

# Aquacleaner Environmental

“Leaders in the field of Waterfront Restoration Technology”

P.O. Box 8 Lancaster N.Y. 14086 (585) 752 - 7930

## Suction Harvesting The Methodology vs. The Myths

**Introduction:** When one first hears about suction harvesting, images of a nozzle randomly vacuuming up the lakes bottom immediately come to mind, like a Hoover cleaning up your living room floor. In reality, nothing could be further from the truth. While Suction Harvesting can be compared to a unique form of dredging, one must look past the perception to learn what the reality under the water is and all the benefits it brings.

**Background:** Suction Harvesting has been around and toyed with since 1982 when a group from the Army Core of engineers in the U.S. and the U.K. built and experimented with a primitive machine, that tested the theory of taking unwanted invasive aquatic vegetation out by the rooting system to see what the re growth would be.

Aquacleaner Environmental has refined and developed technology for suction harvesting as a means of controlling and reversing the infestation of invasive plants that are overrunning lakes and bodies of water throughout the US, and as a viable means of performing Water Front Restoration. If left on it's own, all lakes and bodies of water will follow a path that will lead to issues and possibly their demise due to the natural factors that effect these bodies of water.

The current technology that is in use only masks the problem long term and appeases those affected short term. We believe that the removal of these invasive plants in their entirety, with as much of the rooting system as possible is truly the best way of offering longer term relief and with continued use, long term reduction of their spreading.

We also believe that lakes and bodies of water are altered through time because when water travels, it brings things with it that can begin it's demise or at the very least result in less enjoyment for the users of it (run off filling in a waterfront shoreline with silt). We have seen a cycle occur in the water where organic material even from leaves blowing into the water at the shoreline, forms a layer of silt, which then allows invasive plants to grow closer to the lakes shoreline. These plants die every year, decompose, turning into silt, releasing more seeds of invasive's and then blooming next season with more density. The removal of various types of material from a lake only helps to restore it to the condition it was years earlier. A hard pact bottom makes it harder for aquatic vegetation to flourish, and for the weeds to take hold and multiply. Aquacleaner Environmental is dedicated to restoring individual waterfront properties and lakes as a whole in an environmentally friendly and conscious manner.

## Aqua Cleaner Vegger

**Science behind the Aqua Cleaner:** Your waterfront property is basically an aquatic garden. It is the optimal environment for aquatic vegetation to grow in because it has all the ingredients that vegetation needs to flourish; water, sun, and a rich soil. If you look at your back yard and use that as an example you can further understand the dynamics of what takes place in the water. You have the perfect yard but your neighbor has a bunch of dandelions. The wind blows the wrong way and now you have dandelions (the water is a much better medium than air). If you try to remove the dandelions by pulling them or cutting them they will still grow back. However if you dig them out and excavate the roots, the odds are much greater that the re-growth will be minimized. Because water is constantly moving, it carries fragments from these invasive plants. When these fragments land on your property they can take root and grow. Using chemicals only makes the problem worse because when a plant dies, it drops to the bottom, decomposes and breaks into fragments, which causes additional re-growth next season. Again, harvesters also make the problem worse because when you cut a plant you are spreading fragments that will fall to

the bottom and take hold as well. (Ask any landscaper, and they'll tell you... if you want thicker grass, just keep cutting it).

**How It Works:** Suction Harvesting is the most effective way of removing aquatic vegetation because it removes the blooming vegetation by the roots, as well as the years past plants laying on the bottom in their semi decomposing state. This process can reduce the re-growth to as little as 10% next season but we have experienced as much as 50% depending on variables. It leaves no remains (floaters), can operate in the tightest areas (around docks and break walls) and is environmentally friendly. We can suction up a fish and it comes through the hose without going through a motor, and then is returned into the water.

The Aqua Cleaner machine is essentially an underwater vacuum cleaner. The machine is mounted on 5' X 10' pontoons and floats on the water. The system also has a compressor that continuously provides air by way of a hose and respirator. The diver uproots the targeted plants, the years past decomposing plants and feeds them into a vacuum hose that conveys them to the surface. There, a second worker bags them in 50-pound onion bags. The weeds and all the solids go into the bag, while the water passes through the mesh bag and back into the lake. When a bag is full it is placed onto a raft that is later taken to shore where the bags can be composted or trucked offsite.

**Premise:** That removing invasive aquatic vegetation by their rooting system and removing them out of the water in their entirety, is the best way to slow down the spread and start reversing the infestation.

**A) Marine habitat** – The technology of our machine allows for a fish to be sucked into the nozzle, and come out swimming on the other end, where the person operating the bagging system can remove it and place it back in the water. The operation of this equipment can be timed so as to not disturb the marine habitats and our company methodology has been that we do not start operations until spawning season is over or in some cases prior to its commencement.

**B) Water quality** – A major issue of concern for several reasons; The Disturbance of the a lake bottom and what it might cause in residual affects, and the spreading of turbidity over a large area, I'm assuming is your offices biggest concerns relative to our process. The idea that working through years of organic material that has accumulated will release elements in the water column like Nitrogen, Phosphorus, BOD's that will result in blue green algae or other forms of algae is a tangible one depending on the severity and method of the disruption. Our experience with over 7 years of use with the Aqua Cleaner machines, show no signs of this occurring.

As you are well aware each lakes bottom will vary in its consistency and its composition. Firmer bottoms with sand, rock or clay, will only cause a minimum turbidity cloud, one that typically doesn't spread very far, and settles very quickly (typically within 1 hour). Silted in areas do create a larger turbidity cloud that will spread in approximately 100' circumference with calm tides. Use of a turbidity curtain will contain this easily.

An important point worth noting is that our water quality study has shown that our machines and the method in which we use them does not cause algae blooms or any residual affects to an area we have worked. We have had extensive use on several lakes with multiple machines and never heard of any after affects that had resulted. Our study was conducted in a 2-acre pond with a silty bottom and wall-to-wall infestation of an invasive plant. During this project we operated 2 machines for almost 6 weeks, removed over 2400 bags of vegetation and the only noticeable spikes in the water column resulted during a 2-day heavy rain where we were not even working.

We believe we have had great success because while some organic silt does get disturbed by the suction from the nozzle and our hand pulling of plants, silt does mix with water and end up at the back of the machine as turbulent water, that this causes no by products or after affects. Since nothing ever passes

through an impeller and the composition of the sediment is not altered, we feel it came out the same way it went in.

**C) Disposal** – The disposal of aquatic vegetation is always part of our companies on site plan and varies depending on what the history of the lake is relative to chemical applications. We learn the history of a lake typically from the client, the lake association and state regulatory agencies. When there is no problems we generally have our clients dispose of the vegetation through normal organic compost piles from their local municipality or as a community compost site.

**Technical Information:** While it's true that what we do under the water is unseen, what we do should make sense because of the logistics involved with using our equipment. How we operate the equipment in the water is relative to:

What type of plants we are taking out

The consistency of the bottom

The density of the Plants

There is a huge difference in the rooting system of Spatter Dock, Lily Pads, and Cat Tails vs. those of Milfoil or Hydrilla. Plants with large roots need to be tilled, and with our system we use everything from a divers Hands, and in some cases an aggressive claw and winch, or excavator mounted on a barge.

**Plant Selectivity:** Identifying invasive plants is usually a simple process through educating our divers what to look for, and while under the water we are continually moving around so that we work past the turbidity that is created in the prior spot. Milfoil and Curley leaf pondweeds are visibly different then lilies or eelgrass. It is worth noting that on a micro level (individual home owner's) that we have found a balance between the need of the marine life and ecosystem they inhabit. Many of our clients will ask for removal of all aquatic vegetation on their property so they can enjoy their recreational activities unobstructed by aquatic vegetation. Our normal response is that we are comfortable removing half of the vegetation on their property, leaving half for the marine life. DEC offices in some regions and states have found this to be a fair balance between both, and truly a balance is what we're suggesting.

### **Protocol For Suction Harvesting**

- 1) Define area's to be worked on
- 2) Define types plants to be removed
- 3) Agreed procedures for use of the machine
- 4) Design transportation plan for moving spoils to shore
- 5) Use of turbidity curtains when the area to be worked on meets certain requirements
- 6) Set disposal procedures
- 7) Time frame for seasonal operations depending on each particular lake and the areas that are hot spots.

### **Suction Harvesting - Comparisons:**

1. Chemicals – A short term solution to aquatic vegetation problems because they only kill a portion of the plants, which drop to the bottom, turn into silt, and allow for substantial regrowth, are harmful to your water ways, and while killing the plants, still leave remains floating in your water
2. Weed Harvesters – Cutting vegetation is the old, obsolete method for removing weeds. It has many drawbacks. They leave clippings to collect all over your property and create a mess. Harvesters also spread and ensure new seedlings because clipping a weed in half causes seedlings to fall from the broken weeds and re seed lake bottom. In addition harvesters are large, bulky machines that can't cut close to your docks. These machine also kill huge amounts of fish as they move directly and quickly through a weed bed.

3. Grass eating Carp – While being a good long-term solution for an entire waterway, carp are of no value to your own property. Typically when you purchase these fish, they are so small that they can't eat much vegetation till they are years older. They are also picky eaters and will only eat from a select menu. There is also no way to control the quantity of vegetation that they consume.
4. Excavators – This is the only other way to remove unwanted aquatic vegetation and perform dredging, however it is very messy and ineffective because an excavator can only reach out 15' from shore and when using it for dredging removes silt that has a high percentage of water in it, making it impossible to capture much of the desired material.