

Aquatics Updates

Virginia Lake Management Company

Volume 1, Issue 3

(757) 591-8780
P.O. Box 236
Virginia Beach, VA 23458-0236

Ecologically Balanced Ponds

—Kevin Tucker, President

Although all lakes and ponds are unique, there are a few basic management practices that can be used in all fresh water bodies to help improve or prevent water quality problems. In order to understand these concepts more clearly, we must first understand the problems.

In any pond, especially those in which storm water is being collected, the primary issue is the mass loading of that system with nutrients and sediments from fertilizer, leaves, grass clippings, eroded soils, etc. The excess nutrient and organic buildup in a pond will result in algae growth, poor water clarity and appearance, foul odors, and more. Additionally, the inflow of sediments will begin to fill the pond, displace storage capacity, and result in the need for dredging in the future.

To help mitigate these problems, you should maintain desirable grass and other vegetation in all areas directly surrounding the pond, eliminate direct fertilization of the areas immediately adjacent to the pond, and educate all homeowners throughout the entire community to minimize the fertilizer used on their lawns and shrubs. Also, under no circumstances should any grass clippings, leaves, or other organic material be dumped or blown into the

gutters, drains, ditches, or ponds. If there is ongoing construction, landscaping, or other soil disturbing activities within the community (watershed), it is imperative that appropriate erosion control measures are in place to prevent sediment in these areas from washing into the storm water system and ultimately into the lake or pond to which that storm water flows.

Even with all of the above mentioned practices, most storm water retention ponds experience nutrient loading that exceeds *Mother Nature's* ability to handle. Therefore, experienced lake managers will incorporate aeration and the use of various microbial products to help restore and maintain these ponds in an ecologically balanced state.

Storm water ponds are a valuable tool in the filtration of rain water as it flows from our communities into streams, rivers, bays, and oceans. Proper stewardship and management of these ponds is imperative to this mission, not to mention an aesthetic necessity for the community.



Inside this issue:

<i>Muskrat Love... OR NOT!</i>	2
—Randy Bolin, VLMC	
<i>Aquatic Plants</i>	2
—Dave Ellison, VLMC	
<i>Benefits of Submersed Aeration</i>	3
—Matt Dodson, VLMC	
<i>The White Amur—Beneficial Grass Carp</i>	3-
—Dustin Kennedy, VLMC	
<i>Erosion—How it Affects our Lakes and Ponds</i>	4
—Kyle Finnerfrock, VLMC	



Muskrat Love... OR NOT!

—Randy Bolin, Sales

“Muskrat Susie, Muskrat Sam
Do the jitterbug out in muskrat land
And they shimmy
And Sammy’s so skinny

And they whirled and they twirled and
they tangoed
Singin’ and jingin’ the jingo
Floatin’ like the heavens above
It looks like muskrat love”
--Captain and Tenille

Hard to believe this is a love song about MUSKRATS! We know them as a year round nuisance, burrowing in the banks of slow moving water in marshes, ponds and streams.

Musk rats are seldom far from water. They live in houses constructed of vegetation or in burrows dug into banks. Both houses and burrows have underwater entrances and above water living chambers.

Although the feeding habits of muskrats may result in some damage to agricultural or ornamental crops growing near the water, the principal cause for concern is the potential erosion to the banks of your ponds, resulting from muskrat burrowing activities.

Musk rats breed from early spring until fall, giving birth to several litters of four to seven young. Young muskrats grow rapidly and are independent at an early age. It is recommended to deal with a population of muskrats before they have become established in an area. Watch out for signs and try to adopt early remedial measures as soon as their presence is noted.

Trapping of muskrats is the primary method used to control muskrat population. Companies involved in Lake or Pond Management are the one’s to contact regarding muskrat removal. Rip-

rapping is another method used to discourage muskrat burrowing. Rip-rapping with coarse stone or gravel may prevent muskrats from digging into banks or dam slopes of ponds. This method of damage prevention also protects the pond banks and earthen fill from wave action.

Keeping your ponds free of muskrats and the damage they cause sometimes seems like a never ending job, but with the help of your Lake and Pond Management professionals, this pest can be reduced to a manageable level.



Aquatic Plants

—Dave Ellison, Environmental Scientist

Aquatic plants play an important role in the ecological balance of ponds and lakes. Beneficial plants in shallow areas and shorelines will stabilize banks and prevent erosion. These plants will also provide protection and food for waterfowl, fish and other animals. One of the most important benefits of aquatic plants in terms of lake management is the absorption of nutrients before they enter the water. High concentrations of nutrients will often lead to algae problems in lakes. Ponds and lakes without buffer zones of vegetation have no means of stopping the influx of nutrients.

New plantings of aquatic vegetation are often done with small seedlings or seeds. This process often works well in areas with little existing vegetation that could outcompete the small growing plants.

Exotic plants and aggressive species such as phragmites and cattails could potentially prevent the success of the planting. Although there are stressors facing the young seedlings this is the most frequently used method of aquatic plantings.

Another approach to establishing aquatic plants around a pond is the placing of adult vegetation in the problem areas. This can be done by anchoring a mat containing many adult plants in the desired location and allowing the plants to anchor in to the substrate. A floating area of plants can also be obtained in a similar manor if a pond owner wished to have an island of different plants. This can add the beautification to a pond that many people desire but find difficult to

obtain. The benefits of aquatic plants are significant to the health of a pond and plantings are a way to help obtain a balanced healthy pond.



Pickerel Weed with its purple flowers makes for an attractive and beneficial aquatic planting.

Benefits of Submersed Aeration

—Matt Dodson, Environmental Scientist

Submersed aeration systems are one of the most powerful tools available in the management of your lake or pond. A typical system is composed of a shore mounted air compressor feeding several diffuser units placed on the bottom of the lake and connected with weighted air hoses. These diffused air injection systems offer the most efficient and effective means of mixing a stratified body of water with minimal disturbance to its natural appearance. Some pond owners prefer the minimal visual impact provided by diffused air versus a highly visible floating fountain.

Another big advantage of submersed aeration is that the effects can be spread geographically over a larger area by positioning diffusers throughout the lake. Where a floating fountain's effects are limited to its surrounding area, a similar horsepower air compressor can effectively mix and aerate throughout more of the total water column by spreading its effect between multiple diffusers.

The benefits of aeration to the overall health of a lake are many and far reaching. Fish kills from low dissolved oxygen can be prevented in most lakes with the installation of a diffused air system.

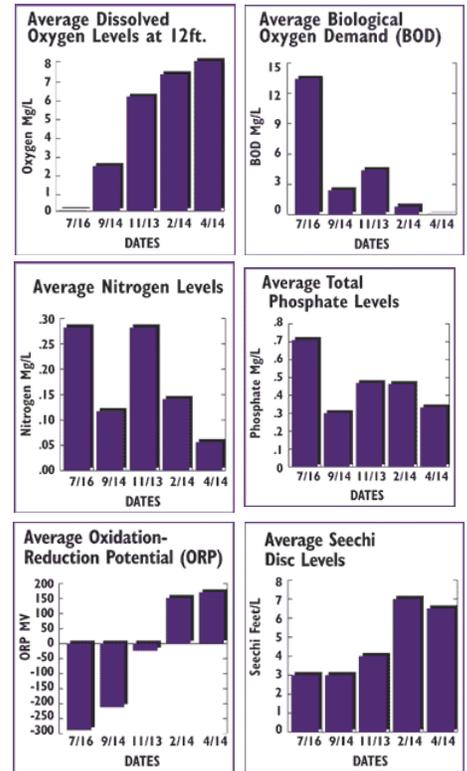
Foul odors from anoxically produced hydrogen sulfide gas will be greatly reduced as bottom water mixes and becomes oxygenated. This oxygenation of formerly stagnant benthic water stimulates beneficial microorganisms which serve to breakdown organic sludge and convert limiting nutrients such as nitrates and phosphates into forms that will not directly fertilize algal blooms.

The following data is taken from a case study on a 21 acre lake in South Florida with depths of over 20 feet. The same principles apply even in small ponds of less than an acre and depths of only several feet. It can clearly be seen from these graphs the effectiveness of the diffused aeration system in improving water quality based on a number of important parameters.

—The top two charts show how the oxygen levels in the pond increase over time while the demand correspondingly drops, both indicators of aquatic health.

—The middle two graphs show how the limiting nutrients for algae and aquatic weed blooms are sequestered from the water column.

—The bottom two charts show the increasing capacity of the system to pro-



cess nutrients and the increase in visual clarity of the water column over time.

All of these factors are prime indications of how the health of your lake or pond can be improved with the addition of submersed aeration.

The White Amur— Beneficial Grass Carp

—Dustin Kennedy, Aquatic Biologist

The White Amur, more commonly known as a grass carp are members of the minnow family (Cyprinidae). The grass carp, as a biological control of aquatic plants, is considered a long-term method for control of submersed aquatic plants. The grass carp has a large, grooved pharyngeal (throat) teeth and a long intestine which allow it to effectively shred and digest aquatic plants as its main source of food.

They are native of China and were imported into United States in 1963. In fear

of environmental impacts the Grass carp population was sterilized. In 1984. The fish are sterilized by shocking the already fertilized eggs with heat, cold, or pressure. This process changes the chromosome count which prohibits normal sexual reproduction.

Grass carp can be an effective biological control agent for some varieties of sub-



merged aquatic soft-stemmed vascular plants and some types of branched algae. These carp can consume up to their body weight in vegetation each day while actively growing and up to 80% of their biomass daily once they reach maturity.

Many states allow the restricted use of grass carp for aquatic weed control and are governed by local states and counties. Fish can be stocked at the rate of 8-15 fish per surface acre. Check with VA Lake Management on permitting and stocking of these helpful fish.

Erosion: How It Affects Our Lakes and Ponds

—Kyle Finerfrock, Environmental Scientist

An erosion problem in your pond's watershed can have serious effects on the pond's health. Erosion is caused when exposed soil is left unprotected against the affects of wind and rain. Over time soil particles can break apart and begin to wash into the pond. Erosion control efforts can reduce sedimentation, minimize turbidity, and lessen nutrient loading. Sedimentation of the deposited soil particles will begin to decrease the average depth of a pond, which can lead to an increase in algae and weed problems. If sediments continue to build up over time it may be necessary to dredge your pond, which can be very expensive. High turbidity in a pond can make the pond look unpleasant and can be unhealthy for the organisms living in the

pond. The inflow of sediments also correlates to the inflow of nutrients into a pond, which can further lead to algae and weed growth. Unprotected shorelines can also be subject to erosion and can lead to loss of property and also add to sedimentation of the pond. By adding rip rap or heavily vegetating to the edge of your pond with beneficial plants can help to stabilize your shoreline significantly. Sediment fences are often used in construction areas where large amounts of terrain are exposed. These fences are effective in controlling runoff but must be inspected and maintained regularly to prevent any breaching. Other more natural looking erosion barriers like fiber logs can also be used to reduce runoff into a pond. Preventing ero-

sion early, before it becomes a problem is important in maintaining your pond's health for the future.



Example of a fiber log barrier combined with riparian vegetation plantings.

2844 Crusader Circle
Virginia Beach, VA 23453
(757) 689-8890

Office Locations

610 Thimble Shoals Blvd Suite 101
Newport News, VA 23606
(757) 591-8780



Fountains
Aeration Systems
Algae & Aquatic
Weed Control
Biological Aug-
mentation
Lake Dyes
Fish Stocking
Water Testing
GPS Mapping &
Lake Survey

P.O. Box 236
Virginia Beach, VA
23458-0236

PRSR STD
U.S. Postage
PAID
Norfolk, VA
Permit No. 292

Fax: 757-873-4896
Email: ktucker@vlmc.net

www.virginialakemanagement.com
"A Full Service Lake & Pond Management Company"