



"How To" Series: A Guide to Lake & Pond Water Quality

By Rick Smith, EasyPro® Pond Products



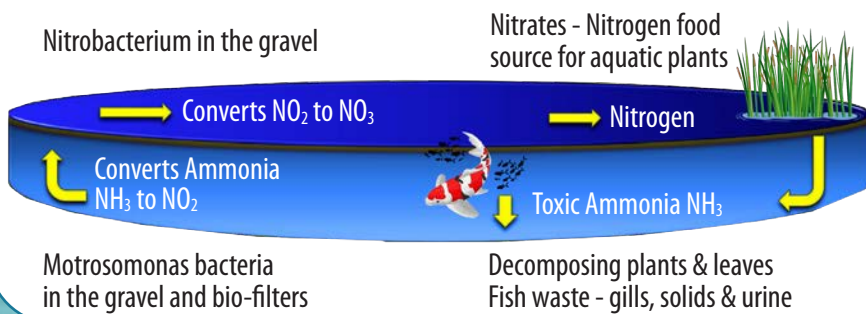
Ponds and Lakes are a valuable natural resource. A natural body of water is a complex biological, chemical, and physical community. The quality of the water determines the health of the entire community and the aquatic organisms living within the system, from the microscopic bacteria to the largest fish.

Big Picture: Understanding the Nitrogen Cycle

Maintaining a Natural Nitrogen Cycle

Excess nitrite (NO_2) prevents blood from carrying oxygen

Excess nitrate (NO_3) helps promote algae blooms



Fish waste, dead plant material (including dead algae) settle to the bottom and decompose. As the organic matter decomposes it creates **toxic ammonia**. **Beneficial bacteria, with the assistance of oxygen**, then converts the **toxic ammonia** into **nitrites** (still toxic) and then into **nitrates**. **Nitrogen** is then absorbed by plants as a food source.

This natural cycle is referred to as the Nitrogen Cycle.

How a Pond Lives & Breathes

Oxygen and Carbon Dioxide Exchange Process

Ponds can be thought of as taking a breath and exhaling once within a 24-hour period.

During the day plants take in carbon dioxide and as a byproduct of photosynthesis releases oxygen back into the water. With the help of the sun plant life goes through the process of photosynthesis to make glucose. Glucose is a form of sugar that plants need to survive.

During the night hours, when photosynthesis stops, beneficial bacteria uses the oxygen to process toxic waste and as a bi-product produces carbon dioxide (CO_2). All living organisms also take in oxygen and produce carbon dioxide.

When everything is in balance the creation and exchange of oxygen and carbon dioxide balances out within each 24-hour period.

The Need for Oxygen and Beneficial Bacteria



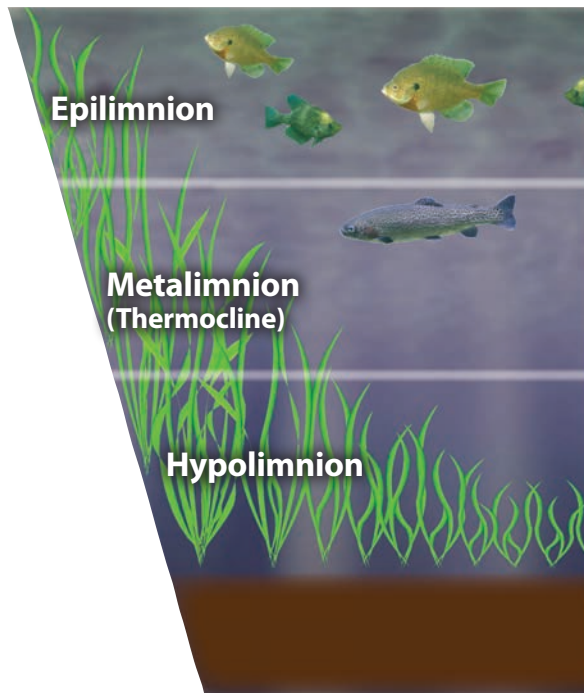
The engine that drives everything within a body of water is the presence of oxygen and beneficial bacteria in proper levels.

A pond's condition deteriorates when its bottom environment cannot support aquatic life. The bottom is where the most oxygen is consumed and the farthest from the surface where it is replenished.

Without adequate oxygen at the bottom, beneficial bacteria's ability to break down the organic waste is greatly reduced.

This results in increased layers of sediment (muck) along the pond bottom. This increase in nutrients promotes algae and poor water quality. Simply put, without oxygen a pond cannot clean itself!

Stratified Without Aeration

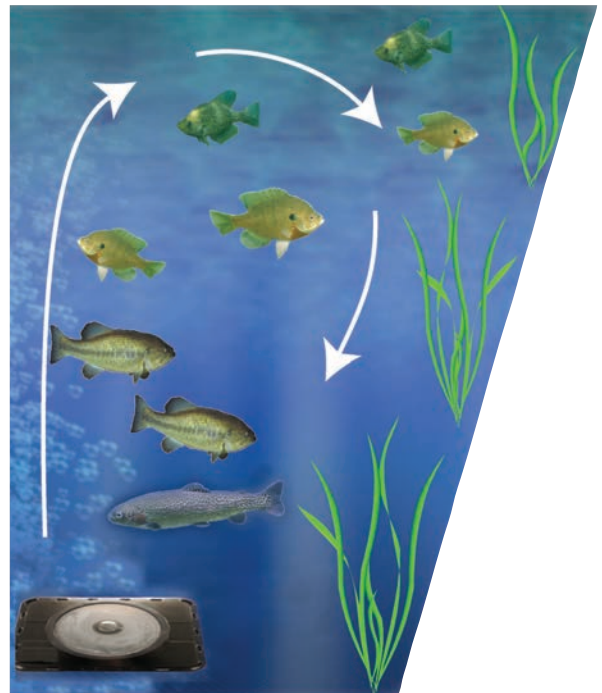


Epilimnion Zone - the water is typically oxygen rich. Waves and splashing of the surface water act to replenish the oxygen. This area may have recurrent surface scum and/or floating weed masses.

Metalimnion Zone or (Thermocline) - there is a decrease in temperature and dissolved oxygen.

Hypolimnion Zone - can be completely void of oxygen – the water temperature is cold – weeds that can thrive in this environment multiply, and it can be unusable by fish and all aerobic organisms.

De-stratified With Aeration



Bottom diffused aeration provides a hydraulic lifting action that mixes the water throughout the water column. This provides uniform temperatures and oxygen levels. The benefits are numerous.

- Fish can use the entire pond all year long
- Improved water clarity
- Reversed algae effects
- Improved natural bacteria populations
- Fewer aquatic weed problems
- Improved fish habitat
- Less organic material accumulation (muck)
- Enhanced pond ecosystem (Nitrogen Cycle)
- Reduced surface scum build-up
- Elimination of foul odors
- Better swimming and recreation areas

Systems & Kits



Basic Systems

Basic aeration kits provide all the necessary components to aerate a pond. A compressor, tubing, diffuser(s) and fittings are sized to work together for a working aeration system in these basic kits.

These kits will require additional weather protection for the compressor, but the kit, as a whole, provides a complete system.



Deluxe Systems

Deluxe aeration kits provide all the components of the basic kits and include the mounting of the compressor in a deluxe cabinet.

These systems are known as Sentinel Deluxe Aeration Systems. Sentinel systems are designed for convenience and reliability.



Windmills & Solar Systems

Windmills and Solar systems are both beneficial when there is no access to electricity. Windmills can effectively aerate ponds while saving money on electric costs, paying for themselves within a few short years.

The battery-free solar systems eliminate the expense of rechargeable batteries and controllers, making them more affordable. There are a variety of systems to choose from to meet your needs.



Fountains

Fountains are a popular choice when decorative looks are desired. Many different spray patterns are available, creating aesthetically pleasing looks while creating circulation and aeration. They can also operate in shallower water areas.

While bottom diffuser aeration requires at least 5 feet of depth to be effective, fountains can operate with at least 30 inches of water depth. However, since they draw water from the area close to the fountain, they cannot destratify to any significant depths.

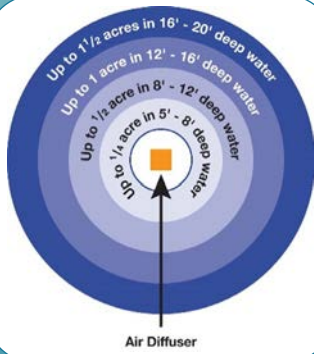


Surface Aerators

Surface aerators are the answer for shallow water depths like those found in retention ponds.

Depending on the model they can move and aerate a lot of water. Many needing only a minimum operating depth of 15 to 26 inches.

Choosing the Right System



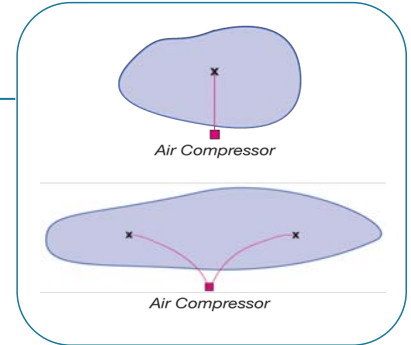
Depth

The deeper an air diffuser is located, the more boiling action and the larger the area that will be aerated. Call our customer service department at 231-834-7720 for assistance.

The PA34 pond aerator would aerate only 1/4 of an acre if operated in 5 feet of water, while aerating up to 1-1/2 acres if operating in 16 feet to 20 feet of depth.

Shape

Pond shape affects the number of diffusers needed. Irregular shaped ponds require multiple diffusers to adequately aerate the entire water column.



Customized Systems

The ability to customize a Basic or Deluxe kit system is also available if tubing or diffuser types need to be adjusted.

EasyPro® can custom design an aeration system for almost any application.

The type of compressor, the length of tubing, the number of diffusers, etc. can all be mixed and matched to give you a system to fit your exact needs.



The Perfect Aeration Companions

Two of the best things for a pond's health and quality of water is bottom diffused aeration in conjunction with regular application of beneficial bacteria.

Pond-Vive



Pond-Vive is a proprietary blend of enzymes and beneficial bacteria formulated to help improve water quality and reduce sludge. The bacteria reduces the nutrient load in a pond to help keep it in balance.

Sludge Remover



This formulation designed to specifically remove organic sludge from the bottom of lakes and ponds. The pellets and block are designed to sink. Then they dissolve and begin to remove bottom organic sludge – often several inches per year.

Phosphate Binder



This all-natural powder formulation provides a non-chemical alternative to using aluminum sulphate (ALUM), to bind problem causing phosphates in pond water. It will also buffer pH, provide approximately 70 beneficial trace minerals, provide minor flocculation (settling) of mud and clay particles and aid in reducing ammonia.



Water Clarifier

This super concentrated water clarifier helps clear murky water by attracting suspended particles together, settling them to the bottom where they can be consumed by EasyPro® Pond-Vive. One gallon treats 250,000 gallons of water. Mix recommended dose with water and spray pond surface.



Pond Dyes

The use of fish safe dye is a common part of an overall pond maintenance program. Upon complete dispersal these dyes are non-staining and are fish, pet, and wildlife safe. No water restrictions are associated with the use of pond dye.