

A harmful algal bloom (HAB) occurs when certain kinds of microscopic organisms multiply and produce toxins in a waterbody or waterway. The microscopic organisms that most commonly cause HABs in Pennsylvania’s fresh and brackish waters are cyanobacteria, or blue-green algae. While cyanobacteria are a natural part of many aquatic ecosystems, under certain conditions, like high nutrients and warm temperatures, some kinds of cyanobacteria can produce cyanotoxins. HABs can form at any time but most often in late summer or early fall. HABs may move and their toxicity may change rapidly, requiring ongoing surveillance and response throughout the season.

WHAT ARE THE BACTERIA AND/OR TOXIN LEVELS OF CONCERN FOR HAB EVENTS?

The Pennsylvania HABs Task Force, comprised of representatives from the Departments of Health, Environmental Protection, Agriculture, Conservation and Natural Resources, Pennsylvania Emergency Management Agency, Game Commission, and Fish and Boat Commission, has developed a Watch recommendation for the purposes of communicating to the public that conditions could lead to a HAB and that users should be attentive.

A **Watch** recommendation is appropriate when:

- Visual observations indicate conditions are optimal for a HAB.
- Waterbodies without public swimming beaches experience colony counts or toxin concentrations that exceed response level thresholds.
- Waterbodies with public swimming beaches experience colony counts or toxin concentration that exceed response level thresholds outside swimming areas.
- Waterbodies with or without public swimming beaches have previously experienced a HAB and subsequent visual observations, colony counts and/or toxin results indicate a HAB is no longer present.

Some cyanobacteria species can produce one or more cyanotoxins. Of the measured cyanotoxins in PA waterbodies, microcystin and cylindrospermopsin can have acute effects on the liver, whereas anatoxin-a and saxitoxin can have acute effects on the nervous system. The Pennsylvania HABs Task Force uses the following human primary contact response level thresholds for four cyanotoxins and for cyanobacterial colony density. Primary contact recreation includes activities where a high degree of bodily contact with water, immersion and ingestion are likely, such as swimming, bathing, surfing, water skiing, tubing, water play by children, and similar water contact activities¹¹. It is important to note these are human primary contact thresholds. Pets or livestock are often more sensitive to cyanotoxins due to their size and/or habits, such as readily swimming in or drinking water during a HAB and licking algae on their fur while grooming.

Cyanobacteria or cyanotoxin	Advisory	Avoid Primary Contact
Cyanobacteria colony density ^{1,2,3}	300 natural units ⁶	1500 natural units
Microcystin	Detect - <8 µg/L	8 µg/L ³
Cylindrospermopsin	Detect - <15 µg/L	15 µg/L ³
Anatoxin-a (provisional)	Detect - <15 µg/L	15 µg/L ^{3,4}
Saxitoxin (provisional)	Detect - <8 µg/L	8 µg/L ^{3,5}

¹ [WHO] World Health Organization, 2003. Guidelines for safe recreational water environments. Volume 1 Coastal and Fresh Waters.

² [WHO] World Health Organization, 2021. Guidelines on recreational water quality. Volume 1: coastal and fresh waters.

³ EPA, 2019. Recommended Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories for Microcystins and Cylindrospermopsin.

⁴ Fawell et al. 1999. The toxicity of cyanobacterial toxins in the mouse: II anatoxin-a. Hum Exp Toxicol. 18(3):168-73.

⁵ EFSA, 2009. European Food Safety Authority (EFSA) Marine Biotoxins in Shellfish – Saxitoxin Group: Scientific Opinion of the Panel on Contaminants in the Food Chain.

⁶ There is limited evidence for specific cyanobacteria-based threshold; however, there is a low probability of adverse health effects at exposures in this advisory level.

Provisional values have been provided by the PA HABs Task Force in the absence of federal guideline values. There is a limited number of toxicological studies on these cyanotoxins. Therefore, PA Harmful Algal Bloom Taskforce may update or revise the values as more research becomes available.

POTENTIAL HEALTH EFFECTS FROM EXPOSURE TO HABs & RECOMMENDATIONS DURING AN ADVISORY OR AVOID PRIMARY CONTACT

	Advisory	Avoid Primary Contact
Potential Health Effects ^{7,8,9,10}	Potential for short-term effects: skin irritation/rash, ear, nose, and eye irritation, abdominal pain, headache, fever, respiratory symptoms.	Short-term effects: skin irritation/rash, ear, nose, and eye irritation, headache, fever, abdominal pain, sore throat, nausea and vomiting, diarrhea, dry cough, tingling sensation, dizziness, trouble breathing.
Recreation Recommendations	Do not ingest water. Avoid contact with discolored water, algae mats, or scums. Wash with soap and water immediately after contact with water.	Avoid primary contact recreation activities in this waterbody. Primary contact recreation includes activities where a high degree of bodily contact with water, immersion and ingestion are likely, such as swimming, bathing, surfing, water skiing, tubing, water play by children, and similar water contact activities ¹¹ . Do not ingest. Wash with soap and water immediately after contact with water.

[7. CDC Avoid Harmful Algae and Cyanobacteria; 8. [New Jersey 2021](#) HAB Freshwater Recreational Response Strategy; 9. [Utah 2023](#) Recreational Health Advisory Guidance for HABs; 10. [Minnesota](#) Causes and Symptoms of HAB-related illness; 11. [EPA 2012](#) Recreational Water Quality Criteria]

HOW TO COMMUNICATE HABs TO THE PUBLIC AT SWIMMING BEACHES

Following the issuance of a watch, advisory, or avoid primary contact, appropriate physical signage with cautionary messaging to warn the public about the potential health risks from HAB exposure should be posted at public beaches and other water access points. Example signage:



If you have any health-related questions about HABs, contact us at env.health.concern@pa.gov.

For other inquiries about HABs or to report a HAB, contact HABs@pa.gov.

For more information on HABs, please visit www.dep.pa.gov/Business/Water/HABs and www.health.pa.gov/topics/envirohealth/Pages/HABs.aspx