Barrier material was also frequently damaged as a result of boat anchors. Slope is moderately steep, with sediment grading from sand in the shallows to deep organic silt underlying waters deeper than 5 meters. Native plant growth was also extensive. In 2001 and again in 2002, Eurasian watermilfoil was also observed in scattered populations around a shallow water danger buoy adjacent to the established bed. Management and maintenance are still required at this site. The staff of Lycott Environmental and the DFWI visited this location in 2002 and designated it to be of 'bed' density requiring extensive management and maintenance.

Mossy Point Boat Launch (M-13). The NYSDEC boat launch facility had dense beds around the southern docks, with moderate density areas in the launch ramp. Eurasian watermilfoil plants were also scattered at the fringes and into an adjacent wetland. The bottom becomes very rocky out from the boat launch facility, restricting the expansion of the milfoil population. The slope in this area was slight, and the bottom very silty around the dock facility and wetland. Water clarity here tends to be lower than average for Lake George. This site has heavy boat traffic due to the boat launch facility and proximity to the navigable channel to the outlet region. Benthic barrier material was installed over the milfoil bed areas at this site in 1990. Barrier removal and hand harvesting was done in the year following the barrier installation. Scattered plants were found in follow up surveys in 1996 with high-density growth on the fringes of the adjacent wetland. A small

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bed was observed in front of the pump house in 1998, and a larger bed near the mouth of the marsh, to the southeastern end of the boat launch area. Low densities of scattered plants were found within the launch area as well. Surveys in 1999-2002 did not reveal any new locations of milfoil in this area, nor any notable change in size of the existing populations. No management was conducted at this location in 2002 by either the DFWI or the staff of Lycott Environmental Services.

Sawmill Bay - Outflow of Finkle Brook (M-15). This was one area of moderately dense scattered plants of limited areal extent. The slope is flat, with sediments grading from sand in the shallows to silt in deeper water. The plants were growing on the edge of the delta formed by the inflow of Finkle Brook to Lake George. All of the Eurasian watermilfoil at this site was removed as part of hand harvesting operations from 1989 to the present. On July 8, 2002, the staff of Lycott Environmental Services removed 6 Eurasian watermilfoil plants by hand harvesting and declared the site "clear". On July 29, staff of the DFWI visited this site and were unable to locate any Eurasian watermilfoil plants, fully supporting the Lycott 'cleared' designation.

Hague Boat Launch (M-18). The area of Eurasian watermilfoil growth is restricted to the boat slip for the boat launch, where the bottom is silty. Low-to-moderate density scattered Eurasian watermilfoil and Curly-leaf Pondweed were observed. The boat launch also supports a dense, near-nuisance growth of native plants and filamentous algae. This site may be considered suitable for suction harvest given proper safety controls for the boat launch area. No management has occurred at this site as of 2001, due to the intensity of boat traffic. On July 17, 2002, the staff of Lycott Environmental Services removed 12 Eurasian watermilfoil plants by hand harvesting and declared the site "clear". They noted that a dredging operation to deepen the water in the boat launch area had been conducted earlier in 2002, significantly reducing the density of Eurasian watermilfoil growth. On September 3, staff of the DFWI visited this site and observed several Eurasian watermilfoil plants, but did not dive to hand harvest them due to boat activity. A major reduction in Eurasian watermilfoil growth however, had occurred from levels observed in 2001.

Sheriff Dock Area (M-21). This former bed area was reduced to a zone of moderate density scattered plants, in the zone of water deeper than the benthic mats installed by the LGPC in 1986. Further expansion is restricted by depth, however a zone of dense milfoil growth at the deep margins of the benthic barrier is now evident possibly growing on accumulated silt at the margins of the barrier. Scattered and moderate density plants were found around both benthic mats in shallower waters. Inspection of the mat in 1995 revealed substantial silt deposits on the surface of the mat, particularly at the end nearest the outfall of the Sheriff's Dock storm sewer. Scattered plants were also found growing on the surface of the mats and in seams of the barrier material. The mat material was also showing signs of deterioration with large sections removed when new docks were installed. Curly-leaf Pondweed was also found at this site. Slope is moderately steep, with bottom sediments generally sand and silt. This area has extremely high traffic, but also has a restricted speed limit. Recent surveys (1999-2002) indicate a large bed of Eurasian watermilfoil stretching from the pump station on Beach Road to the pier at

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Shepards Park. No management, other than that conducted by the LGPC, has occurred at this site. The area of dense growth was mapped by the DFWI on October 23, 2002 (Table 2). The staff of Lycott Environmental Services visited this site on July 24, and designated it "bed" density.

NW Bay - Bay Between Fan and Bear Point (M-24). This small bay currently has low, moderate and dense growth areas of Eurasian watermilfoil. Scattered growth of Curly-leaf Pondweed was also observed. Slope is moderately flat, with highly variable bottom sediments from rocks to silt. The bottom also has numerous logs and other bottom obstructions. All of the Eurasian watermilfoil was removed from this site as part of the 1989 and 1990 hand harvesting project. Intermittent hand-harvesting efforts since that time have not kept this site in control. By 1998, this site had become a large bed. The 2000 survey observed expansion to the north and western edges of the bed. Density levels now suggest more intensive management efforts. In 2001, surveys indicated a decline in milfoil growth at this site, with several areas of moderate density growth and scattered growth throughout this small bay. Decline of milfoil populations in Lake George, not attributable to management efforts, are rare and additional inspections of this location are warranted. In 2002, bed density growth of Eurasian watermilfoil was once again reported for this site by both the staff of Lycott Environmental Services and the DFWI. Bed mapping was conducted by the DFWI on July 30, 2002. This location is proposed for future treatment with the herbicide SONAR™.

Paradise Bay (M-41). There was a moderate-sized area of low density scattered plants in the northern arm of the bay. Eurasian watermilfoil was found at depths of from 1 to 4 meters. The native plant community appears disturbed. This area receives heavy boat traffic. Slope is moderately flat, with a silty substrate. Eurasian watermilfoil was removed from this site as part of the 1989 and 1990 hand harvesting project. Hand harvesting continued at this site until 1992. Since 1993, no maintenance has occurred and milfoil has grown to large areas of bed density growth on the southeast shore. Moderate to scattered density milfoil growth on the southwestern shore is also found within this enclosed bay. In 2002, bed density growth of Eurasian watermilfoil was reported for this site by both the staff of Lycott Environmental Services and the DFWI. Bed mapping was conducted by the DFWI on July 30, 2002. Due to its sheltered nature and distance from residential shorelines, this site is also proposed for future treatment with aquatic herbicide SONAR™.

Smith Bay (M-47). In 1988, a single plant of Eurasian watermilfoil was found and removed from this moderately sloping, silty bay. Moderately dense Curly-leaf Pondweed was found in 1989, but no Eurasian watermilfoil was observed. In 1990, a small area of moderate density growth of milfoil was observed with an outlying area of scattered plants. These plants were in depths of 3 to 4 meters. The milfoil was managed at this site in 1990 with suction harvesting. During follow up visits in 1993 and 1995, hand harvesting removed 33 and 157 milfoil plants, respectively. In 1996, 176 milfoil plants were removed, primarily along the southern shore of the bay in an area remote from that suction harvested in 1990. The 267 milfoil plants removed in 1997 and 255 in 1998 were scattered near the base of a steep drop off on the southeastern shore of the bay, about 5

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meters deep. A few plants were also removed along the opposite shore on the northern side of the bay. A total of 127 plants were removed in 1999 and 142 in 2000, roughly from the same areas as described in 1998. In 2001, a total of 76 milfoil plants were removed from this site. On July 16, 2002, the staff of Lycott Environmental Services removed 29 Eurasian watermilfoil plants by hand harvesting and declared the site “clear”. On October 9, staff of the DFWI visited this site and were unable to locate any Eurasian watermilfoil plants, fully supporting the Lycott ‘cleared’ designation. There is a very diverse population of native plants here, and heavy filamentous algal growth on the southern side of the bay.

Gull Bay (M-48). Numerous low-density scattered Eurasian watermilfoil plants were found off of the stream adjacent to the public beach and launch ramp in this bay. Curly-leaf Pondweed was also found at this location. During revisits to this site a small bed of Eurasian watermilfoil was found at the end of a “T” dock. The slope was moderately flat, the bottom grading from sand in the shallows to silt past 3 meters in depth. Eurasian watermilfoil was managed at this site as part of the 1989 hand-harvesting project. In 1990, both hand and suction harvesting were used for plant management. A small moderate density patch and large area of scattered milfoil growth was observed in 1995. In 1997, three large areas of dense growth were observed. Two of these were near the speed restriction buoys at the mouth of the bay. The remaining bed was centrally located in the bay, though not near the area that was suction harvested in 1990. There appears to be a healthy *Potamogeton* population existing here as well. The 1999 survey removed 20 scattered plants from the mouth of a tributary at the foot of the bay, just to the north of the swim area. Sketches were drawn of the three existing beds in the central portion of the bay in 2000, 2001 and 2002. In 2002, bed density growth of Eurasian watermilfoil was reported for this site by both the staff of Lycott Environmental Services and the DFWI. Bed mapping was conducted by the DFWI on August 9, 2002. No additional management occurred at this location in 2002.

South of Burnt Point (M-49). A single specimen of Eurasian watermilfoil was found, and collected as a voucher specimen, in 1988. No additional Eurasian watermilfoil has been found since 1989. Surveys by Lycott Environmental Services and DFWI failed to locate any Eurasian watermilfoil at this site in 2002. The slope was moderate at this site, with a rocky bottom.

Clark Hollow Bay Brook (M-50). Scattered Eurasian watermilfoil plants were found in 2-3 meters depth parallel to the shoreline in 1989. The slope is moderately flat, with a bottom grading from sand in shallow water to silt in deeper water. All of the Eurasian watermilfoil was removed from this site as part of the 1989 and 1990 hand harvesting project, and during subsequent revisits. Five milfoil plants were removed in 1997. In 1998 a small patch of moderate density was found near a boathouse on the northern side, approximately 4 meters deep. A total of 191 milfoil plants were hand harvested to clear the site. In 1999, a small patch of milfoil was discovered in deeper water to the north of the original location, thus 136 plants were harvested, but the site was not cleared at the completion of the survey. A small bed of milfoil was found 100 meters to the north of the current location in 2000. Limited hand harvesting (174 plants removed) was

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conducted. In 2001, 4375 ft² of Palco[®] Pond Liner was installed. In 2002, the staff of Lycott Environmental Services with the assistance of the DFWI installed an additional 9 panels of benthic barrier (3150 ft²) and hand harvested 17 Eurasian watermilfoil plants from the “southern reaches of this site”. An additional panel of barrier material was left rolled at this location for future use. The staff of DFWI revisited this location on August 9, 2002 to inspect the condition of the barrier material and characterize the condition of this location following barrier installation. The barrier installed in 2002 was in very good condition and covered the majority of dense growth of Eurasian watermilfoil at this location. Moderate density growth of Eurasian watermilfoil was found on the northwestern margin of the barrier material and additional areas of scattered Eurasian watermilfoil growth were observed. Future management efforts are necessary.

Eichlerville Bay (M-51). Moderate and low-density Eurasian watermilfoil plants were found at this site. The majority of plants were in two areas along the outer fringe of the delta, in depths of 3-4 meters. The bottom slope was gradual and sediments consisted mainly of silt with large amounts of detrital material. Milfoil at this site was managed via suction harvesting in 1990, and hand harvesting in 1991 and 1992. Since that time, limited maintenance has occurred and the milfoil populations are similar to those observed in 1989, with an extensive area of dense growth of milfoil observed at the deep margin of the littoral zone. This site was visited on 11 July 2002 by the staff of Lycott Environmental Services and designed as “bed” density with no management performed. The staff of DFWI conducted mapping of dense growth of Eurasian watermilfoil at this location on July 30, 2002. A large area of dense Eurasian watermilfoil growth was observed in 3 to 6 meters water depth. Scattered growth of Eurasian watermilfoil was also observed throughout the remainder of the bay. This location serves as a control site for the Sonar pilot program.

Rogers Rock Park Beach (M-52). Low density scattered Eurasian watermilfoil plants were found along the boat mooring line at the park, adjacent to the public swimming beach, and around the boat launch ramp. The slope at this site was flat, with a predominantly sandy substrate. The plants were restricted to depths of 1-2 meters. All of the Eurasian watermilfoil was removed from this site as part of the 1989 and 1990 hand harvesting project. No milfoil plants have been found at this site since that time. Surveys by Lycott Environmental Services and DFWI failed to locate any Eurasian watermilfoil at this site in 2002.

Cooks Bay, Hulett's Landing (M-54). Nine milfoil plants were removed from this site in 1993, and a single Eurasian watermilfoil plant was found and collected in 1990. No Eurasian watermilfoil was found at this site in 1989. All milfoil plants were found in the northeast shore of the bay near a small tributary. The slope is gradual with sediment predominantly sand and silt. In 1995, 4 milfoil plants were found and removed. No Eurasian watermilfoil was found in 1996 or 1997. Four plants were removed near a red roof boathouse on the north side of the bay in 1998, and a single plant was found here in 1999. No milfoil was present at this location in 2000 or 2001. Surveys by Lycott Environmental Services and DFWI failed to locate any Eurasian watermilfoil at this site in 2002.

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South Sawmill Bay (M-56). A large dense bed of Eurasian watermilfoil was found southeast of Veteran's Memorial Park in the middle of Sawmill Bay, in 3-5 meters water depth. Adjacent areas of moderately dense and low-density scattered plants were also observed. Benthic barrier was installed in both 1991 and 1992, however considerable amounts of milfoil remain in the area predominantly to the east and north of the matted zone. In 1997 thru 2001, barrier at this location was inspected and found to be in good condition with small quantities of silt present. The majority of benthic barrier material installed in 2001 (5950 ft²) was removed from this location. This location is within Sawmill Bay, a site proposed for future treatment with the aquatic herbicide SONAR™. Dense bed growth of Eurasian watermilfoil continues to expand at this location. The staff of Lycott Environmental Services visited this site on July 19, and designated it "bed" density. Mapping of dense Eurasian watermilfoil growth was conducted by the DFWI on September 30, 2002.

Moonlight Bay, Harbor Island (M-61). An area of dense Eurasian watermilfoil growth remains at this site, along with an extensive area of scattered low-density plants. The dense area is near a beaver lodge in the southern end of this small bay. Numerous small milfoil plants were observed growing in the edges of the beaver lodge, making management of this population difficult. Sediments in the bay consisted of clay and the bottom slope was moderate. Milfoil was managed in this area by suction harvesting in 1990 and hand harvesting in 1991. No management has occurred at this location since. This location is proposed for future treatment with the herbicide SONAR™. Dense bed growth of Eurasian watermilfoil continues to expand at this location. The staff of Lycott Environmental Services visited this site on July 11, and designated it "bed" density. Mapping of dense Eurasian watermilfoil growth was conducted by the DFWI on October 1, 2002.

South of Agnes Island (M-63). In 1989, approximately 25 Eurasian watermilfoil plants were found near submerged dock cribs at this northern basin tributary site. Surrounding sediments are sand and clay; however, silt has accumulated between the dock cribs. Hand harvesting has occurred here every year since 1990. One Eurasian watermilfoil plant was removed from this location by hand harvesting in 1993. No milfoil plants were observed in 1995 and one plant was removed in 1996. The site was cleared with the removal of 24 plants in 1997, and 19 in 1998. A total of 40 Eurasian watermilfoil plants were harvested from this site in 1999, 5 in 2000 and 1 in 2001. On July 12, 2002, the staff of Lycott Environmental Services removed 7 Eurasian watermilfoil plants by hand harvesting and declared the site "clear". On August 7, staff of the DFWI visited this site and located a single Eurasian watermilfoil plant, growing adjacent to an old dock crib.

North Sawmill Bay (M-66). A large area of moderate-density Eurasian watermilfoil plants were found clumped along the western speed and hazard buoys at the north end of Sawmill Bay. Depth of this population was 4-5 meters. Eurasian watermilfoil populations now rim the entire Sawmill Bay area. A portion of the milfoil at this site was covered with benthic barrier in 1990. The barrier positioned in 1990 remains in place at this time. Milfoil now surrounds the barrier at this site. This location is within Sawmill Bay, a site proposed for future treatment with the herbicide SONAR™. The staff of

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Lycott Environmental Services visited this site on July 19, and designated it “bed” density. Mapping of dense Eurasian watermilfoil growth was conducted by the DFWI on September 30, 2002.

Bluff Head Creek T-8 (M-67). Two Eurasian watermilfoil plants were found in 1990 at this northern basin tributary site. Surrounding sediments are sand and clay however silt has accumulated between the dock cribs. Both Eurasian watermilfoil plants were removed from this location for voucher specimens in 1990. A single milfoil plant was removed during the 1993 site revisit and two plants were removed in 1995. In 1996, 18 milfoil plants were removed. One milfoil plant was removed in 1997, 2 in 1998, 3 in 1999, 2 in 2000 and 4 in 2001. On July 12, 2002, the staff of Lycott Environmental Services removed 4 Eurasian watermilfoil plants by hand harvesting and declared the site “clear”. On August 7, staff of the DFWI visited this site and located 2 Eurasian watermilfoil plants, growing between two boathouses on the northern shoreline.

Rock Dunder Island T-10A (M-68). Eight scattered plants and a number of fragments of Eurasian watermilfoil were found on the north side of the tributary in 1993. Sediments are sand and clay with a moderate slope. No Eurasian watermilfoil plants were found in 1995. In 1996, 9 milfoil plants were found and removed. In 1997, 37 plants were found scattered along the base of the drop-off on the southeastern side of the island. A total of 59 plants were removed from this same location in 1998. The 1999 survey found 21 plants here, mostly along the southeast side of the island. An additional 5 milfoil plants were found in 2000. No milfoil was found at this site in 2001. On July 12, 2002, the staff of Lycott Environmental Services removed 13 Eurasian watermilfoil plants by hand harvesting and declared the site “clear”. On August 7, staff of the DFWI visited this site and located a single Eurasian watermilfoil plant, growing at the southeast corner of Rock Dunder Island.

Kitchal Bay T-11S (M-69). Four Eurasian watermilfoil plants were found and removed during the 1991 survey. All plants were found between two covered boathouses on the east end of the bay. The slope is gradual to moderate and the sediment consists of a mixture of clay and sand at this site. Milfoil had not been recorded at this site until one plant was found and removed in 1997. No milfoil has been found here since that time. Surveys by Lycott Environmental Services and DFWI failed to locate any Eurasian watermilfoil at this site in 2002.

West Halfway Island T-71 (M-70). A single Eurasian watermilfoil plant was found and removed as a voucher specimen during the 1990 Tributary Survey. The following year four more plants were removed. A minimal number of plants have been removed from this site since that time. No milfoil was found at this site in 2001. Surveys by Lycott Environmental Services and DFWI failed to locate any Eurasian watermilfoil at this site in 2002.

Hague Brook T-86 (M-71). Two Eurasian watermilfoil plants were found and removed as voucher specimens in 1990. Later in the 1990 season, a number of Eurasian watermilfoil plants were observed at the outer edge of the delta near the pin buoys. This

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site was upgraded to a bed in 1991. A large dense bed of Eurasian watermilfoil now extends along the outer edge of the delta in water depth of from 2 to 5 meters. Sediments at this site are sandy on the delta grading to silt at the edges of the delta. The slope on the delta is gradual with a relatively sharp drop-off at the edge. Surveys by Lycott Environmental Services and DFWI in 2002 confirmed dense bed growth of Eurasian watermilfoil at the edge of the delta.

South Cooks Bay T-89 (M-72). This site is located at the south edge of the bathing beach at Rogers Rock State Park, adjacent to the mouth of a small tributary. Slope at this site is gradual with sediments of sand and silt. A single Eurasian watermilfoil plant was found in 1990 and 1991, both were removed as voucher specimens. An additional four plants were removed during the 1993 Tributary Survey. In 1995, 27 milfoil plants were removed. A single milfoil plant was removed in 1996. In 1997, a total of nine plants were harvested. During the 1998 survey, one plant was found and removed. A total of 43 plants were removed from this site in 1999 and none were found in 2000 or 2001. On July 17, 2002, the staff of Lycott Environmental Services removed 12 Eurasian watermilfoil plants by hand harvesting and declared the site "clear". On August 7, staff of the DFWI visited this site and located five Eurasian watermilfoil plants in shallow water (1-2 meters depth), growing at the southern edge of the park beach.

Tributary in Dark Bay T-91A (M-73). Nine scattered Eurasian watermilfoil plants were hand harvested adjacent to a white boathouse north of the tributary in this bay during the 1993 survey. In 1995, 53 milfoil plants were found and harvested from this site. In 1996, an additional 21 milfoil plants were removed. In 1997, only five plants were found and removed from this site. The number increased to 15 when this site was visited in 1998, 14 plants were removed in 1999, 13 in 2000 and 4 in 2001. Sediments are sand and rock with steep slopes. On July 16, 2002, the staff of Lycott Environmental Services removed 189 Eurasian watermilfoil plants by hand harvesting and declared the site "clear". On September 4, staff of the DFWI visited this site and located a single Eurasian watermilfoil plant, growing at the edge of a rock dropoff in 3 meters depth.

Holman Hill Creek (M-99). A scattered area of milfoil (50-100 plants) was first located during the 1993 tributary survey. The site is in front of the boathouse on the north side of Holman Hill Creek. In 1995, 125 plants were removed from this site. In 1996, 54 milfoil plants were removed, and 81 in 1997. In 1998, milfoil plants removed had been reduced to eight. The 1999 survey removed 91 milfoil plants, primarily small individuals near the boathouse, and a larger number at the northern edge of the delta. A total of 4 milfoil plants were found and removed in 2000. An additional 22 milfoil plants were removed in 2001. The slope is moderate to a depth of 3 meters and the bottom sediments are delta sands. Beyond 3 meters depth, bottom slope becomes steep to 10 meters depth. On July 18, 2002, the staff of Lycott Environmental Services surveyed this site and found no Eurasian watermilfoil present. On September 4, staff of the DFWI visited this site and located two Eurasian watermilfoil plants, growing near a swimfloat.

Temple Island T87 (M-100). Two milfoil plants were found at this location in 1993 and removed. The plants were found 100m from the west shore and 100m south of the

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culvert across from the Island. The slope is flat to gradual and sediments are sand and light silt. No milfoil was found in 1995 or 1996, and one plant was harvested in 1997. Nineteen plants were removed from here in 1998. These plants were primarily located on the western shore of the bay, just north of the docks on that shore. The 1999 survey removed two plants from within the bay area, along the seawall. No milfoil was found at this site in 2000. Six milfoil plants were found and removed in 2001. On July 17, 2002, the staff of Lycott Environmental Services removed 16 Eurasian watermilfoil plants by hand harvesting and declared the site “clear”. On September 4, staff of the DFWI visited this site and located two Eurasian watermilfoil plants, growing at the western edge of the bay.

Brook North of Green Point (M-101). A single milfoil plant was found in 1993 and 1995 on the delta of this stream in about 1 meter of water. Close to shore the bottom was rocky with numerous logs. Sand and silt dominated the sediments beyond 1 meter depth. The slope is moderate to steep. No milfoil was found in 1996 or 1997. The 1998 survey found three plants at this site in a marshy area behind a red boathouse, and 10 were removed in 1999. A total of 21 milfoil plants were removed in 2000 and 7 in 2001. On July 12, 2002, the staff of Lycott Environmental Services removed 2 Eurasian watermilfoil plants by hand harvesting and declared the site “clear”. On September 6, staff of the DFWI visited this site and located two Eurasian watermilfoil plants, growing in a marshy area behind a small boathouse.

South Tributary at 5 Mile Mountain (M-102). The site is in a small cut in the shoreline along the eastern side of the Tongue Mountain range, the slope is moderate and the sediment consisted mainly of shallow silt in rock depressions. Eight plants were removed during 1993 and twelve in 1995. No milfoil was found in 1996, 1997, or 1998; two plants were harvested in 1999. No milfoil was found at this site in 2000 or 2001. On July 11, 2002, the staff of Lycott Environmental Services removed 111 Eurasian watermilfoil plants by hand harvesting and declared the site “clear”. On August 8, staff of the DFWI visited this site and located 17 Eurasian watermilfoil plants, growing among some downed trees.

Whale Rock, East of Agnes Island (M-112). In 1996, a moderate density area of milfoil growth was observed in pockets of silt on the eastern side of Whale rock. Slope is steep and the sediment is mainly silt on this bedrock outcrop. By 1998, these patches had grown together to form a moderate sized bed along the eastern edge of the rock. This site received benthic barrier in 2000. A total of 1050 ft² of barrier were installed, and hand harvesting was employed to complete management. In 2001, 170 milfoil plants were removed by hand harvesting. On July 12, 2002, the staff of Lycott Environmental Services declared the site to contain moderate density growth of Eurasian watermilfoil. On August 7, staff of the DFWI visited this site and observed moderate to dense growth of Eurasian watermilfoil at the margins of benthic barrier material installed in 2000. Most of the Eurasian watermilfoil growth was in pockets of silt between boulders and cobblestones on the eastern margin of the island.

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Cape Cod Village Bay (M-115). In 1996, a single milfoil plant was found around a series of finger docks at the Cape Cod Village Resort. A return visit in 1997 did not indicate the presence of Eurasian watermilfoil. However, six plants were found and removed here in 1998, and two were removed in 1999 and 2000. No milfoil was found at this site in 2001. Slope is moderate and sediment is mainly sand. On July 17, 2002, the staff of Lycott Environmental Services removed 9 Eurasian watermilfoil plants by hand harvesting and declared the site “clear”. On August 7, staff of the DFWI visited this site and found no Eurasian watermilfoil.

Glenburnie - Blairs Bay (M-117). A small area of dense growth of milfoil was observed under a swim float near the steamboat landing in Blairs Bay. Slope is moderate and sediments are mainly sand. No management has been conducted here to date. The site has become a large bed, and was in flower at the time of visit. The staff of Lycott Environmental Services visited this site on July 16, and designated it “bed” density. The extent of dense growth of Eurasian watermilfoil was mapped on October 22, 2002 by the staff of the DFWI.

Camp Sagamore T-91 (M-129). First located during the tributary survey of the north basin in 1999, two milfoil plants were hand harvested from underneath a few logs on the bottom of the lake. Several old dock cribs were inspected at this location in 2000, and produced a large number of milfoil plants. A total of 69 milfoil plants were harvested from this location in 2001. This area has a gradual slope, sand and silt sediment and cobblestones near the shore. The rare species *Subularia aquatica* was also found here along the shore, in less than 1 meter depth. On July 16, 2002, the staff of Lycott Environmental Services removed 337 Eurasian watermilfoil plants by hand harvesting and declared the site “clear”. On September 4, staff of the DFWI visited this site and located three Eurasian watermilfoil plants, growing near an old dock crib on the north side of the bay.

South Trib 5 Mile Mtn Brook T-72a (M-130). This site was first identified during the 1999 tributary survey. Two milfoil plants were identified and removed. This location has a moderate slope, with boulders to 4 meters depth, and then primarily a sand/silt sediment composition. Beaver activity was also noted here. No milfoil was found at this site in 2000 or 2001. On July 11, 2002, the staff of Lycott Environmental Services surveyed this site and found no Eurasian watermilfoil present. On September 6, staff of the DFWI visited this site and located four Eurasian watermilfoil plants, growing around a pile of downed trees.

North Steere Island T-75 (M-131). The 1999 tributary survey found 3 Eurasian watermilfoil plants, which were removed via hand harvesting. This site has a moderate slope, boulders to 1 meter depth and then sand and rock sediment composition. No milfoil was found at this site in 2000 or 2001. On July 11, 2002, the staff of Lycott Environmental Services removed 68 Eurasian watermilfoil plants by hand harvesting and declared the site “clear”. On July 30, staff of the DFWI visited this site and found no Eurasian watermilfoil plants.

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Lamb Shanty Bay T-6 (M-132). One milfoil plant was harvested from this site during the 1999 tributary survey, from about 4 meters depth on the side of an underwater drop-off. The location is sandy with a gradual slope out to three meters depth, and then steep slope to 7 meters depth, with a soft silt sediment. No milfoil was found at this site in 2000 or 2001. Surveys by Lycott Environmental Services and DFWI failed to locate any Eurasian watermilfoil at this site in 2002.

St. Sacramento Island (M-134). Identified by an inquiry of a local resident, milfoil was found in a small cove on the southeastern side of the island in 1999. The identification was made too late in the season for any management, but a boat survey identified several small clusters of milfoil within the cove. In 2000, a total of 124 milfoil plants were harvested, however the site was only reduced. Hand harvesting in 2001 removed 116 milfoil plants. There is a gradual slope with sand and silt sediments; large boulders and downed trees are also apparent. On July 11, 2002, the staff of Lycott Environmental Services removed a single Eurasian watermilfoil plant by hand harvesting and declared the site “clear”. On July 30, staff of the DFWI visited this site and found no Eurasian watermilfoil plants.

West Dollar Island (M-137). This site was first located in 2001, as a result of a report by a lake user. A small area of dense milfoil growth was observed near one of the docks on the southeast end of West Dollar Island. There is a gradual bottom slope with bedrock outcrops, sand and silt sediments. No management occurred at this site in 2001. On July 4, 5 and 8, 2002, the staff of Lycott Environmental Services removed 467 Eurasian watermilfoil plants by hand harvesting and declared the site “clear”. On August 9, staff of the DFWI visited this site and found 12 Eurasian watermilfoil plants, which they removed.

Camp Andrew Bay, West (M-141). This site was first located in 2001, as a result of a report by a local resident. A narrow strip, approximately ten feet wide, of dense growth of Eurasian watermilfoil extends from the mouth of the bay around the western point for a distance of about 100 meters. Bottom slope in this area is moderate, and sediments are a mixture of sand and silt. Four panels (1400 ft²) of Palco® were installed here in 2002 by LES and 522 Eurasian watermilfoil plants removed by hand harvesting. The staff of the DFWI visited this site on 16 September 2002, and found the benthic barrier installation to be orderly, with no billows or sediment buildup. Scattered growth of Eurasian watermilfoil remains on the margins of the barrier, which should be manageable by hand harvesting in future years.

North Jenkins Brook (M-144). This site was first located in 2002 by the staff of Lycott Environmental Services. Their description is as follows: “First discovered in 2002, this site is actually just south of Jenkin’s Brook, but north of the site named ‘South Jenkin’s Brook (M-98)’. It is a narrow (ca. 10’ wide) band of milfoil extending north and south ca. 100’ from shore in 2-3 meters of water.” Six panels (2100 ft²) of Palco® were placed here in 2002 by the staff of LES. The staff of the Darrin Fresh Water Institute visited this site on 9 August 2002, and found the benthic barrier installation to be orderly, with no

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billows or sediment buildup. Scattered growth of Eurasian watermilfoil remains on the margins of the barrier, which should be manageable by hand harvesting in future years.

Hand Harvesting Evaluation

The staff of the DFWI visited a total of 25 sites with variable numbers of Eurasian watermilfoil plants harvested by Lycott Environmental between July 30th and October 9, 2002 (Table 1). The staff of the DFWI harvested a total of 50 Eurasian watermilfoil plants compared to the initial harvest of 1283 by the staff of Lycott Environmental Services. This translates to 96% removal efficiency when Eurasian watermilfoil was present at hand harvestable levels. Hand harvesting efficiency ranged from 50 to 100%, with a mean value of 90%. This compares favorably with published values of approximately 85% efficiency in historical reports (Madsen et al., 1989) for Lake George.

At six of the locations surveyed (24%), no Eurasian watermilfoil plants were found by either management effort. At six sites (24%), LES cleared scattered populations of Eurasian watermilfoil plants and the DFWI staff found no Eurasian watermilfoil in their follow-up surveys. At two sites (8%), LES reported no Eurasian watermilfoil and DFWI staff found and removed small numbers of plants (less than 10). At nine sites (36%), both management teams hand harvested Eurasian watermilfoil plants, with greatly reduced numbers of plants collected by DFWI teams (90% reduction). In all, hand harvesting by LES was very effective in reducing Eurasian watermilfoil growth at sites with scattered growth.

Benthic Barrier

Three sites managed with benthic barrier during 2002 by LES were inspected. In all cases, benthic barrier placement was in a neat and orderly manner, with no gas pockets or excess sediment overburden. A total of 6650 ft² of benthic barrier was reclaimed from several locations and redeployed to manage Eurasian watermilfoil at the following locations:

Clark Hollow
North Jenkins Brook
Camp Andrew Bay, West

Clark Hollow (M-50) expanded rapidly between the 1999 and 2000 survey. Given the size of the bed and firm bottom substrate, benthic barrier was selected as the best management option. A total of 12.5 panels (4375 ft²) were installed here in 2001. In 2002, the staff of Lycott Environmental Services with the assistance of the DFWI installed an additional 9 panels of benthic barrier (3150 ft²) and hand harvested 17 Eurasian watermilfoil plants from the “southern reaches of this site”. An additional panel of barrier material was left rolled at this location for future use. The staff of DFWI revisited this location on August 9, 2002 to inspect the condition of the barrier material and characterize the condition of this location following barrier installation. The barrier installed in 2002 was in very good condition and covered the majority of dense growth of

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Eurasian watermilfoil at this location. Moderate density growth of Eurasian watermilfoil was found on the northwestern margin of the barrier material and additional areas of scattered Eurasian watermilfoil growth were observed. This site may benefit from additional small amounts of benthic barrier in 2003. Extensive hand harvesting will be necessary to complete management efforts at this site.

Camp Andrew Bay, West (M-141) was first located in 2001, as a result of a report by a local resident. A narrow strip, approximately ten feet wide, of dense growth of Eurasian watermilfoil extends from the mouth of the bay around the western point for a distance of about 100 meters. Bottom slope in this area is moderate, and sediments are a mixture of sand and silt. Four panels (1400 ft²) of Palco® were installed here in 2002 by the staff of LES. The staff of the Darrin Fresh Water Institute visited this site on 16 September 2002, and found the benthic barrier installation to be orderly, with no billows or sediment buildup. Scattered growth of Eurasian watermilfoil remains on the margins of the barrier, which should be manageable by hand harvesting in future years.

North Jenkins Brook (M-144) was first located in 2002 by the staff of Lycott Environmental Services. Their description is as follows: “First discovered in 2002, this site is actually just south of Jenkin’s Brook, but north of the site named ‘South Jenkin’s Brook (M-98)’. It is a narrow (ca. 10’ wide) band of milfoil extending north and south ca. 100’ from shore in 2-3 meters of water. Six panels (2100 ft²) of Palco® were placed here in 2002.” The staff of the Darrin Fresh Water Institute visited this site on 9 August 2002, and found the benthic barrier installation to be orderly, with no billows or sediment buildup. Scattered growth of Eurasian watermilfoil remains on the margins of the barrier, which should be manageable by hand harvesting in future years.

Suction Harvesting

The suction harvester was employed by LES at a single location – Shepards Park (M-7). A total of 46 barrels of milfoil were removed from this site during 5 days of suction harvesting. A barrel consists of a 30 gallon garbage can packed tightly with Eurasian watermilfoil. The staff of the DFWI visited this site on October 23, 2002 and prepared a map of the area of dense growth of Eurasian watermilfoil. A substantial amount of Eurasian watermilfoil was removed by suction harvesting during the 2002 management season. While numerous scattered Eurasian watermilfoil plants remain, the overall suction harvesting effort was effective. Dense growth of Eurasian watermilfoil along the perimeter of Shepards Park beach was effectively reduced to low and moderate density scattered growth. Dense growth of Eurasian watermilfoil, however continues to expand at this location (Table 3), with a small area of newly located dense growth to the northeast of the suction harvest area as well as the near continuous dense growth of Eurasian watermilfoil extending north from the Sheriff’s Dock area.

Other Management

A total of 26 sites were designated as “bed” density growth of Eurasian watermilfoil during the 2002 Eurasian watermilfoil management program. The staff of the DFWI

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**Table 2. Bed area estimates for Eurasian watermilfoil (*Myriophyllum spicatum*)
growth in Lake George in 2002.**

Site Name	Site Code	Bed Area in Acres		
		2002	2002 (Palco)	2001
Northwest Bay	1	0.950		0.651
Sunset Bay, Huletts Landing	6	0.51		0.64
Shepards Park	7	0.11		0.2
West Brook	8	0.187		0.1
Middleworth Bay South	16	0.113		0.1
Dunhams Bay	19	0.345		0.32
Huddle Bay	20	1		0.97
Sheriffs Dock	21	2.632		2.5
West Tongue Mtn.	24	0.228		0
SW Cannon Point	26	1.27		1.2
North Tea Island Bay	30	0.74		0.7
Paradise Bay	41	0.269		0.246
Gull Bay	48	0.24		0.22
Clark Hollow	50		0.173**	0.16
Foster Brook (Eichlerville)	51	0.494		0.314
South Sawmill Bay	56	0.640		0.400
Silver Bay	58	0.11		0.11
Moonlight Harbor	61	0.194		0.114
North Sawmill Bay	66	0.56*		0.532
Hague Brook	71	1.09		0.92
Harris Bay - East Side	91	0.66		0.69
Harris Bay - mid-bay	96	0.14		0.14
South Jenkins Brook	98	0.1		0.1
Glenburnie-Blairs Bay	117	0.23		0.46
Camp Andrew Bay - West	141		0.032	0.10
Jenkins Brook North	144		0.048	unknown
TOTAL		10.66		11.48

Shaded sites received benthic barrier in 2002

*area included small dense growth area adjacent to main bed

**4375 sq. ft (.101 ac) of Palco were installed at this site in 2001

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prepared estimates of the areal extent of “bed” density growth during the summer and fall of 2002 (Table 2). At 17 of 26 bed density sites, the area of bed density growth of Eurasian watermilfoil increased between 2001 and 2002, 3 sites were unchanged and six sites declined in area of dense growth. At four of the six sites where declines were reported, management efforts are directly responsible. Eurasian watermilfoil growth at three sites was sufficiently reduced through a combination of benthic barrier installation and hand harvesting to remove them from the list of bed density growth. At a third site, suction harvesting reduced the area of dense growth of Eurasian watermilfoil, but some dense growth area remained. At two sites, declines were not directly attributable to management efforts.

Several of the sites where Eurasian watermilfoil growth continues to expand are included in a pilot program of SONAR™ application. Based on the success of this application, the herbicide may be proposed for use on additional sites in Lake George.

Rare Species

Five of the aquatic plant species reported for Lake George are found on the New York State Rare Plant List (Young, 2002). These species with their *genus*, *species* and common names include:

- *Myriophyllum alterniflorum* – Little milfoil
- *Rorippa (Neobeckia) aquatica* – Lake Cress
- *Potamogeton alpinus* – Northern Pondweed
- *Subularia aquatic ssp. americanum* – Aowlwort
- *Utricularia minor* – Lesser Baldderwort

Two additional species present in Lake George were recently reassigned from the New York State Rare Plant List to the New York State Watch List; *Megalodonta beckii*, whose common name is Water marigold and *Isoetes lacustris*, known as large spored quillwort. Reassignment is generally the result of additional survey data providing wider distribution for a particular species.

Four of the plant species present on the New York State Rare Plant List or the New York State Watch List were found during surveys of selected areas receiving management during 2002 (Table 3). These include *Myriophyllum alterniflorum* (10 sites, 23%), *Subularia aquatica* (8 sites, 19%), *Isoetes lacustris* (15 sites, 35%) and *Megalodonta beckii* (12 sites, 28%). These species are all relatively common in Lake George but may be scarce in other regional lakes. The presence of these species at locations where management activities from hand harvesting to benthic barrier installation have been conducted is a testament to the fundamental health of these species in Lake George.

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Table 3. Rare plants recorded at survey sites.

Site #	Site Name	Survey Date	<i>Isoetes lacustris</i>	<i>Megalodonta beckii</i>	<i>Myriophyllum alterniflorum</i>	<i>Subularia aquatica</i>
1	NWB-Brook inflow	30-Jul-02	x	x	x	x
6	Sunset Bay	7-Aug-02		x		
7	Shepard's Park	23-Oct-02				
8	West Brook Delta	23-Oct-02				
13	NE Mossy Point	3-Sep-02				
15	Finkle Bk-FWI	29-Jul-02	x	x	x	
18	Hague Boat Launch	3-Sep-02				
21	Sheriff's Dock	23-Oct-02				
24	NWB- W Tongue Mtn	30-Jul-02				
41	Paradise Bay	30-Jul-02		x		
47	Smith Bay	9-Oct-02	x	x		x
48	Gull Bay	9-Oct-02				
49	S Burnt Point	9-Oct-02	x			
50	Clark Hollow T5	9-Oct-02		x		
51	Eichlerville Bay T11n	30-Jul-02			x	
52	Rogers Rock Beach	3-Sep-02	x		x	
54	Cook's Bay, HL/T11	30-Jul-02				
56	S. Sawmill Bay	16-Oct-02				
61	Harbor Is-Moonlight	30-Jul-02				
63	S. Agnes Island	7-Aug-02		x		x
66	N. Sawmill Bay	16-Oct-02				
67	Bluff Head Creek/T8	7-Aug-02				
68	Rock Dunder Island	7-Aug-02	x	x		x
69	Kitchal Bay Huletts	30-Jul-02		x		x
70	S Trib W Halfway Is	8-Aug-02	x			x
71	Hague Brook/T86	4-Sep-02			x	
72	S Cooks Bay/T89	3-Sep-02		x	x	
73	Trib Dark Bay/T91A	4-Sep-02	x	x		
99	Holman Hill Creek	4-Sep-02	x	x	x	
100	Temple Island	4-Sep-02			x	x
101	Brook. N Green Point	6-Sep-02	x			
102	S Trib. 5 Mile Mtn Bk	8-Aug-02	x			
112	Whale Rock-E. Agnes Is.	7-Aug-02	x			
115	Cape Cod Village Bay	9-Oct-02			x	
117	Glenbernie-Blairs Bay	22-Oct-02				
129	Camp Sagamore (T91)	4-Sep-02				x
130	N Trib 5 Mile Mtn Brook	6-Sep-02	x			
131	N. Steere Island (T75)	30-Jul-02	x			
132	Lamb Shanty Bay	6-Sep-02	x			
134	Saint Sacrement Island	30-Jul-02			x	
137	West Dollar Island	9-Oct-02				
144	N. Jenkins Brook	9-Aug-02				

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Summary

Hand harvesting new scattered plant sites as they are found, especially if they contain only a few plants, appears to be an effective management strategy. Results of hand harvesting areas with elevated numbers of milfoil plants present (Boylen et al., 1997) indicate that while this technique may not eliminate milfoil populations in a single season of harvesting, a substantial reduction in the number of plants present and management effort necessary to maintain these locations can be achieved. Hand harvesting efficiency, as estimated by repeated harvesting, can exceed 85% when sites have mainly scattered populations of Eurasian watermilfoil.

Evaluation of the effectiveness of benthic barrier (Eichler et al., 1995) and suction harvesting (Eichler et al., 1993) indicates that these techniques can also be valuable tools for aquatic plant management. Sites managed by these techniques are referred to as "managed" rather than "cleared", since removal of all visible milfoil plants by these techniques is not practical or cost effective. Used in conjunction with each other and hand harvesting, these efforts can yield cleared areas. Active maintenance of suction harvest and benthic barrier sites on an annual basis is necessary to prevent regrowth and recolonization of milfoil in these areas. This is particularly important if other active milfoil sites are nearby.

A pilot program to evaluate the herbicide SONAR™ at four locations is proposed for future application. The use of this herbicide for milfoil control in Lake George is somewhat atypical. In Lake George, the majority of dense milfoil growth is present as small beds, generally less than 2 acres in size. Typical SONAR™ applications include whole lake treatments at low dosages or "spot treatments" of dense growth zones at least 5 acres in area. In the Lake George pilot project, treatment of smaller dense growth areas or sequestering small bays with booms to reduce water movement, will be experimentally evaluated. The results of this program may provide an additional tool for use in an Integrated Aquatic Plant Management Program for Lake George.

The decline in the number of active scattered plant sites is a result of management efforts, mainly hand harvesting these scattered populations. Substantial effort by the staff of LES was made to reach as many milfoil sites as possible in 2002.

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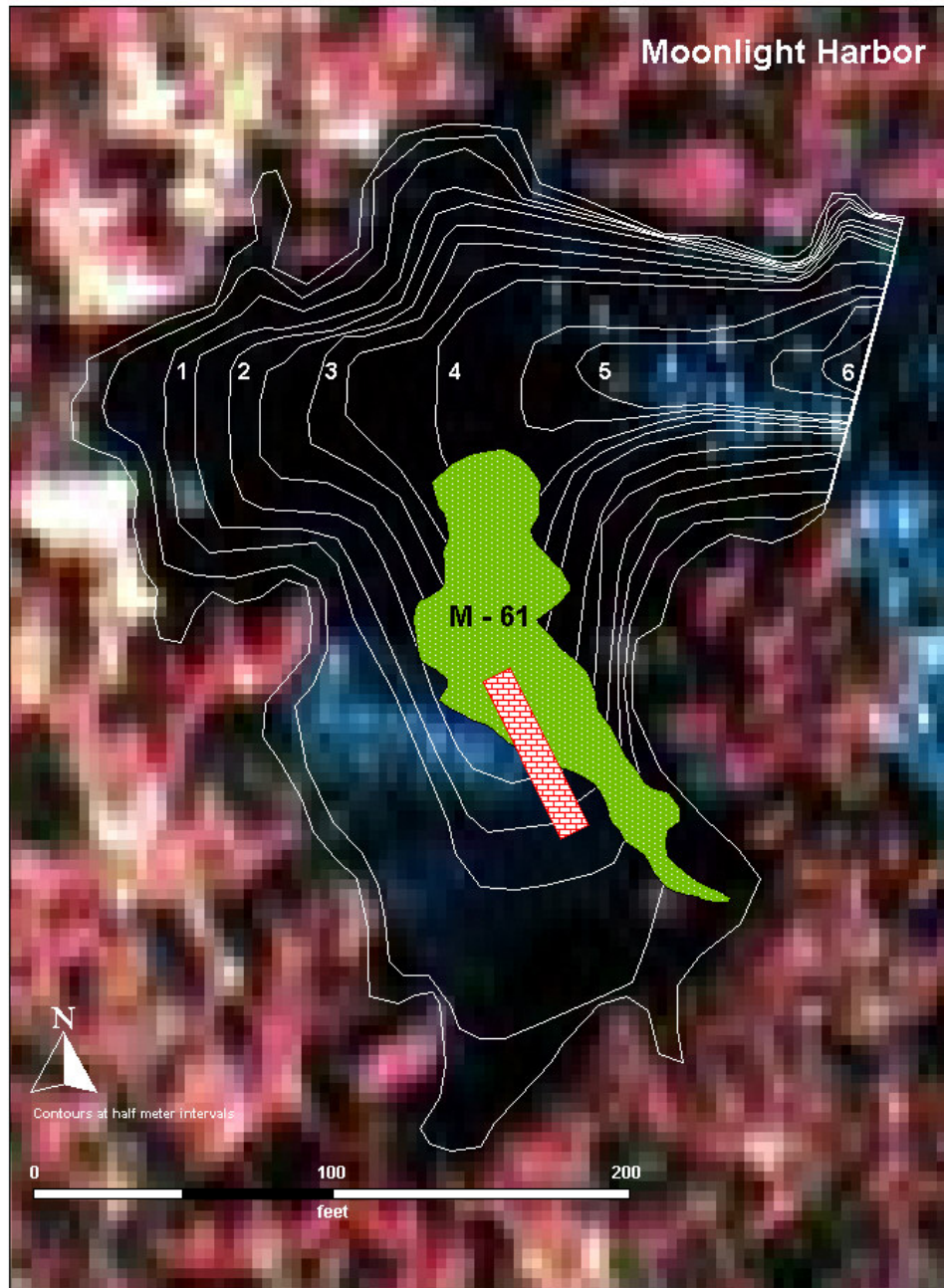
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APPENDIX I - Sketch Maps of All Sites Surveyed in 2002

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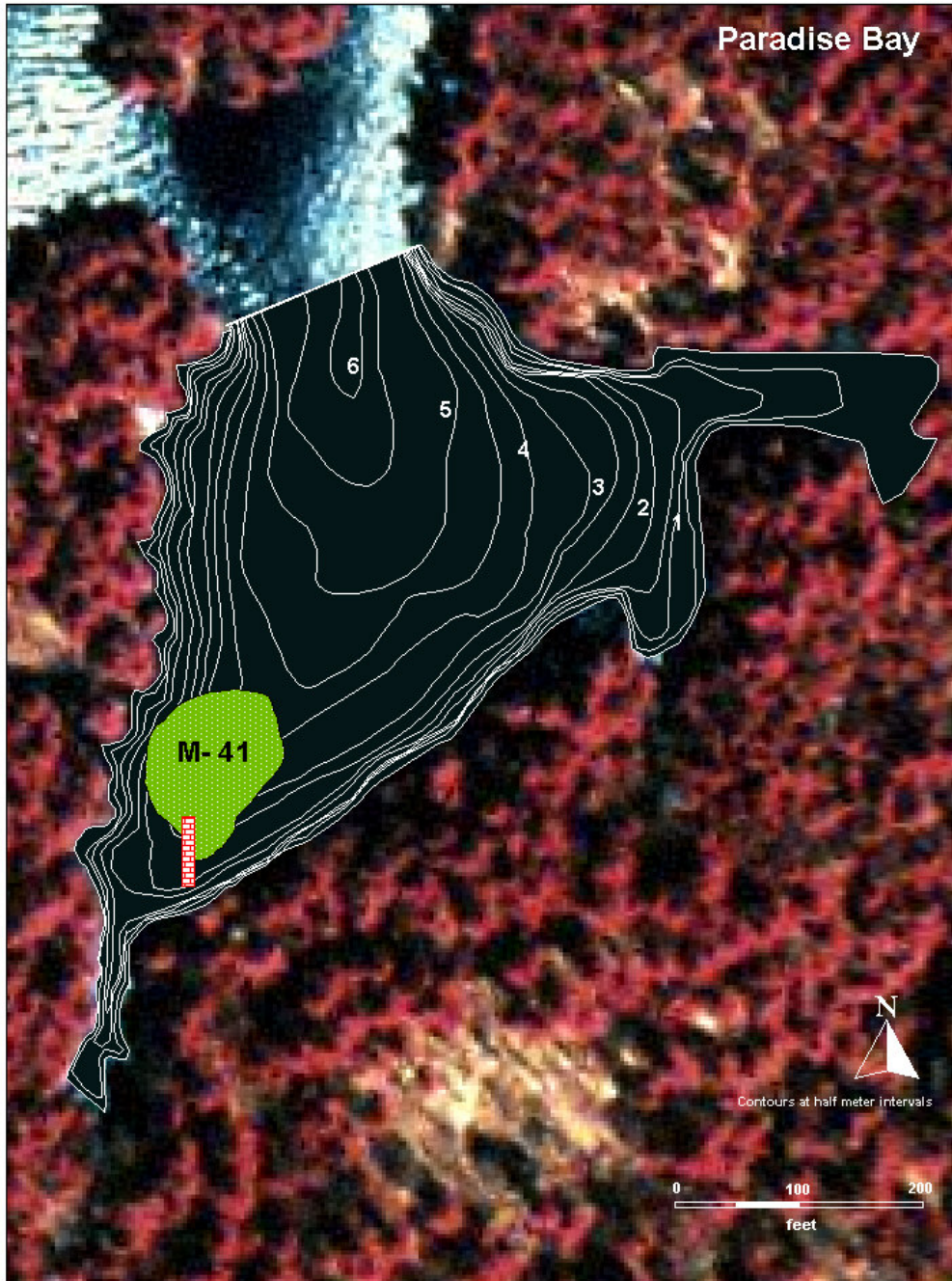
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