Nutrient Solutions!

Nutrient Topics

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The Most Common Pond Problem

Most complaints about pond water quality and overall pond problems have aquatic weeds and algae somewhere in the equation. Excessive aquatic plant growth and algae can turn any pond, lake, or body of water into an eye sore. Excessive growth can also cause problems with overall pond health, fish health, odor problems, etc. So not only does your stagnant, overgrown pond or lake look bad and decrease your enjoyment of your property, it also is slowly "killing" itself and its inhabitants.

The main cause for excessive algae and aquatic plant growth in a pond or lake is an abundance of nutrients. Phosphorus and nitrogen combined with carbon dioxide are the main supplies that can turn your pond from clean to green very quickly. All aquatic plants and algae make their own energy through photosynthesis which uses sunlight and carbon dioxide to create energy and oxygen as the byproducts. The other key ingredient to plant growth and health is nutrients, the main two being phosphorus and nitrogen.

Sources of Nutrients

Phosphorus and nitrogen are all around us, and more importantly around your pond or lake. Since most plant life, aquatic or terrestrial, rely heavily on both, they all contain large amounts of these nutrients. Therefore, the grass, trees, shrubs, cattails, etc. that surround your pond or body of water all are potential sources of nutrients for your pond, as are the existing aquatic plants and algae currently in your pond. Every time you mow your lawn or leaves fall into the pond, nitrogen and phosphorus are added to your ponds ecosystem. Also, every time your aquatic plant growth dies off or is killed off by a treatment method, those nutrients that were in the plants are released back into the system for the next generation of plant growth.

There are several other sources of nutrients that find their way to your pond as well. Grass clippings, leaves, and existing plant growth are "natural" contributors to extra nutrients, but often times the most destructive are the "unnatural" contributors. These typically consist of lawn fertilizers, garden/flower bed fertilizers, farm fields and/or pastures, and wildlife. When golf fairways and greens, lawns, gardens, flower beds, and farm fields are fertilized, there is often large amounts of excessive nutrients that are not used quick enough by the terrestrial plants or that the soil cannot hold. When the first rain or irrigation comes along in these areas, those extra amounts of nitrogen and phosphorus "runoff" into the low areas. Most ponds and lakes are the lowest spots in a given area because they need to be to be able to hold water. Therefore, the nutrients that runoff are flowing directly into your pond or lake and providing aquatic plants and algae more than enough to thrive. This is known as non point source pollution. Golf courses are continually running into this problem because fertilizers are needed to keep greens and fairways up to par. The same thing is true for farm pastures, only this time the nutrients are coming from the animals themselves. Also, the wildlife that uses your pond frequently are making nutrient deposits. The biggest culprits of wildlife contributions are ducks and geese that can swarm to a pond or lake.

Ways to Limit Incoming Nutrients

Now that you know the major contributors to nutrients in your pond or lake, you can try to limit the amount that is introduced. This often times is a long process that is has gradual results because most aquatic plants and algae do not require large amounts of nutrients to thrive so more than likely the muck in the bottom of the pond is filled with nutrients not even being used. However, there are ways to limit new nutrients from entering you pond.

First, examine your pond and the larger area around it. Determine where most of the nutrients are coming from. Trees that surround the pond typically have other benefits that greatly out weigh the amount of nutrients they supply with leaves so those usually stay put. Look closely at elevation changes and where fertilizers and grass clippings can runoff into the pond. Remember, most ponds, especially retention ponds, are designed to be catch basins for the entire area so nutrients can be coming from lots of places.

Once you have determined where the nutrients are coming from you need to try to block them from your pond. If most are from lawn fertilizers, limiting the amount used is a very good start. If the amount of fertilizers cannot be controlled (coming from someone else's property), something needs to be in place to buffer the nutrients from the pond. This step has a lot to do with personal taste. A burm or raised barrier can be created to stop the flow of runoff and divert it to a flat area where it can be used by other terrestrial plants. Another good way of limiting the nutrients is planting quick growing native plants around the pond that can intercept the nutrients and use much of the available nitrogen and phosphorus before it gets to the pond. There are many varieties of terrestrial vegetation that can make your pond setting even more beautiful while using the nutrients that are supplied by runoff. You can also introduce desired aquatic plants that will use up nutrients and beautify your pond. This again is often dependant on personal taste and your local garden

center should have some ideas of native plants that can do the trick. A great aquatic plant is Chara. Chara uses up a lot of nutrients and serves as a hiding place for fish and insects in the water.

If the nutrients are coming from lawn clippings and leaves, you can do a few simple steps like bagging the clippings when you mow, raking leaves more often, and also raking leaves out of the pond near the shore. Every little bit helps. If you have a duck or goose problem, there are several deterrents available on the market that work in varying degrees of success. Keeping wildlife out of the pond is often the most difficult part of nutrient control, however.

Removing Existing Nutrients

Now that you have successfully used, diverted, or blocked much of the nutrients entering the pond you can try to remove the existing nutrients. Again, this is a slow process, but every little bit helps. If you treat your aquatic vegetation or algae, the plants die, but the nutrients are still available while the vegetation is decomposing. By physically removing the vegetation, you are removing large amounts of nutrients. This can be done by cutting or raking the aquatic weeds that are firmly rooted and collecting the fragments that float to the top. It is important to remove the cut weeds from the pond and far enough away that they won't get blown back in when they dry or get washed back in by rain. They make great fertilizer for a garden.

Another way to remove the nutrients is to remove the decomposed organic matter or pond muck at the bottom of the pond. This is referred to as dredging and can be very costly and a large project to undertake, but it is often the quickest way to remove large amounts of nutrient rich soil and organic matter from your pond.

Finally, "binders" can be used to help eliminate the existing nutrients. Aluminum Sulfate, or Alum, is used to clear up muddy or cloudy water and remove phosphorus. Barraclear is a fairly new product with active ingredients of Alum, bentonite clay, and a buffering agent to prevent pH change. It binds phosphorous available in the water to starve plants. The amount required is dependent on the existing levels of phosphorous within the pond.

How Aeration Can Help

Aeration also plays a role in curbing the effects of excessive nutrients in a pond or lake. As discussed in detail in the Aeration section, adding an aeration device provides many benefits to a pond and can help limit the amount of aquatic plant and algae growth to begin with. Aeration adds extra oxygen to your pond or lake and also helps to evenly disperse that oxygen throughout the water column. This is very important when it comes to the decomposition of organic matter.

As discussed above, when aquatic plants and algae are treated or die off naturally, they still provide large amounts of nutrients to the pond ecosystem. The muck in the bottom of the pond is the result of years of decomposing organic matter. The decomposition process takes place in one of two ways or a mixture of both. These are anaerobic and aerobic decomposition.

Anaerobic decomposition is the process of breaking down organic matter with a lack of oxygen. Decomposition of any sort is a rather slow process, but decomposition without oxygen is even slower. It is also a less complete decomposition and has byproducts that are often undesirable, such as sulfur dioxide or

sulfuric acid. This is what gives your pond and pond muck that rotten egg smell. This is not only a nuisance to you, but also can be for your fish and other aquatic life.

Aerobic decomposition is the process of breaking down organic matter in the presence of oxygen. This is a much quicker process than anaerobic decomposition. It is also a more complete decomposition and its main byproduct is carbon dioxide which does not leave the foul odor sulfur dioxide does. The only way to have aerobic decomposition is to have sufficient oxygen for the bacteria and microorganisms during the decomposition process. This is where a Kasco Pond Aerator, Aerating Fountain, or Water Circulator comes in.

A Kasco aeration device will add oxygen to the pond and mix the pond water making sure there is oxygen for the decomposition process. Over time, this will speed up the overall decomposition processes within your pond and help eliminate the rotten egg smells and other foul pond odors. Also, the agitation of the water will help vent off some of the carbon dioxide that is produced by plants as well as during decomposition and there will be less available for plant growth. Some nutrient compounds are also able to be vented when exposed to the air. The process of removing the nutrients by converting organic matter or sludge on the bottom into carbon dioxide and then venting those gasses off is known as bioaugmentation. Bioaugmentation is a long process, but over time, helps to eliminate some of the build up of nutrients.

Since the aerobic decomposition process will be faster, it will start to make up ground on the years of build up in the pond, over a long period of time. It will also help limit the amount carbon dioxide available for plants. A Kasco aeration device used with the other methods discussed earlier, like diverting the runoff, planting desired vegetation that can use some of the extra nutrients, and cutting/raking aquatic weeds out of the pond will gradually renew and rejuvenate your pond. You will be slowing, stopping, and reversing the nutrient loading your pond is currently going through and creating a cleaner, healthier pond over time.

Kasco Marine, Inc.

800 Deere Rd., Prescott, WI 54021

www.gotalgae.com * www.kascomarine.com

info@gotalgae.com

Phone (715) 262-4488 - Fax (715) 262-4487