

The Mechanical Harvester Advantage

By Dr. Bruce A. Richards

Imagine being able to wade into your favorite pond, lake, or coastal bay without having to push aside dead weeds and debris, or step on large clumps of dead algae and nuisance aquatic plants. Wouldn't it be nice if you could fish and not have to constantly pull up crud, or lose bait hooks in the muck? Maybe some of you good readers of *Pond Boss Magazine* remember the days when you could swim off your favorite shoreline and not sink into the scum of dead or decaying plant life.

Over the last 50 years or so, our ponds, lakes, and bays have steadily deteriorated because of the expanding growth of algae and invasive aquatic weeds. Perhaps you thought this was just the way it is and there really isn't anything you can do to fix the problem. Well, please keep reading.

Algae are wonderful little things. They are credited with being the first creatures that took light and converted it into key life processes, i.e., photosynthesis.

Let's say you have a nice home, ten acres of land, and a one-acre pond. Your lawn looks great, but your pond is a green, cloudy mess. You've spent huge sums of money on keeping your lawns beautiful by cutting the grass with state of the art lawn tractors. Fertilizers and pesticides have been carefully applied to make the turf healthy and attractive. *But, taking care of your pond—not so much.* This scenario is more common than you might imagine.

Is there anything you can do to make the pond healthy without chemicals? Okay, drum roll please, you can use mechanical harvesting equipment. Harvesters remove dead material



Today's mechanical harvesters are smaller, more compact and much more efficient.

and invasive plants, and enable you to fish, swim, or just view your pond, bay, or lake. The newer harvesters are smaller, more sophisticated, less labor intensive, and even fun to operate.

We need good, native aquatic plants to provide habitat for fish and invertebrates. Some areas of a lake need to be left alone for waterfowl or juvenile fish nurseries to proliferate. With a strategy I call *precision harvesting* you can take out invasive and decaying plant life, minimize the bycatch (fish, snails, crabs, etc.), and ultimately have a good, healthy ecosystem—without chemical additives.

Too Much Reliance on Chemical Maintenance

Those of us who really love the water cringe when we think about bombarding it with copper sulfate to kill algae, or with other chemicals to kill nuisance plants. In coastal bays, chemicals are avoided because tidal flushing makes chemical applications ineffective. On the other hand, with ponds and lakes, circulation can be especially poor. Still water only needs a few hours to create massive algal blooms of cyanobacteria (blue-green algae). Then, cyanobacteria die after a chemical application, and they sink, robbing the water column of dissolved oxygen, which could

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Big volumes of plants can be quickly collected and disposed of.

cause you to lose fish and other benthic (aquatic bottom dwelling) creatures.

Algae are wonderful little things. They are credited with being the first creatures that took light and converted it into key life processes, i.e., *photosynthesis*. We can thank the ocean's single celled algae for providing our planet with oxygen that proliferated into an atmosphere creating a biosphere. With photosynthesis, oxygen is produced, and most of the oxygen we get comes from the ocean and the single cell organisms that live there.

When algae or plankton bid farewell to the light, however, they sink and *respire*, consuming oxygen and producing carbon dioxide. Most life on this planet breathes in oxygen and exhales carbon dioxide, so decaying algae actually compete with the other forms of sea life for dissolved oxygen in the water. They also form detritus (decayed remains) in the sediments, and can release unhealthy hydrogen sulfides that make that rotten egg smell.

Algal blooms are too often treated with copper sulfate. When this algacide is applied, it not only kills the bloom and causes it to sink to the bottom, it also kills non-targeted species, such as fish. Yes, copper is an essential nutrient for zooplankton and other water-life, but too much copper is deadly.

Invasive plants like Pondweeds, Eurasian Watermilfoil, and Hydrilla are examples of plants that are displacing native aquatic plants. To manage this kind of invasion, we once again tend to add a chemical, or a cocktail of approved herbicides. But, even when the label is properly followed, we will also kill some of what we want to save and protect.

Herbicides applied in small doses have been shown to work in many freshwater systems. However, in my experience, I too often see pond

owners reapplying chemical treatments if the first application doesn't work to their satisfaction. They simply *try and try again*, with another application of chemicals, often exceeding the prescribed dosage.

Chemical overdosing may mean clearer surface water, but it comes at the biological cost of more dead material in the sediment and more fish-kills. It also comes at the risk of human health. I have met many folks who are concerned about their children or pets swimming in chemically treated water. Chemical treatments have been linked to tissue damage, liver and kidney problems, even cancer; and unfortunately, the lake managers who apply the chemicals are the people who are at the highest risk for both short-term and long-term health consequences.

Harvesting the Water

Mechanical harvesting has become more sophisticated over the years. Early fresh or salt water harvesting was much like raking leaves in the fall. In fact, many people still rake the near shore environment. Just like shoveling snow by hand, raking is a back-breaking affair. In my humble opinion, any body of water over a quarter of an acre would be hard to manage with hand rakes. Mechanical harvesting is becoming a more common and preferred alternative in today's world.

Early models of harvesting were basically barges with three or more people pulling dead material off the bottom by suction or conveyor, and pushing the material, dead or alive, into a receiving basin. A conscientious harvesting team would have one or more people removing fish, snails, crabs, or other bycatch, and putting these beneficial organisms back into the water. If you don't have someone taking time to sift through the bottom material, you needlessly let the good die with the bad. I think most of us would like to

see a better way.

About twenty years ago, I was an estuary manager and was able to see a good early-model sea harvester in action in a coastal bay system. Many of you might know that estuaries are bodies of water where both freshwater mixes with salt water. On average, salt water is 3.5 % sodium chloride, often described as 35 parts per thousand. Freshwater on the other side has essentially no salt. Estuaries are between these two systems with a usual salt content of 5 to 30 parts per thousand. In wet years, the estuary has more freshwater, in dry years, the estuary has more salt.

Much of the marine fish, crabs, and other seafood we consume spend part of their life cycle in an estuary where the water moves more slowly and provides habitat protection not available in the ocean. Until the 1970s, east coast estuaries had healthy submerged seagrasses that provided essential habitat. Many of these beneficial grasses died, and were replaced by macroalgae, like sea lettuce (*Ulva*). When macroalgae die in an estuary, it has the same effect as algae or nuisance weeds in your pond. To keep the system healthy, the decaying or dead material in the sediments need to be removed. About 15 years ago, in my home state of Delaware, we hired a Florida company to bring a large three-person sea harvester up to our inland bay system. This sea harvester automatically raked the muck with a slow moving conveyor belt. One technician would hand-remove bycatch and put the beneficial sea life back into the water. This machine worked well, but the time it took and cost per hour was off the charts. Over the years, sea-harvesting technology has vastly improved, and offers a viable alternative to chemical treatments.

Sea Harvesters Come of Age

New sea harvesting models are becoming smaller, sleeker, more efficient, and less expensive. I have recently become a science advisor for *Weedoo*, a company that manufactures a sea harvester that runs on solar-powered electric that can be operated efficiently by one person. The conveyor system can be set to barely skim the surface (minimizing the collection of fish and other bycatch) while collecting large quantities of things like *Lemna* (duckweed, etc.) off the surface of the pond or lake. Again it's *precision harvesting*. The other model is a completely new technology, and I expect to see other harvester manufacturers following suit, because this unit allows for high speed precision harvesting using a boom cutter (as an underwater mower), and a tractor-type front end loader for collecting surface weeds and ripping invasive vegeta-

tion out by the roots. The nice thing about these new precision harvesters is the boats are small, nimble, one-man operations—and I have to admit, they're pretty fun to operate (like driving a zero-turn tractor).

Sea harvesting technologies can be used periodically to keep your water bottom clear and biologically productive. Yes, the process has to

be repeated, because like your lawn, plant life will eventually grow back, but with sea harvesting, you don't have a build up of chemicals in your sediments, or last year's dead material underneath this year's decaying algae, or nuisance aquatic plants.

So, if you really want to reduce or eliminate the use of aquacides and provide a better envi-

ronment for your fish and family, I recommend you consider using some of these newer and more efficient mechanical harvesting technologies.



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