LYCOTT

UPDATE

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Managing Lakes and Ponds since 1971

Celebrating 40 years of Service

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Lake Fairlee – the next chapter in a continuing effort of management

Lake Fairlee is a 457-acre body of water located in Fairlee, West Fairlee and Thetford, Vermont that has been infested with Eurasian Water-milfoil (Myriophyllum spicatum, E. milfoil) since 1995. The Lake Fairlee Association (LFA) has been very active in managing this invasive aquatic plant in selected areas of the lake with techniques including hand harvesting, benthic barriers and suction harvesting. Their efforts are very well documented on their blog www.fairlee.org.

In 2009 the LFA began exploring options beyond the mechanical means previously developed and employed. Their efforts over the years had led them to build and customize equipment specifically suited for their lake; however, the level of E. milfoil infestation had increased to over 100 acres which proved to be well beyond the scale of their capabilities.

Lycott worked with the LFA and the Vermont Department of Environmental Conservation to secure a permit for a multiple-area herbicide treatment which was conducted in June of 2010. Following the posting of the lake's shoreline with the various imposed water-use restrictions, Lycott was able to perform the herbicide application to the infested areas of Lake Fairlee in a single day by utilizing three treatment teams.

Following the treatment the members of LFA collected water samples on a prescribed schedule during the summer for the purpose of herbicide residue testing. In addition, Lycott divers removed several acres of previously installed benthic barriers panels, a condition of the state permit. A fall survey was conducted consisting of 100-plus inspection sites within the treated areas. Although damaged milfoil was observed at one site, all other sites were free of E. Milfoil.

Local boat poking fun at milfoil issue

Lake management efforts planned for 2011 will be limited to hand harvesting and in-depth surveys. The LFA will continue to position paid and volunteer boat ramp monitors at the main boat ramp in a persistent effort to prevent the re-infestation of Lake Fairlee by invasive aquatic plants and animals. Boat ramp monitors will also educate the boating public about the risks associated with the transportation of aquatic plants. The 'year-after-treatment' survey conducted in 2011 will provide a long-term picture of the E. milfoil control achieved from the 2010 herbicide treatment.

From the President's Tool Box

2011 marks Lycott Environmental, Inc.'s 40th year in operation. During this time we have managed hundreds of lakes and ponds throughout the Northeast. Over the years teams have pioneered new methodologies and treatments in mechanical, chemical and other techniques. In 2009 Lycott began the transition from its founding members to a new team of passionate lake and pond managers.

Lycott Environmental, Inc. was founded in 1971, by Lee Lyman who has begun a new phase in his life as an independent consultant and golf aficionado. Like many transitions, the successful ones take time and careful consideration. As the new owner and president of Lycott, I believe Lycott's change in ownership is a text book example of the transition of a small service based business. I am extremely proud of our employees for embracing the change and grateful to our clients for helping us learn more about the perceptions of the services we provide for them.

As always, if you have questions about your pond, lake or even your management programs, please call us and a member of our team will be ready to assist you.

INSIDE THIS ISSUE

When Herbicides are not the Answer – Hand Harvesting and Benthic Barriers

While herbicides are highly effective in managing nuisance and invasive aquatic vegetation in many water bodies, situations arise where alternative methods are necessary. The use of herbicides is restricted in some bodies of water due to use as drinking water, irrigation, or local ordinances. In these cases, alternative techniques including mechanical harvesting, lake-level drawdown, suction harvesting, manual (hand) harvesting, and placement of benthic barrier panels may be used to target nuisance and invasive aquatic vegetation. In many cases a combination of these management techniques is employed to form an Integrated Management Plan.

Loon Lake

Loon Lake is located in the Town of Chester, New York, and lies within Adirondack Park, the largest publicly protected park in the United States. The use of herbicides is restricted within the Park, requiring the use of alternative measures to manage infestations. When E. Milfoil was first documented in this 586-acre lake during 2000, an Integrated Management Plan was instated and carried out by volunteers. Management techniques are solely physical including hand harvesting and benthic barrier installation, and are carried out under a permit from the Adirondack Park Agency.

In 2010, Lycott was retained by the Loon Lake Park District Association and the Town of Chester to conduct surveys and continue physical control efforts. This year's surveys included a littoral zone survey which was completed by snorkeling the entire perimeter of the lake – about 10 miles – as well as around islands and other shallow areas. This survey technique allows identification and GPS mapping of large beds, as well as individual plants; especially those located in sparsely invaded areas. A total of 37 E. Milfoil sites were identified.

Of these 37 sites, 28 were managed via hand harvesting alone, while five sites were managed with a combination of hand harvesting and benthic barriers. By completion of the project in August, Lycott had removed 26,947 plants and laid 58 barriers, covering approximately 0.5 acres.

Lake Cochituate

Pile of harvested E. Milfoil

Last year we reported on an herbicide treatment undertaken in the Northern Basin of Lake Cochituate located in Natick, Framingham, and Wayland, Massachusetts. Efforts to manage E. Milfoil within this significant habitat and recreational resource continued this year and Lycott was employed to conduct a late-season hand harvesting operation. The four-day, two-diver project targeted the heavily traveled Department of Conservation and Recreation (DCR) boat ramp located in Natick along Route 30. A total of 54 bags containing 200 plants per bag for a total of 10,800 plants were removed. This endeavor will serve to decrease the spread of E. Milfoil via fragmentation to new areas, or areas of the lake which have been targeted with other techniques in this extensive Integrated Management Plan.

Aaron River Reservoir

Aaron River Reservoir is a 136-acre drinking water reservoir located in Cohassett, Masshachusetts. In 2008 a pioneer infestation (approximately one acre) of V. Milfoil was identified in the reservoir's southeastern cove. Due to the use of the water body as a potable water resource, benthic barrier was chosen as the primary control method and Lycott was employed for the installation and subsequent removal of 92 panels. When the panels were removed in the fall of 2009, additional growth of the target species was noted beyond the southeast cove, and plans were made for work to continue in 2010.

In 2010 the southeast cove was managed by hand harvesting (benthic barrier panels were not necessary) followed by a detailed shoreline survey. The survey was conducted over the course of two days where two divers snorkeled the perimeter of the water body, marking individual V. Milfoil plants or areas of scattered V. Milfoil growth with GPS. Individual plants and sites with sparse density were hand harvested during the survey. The larger, dense sites were mapped for subsequent management including hand harvesting and benthic barrier placement. In addition to the sparse areas of growth noted, twelve sites were located with dense V. Milfoil growth. A total of 16 panels were installed at three sites, while the majority of the remaining dense V. Milfoil sites were hand harvested. It is interesting to note that V. Milfoil has both aquatic and terrestrial 'forms'. Due to low water levels during the summer of 2010, many sites where the aquatic morph existed during the spring survey were no longer under water. In many cases, these plants had taken the terrestrial form. These plants were targeted for management as part of this project as well, since the terrestrial form will morph back to the aquatic form once environmental conditions allow.

Physical Control Jargon

Benthic Barrier : a material similar to pool liner which is designed to lie on the bottom of a water body, separating the substrate from sunlight to prevent or stop the growth of plants

Panel: the individual pieces of benthic barrier, manufactured or cut in various sizes

Bag or Onion Bag: a mesh container into which hand harvesters deposit plant material.

Divers hand harvesting

Barrier covering terrestrial V. Milfoil

The Fiske Pond Water Chestnut Project - Three Years in Review

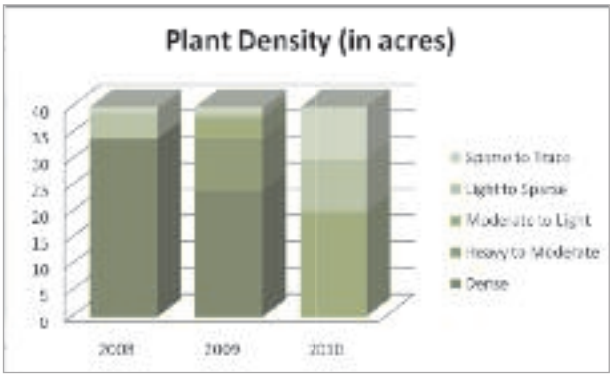
After three seasons of mechanical and manual removal of a 40-acre Water Chestnut (Trapa natans) infestation in Fiske Pond, the progress and effort made is best expressed through statistic results and pictures. This 67-acre pond is located in Natick, Massachusetts within the Lake Cochituate Sub-basin of the Sudbury River Watershed. Water from Fiske Pond flows north towards Lake Cochitute making management of this infestation imperative in preventing upstream growth of this highly invasive species.

Pre-harvest survey pictures depict the diminishing degree of plant coverage.

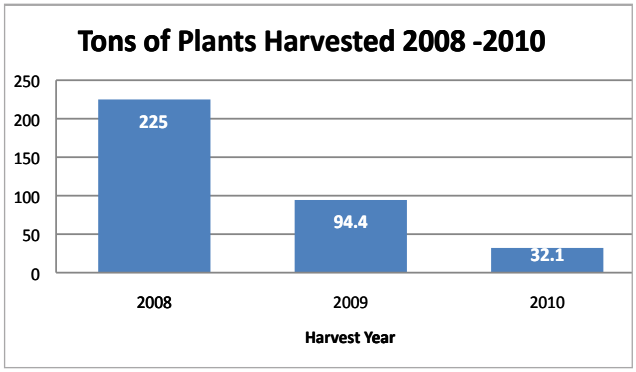
Once impassable by motor or paddle, the removal of 351.5 tons of Water Chestnut vegetation and nutrients has improved the water quality and clarity of the pond, restoring its value as an aquatic and wildlife habitat within an urban area.

To accomplish this progress a cumulative total of 76 days and 9,386 man hours were expensed during the first three harvesting seasons.

The success of this project over the past three seasons is in jeopardy. State and local budgets are currently unable to fund the next phase of this eradication effort. As with all natural resource projects, progress is incremental for any given year. If funding is not found for the continued management, the Water Chestnut infestation conditions will revert back to pre-management levels over a short period of time. We are sincerely hopefully that management can continue.



Change in Water Chestnut plant density over the three seasons recorded during the pre-harvest surveys.



Water Chestnut plant tonnage removed and incinerated. An 86% reduction in vegetation tonnage was achieved after three harvesting seasons.

Website Update

Please visit our new website area with detailed descriptions of the most common invasive aquatic plants managed by Lycott. Many times we are asked how one protects a lake or pond. The best plan is prevention. Paramount in the protection of a water body is understanding the risks that face all of our lakes and ponds. In some cases we have found new infestations (*i.e., Hydrilla*) in a pond within weeks of its introduction. Early management (rapid response) increases the likelihood of a successful management plan and can often reduce the costs as well.

Please see **www.lycott.com** for pictures and descriptions.

Fanwort
(Cabomba carolinina)

Eurasian Milfoil
(Myriophyllum spicatum)

Hydrilla
(Hydrilla verticillata)

Butler Pond - Preservation of a Historical Pond

Reported to have been formed from glacial recession, Butler Pond, in an advanced state of cultural and natural eutrophication, is a shallow water body rich with significant historical events. Dating back to pre-1617, the local Massachusetts Indian tribe was the first documented inhabitants. Through many ownership changes, the land use surrounding the pond is the major contributing factor to its current state.

Peter Butler, from whom the pond gets its name, purchased the pond and some of the surrounding land in 1872. Since 1888, property abutting the pond was constantly transforming through property division and development. In 1897, Merrymount Road was constructed, leaving one-third of the pond connected by a culvert on the south side of new road. The south side of the pond was divided up by the abutting land owners.

By 1943 these plots, at the southern most tip of the pond, with land partially under water were filled in. The Central Junior High School was also constructed abutting the west side of the pond. By 1957 the remainder of the pond on the south side of Merrymount Road was filled in and developed.

A struggle between the residents and the school committee known as the 'Battle of Butlers Pond' took place in 1939 and again from 1954 to 1956. The school committee expressed a need to extend recreational space and petitioned to convert the remainder of the pond, on the north side of Merrymount Road, into a playground. The residents were ultimately successful in preventing this initiative and preserving Butler pond.

In 1984, the second attempt to donate the pond by John W. Walsh Jr. to the City of Quincy was controversial and stalled due to legal complications. Ownership finally passed to the City of Quincy in October of 1993 with a stipulation that the municipality preserve and beautify the pond.

The pond was and is now a meeting place for local residents to fish, ice skate and enjoy the wildlife attracted to the pond as well as an outdoor classroom for schools in the vicinity.

The Friends of Butler Pond Association with the Quincy DPW have taken action to preserve and beautify their neighborhood pond. Their first priority is to control the invasive and excessive aquatic vegetation; Common Reed, Duckweed, Filamentous algae and Coontail. Water quality and bathymetry studies are in the planning stages along with future plans to plant flora along the shoreline for the benefit of wildlife.

In September of 2010, Lycott performed an aquatic vegetation survey and wildlife habitat survey in preparation for a Notice of Intent to manage the pond. Once a valid Order of Conditions was obtained in October, a herbicide treatment utilizing a low pressure tracked amphibious vehicle with a spray tower was employed to treat the Common Reed along the entire shoreline. In late December of 2010 and January of 2011 the Common Reed was cut utilizing commercial brush cutters and then collected for disposal. Treatment of the in water aquatic vegetation, spot treatment of the surviving common reed along the shoreline and field work associated with the water quality and bathymetry studies are planned for the summer and fall of 2011.

For a more in depth account of the history of Butler Pond, visitthe Friends of Butler Pond website, **butlerpond.org**, and browse the paper, "Butler's Pond in Quincy 'An Incomplete History'.

Before Common Reed Management

After Treatment and Removal

Water Quality Monitoring - An Important Lake Management Tool

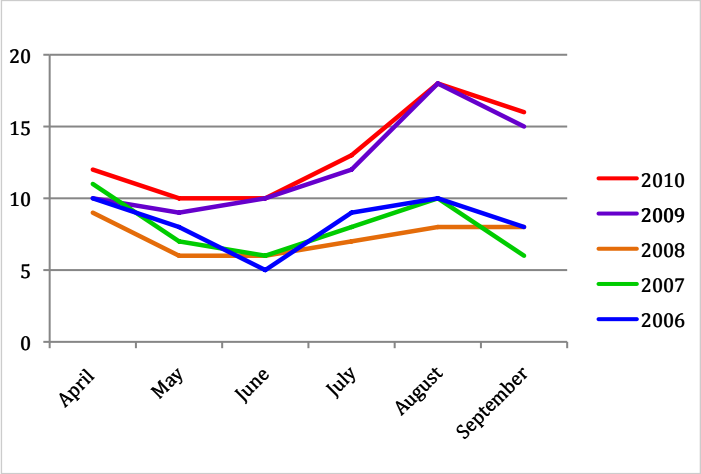
The evidence of poor water quality is often readily visible at the water's surface – one can tell that a water body is eutrophic just by driving by. Once a water body reaches this state, restoration becomes a long and arduous process. However, the eutrophication process does not happen overnight; if theearly signs are recognized, the process can be slowed and the results drastically different.

Monitoring water quality through a set of physical, chemical, and biological parameters allows lake managers to assess the condition of a water body on a quantitative basis. When these parameters are tracked monthly or seasonally from year to year, trends can be identified and elevated levels are easily recognized.

Common parameters used in monitoring water quality are dissolved oxygen (DO), pH, turbidity, water clarity (secchi depth), temperature, E. coli and nutrients, including phosphorus and nitrogen. Additional analyses may be carried out depending on the state of the water body, as well as known factors such as agricultural runoff or local development. Water quality sampling can be combined with pre and post aquatic vegetation surveys to understand how the nutrient level, particularly phosphorus, is contributing to excessive weed growth and poor aquatic habitat.

The number and positioning of sampling locations is often dictated by the size, shape, location, and source(s) of the water body. Typically, each inlet stream is sampled where it enters the lake or pond, in addition to the 'deep hole' (deepest part of the water body) and often the outlet. Results of samples collected at inlet locations allow for identification of pollutants with sources upstream, while deep hole and other in-lake locations provide insight into the water body's trophic status.

Even though your lake/pond/reservoir may not need direct management yet, or on a yearly basis, monitoring the water quality on such a schedule is an important part of an integrated management plan. Lycott assists many clients with water quality sampling programs including direct sampling and analysis of results, however basic monitoring can also be carried out by dedicated volunteers. We are happy to assist organizations or private lake residents in tailoring water quality monitoring programs to each water body.



Hypothetical total phosphorus (TP) results from a single site, 2006-2010. These results show a clear trend of TP falling between 5 and 11 ppb during 2006-2008, with elevated levels generally found in April and August. Since the results at this location were consistent during the first three years of sampling, higher levels reported in 2009 and 2010 are easily identified.

Hypothetical lake sampling locations: This lake has several large inlets which should be sampled on a regular basis. An airport with a storm water drain which enters into the lake is located to the north. Algae blooms are occasionally observed in the vicinity of the pipe, making this a prime sample location. The lake's outlet and deep hole should also be sampled to create a temperature and dissolved oxygen profile of this 40 ft. deep lake.

Lake George Report

Another successful milfoil management season was wrapped up in late August on Lake George. Lycott SCUBA divers removed 58,359 plants from 167 sites by hand harvesting and removed an additional 612,462 plants through management with benthic barrier. An additional 270,000 plants were removed from 62 sites through hand harvesting efforts by the FUND for Lake George, which supplements the work conducted by Lycott under contract with Lake George Park Commission. In total, 171 of the 183 known milfoil sites were clear of milfoil by the close of 2010 efforts.

As we turn the corner on active control of milfoil in Lake George, a significant portion of our annual eight-week effort is now dedicated to the removal of benthic barrier. To that end, Lycott has recently removed 8 of the 15 acres of barrier panels installed over our nine-year history here. Thus, less than 7 acres of panel remain in place, most of which will be extracted during the summer of 2011.

Lycott's nine-year management of Lake George was preceded by more than ten years of research and management work by staff and students at the Darrin Freshwater Institute with varying levels of effort by year. We continued, expanded and in some ways adapted the efforts of our predecessor and are happy to report that Lake George will soon be downgraded to a maintenance program, saving the client a significant annual investment.

However, milfoil plants, seeds and fragments are continually introduced through biological transfer and from anthropogenic causes, particularly in very large lakes with thousands of boats from numerous states launched each summer. Thus a maintenance program is highly suggested as a means to ensure that sites remain in controlled status and as a first-warning if new sites are invaded. Early detection and management will be the key to keeping Lake George free from the negative impacts of this invasive species. While eradication is not considered a possibility, we believe we can largely negate the ecological impact of this invader. Lycott is proud to be a significant player in the control and future maintenance of Eurasian Milfoil in Lake George and other Adirondack lakes.

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Fully Licensed and Insured

Celebrating 40 years of Service