

## Overview

This descriptive summary document explains harmful algal blooms (HABs), why they are a concern to both the environment and human health, and how to properly report them. While working or recreating with waterbodies in Pennsylvania, it is important to be aware of HABs, understand how to identify potential HABs, and know the right steps to report them. The Division of Environmental Health Epidemiology at the Pennsylvania Department of Health (DOH) has put together a more thorough, technical training on HABs available on its [website](#). Both the training and this document have been developed in collaboration with the interagency Pennsylvania HABs Task Force, including members from



Harmful algal bloom at Green Lick Lake located in Bullskin Township, PA (August 2020)

the Pennsylvania Department of Environmental Protection (DEP), Pennsylvania Department of Conservation and Natural Resources (DCNR), DOH's Bureau of Community Health Systems (BCHS), among other Commonwealth agencies and commissions.

## Introduction

Harmful algal blooms, or HABs, occur when certain kinds of microscopic organisms multiply and produce toxins in water. In Pennsylvania, and in some other parts of the world, the microscopic organisms that most commonly cause HABs are known as cyanobacteria. Under certain conditions, some cyanobacteria can produce toxins that can kill fish, mammals, and birds. Toxic HABs may also cause serious illness in humans. Pennsylvania has many waterbodies – the beach where you work at could be vulnerable to HABs.

In 2019, the Pennsylvania HABs Task Force was formed to respond to increasing occurrences of HABs in PA. The task force is comprised of representatives of DEP, DOH, DCNR, the Pennsylvania Department of Agriculture, the Pennsylvania Fish and Boat Commission, the Pennsylvania Game Commission, and the Pennsylvania Emergency Management Agency. The mission of this interagency task force is to understand and respond to the growing HABs concern in Pennsylvania via monitoring and prevention, raising public awareness of HABs, and strengthening public health infrastructure surrounding HABs.

### KEY TERMS

**Algae:** Single- or multi-cellular photosynthetic organisms that grow in water and lack roots, stems, or leaves

**Cyanobacteria:** Microscopic photosynthetic bacteria found naturally in water (also known as blue-green algae due to its most common appearance)

**Harmful algal blooms (HABs):** overgrowth of toxic algae or cyanobacteria in water

## Occurrence of HABs



HAB in Blue Marsh Lake located in Reading, PA (August 2020)

HABs are observed all around the country and throughout Pennsylvania, especially in slow-moving or still water, like lakes, ponds, bays, reservoirs, and estuaries. They occur in all types of water: fresh water, salt water, or brackish water. Waterbodies with high concentrations of phosphorus and nitrogen are more likely to experience HABs. Nitrogen and phosphorus are natural nutrients in aquatic ecosystems, but too much of these nutrients from natural or artificial sources can cause cyanobacteria to grow in excess, which can have negative impacts to the environment, human health, and animal health. Since warm water temperatures increase the potential for HABs, the typical season for their appearance is between mid-June and late-August, when the weather is hot, calm, and dry, but they can also occur during other times of the year if the conditions are right. As climate change heats the Earth, scientists predict that HABs will become more common, severe, and wide-ranging.

## Environmental Impact

HABs can negatively impact water quality and biodiversity. The overgrowth of cyanobacteria, regardless of whether they produce toxins, prevent aquatic plants and animals from accessing the sunlight and oxygen they need to survive. HABs can also prevent fish, shellfish, and other animals from breathing by clogging their gills.

## Human Health Impact

Some HABs can produce toxins in water that are hazardous to human health. Ingestion, inhalation, and skin contact are possible exposure pathways of HABs. By swallowing contaminated water or eating seafood contaminated with toxins, humans may experience nausea, vomiting, or diarrhea. Breathing in toxins suspended in the air may result in respiratory irritation and shortness of breath. Contact with HABs occurs while swimming or boating in contaminated water can induce a skin rash and eye irritation.

Common acute human health impacts from exposure to HABs, include cough, itchy eyes, rash, stomach pain, muscle weakness, dizziness, vomiting, and diarrhea. Long-term exposure to HABs may result in liver damage or other chronic health effects. Children may be especially vulnerable to these effects due to lower body weight and greater likelihood to partake in recreational water activities. If you or someone you know experience any of the symptoms above, or suspect contact with a HAB, consult a healthcare provider for advice on how to relieve symptoms.

## Animal Health Impact

Since animals may be more likely to swim in or drink from HAB-contaminated water, regardless of if it looks or smells bad, they are often exposed more than humans. Like children, an animal's smaller body size can make them more vulnerable to the health effects of these environmental contaminants. For questions about the animal health impact, contact your regional veterinarian listed online at [agriculture.pa.gov/regional-offices/pages/default.aspx](https://agriculture.pa.gov/regional-offices/pages/default.aspx), the State Public Health Veterinarian at (717) 787-3350 or [env.health.concern@pa.gov](mailto:env.health.concern@pa.gov), or the Animal Poison Control Center at (888) 426-4435.

## Occupational Exposure

Working at a beach or other water recreational facility may put you at an increased risk of exposure to HABs. Since 2019, HABs caused at least five beach closures at Pennsylvania state parks. If you suspect or see a HAB, report it as soon as possible.

## Identifying a Suspected HAB

Not all HABs are easy to identify by visual inspection alone. The appearance of HABs depends on the specific organisms present, the weather, and water conditions. For cyanobacteria, signs of a bloom include changes in the color and surface of the water. A cyanobacterial bloom can change the color of water to blue, green, brown, yellow, orange, or red. If they grow on the surface, blooms can look like foam, scum, mats, or spilled paint. Another way to detect a HAB is by smell. When the organisms in a HAB start to decay, they can release harmful



Scum at Eagles Mere Beach located in Eagles Mere, PA (July 2021)

### KEY TERMS

**Potentially Toxigenic screen:** Qualitative scan of a water sample to confirm the presence of cyanobacteria.

**Cyanotoxin:** Poisonous substance produced by the cyanobacterial cells.

gases such as methane and hydrogen sulfide, the latter of which smells like rotten eggs or rotting plants.

Visual observation or waterbody odor alone cannot confirm a HAB. Laboratory analysis of a water sample, starting with a Potentially Toxigenic (PTOX) screen, is required to have a definite identification of a HAB. This test should be conducted within 24 to 48 hours of receiving the water sample. DEP's Bureau of Laboratories and GreenWater Laboratories are the primary laboratories that test Pennsylvania water samples for HABs.

## Signs for HABs Risk

Public signs inform workers and beachgoers alike on how to recognize a HAB and the potential health risks associated with exposure to water containing HAB toxins (e.g., cyanotoxins). The specific use of the waterbody and the available evidence of the HAB are considered to determine the type of sign to be posted. The Pennsylvania HABs Task Force uses three response level signs for HABs: watch, advisory, and warning (threshold levels for this signage are under review and will be updated in the coming months).

- **Watch** signs are recommended for waterbodies with conditions favorable for a HAB event or a history of HABs.
- Yellow **advisory** signs indicate that a HAB may be present, and precaution should be taken before participating in water activities. Advisories also inform water resource users on how to identify HABs, the associated risks, safety precautions, reporting information, and where to get more information.
- Red **warning** signs indicate that high levels of HAB toxins have been detected and to avoid any contact with the water.



## Protect Yourself & Others

1. Follow waterbody advisories at your beach
2. Stay out of water if you see signs of a HAB, such as foam, scum, discoloration, or dead fish
3. Do not work in areas where there is a potential HAB
4. Do not let people or pets get in or drink water where there is a potential HAB
5. If skin contact occurs with HAB-suspected water, wash skin area thoroughly
6. If symptoms are noticed, contact health care provider or veterinarian

## Reporting HABs

The first step in reporting a HAB is to talk to your supervisor to make them aware of the concern. You or your supervisor should contact the Pennsylvania HABs Task Force at [HABs@pa.gov](mailto:HABs@pa.gov) to formally report the suspected HAB as soon as possible. To report illnesses caused by HABs or for health-related questions about HABs, contact the Division of Environmental Health Epidemiology at [env.health.concern@pa.gov](mailto:env.health.concern@pa.gov).