



STEADFAST ENVIRONMENTAL

From the Steadfast Water, Algae and Trash (SWAT) Rapid Response Team

SUMMER POND CONDITION REPORT



A Pond Technician applies algicide to filamentous algae collecting near the bank of the pond.

SUMMER CONDITIONS *A perfect storm for algae growth*

By Kevin Riemensperger

Summer is in full swing, and with the passing of the solstice, we are in peak growing season. Periodic rainfall has resulted in erratic changes between high and low water levels. Most daily high temperatures are in the high 80's and low 90's, contributing to increased water temperatures. Residents may notice sporadic algae blooms and explosive growth during this time; a direct result of intense nutrient loading and greenhouse-like conditions. Contributions to algal activity include excess nutrients from fertilizers & grass clippings, stormwater runoff, and lack of water movement between rainfall events. These nutrients, in addition to the abundant summer sunshine, high humidity, and increased daytime temperatures, culminate in the perfect storm for algae growth. Blooms may take the form of cloudy planktonic algae, patches of surface filamentous algae, or paint-like cyanobacterial slicks. Technicians on-site are currently providing both reactive and

proactive treatment to the growth. If any algal activity is found to be actively growing around the shoreline and shallow areas, it is immediately targeted with algaecides. Ponds which historically (in our experience) produce algal activity are pre-treated with algaecides even if none are present in an effort to get ahead of the growth. As we continue through the rainy season, much of the ponds' waters will be flushed out into wetland zones, helping reset the biology of many of the community's ponds. Rain also circulates water through the ponds, and so it's presence will help to repress algal growth. Additionally, with each rain, refuse that has settled in the stormwater drainage systems will be flushed into the ponds. Technicians will, to the best of their ability, be removing common items such as bottles, bags, and undoubtedly construction debris from the ponds.

FERTILIZERS AND ALGAL BLOOMS

Algal blooms are unique to each pond

By Joe Hamilton

Increased rainfall and water levels can certainly aid in improved aesthetics of the ponds as the fresh water pushes out stagnant water into wetlands. One occurrence we need to be mindful of with frequent rainfall is the contaminants that the runoff contains, namely fertilizers and organic debris. Lawn fertilizers are high in nitrogen and phosphorus, both nutrients that contribute to algal growth. Organic materials that end up in the pond, such as grass clippings also give off nutrients as they decay. Excessive fertilizers and grass clippings in a pond can lead to something called eutrophication (an overabundance of nutrients in the water). This allows algae to take over the pond and impact it's health. While it's true that algae produce oxygen via photosynthesis, they only do so during the day, when they have access to sunlight. At night, when there is no sun available, algae draw oxygen out of the water, reducing dissolved oxygen levels, which can harm life in the pond. Algal blooms are unique to each pond and are dependent on several factors. Things like the pond's dimensions, the volume of flow entering the pond, and the

proximity of adjacent wetlands for water to drain into. All these factors affect a pond's ability to withhold the nutrients that fertilizers supply for algal blooms. Full spectrum Copper Sulfate treatments are in effect in response to these seasonal algal blooms, and across most ponds we are seeing signs of having prevented the worst of it. In other ponds whose construction leads to high nutrient retention, this will be a constant battle against the algal growth until fresh rains once again bring relief, or until we see a reduction in growth rates during the onset of Fall, where many nutrients will have time to settle and get locked away. To reduce harmful effects fertilizers can have on your community's ponds, it is recommended to only fertilize a few times a year. Once in early spring, then again in late summer. Pick a time when the soil is moist from recent rains, but when the next rainfall event is several days away. New rains will waste fresh fertilizer, washing it into the pond and causing new blooms.



An example of a rapid algal bloom caused by influx of nutrients

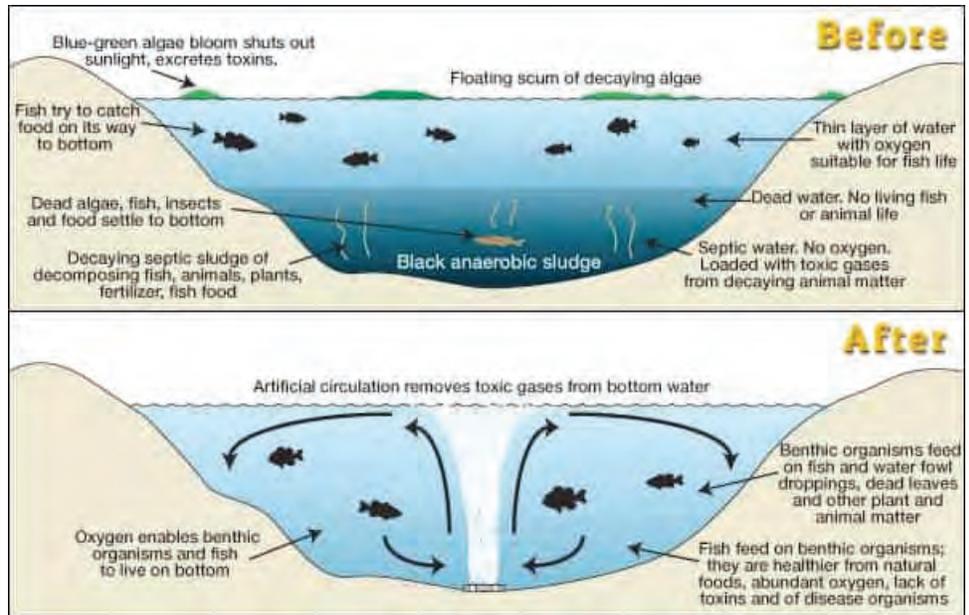


BOTTOM DIFFUSE AERATION SYSTEMS



HOW IT WORKS

- ✓ A Compressor box located on shore intakes air and pushed it through hoses to diffuser disks which are located on the bottom of the pond.
- ✓ The air is forced through tiny holes on these disks and exit as fine streams of bubbles, which float up towards the surface.
- ✓ As the bubbles float upwards, they pull water with them from the bottom of the pond to the top, turning water volume over, and helping it circulate.



DECREASED ALGAE BLOOMS

As the bubbles move through the water, they exchange gasses with it. Toxic gasses enter the bubbles as they travel and are carried out of the pond once they break the surface; this is known as off-gassing. At the same time, oxygen from inside the bubbles enters the water, increasing the water's oxygen content. Many forms of algae grow poorly in water with high levels of oxygen, and the increase in water movement slows their growth further. Diffused oxygen also helps break down nutrients like nitrogen and phosphorus which aid in algal growth. Nutrients like these build up over time, and it is typical for ponds with a lack of movement to become overloaded with them.



MINIMIZED FREQUENCY OF FISH KILLS

By increasing the oxygen content of the water, aeration systems also create a better environment for the pond's aquatic life. Ponds which are aerated host more robust populations with healthier fish. And by permanently mixing the pond's waters, it prevents the pond from settling into two distinct layers: a high-oxygen top layer with all the pond's life & low oxygen bottom layer where nothing can survive. This means smaller pond turnovers and a reduced frequency and severity of fish-kill events.



REDUCED MIDGE FLY NUMBERS

Another benefit of improving the health of pond's fish is allowing for better insect control; namely midge flies and mosquitos. When dissolved oxygen levels are higher throughout the water column it allows fish to dive deeper where the midge larvae begin their life cycle. Dissolved oxygen will also reduce stagnation in the lake creating a less desirable breeding ground for the insects. A healthy pond is less desirable for midge flies to breed because their larvae cannot survive. The conditions they prefer can be limited by installing aeration systems, helping to reduce their numbers.

Bottom diffuse aeration is a long-term remedy to many of the issues faced by Florida's stormwater ponds and man-made waterways. After their installation, and with proper maintenance, the benefits they provide can improve the health of any community's water features for years to come.



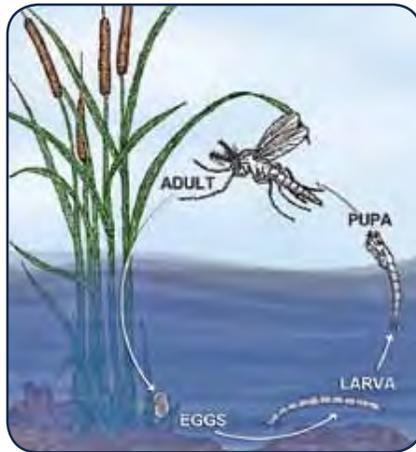
AQUATIC MIDGE FLIES

Are swarms of bugs keeping you inside?

Aquatic midge flies are non-biting insects found in lakes and ponds throughout Florida and are known by many common names including blind mosquito and fuzzy bill. They do not bite, suck blood, or carry disease like true mosquitoes do, so they are more of a nuisance than anything.

Midge flies are a food source for other aquatic insects, such as dragon fly nymphs and several varieties of fish, so the goal is not to completely eliminate them, but to keep them in proper balance within the ecosystem. Midge fly populations grow exponentially in water that is high in nutrients and bottom muck, and low in oxygen, environments that don't support fish.

- Can be a problem in Florida all year but swarms tend to be worse in the spring and early fall
- At night they are attracted to lights around houses and businesses
- Outdoor activity can be difficult as swarming midges can be inhaled into the mouth and nose and get into eyes and ears
- Swarms fly to cool shady areas & stain paint, stucco, roofs, cars, etc.
- Small & large pond and lakes, whether natural or man-made
- Larvae live on and in the lake bottom making them more difficult to control and to detect imminent adult swarming



What can be done about them?

Shorter term control with fast results includes applying larvacides to the lake to prevent midge flies from developing into flying adults.

For longer term control, you need to improve the water quality of the lake. As lakes age many develop layers of organic bottom muck that dramatically lowers dissolved oxygen levels favoring growth of midge fly larvae while preventing fish and other insect predators from feeding on them. Infested lakes can easily support populations of 2,000 larvae per square meter.

Lakes low in oxygen and high in nutrients, pollution and algae are a perfect habitat for midges. The most effective long term remedy for midge flies may be installing a Vertex diffused air aeration system to raise oxygen levels and improve overall water quality. Call Steadfast Environmental for a site survey and consultation on the best solution for your swarming midge fly problem.

Order: Diptera

Family: Chironomidae

Genus & Species: 2000+ species in North America

Habitat

- Bodies of water 3'–30' deep
- Lakes with excess organic waste from landscaping, turf, reclaimed water, paved surfaces, septic tanks, and other watershed sources
- Ponds with low oxygen conditions that allow waste products to release ammonia, hydrogen sulfide gas, phosphorus and other nutrients
- Water with higher levels of muck accumulation, murky color, bad odors
- Ponds with excessive blue-green algae and phytoplankton

Control Methods

- Increase oxygen in the lake with an aeration system
 - Destratifies lake bottom
 - Increases beneficial bacteria
 - Reduces nutrients
- Use larvacides as needed
- Treat algae quickly to avoid creating more problems
- Add fish that feed on midge larvae

