

## Battling the Invaders

*As of June 2020, thirty waterways (including several multi-waterbody systems) are known to be infested with one or more invasive aquatic species. Variable water-milfoil is still the most widespread of the known invasive aquatic plants in Maine. Other invasive aquatic plants present in Maine include curly-leaf pondweed, Eurasian water-milfoil, spiny (European) naiad, hydrilla and European frogbit. Five additional invasive aquatic plant species (not yet known to occur in Maine) have been listed by Maine law as imminent threats to our State.*

Once an infestation has been confirmed, rapid response is crucial. The prospects for eradication (or barring that, effective management at minimum risk to the aquatic ecosystem), are greatly increased by swift, well-planned, and properly executed controls. In developing an invasive aquatic plant management plan, one of the most important questions to be answered is “How, exactly, is the invasive plant infestation to be controlled?” The principal approach in Maine—used primarily by groups currently involved in battling variable milfoil (or its invasive hybrid)—is “manual control”. Manual control methods may alternately be referred to as “non-chemical,” “physical” or “mechanical” methods. The three primary manual control methods currently being used in Maine are: manual harvesting, benthic barriers, and suction-assisted harvesting.



*Variable water-milfoil infestation*

Maine has taken a cautious approach to the use of aquatic herbicides to control invasive aquatic plants. Herbicides, like all pesticides, pose a definite degree of risk for people, for fish, and for the integrity of the aquatic ecosystem which depends on that body of water. Though aquatic herbicides are seen by state officials as an “effective tool,” it is the state’s position that the “benefits of using herbicides rarely exceed the risks of very real adverse ecological impacts.” Therefore, “it is only in extraordinary circumstances that the Maine Department of Environmental Protection (DEP) will support the use of herbicides.”<sup>1</sup> In recent years, the DEP has approved and overseen the use of aquatic herbicides in four specific instances--the Hydrilla infestations in Pickerel Pond in Limerick and Damariscotta Lake in Jefferson, and the Eurasian water-milfoil infestations in the unnamed gravel pit in Scarborough and Salmon Lake in Belgrade.

**IMPORTANT! – All invasive aquatic plant control projects are subject to regulation under Maine’s Natural Resources Protection Act. Before planning any control project, contact the Maine Department of Environmental Protection for specific permit requirements. All native aquatic plants are strictly protected by Maine law.**

### Manual Control Methods

Below is a brief overview of the three primary manual control methods currently being used in Maine: manual harvesting, benthic barriers, and suction-assisted harvesting. More detailed information on each method is located online at [www.mainevlmp.org/aquatic-invaders/](http://www.mainevlmp.org/aquatic-invaders/).

### **Manual Harvesting (or Manual Removal)**

Most of the variable milfoil management efforts currently underway in Maine involve a combination of manual control methods. Nearly all of these projects involve at least some use of the method known as manual harvesting. Manual harvesting is a useful technique for removing scattered individual plants and controlling small, infested patches. With manual harvesting, plants and their root systems are individually removed from the infested area, collected, and transported away from the waterbody for disposal. As even tiny plant fragments can generate new plants, it is very important when using manual harvesting that every attempt is made to remove all plant and root fragments from the project site.



*Jim Chandler, using manual harvesting to control variable milfoil in Lily Brook, surfacing with a bag of milfoil.*

The means by which the plants are approached, handled, and even the way in which they are disposed of may vary, but the basic concept remains the same. Think “weeding the garden by hand (or with hand tools).” Now think “weeding the garden under several feet of water.” This should give you a pretty good sense of the work. Depending on the water depth, the work is done by waders, boaters, snorkelers and/or SCUBA divers. Though manual harvesting is a labor-intensive process, if done with care it is a “species selective” technique that causes minimal impact to other native species in the vicinity of the control activity. However, despite the level of care and thoroughness, it is nearly impossible to see and remove every stem and root fragment in the infested area. For this reason, ongoing monitoring of management sites and routine control activity is essential.

### **Benthic Barriers (also called Benthic Mats or Bottom Barriers)**

Placement of benthic barriers is another labor-intensive, but effective, method for controlling invasive aquatic plants. Benthic mats are particularly useful in treating small to moderate sized patches of dense growth. They are used to suppress invasive plant growth in high use areas such as public swimming areas. If depths are sufficient, benthic barriers may also be used to clear and define plant-free boating channels through infested areas, reducing plant-boat contact and thereby minimizing the potential for boats to spread the infestation. Controlling larger infestations with benthic barriers is possible, but given the labor and materials involved, larger control projects are generally done incrementally in stages, and in some cases may take several years to reach the desired result.

Benthic barriers may be constructed in various shapes and sizes, using a variety of materials and systems for weighting the mats down. Their basic function, however, is to lay “flat” on the bottom of the lake, pond, or stream, covering the infested area, preventing plants underneath from receiving sunlight, thereby killing them. (Returning to the garden analogy . . . think mulch). The mats are left in place long enough to kill the plants (generally four to six weeks, though in some cases, the mats may be left in place for longer periods). Manual harvesting is often used in tandem with the placement of benthic barriers to control any “outliers” and plants that find their way out from under the mats around the edges. One significant advantage with the use of benthic barriers is that the plants in the treated area are, by and large, killed. The “almost impossible” challenge of extracting



*Photo by Nikki Leam  
Team installing benthic barriers to control variable milfoil in Lily Brook.*

every root hair from the substrate (as is necessary to completely kill a plant through manual harvesting) is largely eliminated when this method is properly employed. One disadvantage is that benthic mats are not "species selective" and may cause "collateral damage" to any native flora and fauna that do not have the means to escape out from under the mats.

### Diver Assisted Suction Harvesting (DASH)

Suction harvesting is the least frequently used, of the three manual control methods now employed in Maine. It is a relatively expensive and cumbersome control option. However in certain circumstances such as large, widespread infestations, suction assisted harvesting is proving to be an important management tool. Groups in Maine utilizing this method have shown enormous industry and innovation in developing the required technology and techniques. As the fine-tuning of the process proceeds and more "rigs" come on line, it is likely that the use of suction-assisted harvesting in Maine will expand.



*Little Sebago Lake Association has developed two floating work stations (dubbed HIPPO I and HIPPO II) to support their suction assisted harvesting activity*

Suction harvesting is 'manual harvesting' (see above) with the added advantage of a highly efficient way to get the plants to the surface where they are collected for disposal. Rather than swimming the plants to the surface in mesh bags, divers extract plants by hand as above, and then feed the plant material directly into a suction tube for rapid transport to the work platform at the surface (generally a pontoon boat or barge). From the hoses, the plants and any sediments clinging to the plants, are pumped through some form of strainer system, then piled or bagged. The sediment-laden water that comes along with the plants is either returned directly to the waterbody, or (better) is put through another system that removes sediment particles or allows them to settle out.

Plant fragmentation is a concern with all of these manual control methods, but with diver-operated suction harvesting the potential for fragmentation is moderately high. Use of careful technique and fragment barriers can significantly reduce the creation and escape of fragments from the work area.

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1. Keynote Presentation at the Seventh Annual Maine Milfoil Summit by Commissioner David P. Littell, Maine Department of Environmental Protection.