

The state of Florida is in the midst of an algae identity crisis. On a daily basis, we are bombarded with unfamiliar terminology – algae; blue-green algae; cyanobacteria; *Microcystis*; red tide; *Sargassum*. So what do these terms mean, and how do they relate to you?

“Algae” is a general term that refers to a very broad group of plant-like organisms. Adding to the confusion are cyanobacteria, which are sometimes called “blue-green algae.” While cyanobacteria are outwardly similar to algae, they are actually a type of primitive bacteria. There are tens of thousands of different species of algae and cyanobacteria on Earth. Some species are tiny single-celled organisms that can only be seen with a microscope (‘microalgae’). Other species, like giant kelp, are large enough to create their own ecosystems. These larger species of marine algae are often called “seaweeds” or macroalgae.

Similar to plants, algae and cyanobacteria use sunlight, carbon dioxide, and nutrients like nitrogen and phosphorous to fuel their growth, giving off oxygen in the process. In fact, the oxygen in Earth’s atmosphere was originally created by cyanobacteria early in our planet’s history. Many types of algae play important roles in the environment (e.g., providing food and shelter for marine life). Some algae species are even consumed by humans. Unfortunately, a number of algae and cyanobacteria species are considered “harmful.” These species are capable of causing severe ecological damage, and can affect human health, especially when they “bloom” or occur in unusually high concentrations. Below is a short summary of important algae-related terminology.

Cyanobacteria (also called “blue-green algae”)

- A primitive group of organisms that are actually a type bacteria.
- Can live in many different environments, including fresh water, brackish water, and salt water.
- Can produce a wide variety of toxins. These toxins can have acute and chronic health effects.
- Not all cyanobacteria are harmful, and a bloom of cyanobacteria can rapidly switch from “non-toxic” to “toxic.”
- Humans can be exposed to these toxins through direct contact (e.g., swimming, fishing, drinking) or through inhalation. Pets and wildlife are also affected by toxins produced by cyanobacteria.

***Microcystis aeruginosa* (one type of cyanobacteria)**

- A specific species of microscopic cyanobacteria
- This is the neon-green species that blooms in Lake Okeechobee and is transported to the St. Lucie and Caloosahatchee Estuaries through human-made drainage canals.
- Historically, *Microcystis* has NOT been detected in those estuaries unless Lake Okeechobee discharges were occurring.
- Thrives in warm, nutrient-rich fresh water, but can survive in low-salinity brackish water.
- Excessive levels of nutrients, particularly nitrogen and phosphorous, fuel the rapid growth of cyanobacteria like *Microcystis*.
- Sources of these nutrients include agricultural and residential fertilizer runoff, as well as septic tank and wastewater treatment plant discharges.
- *Microcystis* produces a number of toxins that are harmful to humans and wildlife, including microcystin and BMAA.
- Acute exposure to microcystin can cause a variety of symptoms, including skin rash, burning eyes, runny nose, coughing, headache, vomiting, or liver failure.
- Chronic exposure to BMAA has been linked to neurodegenerative diseases like Parkinson’s Disease, Alzheimer’s Disease, and ALS.

- The State of Florida tests water for the presence of the toxin microcystin, but currently, fish, shellfish, and sediments are NOT being tested. The state is NOT testing for the presence of BMAA.

Florida Red Tide (a type of harmful marine algae bloom)

- A bloom of a specific species of microscopic algae – *Karenia brevis*. *Karenia* is a type of algae known as a dinoflagellate. Red tides in other parts of the world are caused by different algae species.
- The Florida red tide occurs in salt water – *Karenia* cannot survive when salinities get too low.
- While red tides generally start offshore in the Gulf of Mexico, winds and currents can move these algae blooms into nearshore areas where they cause tremendous environmental and economic harm. Red tide blooms can last for many months.
- Red tides have been documented in the Gulf of Mexico for hundreds of years, but it is extremely likely that today's red tides are being exacerbated by excessive levels of nutrients pouring into coastal waters from land-based sources (e.g., fertilizer, sewage, phosphate mining).
- During severe blooms, red tide algae are sometimes carried from the Gulf of Mexico to Florida's east coast by ocean currents.
- A red tide can cause ocean waters to appear red, brown, or green.
- The algae species responsible for the Florida red tide produces a potent neurotoxin that can cause mass mortality events in fishes, sea turtles, manatees, and dolphins.
- In humans, even brief exposure to this toxin can cause skin irritation, burning eyes, coughing, or difficulty breathing. Wind can carry airborne toxins a considerable distance from the ocean. Consuming contaminated bivalve shellfish (e.g., clams, oysters) can cause neurotoxic shellfish poisoning.

***Sargassum* (a type of macroalgae or "seaweed")**

- A type of coarse, fibrous algae that sometimes washes up on Florida beaches. Often found piled up at the high tide line, fresh *Sargassum* is a golden yellow color, darkening to brown or black as it dries up.
- The *Sargassum* species that typically appear on Florida's shorelines normally occur as thick floating patches in the open ocean, where they provide an important home for fish, sea turtles, and crustaceans.
- Wind and ocean currents can carry floating *Sargassum* for thousands of miles.
- In recent years, certain Caribbean islands have experienced an unprecedented influx of *Sargassum* washing onto beaches. It has been suggested that increased nutrient levels in the ocean (caused by human actions) may be responsible for this increase in *Sargassum* abundance.
- While *Sargassum* is not considered toxic, it can still have ecological and economic impacts. Beaches covered in *Sargassum* are not hospitable for wildlife, including nesting sea turtles and shorebirds. The strong odor of rotting *Sargassum* negatively affects tourism.