



# PONDerings®

Official Newsletter | Issue 19 of **AQUA DOC®**

CLEVELAND | COLUMBUS | CINCINNATI

## Be a Good Steward of **YOUR** Water!



“The duty or function of watching or guarding for the sake of proper direction or control” is how Merriam-Webster defines stewardship. In Ohio we are blessed with an abundance of lakes, large and small. In fact, the estimated number of ponds and lakes in Ohio tops 50,000 or more, with 2,000 over five acres (ODNR Ohio Outdoor Notebook 2006). Geologists with The Ohio Department of Natural History say there are two types of natural lakes in Ohio. First are glacial and kettle; whole lakes created when glaciers moved out of Ohio. The second are oxbow lakes; formed when a bend in a river separated from the main flow and became impounded.

These natural lakes are rare. Amazingly, there are only 110 lakes in Ohio over five acres that are natural lakes (Black ODNR 1991). There being 50,000+ water bodies in Ohio and only 110 of those “natural” add up to a lot of man-made lakes and ponds in Ohio.

When most of these lakes were constructed they were built with a purpose such as fishing, swimming, boating, etc. Nature will work at reclaiming each of these water bodies. This is where stewardship comes to have meaning. The management and care for your water is imperative if there is a desire to “pass along” this resource to family and others in the future. Stewardship does not automatically mean expensive. Stewardship is a “function of guarding”. Nutrients and excessive plant and algae growth can be responsibly managed to maintain a ponds’ health and function. Experience, knowledge, and trust are all key whenever stewardship is involved. At AQUA DOC, stewardship is much more than a word. Stewardship is our job.

What's Inside?

- ✓ **AERATION**  
A Tool to Minimize Phosphorus
- ✓ **PHOSPHORUS POLLUTION IN YOUR POND:**  
Sources, Impacts, Solutions

# Aeration "A Tool to Minimize Phosphorus"

Josette M. La Hee Ph.D., Aquatic Systems

Phosphorus is a naturally occurring element in lakes and, along with nitrogen, serves as an important primary nutrient. At normal levels, phosphorus promotes the healthy growth of plants and algae, both of which are necessary components of any lake system. However, when phosphorus is present at elevated levels, undesirable overgrowth of aquatic weeds and nuisance algae can occur. Elevated phosphorus levels in lakes can be attributed to external factors such as fertilizer runoff from lawns, infiltration of nutrient rich storm water and inputs of bird or other animal excretions into water. **However, the leaching of phosphorus from decomposing organic material (e.g. dead plant, algal, animal matter) in the sediment can also serve as an important internal source of phosphorus loading to the water column.**

Within a lake system, a large amount of phosphorus is often stored in the bottom sediments, either as a component in dead organic materials (e.g. leaves, algae, fish) or as molecules bound to various naturally occurring minerals. The capacity of the sediment to hold on to stored phosphorus is very important because in lakes, phosphorus that remains bound in the sediment is not available for immediate uptake by algae and floating plants, thus reducing the likelihood of nutrient induced overgrowth.

Multiple factors influence the ability of sediment to bind phosphorus, and one of the most important of these is oxygen is absent, iron and manganese tend to bind with other elements and are therefore not available as binding agents for phosphorus. **This means that when oxygen levels are very low within a lake, phosphorus leaches out of the sediment into the lake, potentially fuelling algal blooms.**

**Aeration, using bottom diffusers is an effective way of ensuring that the lower water column, and particularly the water/sediment interface, has adequate levels of oxygen to encourage the binding of phosphorus in the sediment.** Aeration, when properly employed, can efficiently circulate the water within a lake, thus transporting low oxygen water up to the surface where it can uptake oxygen from the atmosphere, and bringing oxygenated surface water down to the bottom of the water body where it is needed. Once a layer of oxygenated water remains above the sediment/water interface, phosphorus is inhibited from leaching into the water column. Aeration is therefore one tool that can aid in reducing phosphorus levels in lakes, and thereby reduce the overgrowth of algae.



*If you have a Lake or Pond PROBLEM... Aqua Doc has the SOLUTION!*

## Phosphorus Pollution in your Pond: Sources, Impacts, Solutions

West Bishop, Algae and Aquatic Research Scientist, SePRO Corporation

**So what's the big deal about phosphorus?** Perhaps you have observed the increase in regulatory standards being placed on phosphorus containing products (i.e. detergents, fertilizers) or the implementation of best management practices in regards to (buffer zones, rain gardens, stormwater regulations) Is this attention on phosphorus pollution warranted? Well let's dive in and take a closer look at how phosphorus may impact your pond.

**Sources:** Phosphorus is a critical nutrient for all life, especially plants, animals and humans. Common sources include: animal wastes, dead organic matter (such as leaves, grass and even fish food), fertilizer runoff (agriculture, golf course, lawn), and faulty septic systems. The concern is phosphorus typically ends up and accumulates in our precious freshwater resources. The internal cycling of historically accumulated phosphorus can also be a significant, ongoing source of phosphorus loading that can have devastating impacts in your pond.

**Impacts:** Once present in aquatic systems, phosphorus can go from a key nutrient in plant and animal health to the culprit for negative water quality and algae blooms. You see, phosphorus is the common limiting nutrient for algae in freshwater (especially the bad types) and the primary component governing eutrophication (aging of ponds). Toxin and taste/odor producing cyanobacteria (blue-green algae) are particularly dependent on phosphorus levels to

*(continued)*

Manage the **CORRECT** problem with the **CORRECT** material using **KNOWLEDGE & EXPERIENCE.**



**BEFORE**

**AFTER**

### Phosphorus Pollution in your Pond: Sources, Impacts, Solutions (continued)

become dominant in your pond. This is because they are relatively poor competitors for phosphorus in the water column and require large amounts of phosphorus for optimal growth.

So how do you know if you have a phosphorus problem? Well, looking at your watershed and characterizing inputs is one way, also just looking at how much muck you have built up or the amount and type of plant and algal growth you have may help. Is your pond water clear? Does it give off an odor at times? Have you experienced fish kills?

#### **Solutions:**

We have seen where phosphorus comes from and the devastating impacts it can cause in water resources, now, that is all just describing and characterizing the problem. So what can we actually do if phosphorus is a problem?

#### **A few phosphorus fighting tips:**

- 1) Allow native plants to create a buffer strip along shoreline
- 2) Stop erosion
- 3) Monitor septic systems
- 4) Manage existing plants & algae
- 5) Monitor watershed of your pond
- 6) Minimize phosphorus in lawn fertilizers

*Be diligent, try to keep all things organic out of your pond. Your water will benefit!*

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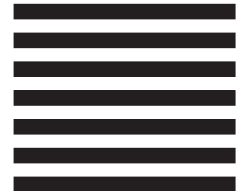
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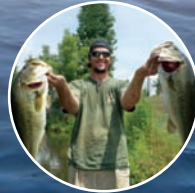
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If you have a Lake or Pond **PROBLEM...** Aqua Doc has the **SOLUTION!**



## FREE CONSULTATION!

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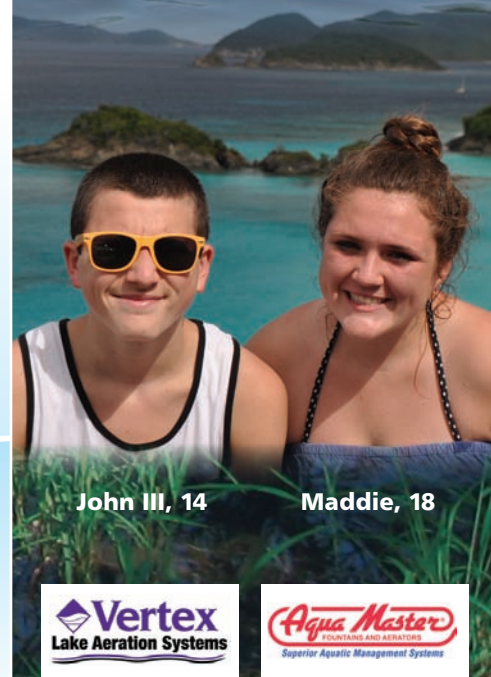
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