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# How To Restore Lake And Pond Water Quality Through Nutrient Management

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Lakes, ponds and other water resources are an important part of any property. Whether natural or manmade, they are places to sit and enjoy nature, go fishing with friends, pack a picnic or play a round of golf. Lakes and ponds are landmarks that beautify communities, focal points for golf courses (and, of course, an added challenge for players) and sources of recreation. Keeping them well maintained is critical to the overall appearance of any property, and, in many cases, a functional or regulatory necessity for managing stormwater. If a pond's surface is laden with thick blooms of algae, the whole area looks unkept – no matter how well maintained everything else may be.

Maintaining water quality in your lakes and ponds requires experience, attention to detail and an extensive scientific knowledge base. One of the most difficult tasks you will face is balancing the in water nutrient levels. Too few nutrients means the aquatic life quickly dies off, but water that is too nutrient-rich (eutrophic) is a breeding ground for unsightly and unhealthy algae and weeds. Creating the perfect nutrient balance in your lake or pond makes maintenance easier, water cleaner and aquatic life healthier.



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## Why Do Nutrients Matter?

Nutrients are absolutely essential to a pond's ecosystem, but the ideal nutrient levels and ratios vary with the type and use of the water feature in question. A recreational fishing pond's nutrients are indispensable to that ecosystem: Without the right balance, algae would disappear, plants would wither and fish would die off. In a short time, the pond would become a lifeless puddle. Natural ponds and lakes are brimming with nutrients, but keeping them balanced is not always easy. While it may be tempting to "let nature run its course," this often results in an algae-infested aquatic system that's virtually useless to anyone but the mosquitoes calling it home. Realistically, there are too many man-made inputs entering the aquatic system for it truly to be considered "natural," anyway. To keep the negatives in check and the positives flourishing, a little science-based manipulation is critical.

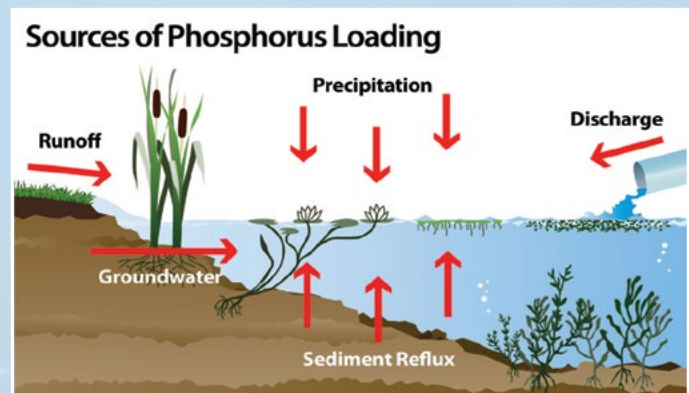
Man-made ponds often start with less plant and animal life. But, almost immediately upon creation, a pond becomes its very own ecosystem. Soon, the same challenges that face older lakes and ponds begin to negatively impact newly constructed man-made ponds. After every rain, runoff from the surrounding watershed flows into the pond, carrying sediments, organic matter and fertilizer, which begin to accumulate in the pond. Coupled with leaves, grass clippings and other organic matter that get into the pond through the ongoing maintenance of the surrounding landscapes, as the pond ages, you have a recipe for significantly accelerated degradation of the water quality.

## How Do Nutrients Get Into The Water?

An abundance of nutrients are found in ponds and lakes from a variety of sources. The over-enrichment of nutrients in water is called eutrophication, and it has far-reaching implications in all bodies of water.

The soil surrounding the pond leaches its nutrients into the water. Nutrients seep in when water levels rise or when runoff flows into the pond. In addition, waste from livestock and fertilizers used in farming or

poorly management turf fertilization programs ultimately find their way into ponds and lakes. The decomposition of organic matter like leaves and grass clippings is also a big contributor to the nutrient load in a pond or lake. The breakdown of vegetation, fish and animal droppings, as well as decaying debris, all play a role in adding nutrients – especially phosphorous – to a pond.



## What Havoc Do These Nutrients Wreak?

Excessive nutrient accumulation in ponds causes ecosystem changes, such as increases in phytoplankton, filamentous algae, macro algae and nuisance or invasive aquatic weeds. One of the most frustrating symptoms of eutrophication is the creation of unsightly algal blooms, which are toxic at times and dangerous to fish and other aquatic life that are sensitive to dissolved oxygen depletion. If these conditions persist, the pond bottom often becomes anoxic, and foul odors become prevalent. These conditions also result in an interruption to recreational activities that occur on the lake or pond.

For residential communities, parks, commercial developments, private landowners, golf courses and anyone else with a lake or pond, these conditions have the potential to be devastating. For any community, nursery, farm or golf course that is using these lakes or ponds for irrigation, there are severe financial risks associated with the loss of valuable crops, nursery stock and turf.

## Should They Stay Or Should They Go?

The first step to an effective pond management strategy is knowing the difference between beneficial nutrients and those that need to be kept in check. The most common nutrients found in ponds and lakes are:

- Carbon
- Silicon
- Nitrogen
- Phosphorous

A vital focus for lake and pond management is phosphorous, because it's a food source for algae. Finding ways to control the input and/or existing levels of phosphorous has the most significant impact on water quality. It's important to remember, though, that phosphorous is not the only culprit contributing to impaired waters. Nitrogen is also a limiting nutrient that greatly impacts the water quality issues plaguing many of our lakes and ponds. **It is the ratio between these key nutrients that determines the health of your pond.**



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## How Should Nutrients Be Controlled?

Removal and control are not the same. Treating algae with an algaecide, for example, is a very temporary solution: In the short-term, the water clears up. But soon, the dying algae release their nutrients back into the water column as they degrade, which provides potential fuel for new blooms.

Maintaining a controlled balance of nutrients requires consistent analysis and a scientifically based strategy to mitigate and maintain. Water-testing data allows you to understand the total nutrients and other water chemistry constituents, the ratios between them and the overall conditions in your lake or pond. With this knowledge, you're able to formulate a plan to best balance out your aquatic ecosystem.

Mechanical dredging to remove the unconsolidated and typically nutrient-rich sediment layer on the bottom of your lake or pond is the most direct mitigation strategy. However, this process is highly disruptive and extremely expensive, especially for a site like a golf course, where downtime is unacceptable, or a homeowners association with poor access for heavy equipment. Although dredging is inevitable for many sites as their ponds age, the need to do so is greatly deferred with proper management.



So, how do you save money and buy yourself time through sound water quality management? The best management programs typically combine the benefits of aeration, biological controls, improved cultural practices, vegetative buffers and prescription water quality restoration through the application of natural binding agents that sequester available nutrients from the water column and sediments.

Binding renders a nutrient unusable, and it's a great way to target specific nutrients. Since phosphorous is the most significant contributor to algae growth, it's often the focus of nutrient binding: A pond full of bound phosphorous is completely useless to a growing bloom of algae. Unlike dredging and draining, nutrient binding costs much less in terms of time and money – and, most important, a golf course that uses this method of treatment stays open for business.

Aluminum sulfate, also known as Alum, is often added to water to bind with phosphorous. It eliminates the ability for algae to feed on phosphorous, ultimately purifying the water and decreasing turbidity.

One of the least disruptive and most effective products for phosphorus binding is a newer technology called Phoslock. Phoslock is a mineral (lanthanum) with an extremely high affinity for phosphorus. It is embedded into bentonite clay to create a product that binds with free-floating phosphorous



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in water. Applied to the surface of the water in granular or slurry form, Phoslock may be used in both mitigation and maintenance applications. Any unbound lanthanum sinks to the bottom of the waterbody with the clay, and continues to release and sequester phosphorous until all the lanthanum in the pond is saturated. This highly efficient method of mediation also eliminates the need for pond shutdown during treatment, much to the delight of golf course superintendents, community managers and recreational lake managers everywhere.

Phoslock is also much more stable than Alum, is a more permanent bond with the phosphorus and is much safer as there are no concerns with pH or other water chemistry constituents as is sometimes the case with Alum.



While it may seem counterintuitive to add more microorganisms to your pond or lake, supplementing your waterbody with beneficial bacteria inoculations is another great strategy for nutrient management. Since the beneficial bacteria in the pond are typically able to outcompete with algae for the available food sources (namely phosphorous), they help to enhance water quality and prevent the conditions that are otherwise favorable for issues like foul odors and algal blooms. Beneficial bacteria also aid in the decomposition process. In a form of “biological dredging,” certain types of bacteria may be added to water to speed up the decay of organic matter in the substrate. In digesting the decaying matter, beneficial bacteria may eliminate sludge on the pond’s bottom, add depth to the waterbody and improve water quality.

Properly sized aeration systems are often the backbone of any sustainable lake or pond management program. The benefits of aeration are many, and in almost every case, the water quality in a lake or pond is greatly enhanced though the addition of aeration. The improved circulation and destratification, and the increase in dissolved oxygen throughout the water column that results from good aeration, enhance water quality and help prevent eutrophication. The



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improved dissolved oxygen also positively impacts fish and other aquatic organisms, and limits the likelihood of fish kills and other water quality issues that often result from excessive algae growth.

Aeration is achieved in many ways, and the two most effective for lakes and ponds are submersed air-diffused aeration systems and floating fountain aerators.

Finally, beneficial vegetative buffers are a smart addition to any new pond or lake. Installing beneficial buffers, consisting of native vegetation along the shoreline areas and within the inflow channels and forebays of a lake or pond, help anchor any long-term integrated management plan. Naturally occurring beneficial plants along the shoreline areas of a pond should be encouraged to grow and thrive. Well-established vegetative buffers help filter runoff and remove nutrients from the water, prevent erosion, stabilize the shoreline and firm the substrate. Forebays are designed to trap sediment in a small area near the mouth of the pond, facilitating frequent and small-scale removal while preventing accumulation in the main body of water.

## Dive Deep Into Your Own Waters

Ideally, you would have pristine waters with no pond management effort. In reality, the absence of lake and pond management means water quality suffers, unsightly algae flourishes and your body of water is rendered unsightly or unusable. Invest in a lake and pond management strategy that incorporates water quality restoration based on the principles of ecological balance and scientific knowledge. By doing so, you ensure that your lake or pond is not only healthy and beautiful, but that the management program being used to keep it that way is sustainable and environmentally sound.

Put your waterbody in the hands of the experts. [\*\*SOLitude's team of biologists and environmental scientists\*\*](#) has the expertise to start you on the path to a perfect pond management strategy. Call **888-480-LAKE (5253)** or click on the link below to learn more.

**Improve Your Pond's Health**



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