

Aquacleaner Environmental

“Leaders in Waterfront Restoration Technology”

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

Facts and Stats About Diver Assisted Suction Harvesting

History: DASH has been a technique used to remove and suppress invasive plants, since the Mid 70’s however few companies have invested any resources to expand on the technology. Aquacleaner Environmental has been in this field since 2000 and has defined it’s roll in the waterfront restoration industry by manufacturing a variety of suction harvesting machines including the most aggressive and mechanized system to date. In the service portion of our business we continue to lead the way by extracting more aquatic vegetation and working with a variety of invasive plants. In the 2008 season we removed over 20,000 onion bags of plants totaling over 500 tons of bio mass.

The amount of bottom time our divers have has lead us to develop some very unique techniques which help yield quality suppressions of invasive plants. The operation of the nozzle is a key component to successful use of DASH. Working in turbid water and removing the plant that you can see along with it’s associated roots crown is only part of the technique but removing years past plants in various stages of decomposition will help yield the best results.

Other forms of suppression including solar powered water circulators, benthic matting, mechanical harvesting, and spot-herbicide treatment typically are only band aids since they don’t address the root of the problem. Hand harvesting while being a valid form of plant removal does not offer the rate of progress (ROP) compared to that of DASH because a diver can only remove a small group of plants per hour, in a small confined area. When a patch is dense and has been present for a number of seasons, or when the plants or tall (over 4’), hand harvesting becomes a slow tedious process. Capturing the fragments of these plants can further slow down this process.

DASH Experiences:

We have been using suction harvesting in a variety of lakes and with a variety plants including: Water and Variable Milfoil, Water chestnut, Lily Pads, Curley Leaf Pond weed, Fanwart, Hydrilla, Water Lettuce and others.

During the summer of 09 we worked in Connecticut on:

Bantam Lake – we extracted 4600 onion bags of Fanwart from approximately 2+ acres in 4 weeks.

Crystal Lake – we extracted over 2000 bags of curly pondweed and Milfoil from the entire lake in 3 weeks

Woodridge Lake – we extracted over 2000bags of 12’ Milfoil in 2 weeks

Several Lakes in New England have built or purchased suction harvesting machines and has remediation programs that are fun by volunteers or paid staff. They include Lake Sebago in Maine, Lake George in NYS and Lake St Catherine in Vermont.

Determining ROP – DASH programs can be very successful based on the dynamics involved including the type of plant, height of plant, density of plant and the type of substrate. The ROP one can expect to achieve is directly related to these dynamics. A single 5" nozzle can work at a ROP of 500 square feet per hour and a double 5" system can work at 1000 square feet per hour. An acre project can be covered in approximately 40 hours.

The idea that a DASH program cannot achieve success for large-scale infestations is not correct unless you are using an inferior piece of equipment. Our company's goal of manufacturing the most aggressive and mechanized equipment for suction harvesting overcomes the myths that DASH cannot offer remediation of large-scale infestations. Using our multi nozzle pontoon boat we can cover a 120' x 50' area of dense, tall plants in a day and manage what we remove in an easy manner.

Models – We have three different models of the Aquacleaner machines that all have been through extensive field use in our service division and offer the most efficient, productive and easy to use Suction Harvesters created.

Home: This model is designed for individual or groups of waterfront homeowners who share common aquatic vegetation problems. It is very portable and easy to use and store.
Single engine, 4" suction line, air compressor, dual bagging system, on a 4' x 8' floating barge

Commercial: The machine that began it all in our service division is the perfect balance between productivity and portability. Twin engine, 5" or 6" suction line, air compressor, dual bagging system, on a 5' x 10' floating barge

Options – We offer a variety of options that can aid in the use and add productivity to your daily suction harvesting operations, and will be happy to custom build your accessories based on a better understanding of your individual water bodies issues.

Pump Engine Size – Larger engines can aid in the productivity of your machines as well as the length it will work.

Air compressor- A larger air compressor will allow two divers air at deeper depths.

Refuge barge- This will allow you to stay in the water longer by giving you a place to store your bagged vegetation.

Suction hose – A longer hose will allow you to reach a larger circumference and get into deeper water.

Bagging configuration- Offers you options that match your manpower and daily capacity goals.

Turbidity curtain- Contains turbid water & potential fragments while being compliant with states requirements

Industrial: The most aggressive suction harvester ever produced that offers a wide range of options designed to meet your lake management needs.

Self-Propelled 28' Aluminum pontoon boat, 4 Pump engines, twin 5" suction lines, air compressor, 3 filtration and bagging configurations.

Options: Pump engine size, Pontoon Boat size, Additional Hulls (increases buoyancy), Spuds (anchoring system), Turbidity Curtain outriggers, Pontoon Boat Refuge Barge with/without conveyer belt that manages the removed biomass with ease.

Our equipment reduces set-up time, moving the rig from area to area, simple maintenance that alleviates breakdowns, and suction tube suspension process that reduces the disturbance of bottom sediments that occur when the suction hose is moved while working beneath the water.

Remediation Program for DASH:

Aquacleaner Environmental will assist your lake in developing a management plan that addresses all aspects of suction harvesting program.

Defining the targeted area – We first begin by prioritizing the areas that need work, based on the type of plant, location, density and amount of traffic a given area might have.

Capacity – There are several criteria that must be assessed to determine the rate of progress (ROP) that you can achieve using our Aquacleaner S.H. It is important to understand the relationship between the time spent in any one spot versus the quantity of vegetation removed. Working the bottom more extensively takes more time but also may yield better results long term relative to the re growth. ROP varies from 200sq/hr to 600sq/hr

Type of plant: Rooting System dictates how fast we can remove this year's plant. Your goal is to get last years plants out as well which are beneath this years plants.

The type of bottom – Soft, silted in bottoms will make plant removal and it's rooting system easier to extract. Hard bottoms like clay or sand will require more suction to get to the rooting system of the plant.

The density of the plant both in how many plants are in a given box as well as how tall they are. More Biomass requires more time to go through a given area.

The Depth of the water is important because deeper water work will slow your rate of progress due to the logistics of moving around while under water and the size of the plants involved.

Define The Other Types of debris in the area to be cleaned. Leafs, stick rocks, zebra mussels, and larger timber must be gone through as part of a shoreline remediation and to maximize your use of the waterfront.

Training – U.W.S. offers a comprehensive training program with delivery of your machine as well as options for long-term use. We will assist in all aspects of your program including manpower, supplies, and insurance.

Maintenance – Our equipment is very simple to maintain. The only moving parts are those of the engines and the pumps. We use only Honda small engines, which any small engine shop or any backyard mechanic can perform. Typical maintenance required is engine oil (every 100 hours) and spark plugs (every 500 hours).

There is several pump components including: an outer pump housing, inner pump housing, impeller, and pump seal. Over time the only part that might need replacing would be the pump seal (usually due to misuse). The cost for this type of repair is only \$200-\$300.

There is a belt on the air compressor, which will require periodic tightening and should be changed once a year depending on the model. In the course of doing business for over 9 years, we have had only 1 engine that required significant engine repairs.

Storage – A large pontoon model can be broken down of all components in approximately an hour and the engines, pumps, Hookah and hoses can be stored in any small garage. The pontoon boat can be wrapped or covered and stored anywhere outdoors.

Labor – There are several scenarios that can put into place to handle the labor aspects of operating a suction-harvesting machine. The amount of people needed will vary based on the model chosen (small machine can be operated by a minimum of 2 and up to 3 while a large pontoon boat with 2 nozzles can be operated by a minimum of 4).

The positions on a DASH include:

1 diver for each nozzle

1 handler for working with the vegetation

Note: When working with large quantities of vegetation it is more efficient to have two people on the surface handling the biomass. Our pontoon boat with 2 nozzles needs 2 deck hands to manage the engines and the filtration bags.

Volunteers - Labor can be found through volunteers that have the desire to be involved in the remediation of their lake.

Paid Staff – When necessary staff can be hired to operate the suction harvester. The logistics involved in finding qualified staff can be simplified by using some creative advertising. Many of our staff are college students who enjoy being in an outdoor environment. Local dive shops can offer certified divers that are looking for summer employment.

Divers – Our insurance company does not require divers to be certified because we are using a Hookah system to provide air and not air tanks, hence your options for finding divers should be made simpler. Anybody who is comfortable swimming and snorkeling can be trained to operate a nozzle underwater.

If you are required to have employees you can take volunteers and pay them minimum wage so that they are covered with the proper insurances.

Insurance – Through our business history we have established a quality relationship with a high rated insurance carrier that offers a package of cover that includes: liability insurance, theft and inland marine coverage starting at \$3000.00 per year. Since our work falls into the category of landscaping the workmen's comp insurance is usually only about 15% of the employee's salary. If your hourly wage were \$10.00/hr then your looking at approximately \$15.00/hr with all necessary insurance coverage. Cost to operate a 4 man crew could be as low as \$75.00/hr including fuel.

Disposal – When putting together any DASH management plan the disposal of the biomass must be addressed. The best "green" use of the spoils from a suction-harvesting program would be to find a local farmer or nursery that can compost this material. A simple ad in a local paper will inevitably find you some interested parties many of whom may be willing to cover the transportation costs involved in relocating the spoils. Other options would include a local organic landfill or a vacant piece of property where the material can again be recycled as compost.

Timing – A DASH program can be implemented as early as May through October. Typically we recommend clients commence operations in June when the plants are blooming because the plants pull best when they and their associated rooting system are mature.