
FOCUS: WATER MANAGEMENT AND IRRIGATION

Alternative water treatments that don't cost the earth



The canals of Ontario's Holland Marsh are the lifeblood for 7,000 acres of intensely farmed muck soils. The Holland Marsh Growers' Association is active in stewardship initiatives to treat not only washwater, but settling ponds. In the future, floating rafts may be employed to remove unwanted nutrients from canal water.



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KAREN DAVIDSON

Bond Head, ON -- The Holland Marsh Growers' Association (HMGA) is half way through a three-year, \$2.1 million water management project. Lessons were shared at a recent seminar that heartened the spirits of growers under increased environmental regulations.

One speaker, Riley Milligan, Ontario Ministry of Northern Development and Mines, talked about the geology of the Marsh, describing different soil layers and the 50-foot shallow aquifer and another deeper one at the southern end. Water moves laterally and vertically, so a 3-D understanding of the area is important. Growers have the bounty of not only Lake Simcoe but an additional water source supplying their crops. With that

abundant water resource comes responsibility of stewardship, especially as so much water is used to wash produce before it goes to market.

"We're looking for holistic solutions to manage water in the Marsh," says Charles Lalonde, HMGA water project manager. "Let's clean up the dirt before it gets to settling ponds."

To meet standards of the Ontario Ministry of the Environment and Climate Change (MOECC), the focus is to decrease phosphorus emissions and turbidity of the water -- the suspended materials in the water which have a large impact on fish in streams. These include soil particles -- clay, silt, sand and muck -- as well as phosphorus and nitrogen.

Lalonde explains that potential solutions for improving water clarity are flocculants, agents that

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will clean wash water before being released to settling ponds. Alum is one example of a flocculent that can cause fine particulates to clump together. The “floc” then sinks to the bottom of the liquid, similar to the milk layer below the cream of

unpasteurized milk.

Add to that a promising technology called Geotube dewatering containers. These units are constructed of a specially-engineered, dual-filament polypropylene textile that are formed with a high strength patented seaming process that can withstand a high flow of sludge or contaminated water being pumped through them. Solid materials accumulate within the tube that also trap much of the nitrogen and phosphorus. Once the Geotube is filled with solids, it continues to dewater and go through aerobic digestion over time so the captured nutrients can be reused by the grower for crops instead of being released into the water environment.

The objective is not to pay for removing water, but to remove only the dewatered beneficial solids. The water could be reused

for irrigation or treated and reused within processing facilities says Don Bishop, president and chief technology officer for Bishop Water Technologies.

The Geotube dewatering system has been around for more than 50 years but only within the last decade has it been recognized and used in Canada. Numerous municipalities are now using it to dewater the waste sludge from their waste water or water treatment plants as well as to clean out their sludge lagoons. The Perth Water Treatment Plant is the most recent. Where a traditional solution would have cost \$7 million, the Geotube solution cost the municipality just \$1.25 million. Costs would be considerably lower for on-farm treatment as flow rates and volume will be less.

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Geotube dewatering system

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Another alternative technology, BioCord reactors, have been around for 30 years yet still are almost unknown in Canada. They have been tested and enhanced by Bishop Water Technologies to remove unwanted nutrients from agricultural settling ponds or streams.

The reactors are basically a floating raft with multiple strands of braided, looped BioCord rope hung below. They act as a

removing phosphorus and nitrogen from the water.

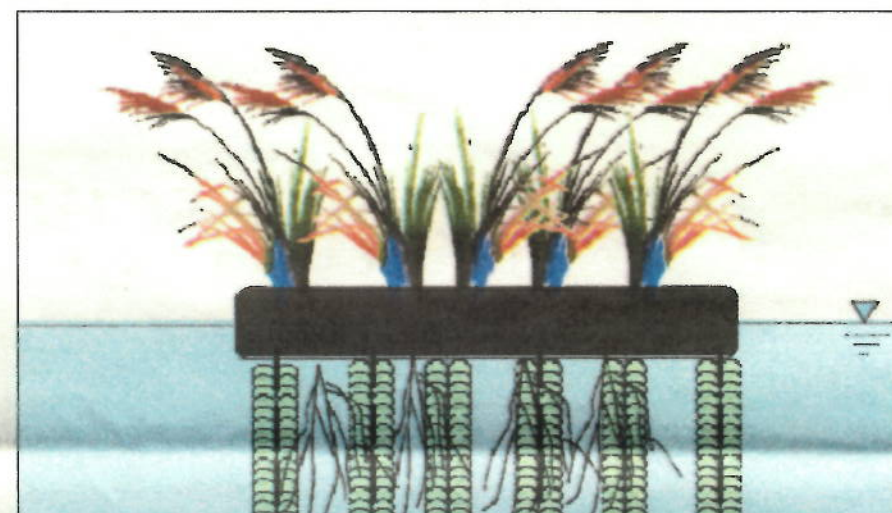
"Think of it as an apartment building for the bacteria to live in," says Bishop.

BioCord can be installed on stainless steel racks or fixed to a surface frame. Coarse air diffusers slough off the excessive biofilm growth during high loading periods. Fine bubble diffusers are used to feed the bacteria in closed intensive systems, as in waste water treatment for food processing, or existing lagoons that are not meeting discharge criteria. In the natural environment, the available dissolved oxygen is efficient in most cases.

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New BioCords in the water column before bacterial seeding





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The reactors are basically a floating raft with multiple strands of braided, looped BioCord rope hung below. They act as a substrate to attract different types of beneficial bacteria that will remove the nutrients from the water. There are 10 different types of BioCord that use different types of fibers and a selection of surface area to attract the most beneficial bacteria. It's a low-tech system that can deal with algae blooms because it's

removing phosphorus and nitrogen from the water.

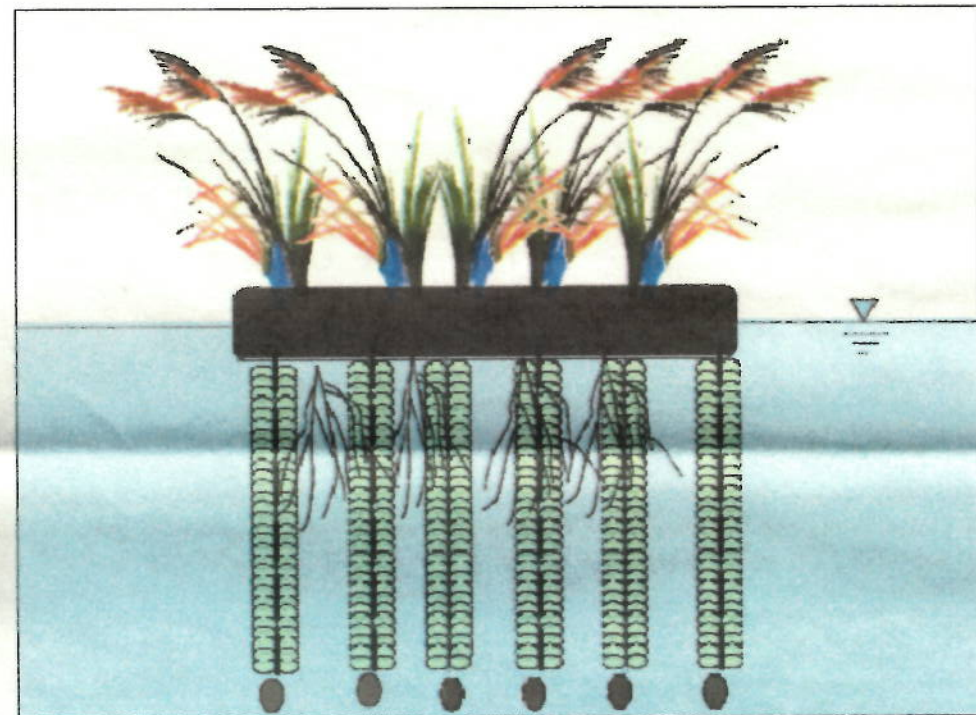
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It's not inconceivable that the Holland Marsh canals could be "seeded" with floating BioCord islands however the original source has to be dealt with first. Lalonde says that assessments are required as to placement and how many are needed for best results. If the concept works, it would be a highly visual project that could communicate to the broader public how growers are proactively looking after the water resource.



New BioCords in the water column before bacterial seeding



BioCord raft working with aquatic plants to greatly increase nutrient uptake