

ALGAL BLOOMS THINGS TO KNOW

Algae are photosynthetic organisms naturally found in aquatic environments. Under the right conditions, they multiply to high concentrations called blooms. Some blooms are blue-green algae capable of producing toxins that can cause skin irritation, illness or in rare instances death in pets, livestock and people. These blooms are known as harmful algal blooms or HABs.

Since 2015, HABs appear to be on the rise in North Carolina's Chowan River and Albemarle Sound, causing concern for communities and prompting responses by researchers, managers and citizens.

What causes an algal bloom?

Increased temperatures and nutrients, along with calm waters, provide favorable conditions for blue-green algae, also known as cyanobacteria, to grow rapidly and form large, visible mats or blooms. Otherwise, cyanobacteria cells are too small to be seen with the human eye. Freshwater algal blooms are increasing around the globe.



Cyanobacteria blooms are known to be patchy in nature like this one in the Chowan River photographed from a 19-foot cliff in Bertie County on July 27, 2019.

Photo credit:
Lucy Daniels

Why are some blooms harmful?

Some species of cyanobacteria produce toxins that may accumulate in high concentrations during blooms. Several types of toxins may be produced depending on the type of cyanobacteria present. One toxin of concern, microcystin can cause skin rashes and gastrointestinal issues, as well as damage to the liver, kidneys and nervous system.

Children, elderly adults and people with weakened immune systems may be more susceptible to the effects. Toxins can also be fatal to pets, livestock and wildlife that drink or come into contact with contaminated water. In the summer of 2019, some N.C. blooms contained up to 620 ug/L of microcystin toxin. The World Health Organization considers 20 ug/L a moderate health risk for swimming.

Can I eat fish taken from affected waters?

Fish and shellfish exposed to affected waters can absorb toxins into their bodies. While no one has reported getting sick from eating fish caught during a cyanobacteria bloom, the health risks are still unknown and being studied. The U.S. Food and Drug Administration recommends trimming the skin, fat and internal organs – areas where toxins are most likely to accumulate – before cooking fish. Also, avoid eating the “mustard” or hepatopancreas of blue crab, as it

can accumulate significant levels of toxins. The World Health Organization recommends moderation in eating fish exposed to blue-green algae.

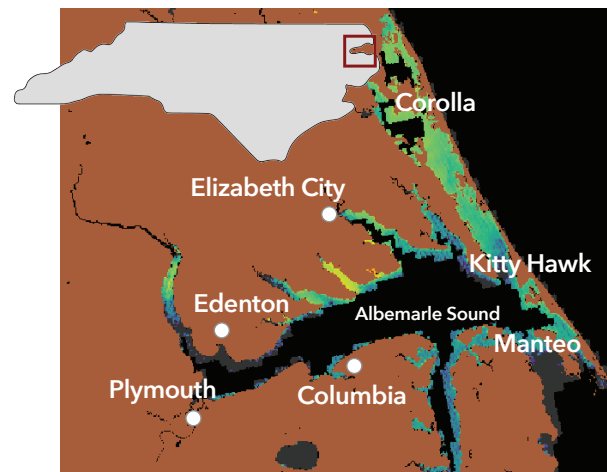
How can I keep my family safe?

You cannot tell if a bloom is toxic just by looking at it. Do not take chances. Never swim in water during a bloom. Keep pets out of the water. If they come in contact with affected water, thoroughly wash them off using another water source and soap. Never drink or cook with affected water. Boiling will not remove the toxins if present. Avoid boating or skiing through a bloom and breathing in airborne droplets.

See a healthcare provider if you experience symptoms, such as confusion, vomiting and diarrhea, after exposure to potentially affected waters. Symptoms can present in as little as a few hours or days, but generally take about a week to show up.

What are the environmental impacts?

As the algae die, other bacteria use dissolved oxygen in the water to decompose and consume the dead algae, resulting in low oxygen levels. This can lead to die offs of aquatic organisms. Mammals, birds and fish can get sick or die after drinking from or exposure to water containing toxins created by HABs.



This satellite image shows the highest concentrations of cyanobacteria cells that occurred in northeast North Carolina during the period from July 28 to Aug. 3, 2019. Cooler colors such as green and blue are lower concentrations; while warmer colors such as yellow and orange are higher concentrations. Black indicates no data, such as cloud coverage. Grey pixels indicate no detection.

Base image is from Cyanobacteria Assessment Network, an EPA/NASA/NOAA/USGS project: epa.gov/cyanoproject

How can I contribute to understanding the algal blooms?

Examining and tracking local conditions are vital for improving what we know and what is needed to address the algal blooms. Individuals and groups can:

- **Report Blooms and Fish Kills**

Let the N.C. Division of Water Resources know when you see a bloom by using the reporting system at:

go.ncsu.edu/reportahab

- **Monitor for Algae**

Local groups can join the NOAA Phytoplankton Monitoring Network and train to obtain water samples, identify phytoplankton microscopically and submit reports.

<https://coastalscience.noaa.gov/research/stressor-impacts-mitigation/pmn/about>

Contact: Jennifer Maucher, jennifer.maucher@noaa.gov

- **Share this Factsheet:** go.ncsu.edu/algal-blooms

- **Document Possible Health Impacts**

If exposure to an algal bloom gives you a rash, cough or other condition that sends you to seek medical care, suggest the provider record the ailment with a new medical code designated to track problems related to toxic algae. The code is Z77.121. It is part of the International Classification of Diseases - Tenth Edition (ICD-10).

How can I help prevent algal blooms?

Blue-green algae thrive on nutrients such as nitrogen and phosphorus. Help reduce nutrient loads in waterways:

- Limit use of fertilizers and follow application directions.
- Minimize and control storm water leaving your property.
- Maintain or restore native plants along shorelines.
- Pick up and dispose of pet waste.
- Maintain septic systems. Pump and inspect every three to four years.
- Prevent surface runoff from agricultural and livestock areas.
- Prevent erosion at construction and logging sites.

Local/Regional Organizations: For public health alerts, citizen science efforts and water-focused projects

Albemarle Regional Health Services: arhs-nc.org/

Albemarle Resource Conservation and Development Council: albemarlercd.org/fighting-algal-blooms.html

Chowan Edenton Environmental Group's Facebook Page: facebook.com/CEEG2007

State and Academic Organizations: For information on management, public health and toxin research

N.C. Department of Environmental Quality's Division of Water Resources: algae.nc.gov

N.C. Department of Health and Human Services: epi.publichealth.nc.gov/oeo/a_z/algae.html

NC State University, Astrid Schnetzer's Cyanotoxin Research: sites.google.com/a/ncsu.edu/schnetzerlab/home

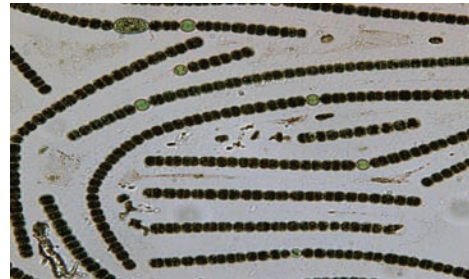
N.C. Division of Water Resources Nutrient Criteria Development Plan: deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/nutrient-criteria-development-plan

Federal Organizations: For satellite imagery and general algal bloom information

National Oceanic and Atmospheric Administration: coastalscience.noaa.gov/research/stressor-impacts-mitigation/hab-monitoring-system/ and oceanservice.noaa.gov/hazards/hab/

What is being done about algal blooms?

Local, state and national organizations are studying algal blooms as they increase across the country. In North Carolina, work is focused on understanding cyanobacteria toxins and their impacts, the environmental conditions that promote HABs, and improving our capability of detecting HABs from satellite imagery. Managers continue to identify strategies to improve water quality and to communicate regularly with the public about health risks associated with blooms.



Microscopic view of bloom forming cyanobacteria from Edenton Bay, June 2017.
Photo credit: N.C. Division of Water Resources



HABs may be bright green or blue-green. They can migrate vertically in the water column or collect at the surface and be moved by wind and wave action, both of which can rapidly change the bloom's appearance. Photo credit: Colleen Karl



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