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Algal Blooms in Arkansas Streams, Ponds, and Lakes

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**ARKANSAS WATER
RESOURCES CENTER**

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What is an Algal Bloom?

Did you know that algae are a natural part of ponds, lakes, streams, and rivers? These organisms grow in the water (plankton) and on rocks, plants, and other surfaces (periphyton) and sometimes periphyton slough off into the water (seston). Most of the time these algae are hardly noticeable in waterbodies; however, sometimes they can form very noticeable algal blooms. An **algal bloom** is defined as an excessive amount of algal growth due to ideal growing conditions (that is, plenty of light and nutrients such as nitrogen and phosphorus).



Photo by: Bradley Austin

Algal blooms form when algae have plenty of light and nutrients.

Nuisance Algal Blooms

Nuisance algal blooms are those that negatively affect the aesthetics, recreation, and aquatic life of a waterbody.

- Algal blooms turn the water green reducing water clarity and can form scums on the surface.
- Filamentous algae can tangle up with fishing line and hooks.
- Decomposing algae smells bad.
- Decomposing algae also consumes oxygen, which can cause fish kills.
- Some algal blooms may cause taste and odor issues in treated drinking water.



Photo by: Ryan King

Despite the water quality issues and health risks to aquatic organisms, nuisance algal blooms themselves do not generally pose a health risk to us; they are just a nuisance to the ways we want to use the water.

Nuisance algal blooms reduce the aesthetic and recreational value of waterbodies.



Photo by: Ryan King

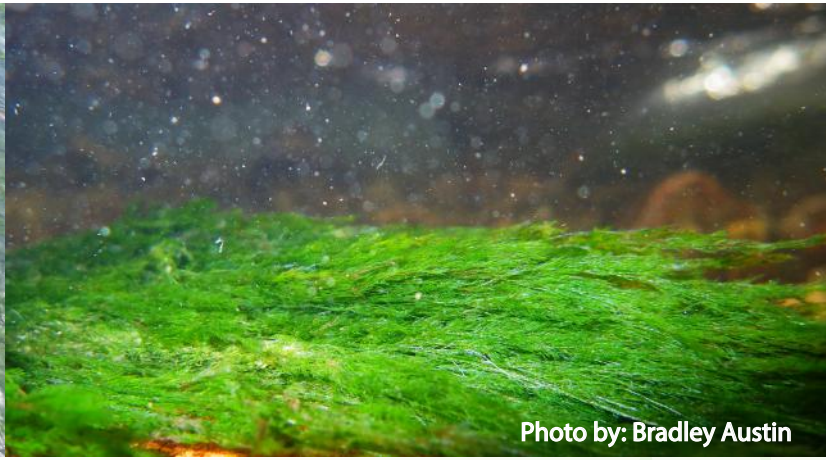


Photo by: Bradley Austin

There are many types of algae that can cause nuisance blooms, and often times these blooms are not restricted to just one type of algae. These nuisance algal blooms might look like:

- Long stringy filaments, waving in the water of streams and rivers.
- Some microscopic planktonic algae can turn a water body green.
- A yellowish-brown “snot” like slime attached to rocks or other surfaces in streams.
- Pillowy blooms and floating mats found mostly in ponds, coves, and near shorelines, but can also be found in flowing water when filaments slough off from the main plume.

There are two groups of algae that can form nuisance algal blooms that you may encounter in streams, ponds, and lakes in Arkansas.

Green algae blooms typically have a green-grass color and many types of green algae, but not all, will consist of long stringy filaments that have a slippery or cotton feel to them.



Photo by: Bradley Austin

Diatoms under normal conditions may be a large part of the algal or phytoplankton community in ponds and lakes and are most commonly associated with late winter to early spring algal blooms when the water is cooler. *Didymo*, a diatom commonly found in streams, can coat the entire stream bottom in a yellowish-brown slime and is aptly named “rock snot”.

Harmful Algal Blooms

Like nuisance algal blooms, harmful algal blooms (HABs) negatively affect the aesthetics, recreation, and health of the waterbody. However, the defining characteristic that separates harmful from nuisance algal blooms is that HABs may pose a serious health risk. These blooms may produce toxins when stressed by environmental conditions or when they die. Contact with these toxins may cause skin irritation, while consumption may result in illness such as vomiting, diarrhea, paralysis or even death in wildlife, pets, livestock, and people.

When stressed, HABs may produce toxins that are harmful to people, pets, and wildlife.

Cyanobacteria, or more commonly blue-green algae, are the group primarily responsible for HABs in freshwater systems. Cyanobacteria are a type of bacteria that are capable of using sunlight for energy through a process called photosynthesis, just like plants and true algae. They are often grouped into algae, but have some differences:

- Cyanobacteria contain gas vesicles which allow them to control their buoyancy and depth in the water column.



Photo by: Don Glover

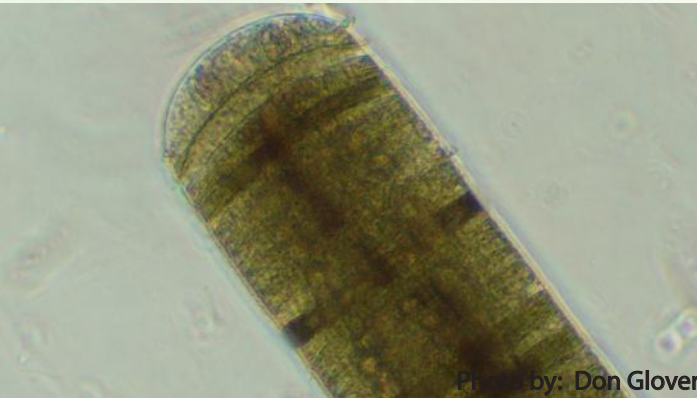


Photo by: Don Glover

- Several types of cyanobacteria are able to fix nitrogen (N_2) from the atmosphere, which means they can continue to grow even when N is not readily available.
- Several types (roughly 40) are capable of producing cyanotoxins making them harmful to animals and humans.

Two of the most common cyanotoxins produced along with drinking water and recreational limits are shown in Table 1.

Table 1: Drinking water and recreation limits for common cyanotoxins

Cyanotoxin	Drinking Water Limit ($\mu\text{g/L}$)		Draft recreation limit ($\mu\text{g/L}$)
	Children (<5 yrs)	Children & Adults (>5 yrs)	All Children & Adults
Microcystin	0.3	1.6	4
Cylindrospermopsin	0.7	8	8

There are some key features that can be used to tell HABs apart from nuisance algal blooms. Harmful algal blooms might look like:

- Spilled paint on the water's surface that is pea-soup or bluish-green in color
- Cells may ball up into small round clumps or may take on a grass clippings appearance.
- Surface scums are made up of loosely clumped cells that will flow through your fingers (with gloves on!) if you try to pick them up.
- Sometimes there might not be a visible surface scum, the harmful bloom may consist of water that is very green or opaque in appearance with limited visibility.

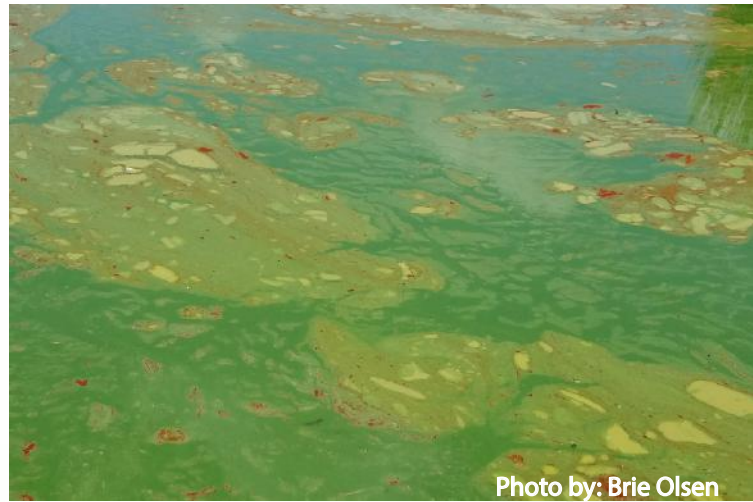
HAB surface scums may look like spilled paint on the water's surface



Photo by: Melanie Treat

Testing

As indicated earlier, not all algal blooms are harmful, and it may be difficult to determine whether an algal bloom is nuisance or harmful from visual inspection alone. Before sending a water sample off for testing, there are a couple simple tests you can perform to determine if an algal bloom consists of cyanobacteria or not. These tests are referred to as the Jar and Stick tests and a detailed description can be found at www.kdheks.gov, acquired 7/5/2018 .



The Jar Test entails collecting a water sample in a quart size mason jar and letting it sit in the refrigerator overnight.

- If the algae settle to the bottom of the jar, this is an indication of green algae.
- If the algae form a ring at the top of the water in the jar, then this is an indication that cyanobacteria are present in the water.

The Stick Test is performed by pushing a stick into the surface algal scum or mat of concern and then lifting the stick out of the water.

- If the stick pulls up strands that look like green hair or thread, then the algal mat likely consists of filamentous green algae.
- If the stick comes out looking like it had been stuck into a can of paint, then the algal mat likely consists of cyanobacteria.

These tests can provide a quick and easy way for determining if an algal bloom consists of cyanobacteria and thus has the potential to produce toxins. However, not all cyanobacteria produce toxins, and the verdict is still out about whether a cyanobacterial bloom should be considered a HAB if toxins are not present. Water testing is the only sure way of knowing if toxins are present. The Arkansas Water Resources Center's (AWRC) Water Quality Lab and Arkansas Department of Environmental Quality (ADEQ) are able to test your water for the presence and concentration of microcystin, one of the most common cyanobacterial toxins. Contact the [AWRC Water Quality Lab](http://www.awrc.org) directly for a sample bottle and instructions on how to collect your sample for testing.

Reporting

You can report harmful or nuisance algal bloom sightings to www.adeg.state.ar.us, or use ADEQ's mobile app that allows users anywhere in the state to report environmental hazards directly from their smart phone. If microcystin is found in a drinking water source you should notify the Arkansas Department of Health.

If you have a nuisance or harmful algal bloom in your pond you can contact your county extension agent for assistance dealing with the problem. The "[Farm Pond Management For Recreational Fishing](#)" and "[Algal Blooms, Scums, and Mats in Ponds](#)" may provide additional guidance.

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Photo by: Bradley Austin



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