Eurasian milfoil removal proposal 2012

Tuxedo Lake, NY

Prepared By:

Aquatic Invasive Management (AIM), LLC

6047 Sentinel Rd.

Lake Placid, NY 12946

Proposal submitted to:

Mayor Thomas Wilson

The Village of Tuxedo Park

Tuxedo Park, NY 10987

Basis for proposal

For the purposes of compiling this proposal, Aquatic Invasive Management, LLC (hereafter "AIM") has been in contact with Susan Goodfellow, Chair of the Tuxedo Park Environmental Advisory Committee as well as Chris Doyle of Allied Biological. When creating a plan for a lake's specific milfoil problem it is very important for us to get a solid concept of the area affected and the density of the growth. The 2011 Aquatic Macrophyte Survey Report completed by Allied Biological provided the necessary information on the lakes characteristics to allow us to make confident assessments.

Who we are

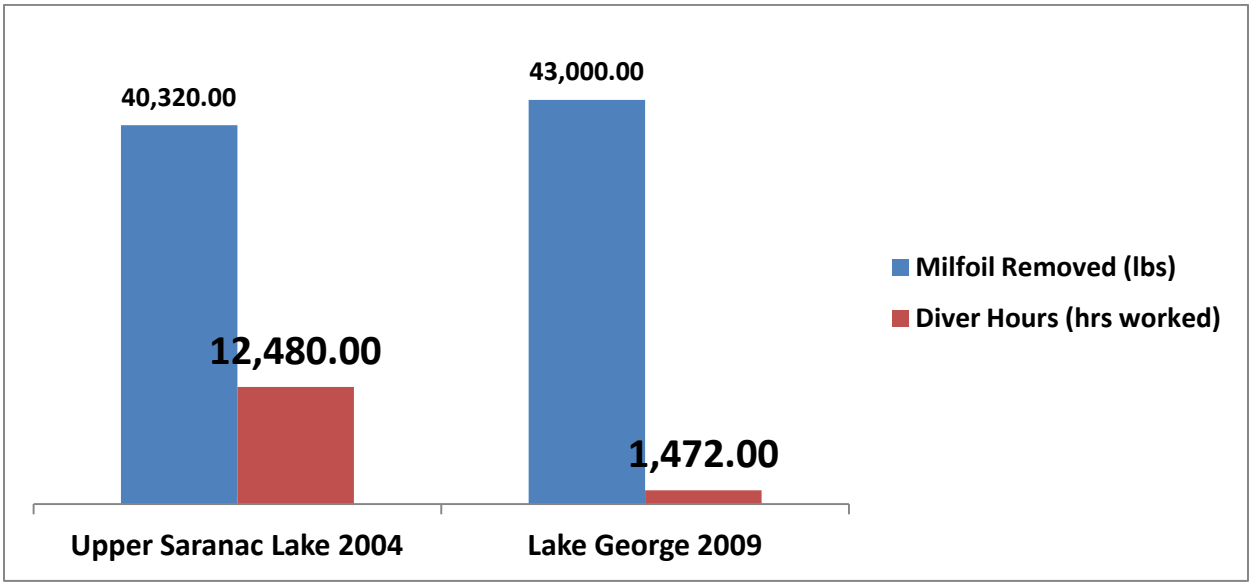
Aquatic Invasive Management is a company specializing in the hand-harvesting of invasive aquatic plants from lakes throughout the Adirondack Park as well as several beyond the park boundaries. The company got its start in 2007 on Minerva Lake and has since expanded its client base to 10 clients representing 15 lakes ranging from as far south as Saratoga Springs to as far north as Chateaugay. Its founders gained their knowledge and experience working on the Upper Saranac Lake hand harvesting effort from 2004 to 2007. The project was the first lake-wide hand harvesting management effort attempted and it was completely successful. Aquatic Invasive Management took on the Upper Saranac Lake project in 2008 and has been managing the lake successfully since. The company prides itself on its relentless innovation and hard work ethic. To date it has successfully suppressed lake-wide milfoil problems on five different lakes. In other cases, the client cannot generate enough funding to tackle their milfoil problem lake-wide. When this occurs AIM works within the budgetary constraints to achieve specific goals year to year.

The following is a list of current and past AIM clients and the status of their lakes.

Lakes Managed by AIM	Scope of Management	Years
Minerva Lake	Full Lake - currently maintenance phase	2007-present
Brant Lake	Full Lake - currently maintenance phase	2008-present
Upper Saranac Lake	Full Lake - currently maintenance phase	2008-present
Lake Placid	Full Lake - currently maintenance phase	2009-present
Lake George	1/3 of all littoral area, including all known dense sites managed	2009-present
Sunnyside Lake	Density reduction, planned maintenance in 2012	2009-2010
Mountain View and Indian Lakes	Full Lake - currently maintenance phase	2010-present
Chateaugay Lakes	Density reduction, moving into new areas of growth each season	2010-present
Lake Luzerne	Full Lake - approaching maintenance phase	2010-present
Saratoga Lake	Specific site treatment- 4 acres of dense growth	2011-present
Blue Mountain, Utowanna and Eagle Lakes	Lakewide diver inspections, no invasives found	2011-present

AIM uses hand-harvesting as its sole milfoil removal method. In earlier years the company used benthic mats in some specific cases and found that they were largely ineffective. To date the company only engages in matting operations for Asian Clam management on Lake George. Hand-harvesting has often

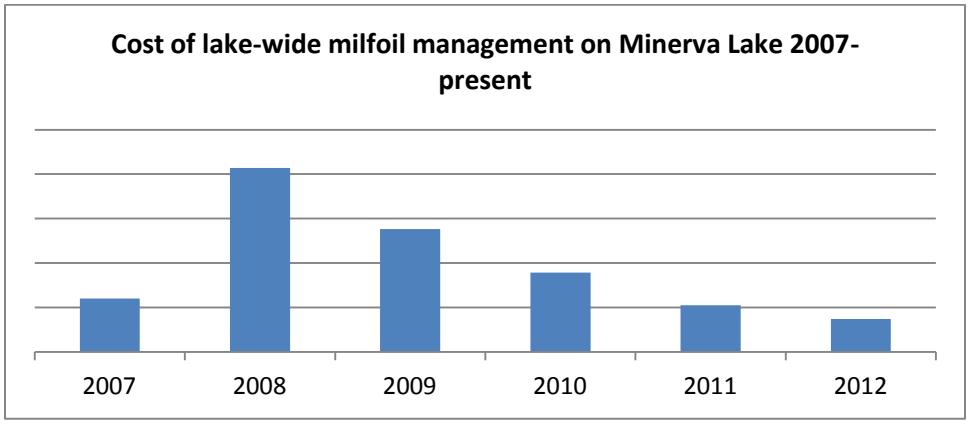
been viewed as a costly, tedious way to go about managing an aquatic plant problem. Critics have claimed that it increases fragmentation and due to poor visibility is ineffective. Since the Upper Saranac Lake project, AIM has been continually proving that well-trained, professional hand harvesting crews can achieve harvesting efficiencies greater than any other known method. The company trains its divers to operate effectively in any conditions and to do so while working in formation and achieving 100% coverage of affected littoral zones. As shown below, AIM has improved the efficiency of its methods by nearly a factor of 10 since the Upper Saranac Lake project.



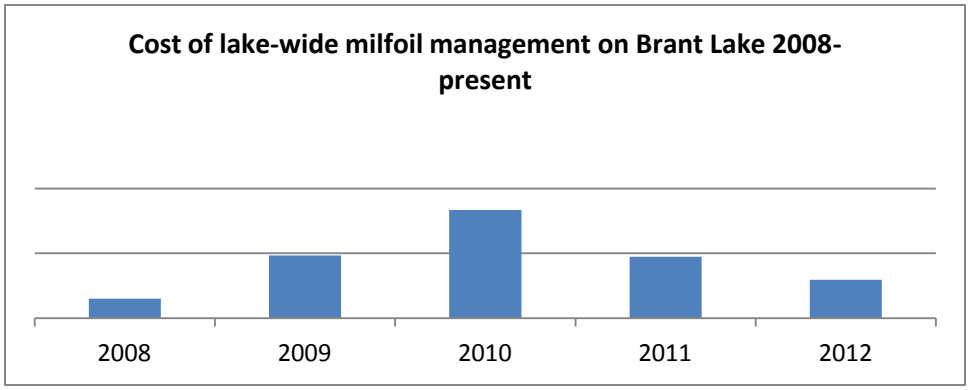
The Goal

In the early stages of any milfoil problem, the most important goal is reducing the density of growth quickly. Dense growth is far more expensive to deal with and is far more difficult to suppress. Over the years AIM has learned that multiple harvests of dense areas in the same season is the best approach. After the initial harvest, unseen fragments of plant material will create re-emergent growth. Once that growth is visible it is harvested again. This brings about the fastest transition to maintenance phase management available.

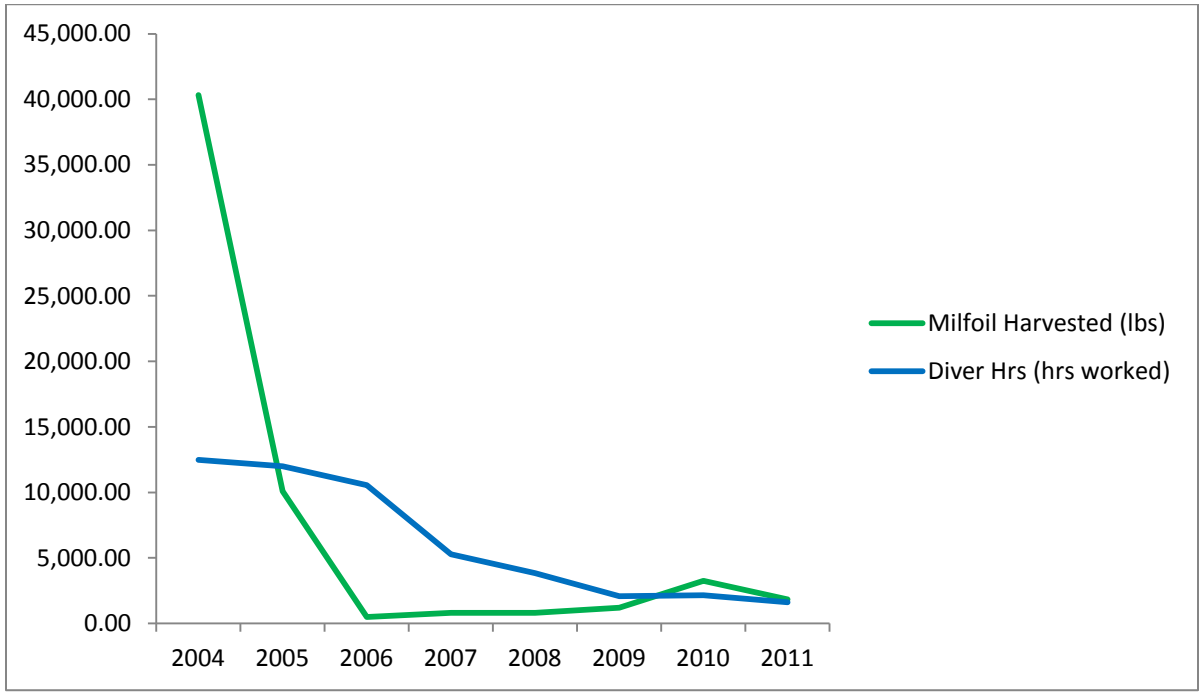
If all of Tuxedo Lake were to receive AIM management in 2012 at the levels recommended there would be a cost reduction in 2013, barring the discovery of significant amounts of un-mapped milfoil. Each subsequent year would cost less for lake-wide management until the ideal level was established to continue to control the milfoil presence. This is what is referred to as the "maintenance phase". This is the long term management goal of any lake with a milfoil problem, and is the ideal end state for any lake regardless of the methods employed (chemicals, biological controls, etc.). Eradication of milfoil is an unrealistic goal, whereas management of milfoil is not. Below is an example of the cost reduction over time shown on Minerva Lake. The first year was due to a limited budget but served to reduce density in a key part of the lake.



In some cases the level of investment must increase initially to reflect the emergence of new growth or the discovery of unknown growth. In the case of Brant Lake, it took increasing costs to reach the necessary level to begin the downward trend.



Below is a graph showing the comparison of diver hours worked (cost) to milfoil removed in pounds over the course of the Upper Saranac Lake milfoil project. Between 2007 and 2010 the techniques for lake-wide maintenance phase management were being honed and refined. As of 2011 the ideal methods have been put in place and costs are expected to reduce in years to come.



With the appropriate level of effort any lake can be brought into maintenance phase in three years time. Once in maintenance, the goal is to further reduce costs while continuing to control all of the lake's milfoil growth. Tuxedo Lake has a "management friendly" structure, with relatively narrow littoral zones and limited plant growth. As a result, we are confident that "maintenance phase" management can begin as early as next year.

Project Scope and Cost

We feel that our two diver crew size (two divers and one tender) for two weeks will more than adequately harvest all known growth of *Eurasian* milfoil in Tuxedo Lake. The crew will begin work on the 1.8 acres of growth in the dam area in the north end of the lake and will finish by removing the scattered plants located in the south end of the lake. The work would be conducted in early to mid summer (June-early July).

Our crew will train any volunteer divers on the basics of identifying and properly removing Eurasian milfoil. AIM requests that this be done with all of the prospective volunteers at one specified time period (not more than an hour would be needed) during the workweek. In addition, AIM requests that the volunteers do not attempt to work with the crew at any point during the remainder of the week. We ask this not out of disrespect to the efforts of the volunteers but rather out of the need for our crew to be able to focus and engage in specific methods for an effective harvest.

We like to operate with some built in scheduling flexibility for the following reason. It is possible that our crew will effectively harvest all of the known growth on Tuxedo Lake in one week. If this is the case we would like the flexibility to postpone the second week to later in the season (August) so that any and all re-emergent milfoil growth can pop out of the sediment for the divers to come back and remove. If we are able to do this we will have accomplished a two-hit harvest on the worst of the lake's growth and will be well positioned to reduce efforts by at least half in 2013. It is important to note that after an initial hand-harvest of dense growth there is typically about a 30% re-growth of milfoil in the same area. This re-growth is caused by buried root and plant fragments invisible to a searching diver. If we give these fragments enough time to produce telltale green growth it is very easy for the divers to remove them. We prefer to have a multi-hit harvest on denser growth to ensure a drastic reduction in the workload for managing the same area in the following season.

It is also possible that the divers will encounter much worse growth than anticipated and in such a case we will make immediate recommendations. We feel that this is unlikely due to the detailed analysis offered by Chris Doyle of Allied Biological, and are confident in recommending the following:

2 diver crew (composed of two divers and one tender, boat and all associated dive and safety equipment) for two 40 hour workweeks at a total cost of **$14,818**.