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## Control of Eurasian Milfoil

### Eurasian Milfoil

Eurasian water-milfoil is a very invasive water plant. One of the reasons that this plant is so invasive is that it spreads through stem fragmentation; e.g. if a single plant is cut into 10 pieces, it will grow 10 more plants from those pieces. It is a very fragile plant and easily chopped up by a canoe paddle or boat propeller.

When it infests an area, it can form thick underwater stands of tangled stems and vast mats of vegetation at the water's surface.



*Typical Eurasian Milfoil infestation*

The dense growth of the milfoil displaces the indigenous species and prevents fish from laying eggs in the infested area. This reduces the indigenous plant growth, negatively affects fish populations and makes recreational use in those areas difficult or impossible. Milfoil will also significantly reduce game fish (e.g. trout) populations by changing their habitat.

A significant increase in the milfoil growth rate can occur when it spreads into high boat traffic areas on lakes and rivers. These areas include boat launch zones, shallow waterways with high traffic and near cottage docks. These areas are significantly contributing to the growth rate, since each powered boat passing through the infested areas has the potential to chop up thousands of milfoil plants with its propeller. This then leads to the re-growth of thousands of new plants.

### Control Methods

Regardless of which method is used to remove the milfoil, the milfoil will spread back to the cleared area based on the amount of fragmentation in the area. Therefore a lake must be managed from a holistic perspective, to significantly reduce milfoil fragmentation. The milfoil must be removed from both public and private high traffic areas and the lake community needs to be well informed as to how to minimize milfoil fragmentation.

It is not realistic to completely eradicate Eurasian Milfoil from most lakes, since it is usually cost prohibitive to remove 100% of

the milfoil. However, a holistic approach will control the spread of milfoil.

There are 7 potential methods to remove or kill milfoil. They are as follows.

- Chemicals/herbicides can be used to kill milfoil infestations, but will also kill off the indigenous species and aquatic life. This is not a realistic solution and is illegal in Canada
  - The milfoil can be cut with hand tools or industrial harvesters. However, as discussed above, one of the reasons that Eurasian Milfoil is so invasive is that any plant clippings left in the water will grow a similar number of new plants. Although the cutting of milfoil may be the cheapest method, it can cause more damage in years to come and can significantly increase the growth rate for the given lake, if the clippings are not managed. The cutting of milfoil is now illegal in many regions in Quebec and a number of harvesting operations in BC and France have been stopped, due to the resulting damage. Cutting typically does not remove the roots, so regrowth occurs quickly.
  - Weevils (a beetle) can also be used to reduce the growth of the milfoil. A weevil is specifically bred to eat Eurasian Milfoil and their larvae will kill off the milfoil. The use of weevils has historically produced inconsistent and unpredictable results and they can be expensive at \$1 US per weevil. Typically tens of thousands are required to treat an area. When they are effective they can reduce the milfoil in an area, but typically they don't completely eradicate the milfoil from the area. The use of weevils is illegal in some parts of Canada.
- A low cost solution can require the complete removal of milfoil in a discrete path through a milfoil bed, as opposed to treating an entire bay. This is typically done for a boat launch, to provide a path to the open lake. Weevils can't be controlled to eat in specific areas, so they can't be used for discrete areas. As a result, a weevil solution may require treating an area 10X that of a discrete path.
- SCUBA divers can be used to manually pull or harvest milfoil by pulling the plant out with its roots. This meticulous work can be very effective. However, it is typically one of the most expensive options. This should be done by experienced divers, since it requires long hours underwater and often working in limited or poor visibility when the bottom silt gets stirred up in the process. Some lakes in the United States have been spending over \$100,000 per year for this service.

This process can also be done with the use of suction harvesting equipment where the diver pulls the plant and feeds it into the suction hose to be drawn up to the surface. It is then collected on a barge. The literature is not consistent



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as to whether this is more efficient than hand harvesting. Depending on how suction harvesting is done it can be seen as dredging, which causes significant damage to the lake bottom and is illegal in some parts of Canada.

- Controlling milfoil by using bubblers to oxygenate the water has produced inconsistent results. It may be marginally effective in small areas like a pond, but is not realistic or cost-effective in large areas. The equipment is also very expensive.
- Benthic mats and bottom screens represent non-biodegradable solutions. Although these methods will kill off the milfoil, silt will build up on top of these materials over a few years and milfoil can still grow on top of the mats. This tends to eliminate the benefits related to the longevity of a non-biodegradable solution. These solutions are very labour-intensive to install on a large scale, since they require a very manual process. Some regions have strict limitations on the use of non-biodegradable mats, requiring annual removal.
- Burlap cloth can be used to cover the areas infested with Eurasian Milfoil. The burlap cloth will kill off the milfoil and its roots by compressing the weak plant on the lake bottom. The burlap solution has the added benefit of allowing the stronger indigenous plants to grow through its loose weave at the same time. The burlap will then biodegrade over a 1-3 year period. In that period, the indigenous plant growth has a chance to regain its dominance in the area.



*Installed burlap (covered with lake silt), starting to biodegrade after one year*

Although the burlap solution is the most consistent environmental solution, installing burlap in large areas has historically been very labour intensive and hence expensive.

Block-Aid's automated burlap solution involves very little labour, which significantly reduces the installed cost, making it highly cost competitive. It can be less than 1/3 the cost of using divers.

### **Block-Aid's Burlap solution**

Block-Aid's burlap solution represents the commercialization of a manual burlap process developed by ABV des 7. ABV des 7 is a non-profit environmental group in Gatineau, Quebec and is

responsible for the 7 watersheds of South West Quebec. Upon reviewing all the possible solutions, it decided to experiment with burlap to cover (and kill) the milfoil, since it seemed to be the most efficient and environmentally friendly approach.

ABV des 7 then conducted a 3 year experiment in Lac Pemichangan, Quebec, to test the solution and confirm how safe it was for the environment. After the 3 year test, ABV des 7's resulting report demonstrated that the burlap had almost completely biodegraded in the 3 year period and had no adverse effects on the lake conditions. In fact it actually improved conditions. The added benefit was that the loose weave of burlap allowed the indigenous plant species to grow through the burlap and start to regain their dominance, while the milfoil was being killed off. The only issue with the manual process, was related to it being very labour intensive. This issue has been alleviated with Block-Aid's automated burlap installation system.

Block-Aid's proprietary system involves a large barge with an articulated arm and a sand hopper. The barge supports 3.8m (12.5 ft) wide X 1,000 m (3,280 ft) long rolls of burlap weighing over 650 Kg (1,430 lbs) and 8,000 lbs of local sand. The system will install about 8,000 m<sup>2</sup> (9,500 yds<sup>2</sup>) per day. Although the wet burlap will naturally lay on the lake bottom, small amounts of sand is also used to hold it to the bottom, since the milfoil will off gas from decomposition.

The barge can operate in very shallow water and uses custom designed positional thrusters to control its travel in all directions. The thrusters have special inlets to minimize any damage to the milfoil while the barge is installing the burlap. Milfoil fragmentation is also monitored during installation. The Barge is computer controlled with real time GPS positioning, allowing accurate laying of burlap. A structural sonar is used to monitor bottom conditions during an installation.



*Burlap Installation System*

Do-it-yourself burlap kits for small areas around docks, are also available. Each kit covers an area of 3.8m wide X 10m long and includes bags for sand and instructions. Shoreline rocks can also be used to hold the burlap in place.