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Robert Lamoureux < bclamour@gmail.com>

AIM Proposal

1 message

Thomas Thomson < earthtrout@yahoo.com>

Tue, Aug 20, 2013 at 10:43 AM

Reply-To: Thomas Thomson <earthtrout@yahoo.com>
To: "bclamour@gmail.com" <bclamour@gmail.com>

Good morning Bob, hope all is well. I've attached the proposal and although the numbers are out of the range of the current funding it is a projection of the possible cost associated with getting Goose Bay back on track using our methods. I hope you can open some eyes and get people to contribute. Let me know if I can be of help in any way.

Thanks again and have a great day,
Tommy

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Proposal.pdf
182K

Hand Harvesting Proposal

Aquatic Invasive Management

8/20/2013

From: Aquatic Invasive Management, LLC
52 Burt Lane
AuSable Forks, NY 12912

Milfoil Hand-harvest of Goose Bay Proposal

To: Goose Bay Reclamation Corporation
P.O. Box 111
Alexandria Bay, NY 13607-0111

Proposal # 01_13

Proposal Date 8/19/2013

Item	Description	Duration	Unit Price	Amount
Option I	6 Diver/2 Topwater to harvest approximately 10 acres of moderate to dense areas of growth	3 weeks	$61.75/man hr	$59,280
Option II	6 Diver/2 Topwater to harvest approximately 20 acres of moderate to dense areas of growth	6 weeks	$61.75/man hr	$118,560
Option III	8 Diver/2 Topwater to harvest approximately 12 acres of moderate to dense areas of growth	3 weeks	$61.75/man hr	$73,200
Option IV	8 Diver/2 Topwater to harvest approximately 24 acres of moderate to dense areas of growth	6 weeks	$61.75/man hr	$148,200
10% of bay	6 Diver/2 Topwater to harvest approximately 100 acres of moderate to dense areas of growth	34 weeks	$61.75/man hr	$671,840
10% of bay	8 Diver/2 Topwater to harvest approximately 100 acres of moderate to dense areas of growth	25 weeks	$61.75/man hr	$617,500

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Aquatic Invasive Management, LLC.

AIM

Hand-harvesting methods for invasive plant management

Year 1

In the first year of a project we are typically dealing with areas of highly dense milfoil growth with surrounding areas of moderate density and then trace growth in all viable areas of the water body. We start by targeting the dense areas with what we refer to as "mass removal" early on in the growing season (ie: May-June). Mass removal is when we devote a number of divers to the specific patch or bed of growth for as long as it takes to remove the vast majority of the plants including their entire root systems. An area with dense growth requires this initial harvest to remove the mass and then an immediate follow up harvest to remove the smaller plants and to gather all visible fragments lying on the bottom. Once this two-part initial harvest is finished the area can be left alone for 2-4 weeks before a second harvest is conducted to clear what we call re-emergent growth. This is caused by buried stem fragments, buried root fragments and drifting plant fragments. Areas that once had a "bed" continue to be productive fragment growth locations for years to come so they require repeat harvests of the small emerging plants. Fortunately, these follow up harvests are far quicker and require far less labor to complete than the initial "mass removal".

Areas with moderate density growth are the next priority and usually require that we "line swim" them to effectively cover all areas of the lake bottom. Line swimming is when the divers swim side by side in a pattern marked from the surface by buoys and guided by surface personnel to ensure that 100% of the littoral zone (the area supporting any plant growth on a water body) is harvested. The same principle with some modifications is applied to harvesting areas with sparse growth. We often "surface spot" to speed up the process of locating individual plants in large areas. Surface spotting is when we drive over littoral zone areas in a "line swim" pattern and mark plant locations with buoys for later harvest by divers. We use this method in ideal conditions such as flat water, good sunlight, good water clarity and with the use of polarized sunglasses and a high vantage point (such as standing on the bow of our boat).

The most important strategy in year one is the repeat harvest. Areas that produce significant growth need to be harvested multiple times (typically 3) throughout the growing season to remove the re-emergent growth, remove the growth caused by drifting fragments and to ensure that problem density growth does not re-occur due to lack of management. In ideal conditions the plant can grow very rapidly. Therefore, a drifting fragment in June has the potential to be a massive plant in August producing hundreds of fragments on its own.

Year 2

The next year is significantly different from the first. Since the major beds were effectively harvested their growth no longer requires a major time commitment and major logistical commitment (hauling, dumping, etc.). Nonetheless, the areas determined to be the problem areas in year one receive the first attention in year two. We think of it as clearing and holding. You clear an area and keep re-clearing it to make sure the native growth starts to come back and to keep new milfoil growth from establishing a toehold. Then we focus on all other areas of the water-body in order of importance. The same principle of repeat harvesting applies here. The cost of management is greatly reduced in year two, often by 50% or more depending on the fertility and voracity of the lake bottom and plant growth respectively. This is because we are harvesting smaller plants in much lower densities over larger areas rather than dealing with thickets of large, mature growth.

It is important to note that this phase is important for the establishment of native plant growth. By clearing and holding areas that were once milfoil dominated we are allowing native plants to come back. Their reclamation of these areas benefits our management efforts. It makes it more difficult for a drifting milfoil fragment to take over a location and grow quickly because that fragment now needs to compete for sunlight and nutrients with well established natives. It creates healthy structure to support macro invertebrate and fish communities. Most importantly, the re-establishment of native growth creates stability for the lake's ecosystem.

Year 3

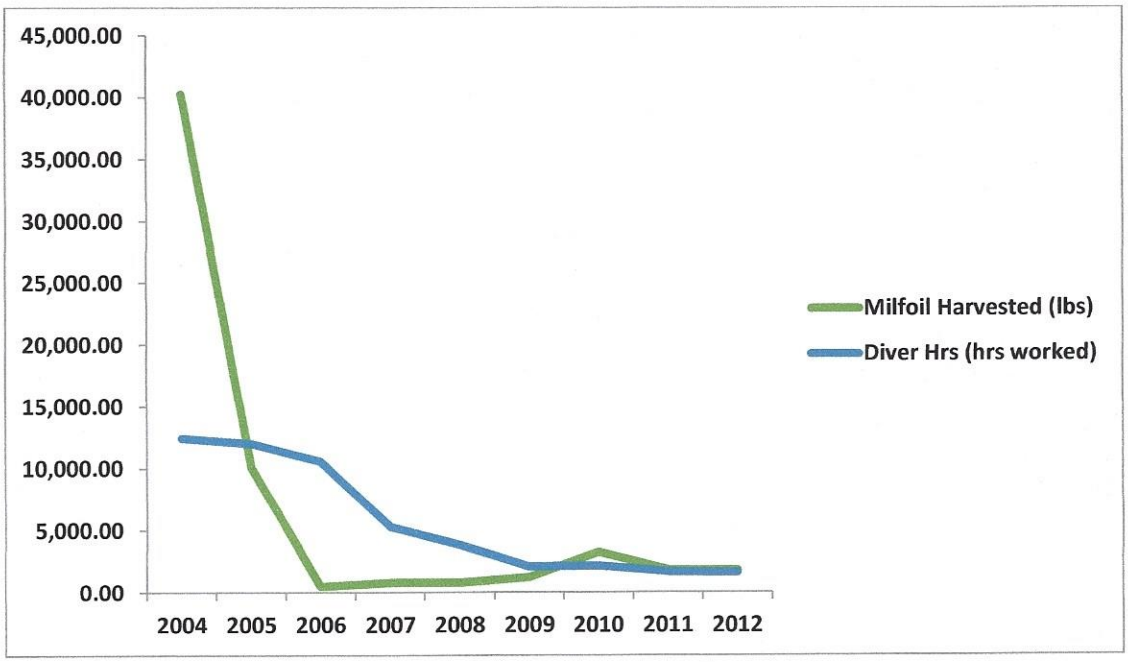
The third year of the project is when we shift our efforts down as much as possible while continuing to harvest all growth and reduce all density lake-wide. In this year we begin entering the "maintenance phase". The maintenance phase is when we bring down our efforts (aka costs) to their lowest level possible while retaining control of the small, remaining milfoil population. This phase requires a lot of improvisation and trial and error within the confines of a successful strategy. In other words it needs to be continually modified in small ways to achieve ideal management of a specific water body. Each lake or pond has its own unique characteristics. In the maintenance phase we master those characteristics and make them work to our advantage. In subsequent years the maintenance phase costs usually continue to decrease until an ideal level of effort is found or the plant is eradicated. Eradication is often only a realistic hope for small water bodies or larger water bodies with very low nutrient levels (oligotrophic lakes and ponds).

Tailoring to the budget

In many cases a lake organization cannot afford the ideal year one management for their entire water body. In that case, we focus our efforts on clearing key areas of the lake year after year. These areas are often high use areas (boat launches, channels, etc.) or likely spread vectors (dense beds with un-infested areas down-wind/current). Over time we clear and hold more and more territory on the lake until acheiving lake-wide management.

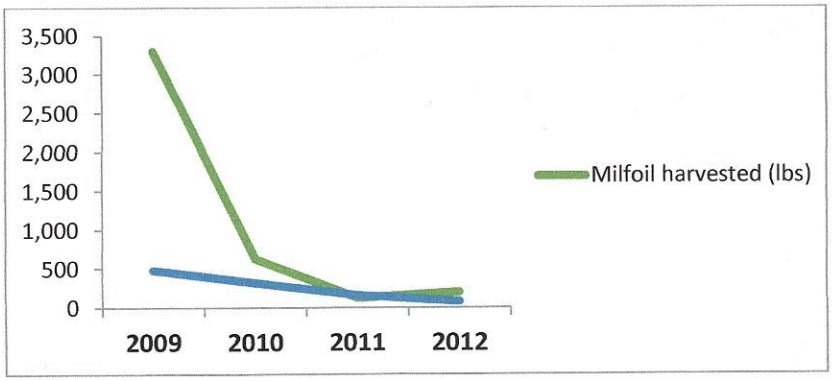
Examples

The chart below shows our data from Upper Saranac Lake since 2004. The green line indicates the pounds of milfoil removed. It is an indicator of the quantity of growth found on the lake each year. The blue line shows total diver hours worked each season. It is an indicator of project cost per year. Upper Saranac Lake has an approximated 5,000 acre surface area, 44 miles of shoreline and roughly 1600 acres of littoral zone.

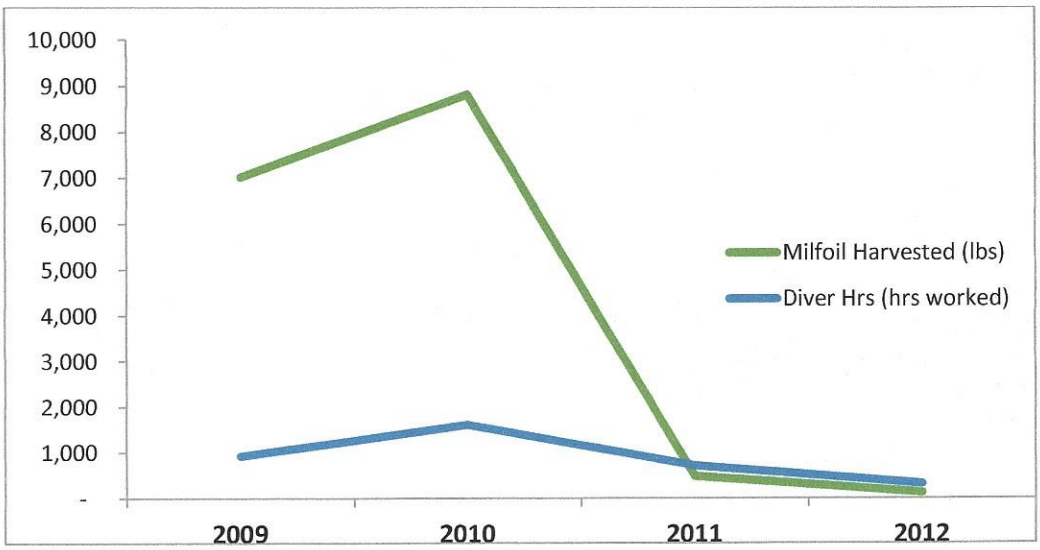


The above chart shows a successful lake-wide reduction of milfoil (2004-2006) followed by a successful development of and continued cost reduction of a lake-wide maintenance phase program (2007-2012). All of this success was achieved while the methods were still new and the conditions less than ideal. In other words, it had to be figured out as we went. Now, AIM operates with the benefit of this experience so new projects receive a much more rapid transition into maintenance phase.

The following is a similar chart showing AIM data from their lake-wide management of Minerva Lake, an extremely fertile lake of about 55 acres all of which is littoral zone.



The following is another chart showing AIM data from Brant Lake, a 5 mile long lake with a variety of lake-bottom conditions ranging from rock and sand to mud and muck. Due to budgeting constraints, this project did not reach optimal lake-wide management levels until 2010.



Why Hand-harvest?

The methods outlined in the three year breakdown are what we apply to any infestation whether it be a specific bay, a small pond or a major lake system. They are universally effective and proven. In addition, they bring about stability to a lake's aquatic vegetation and by association its fish and invertebrate populations.

There are numerous options for killing invasive plant growth. Here is a look at how they compare.

Chemical – There are a number of highly effective, milfoil targeting herbicides on the market today. They can be applied in several different ways with little labor. Why does AIM hand-harvest instead? We have found that chemicals have some downfalls. They require specific concentrations to be fully effective. These levels can be reduced by water and wind currents and general dissolution. In many cases an area needs to be "sealed off" with surface to bottom curtains to reduce water exchange and a loss of chemical concentration. When effective, the chemicals kill the plants causing them to decay in the water column and therefore creating lots of available nutrients to support algae blooms and future plant growth. No matter what, chemicals cannot kill all milfoil growth. Some, often 20% in an ideal treatment, survives and immediately resumes its growth and spread. In a chemical only management project for invasive plants there needs to be major treatments every several years to kill off the dense re-growth. Each treatment results in more decaying organic material in the water column and another shock to the lake's ecosystem. The project costs do not go down over time since the results are always the same.

Benthic Matting – AIM has placed thousands of benthic mats for various projects and most of them have been for Asian clam management on Lake George. After much experience with matting milfoil on several lakes, AIM has stopped recommending their use for invasive plant management. They have several key downfalls. Once a mat is placed it immediately needs to be maintained by divers on a regular basis (often once a week early on) to ensure that it stays down and does its job. As the material decomposes underneath gases build up and will displace the mat entirely if not "burped" by divers. A benthic mat kills all growth rather than just selectively killing milfoil. Therefore, once it has done its job and is removed from the lake bottom it leaves behind a blank slate for new growth. The most likely successful colonizer of that blank slate will be milfoil or other invasives. Like chemicals, this method shocks the system and de-stabilizes the benthic community.

Mechanical Harvesting – Mechanical harvesters deploy large mechanical rakes or cutting conveyors to literally mow aquatic plant growth down to a set depth with an equipment maximum specific to each machine. It is important to note that this method is mowing and not harvesting because the plants' roots and lower stems stay in place and resume growth immediately. The main benefit of this method is that the material is removed from the lake. The downfalls are that it assists the spread of the growth by fragmenting it and it never actually removes any of it in its entirety. Like chemicals and benthic mats, this shocks the system. It also never goes down in cost over time to achieve roughly the same effects.

Biological controls – These options are basically the introduction of another invasive to fight the problem invasive. In some cases its in the form of grass carp who are supposed to consume the plant growth. This rarely works very well since they often switch to consuming native plants once invasive levels are low and while marketed as "sterile" they often wind up reproducing and overwhelming a lake system. Another example is weevils which are supposed to consume the invasive growth. They are quite expensive and often suffer mass die offs while never totally suppressing the milfoil growth. We have yet to see a biological control method that truly works and is not another destabilizing factor for a lake system.

Suction harvesting – This method is similar to hand-harvesting in that a diver hand removes the plants. However, once removed the diver feeds the plant into a suction tube that then brings the material into a bagging system on the surface. We used to think this was going to be our ideal method but after much research have realized that it will be slower than our current approach. The additional layer of equipment to move around, keep running and rely on all day would create slowdowns and complications that would reduce our efficiency.

Summary

AIM has been in business since 2007 when it started out with one small lake contract. Today, we work on 18 lakes ranging across New York State with successful management efforts across the board. We have stuck to our methods and focused on perfecting them rather than chasing the elusive "quick fix" for invasive species. With a well structured company, well paid employees and reliable equipment we operate with maximum efficiency and produce results.

We can help any organization draft a plan for managing invasive plants and we can give solid numbers on costs. In addition, we can tailor our efforts to the available budget by setting realistic goals and achieving them in order of priority. The money spent on our work is an investment in lower management costs in the future and a healthier lake.

Please feel free to contact us anytime:

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Gmail by Google

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