



## Crystal Lake Martha's Vineyard, Massachusetts

**C**rystal Lake, which is 12.5 acres in size with an average depth of six feet, is located in Oak Bluffs, Martha's Vineyard. There is no inlet or outlet to this kettle pond and the shoreline is primarily vegetated.

During the past several years, the East Chop Association has conducted several in-depth water quality studies of Crystal Lake in an effort to determine the most effective means of reducing the aquatic plant and algal growth.

Common Reed (*Phragmites*) had established itself around most of the shoreline, Pondweed (*Potamogeton species*) had inundated the lake, and microscopic algal blooms severely impacted the water clarity.

The Association has implemented a couple of lake management techniques over the past several years. The first technique employed was hydro-raking. After two years and the removal of tons of plant material from the lake, the vegetation continued to flourish and the water quality remained poor. The second technique involved the introduction of bacteria to digest the nutrients and sediment and reduce the nutrient load to the lake. After two years and considerable expense, the aquatic vegetation and algae were still proliferating.



Phragmites, Pondweed and algae in Crystal Lake, Martha's Vineyard, Massachusetts successfully managed by Lycott.

During the fall of 2001 the Association asked Lycott to assess the condition of the lake and develop a plan to reduce the Pondweed, Phragmites, and algal growth thereby improving the water clarity. After conducting a survey of the lake and analyzing the lake's water, Lycott proposed a comprehensive management plan with the use of herbicides to effectively manage the Phragmites and Pondweed without adversely affecting the more desirable aquatic plants, and aluminum sulfate (alum) to reduce the nutrients and available food source for the algae. Permits were acquired during the winter and early spring and the management program was implemented. A considerable improvement was realized as a result of the treatments. This valuable resource will continue to be restored to its historical condition, which provides recreation for the residents and a viable fisheries and wildlife habitat.

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# Milfoil Management in Lake George

## Lake George, New York with Hand Harvesting, Suction Harvesting, Benthic Barriers

**T**here are continuing efforts to move forward with alternative aquatic plant management methods. During 2002 Lycott became involved with a very extensive and intensive hand pulling, suction harvesting and benthic barrier project at Lake George in New York.

Eurasian Milfoil (*Myriophyllum spicatum*) was identified in three locations of Lake George by the Rensselaer Fresh Water Institute in 1985. The Milfoil sites have increased by approximately ten sites per year. Discussions took place with various state agencies and the Lake George Park Commission (LGPC) concerning the management of this invasive plant.

In the 1980's Lycott recommended the use of herbicides to preclude the Milfoil from spreading in Lake George. Since the use of herbicides has been prohibited in Lake George thus far, the LGPC and Darrin Fresh Water Institute (DFWI) initiated a plant assessment and management program in 1989. The management program involves the use of hand harvesting, suction harvesting and benthic barriers. While these management techniques are successful, there are many considerations for implementation including water clarity, substrate conditions, species and density of the aquatic plant growth, and the depth

of the plant growth. A cooperative effort was made by the DFWI and the LGPC to physically manage the Milfoil in Lake George. By the end of 2001, 141 Milfoil sites had been identified.

Lycott Environmental, Inc. (Lycott) entered into a contract with the LGPC to undertake the integrated management program at Lake George during 2002; a total of 144 Milfoil sites were identified.

Hand harvesting is the top priority work element at Lake George. In 2001, 5074 Eurasian Milfoil plants were hand harvested from 50 sites at Lake George. During 2002, Lycott's crew removed a total of 11,605 Eurasian Milfoil plants by hand from 76 locations.

The second priority work element is benthic barrier maintenance. During 2002, 24 panels were removed and 19 panels were relocated. The third priority work element is suction harvesting. During 2002 suction harvesting was employed at one location where 46, 30-gallon barrels of milfoil were removed. Additional suction harvesting will be required at this location during 2003. To date, 12 sites in Lake George have not received any management effort.



Lake George, New York where Lycott implemented an integrated management program for the management of Eurasian Milfoil during 2002.

# The Success of Low-Dose Alum Treatments

**T**he use of aluminum sulfate (alum) has generally been accepted as an effective tool to manage nutrients in the water column of lakes, ponds and reservoirs, thus precluding algal blooms. Much of the literature suggests that applications involve the use of 10 - 20 ppm of alum. The



Aerial photograph of Dug Pond, Natick, Massachusetts.

treatments were historically accompanied by a simultaneous application of either sodium aluminate or lime to buffer the drop in pH associated with the alum treatment. Many of these treatments have been conducted with great success over the past thirty years.

Lycott Environmental Inc., (Lycott) conducted similar treatments in the early 1980's. Under a state contract in July 1981, Lycott conducted a treatment to Spy Pond in Arlington, Massachusetts. In 1983 the Town of Natick asked Lycott to conduct a treatment to Dug Pond with Potassium Permanganate. The Town's swimming beach and high school are located on the shores of Dug Pond, and the beach had to be closed annually due to severe algal blooms and reduced transparency. We felt that utilizing a solution of alum combined with sodium aluminate would be a better solution.

Jar tests were performed, and an alum concentration of 2.56 ppm was applied to Dug Pond on June 26, 1983. The analysis of the pond's water before and after the treatment for total phosphorus showed a drop to non-detectable levels until the end of July when the concentration slowly began to rise. The total phosphorus level did not return to the original concentration until September.

More importantly, the pond did not experience an algal bloom.

In subsequent years, Lycott began to reduce the amount of alum to determine if the same results would be realized. In 1989, 4,226 gallons (1.44 ppm) of alum was used without sodium aluminate for the first time. In 1991 Lycott used 4,100 gallons (1.39 ppm) of alum; in 1997 3,100 gallons (1.05 ppm) of alum; in 2000 2,400 gallons (.82 ppm) of alum; and in 2002, 2,200 gallons (.75 ppm) of alum was used to successfully reduce the total phosphorus and preclude algal blooms. Dug Pond is forty-eight acres in size with an average depth of sixteen feet. The water clarity remains at fifteen to eighteen feet.

As a result of the success at Dug Pond, Lycott began to treat other water bodies with low doses of alum (<1 - 2 ppm). More recently, Lycott conducted a low-dose alum treatment at East Lake Waushacum in Sterling, Massachusetts, which has had historic algal blooms until the treatment was conducted. We believe that not only will low doses of alum reduce the total phosphorus sufficiently enough to preclude algal blooms in many water bodies, but repeat low-dose treatments appear to have long-term beneficial effects.

## Ice Pond Treated with Sonar Precision Release Mason Island, Mystic, CT

**I**ce Pond, located in Mystic, Connecticut, is four acres in size. The pond was infested with the aquatic plant Hydrilla (*Hydrilla verticillata*) in 1997, and treated in 1998 -1999 with the herbicide Sonar A.S.

Lycott entered into a contract with the Mason Island Fire District in 2000 to manage the weeds and algae in Ice Pond. As no evidence of Hydrilla was found during the spring/summer of 2000 or 2001, no Sonar treatments were conducted. The Connecticut Department of Environmental Protection (DEP) conducted a survey of Ice Pond in the fall of 2001; this survey revealed the presence of Hydrilla tubers sprouting in sections of the pond.

On May 21, 2002 Lycott conducted a treatment using 80 pounds of Sonar PR (Precision Release). Sonar PR is a slow-release pellet, with the active ingredient fluridone, manufactured by SePRO Corporation. Sonar PR became available for use in Connecticut on November 16, 2001. This was Lycott's first treatment with this precision release formulation. The highest recommended dosage for this water body was used because Hydrilla is a very invasive, difficult plant to manage. The goal of the application was to maintain a minimum 10 ppb concentration of fluridone in the pond for at least three months.

In order to determine the concentration levels present throughout the three-month period, fluridone residual tests (FasTEST) were conducted throughout the summer. We were able to maintain a concentration of 16 ppb or greater for the entire three-month period with one application. Lycott is encouraged by the results of this treatment, and will certainly consider the use of Sonar PR at appropriate sites in the future.

# Harvest Time

## Hobb's Pond, Weston, Massachusetts

**T**he Weston Forest & Trails Association approached Lycott in the fall of 2001 for help dealing with the Water Chestnut (*trapa natans*) plants that were covering the majority of Hobb's Pond. The pond is eight acres in size with an average depth of six feet. Lycott typically recommends the use of aquatic weed harvesting and/or hand harvesting to manage Water Chestnut. After



Hobb's Pond, Weston, Massachusetts prior to the completion of the weed harvesting project.

conducting a survey, Lycott determined that harvesting was indeed the best management technique for this water body.

The harvesting efforts were coordinated with the Cambridge Water

Department, as they use the water from Hobb's Pond. Lycott installed a limno-barrier and netting at the dam to preclude the seeds and fragments from traveling downstream into the reservoir. Approval was obtained from the Massachusetts Department of Environmental Protection (DEP) to dispose of the harvested material at Wheelabrator Millbury, Inc. for incineration.

It is important to harvest this annual plant early in its growing cycle before it matures and goes to seed. The plants were harvested with Lycott's aquatic weed harvester. The harvester cut the plants off below the surface of the water and conveyed them to a platform on

the harvester. The plants were then unloaded by a conveyor on the other end of the harvester into a front-end loader, dumped into a specialized roll-off container, and transported to Wheelabrator for incineration. Fifty-one tones of biomass were removed over the course of twelve days of mechanical harvesting and eight days of hand harvesting.

Although a dramatic difference in the appearance of the water body was realized at the completion of the 2002 harvesting program, new growth will appear next year from dormant seeds. Lycott recommends management for several consecutive years to substantially reduce the biomass and allow more desirable aquatic plants to become established.



Hobb's Pond at the completion of Water Chestnut harvesting project.



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