



BEST MANAGEMENT PRACTICES

for Blue-Green Algal (cyanobacterial) Blooms in your Stormwater Pond



All Florida waterbodies contain some level of blue-green algae (cyanobacteria). They are natural components of aquatic communities, essential in the food chain and in several natural cycles. However, when algae are so plentiful that they are visually present in the form of scums or proliferations (algae that form at the bottom growing on sediments or aquatic plants which increase in number becoming visible as surface mats), action may be an appropriate next step.

This best practices guide was created to assist Floridians living, recreating, and working around stormwater ponds to know what to do if a blue-green algal bloom occurs. This guide will fill in the regulatory gap for stormwater ponds because these waterbodies do not fall under the responsibility of state regulating agencies, and therefore, do not have any associated monitoring or public notice protocol.

Stormwater ponds are man-made ecosystems designed to capture, temporarily store, and treat stormwater in order to decrease flooding and remove pollution. According to the Southwest Florida Water Management District, recreational use of stormwater ponds is potentially hazardous to human health and is not recommended. Despite this, residents commonly use these waterbodies to fish, bird watch, and exercise around. These stormwater ponds are regularly thought of as “lakes” and not as stormwater treatment systems that are designed to hold motor oil, gasoline, fertilizer, pesticides, animal waste, pathogens and sediment in an effort to protect state-regulated waters. The functions of stormwater ponds as treatment systems do not preclude them from being beautiful Florida amenities that can be safely enjoyed by humans, pets and wildlife. For these man-made systems to effectively provide these functions, they must be properly managed. With this in mind it is important for Florida residents and visitors to know exactly what is blooming in these stormwater systems.

As a result of official guidance warning Floridians of the inherent danger associated with stormwater ponds, Florida law does not require state agencies to regulate, monitor, or further warn citizens about the potential risks associated with blue-green algal blooms brewing in these neighborhood waters. Blooms of blue-green algae can be harmful to you and your pet’s health and that is why people should be warned when these algae become so concentrated that visible scums or mats form. It is at this point that the Florida Department of Health recommends that people and pets avoid contact with water because there is a risk that toxins may be present.

Authors

Abbey Tyrna, Ph.D.
Water Resources Agent
UF/IFAS Extension
& Sustainability
6700 Clark Road
Sarasota, FL 34241

Dail Laughinghouse, Ph.D.
Assistant Professor
UF/IFAS Fort Lauderdale
Research and Education Center
3205 College Avenue
Fort Lauderdale, FL 33314

If excessive amounts of blue-green algae are observed, caution signage should be posted depending on the pond's proximity to public areas and its common use. **Adopting the Florida Department of Environmental Protection's (FDEP's) Precautionary Principle**, it is recommended that the visual presence of an algal bloom be used as a threshold instead of numeric cell concentrations and toxin values for several reasons. First and foremost is the ability for residents to get timely, accurate testing completed. Until investments are made for such testing infrastructure, we recommend following the best management practice guidance laid out below, which mimics the guidance set for state recreational waters.

Content of the Best Management Guide

- How do you know the type of algae you have
- When to place publication notification
- When, where, and how often to sample
- When to take down notification
- How to treat the algae if you choose to try to get rid of it

STEP 1: Recognize the Visual Presence of Potentially Toxic Algae

- Some pond scums and mats are created by algae. These visual cues should spark immediate action.
- It is not possible to know by sight whether an algal bloom is producing toxins. In fact, not all blue-green algae produce toxins, and those that produce, can be found non-toxic one day and toxic another. The only way to know if the visible algal bloom is toxic is to identify the type(s) of algae forming the bloom and then test for the presence of toxins.
- Blooms of potentially toxic algae can look like any of the images below.



Photo credit: Emily Randall.



Photo credit: Forrest Lefler.

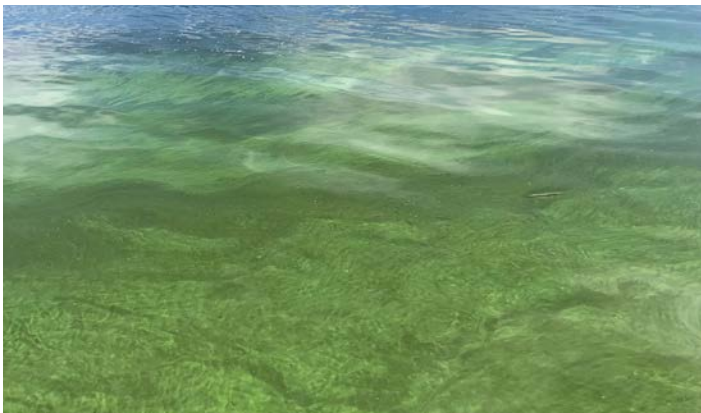


Photo credit: David Berthold.



Photo credit: Andy Nilssen.

STEP 2: Get ID by Collecting and Mailing Sample(s)

- Keep a record of the date, time, weather conditions leading up to the event and during time of sampling, and sample locations.
- If there are surface scum and mats, please treat as if it is toxic. Due to potential toxins, use a glove and with a bottle, sample just under the surface of the water.
- Place bottle on ice and overnight to
Dr. Laughinghouse
UF/IFAS Fort Lauderdale Research and Education Center
3205 College Avenue
Fort Lauderdale, FL 33314
- Lab Services include identification and enumeration of phytoplankton (algae and cyanobacteria), water quality measurements (nitrogen and phosphorus), and microcystin (toxin) concentration.

STEP 3: Alert citizens with signage

- If you let residents and community members know that the algal bloom has been observed and that you are taking action then that will reassure the community and provide a positive sense that something is being done.
- Suggested sign language includes:
DATE: ____
Alert: An Algal Bloom has been spotted and we are working with a water testing lab to get the algae properly identified.
You will be alerted if the algae present could potentially produce toxins.

STEP 4: Warn residents if algae identified can produce toxins

- Warn residents of the potential toxic-producing algal bloom by replacing the initial sign with a warning sign.
- People and pets should not come in contact with the water.
- Florida Department of Health includes the following on it's warning signs for recreational waters. It is recommended that your community creates a similar sign to post at the water's edge where there is high traffic.
 - **CAUTION**
 - (Explains the issue): Blue Green Algae may be in these waters. **THERE MAY BE TOXINS.**
 - (Tells what to do):
 - › Use caution if you see algae at this time.
 - › Avoid getting water in your eyes, nose or mouth.
 - › Do not eat shellfish from this location.
 - › Rinse fish fillets with tap or bottled water. Throw out guts. Cook fish well.
 - › Keep pets and livestock away from the waters in this location.

- (Contact information):
 - › Provide contact information for the resident or staff who can answer questions about the stormwater pond.



STEP 5: Decide if and how to treat

- It is important to recognize that there is no silver-bullet. Effective management entails knowledge of the targeted algal species, pond-specific characteristics, and science-based data on all management options.
- In general, there are both long-term and short-term solutions for treating a blue-green algal bloom.
- The primary long-term solution is nutrient reduction
 - Contact your [local UF/IFAS Extension Office](#) for more information.
- Short-term solutions include chemical and physical treatment and must be considered on a case-by-case basis. UF research shows that different species are affected differently by chemical algaecides.
- **Physical treatment:**
 - Aeration or artificial mixing may create conditions that are more suitable for competing diatoms. Thus, reducing the targeted algal species.
 - Blue dyes also help with competition.
- **Chemical treatment:** There are many algaecides on the market. One thing to consider is that during treatment, you can “kill” the bloom, but killing the algae cells may release the toxins and result in an initial and temporary increase in toxins. Thus, it is recommended that you monitor (e.g. microcystin) levels after any treatment method. Overtime, these toxins will be degraded.
 - **Copper:** The most commonly used algaecides are copper-based (e.g., copper sulfate, copper ethanolamine complex, and copper citrate/ gluconate). The different formulations are due to chelated or non-chelated coppers and acidified copper.
 - **Hydrogen peroxide:** There are two peroxides used (hydrogen peroxide/ peroxyacetic acid and sodium carbonate peroxyhydrate). One is liquid and one is granular and are targeted for different cyanobacteria. Many people and communities prefer these formulations due to concerns of copper usage.
 - There are other compounds, such as endothall, diquat, flumioxazin, bispyribac-sodium, etc. on the market but be sure to read the labels as not all are labeled for cyanobacteria.

Always follow the label and remember that any product used to combat algae must include an EPA label under FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act). It is recommended that anyone who uses herbicides for management of aquatic plants and algae be certified.

STEP 6: Determine potential causes and consider pond enhancement projects

- Work with your pond manager and/or ponds committee to discover negative inputs to your pond such as heavy use of fertilizer and irrigation water, plus any grass clippings, leaf and acorn debris, and sediments.
- Create a plan for reducing negative inputs that could lead to algal blooms.
- Assess your pond to see whether it is providing the habitat structure necessary to balance the pond food web thus limiting the potential for algal blooms. To use the the online assessment visit www.tinyurl.com/StormwaterPondAssessment
- Get involved with [Florida LAKEWATCH](#)
- Contact your [local UF/IFAS Extension Office](#) with any questions.

Resources

- Lefler et al. (2019). Cyanobacterial Blooms in Florida’s Fresh Waters. *Aquatics*, 41(3), 14-15.
- Laughinghouse et al. (2020). Approaches to Managing Cyanobacterial Blooms and Altering Water Quality. *Aquatics*, 42(1), 13-16.
- [Stormwater Ponds Need Your Help!](#)
 - [Stormwater Ponds: A citizens guide to their purpose and management](#)
 - [Stormwater Pond Plants Database for Trait-based Selection](#)
 - [Living on the Water’s Edge](#)
 - [Florida-Friendly Plants for Stormwater Pond Shoreline](#)
 - [Pinellas County’s Adopt-A-Pond: Florida Ponds and Lake Guidebook](#)
 - [University of Florida’s Plant Directory](#)
 - [Efficacy of Herbicide Active Ingredients Against Aquatic Weeds](#)
- Wood et al. (2020). [Toxic benthic freshwater cyanobacterial proliferations: Challenges and solutions for enhancing knowledge and improving monitoring and mitigation](#). *Freshwater Biology*, 65(10), 1824-1842.