

Q: What are harmful algal blooms?

A: Harmful algal blooms (HABs) can harm people, animals, and the environment. They occur when certain kinds of microscopic organisms multiply and produce toxins in a waterbody or waterway. The organisms that most commonly cause HABs in Pennsylvania are known as cyanobacteria or blue-green algae.

Q: Where are HABs found?

A: HABs have been observed in salt and fresh-water bodies worldwide and have been reported in all states, including Lake Erie and other Pennsylvania waters. They can form in still or slow-moving waters such as lakes, ponds, stormwater retention basins, rivers, streams, or reservoirs.

Q: What are cyanobacteria?

A: Cyanobacteria (blue-green algae) are naturally occurring bacteria found in all types of water, and there are more than 600 known species. Cyanobacteria are bacteria and not algae, and they are often the cause of HABs in Pennsylvania's fresh water. They only become harmful when given the opportunity to multiply quickly, creating HABs, and producing toxins that spread below the water's surface or float on it. Microcystins, cylindrospermopsin, saxitoxin, and anatoxin are types of toxins produced by cyanobacteria that are known to be harmful to humans and animals.

Q: How are HABs formed?

A: Under certain environmental conditions, such as elevated levels of nutrients (phosphorus and nitrogen from sources like fertilizer runoff and sediment buildup), warmer temperatures, still or slow-moving water, and plentiful sunlight, bacteria can rapidly multiply to form HABs. As the bacteria multiply, some can produce toxic compounds. HABs can form at any time but most often in late summer or early fall.

Q: Why are HABs a public health concern?

- In high enough concentrations, cyanotoxins from HABs can be harmful to people, pets, livestock, and wildlife that contact them or ingest them. Those who encounter these toxins can experience severe illness including, but not limited to, vomiting; diarrhea; neurological symptoms; skin, eye, nose, or throat irritation; or even death.
- To date, no HAB-associated human deaths have been reported in the United States; however, many pet deaths (especially dogs) have been reported after the animal swam in or drank from water bodies with ongoing HABs. Between 2007–2011, thirteen states reported 67 cases of cyanobacteria toxin-related illness in dogs to the Centers for Disease Control and Prevention (CDC), and over half (58%) of these cases resulted in death.
- HABs can also block the sunlight and steal oxygen and nutrients that other organisms need to live.

Q: Why are HABs occurring more frequently now than in the past?

A: The occurrence of HABs has been increasing in frequency and severity due to warming water bodies, farming practices, storm and wastewater runoff, and other environmental issues.

Q: What are indicators of HABs?

A: Due to the microscopic nature of bacteria, not all HABs are visible. They sometimes stay below the water's surface or float on it. As bacteria in HABs die, the water may smell like rotting plants. Some HABs can look like foam, scum, or mats, particularly when the wind blows them toward a shoreline. Though typically blue/green in color, HABs found in Pennsylvania can also be blue, bright green, brown, or red, resembling paint floating on the water. Even if there are not any noticeable signs of HABs, cyanobacteria and other microorganisms may still be present in the water. Below are a few examples of what HABs may look like. Check for posted HAB advisories or ask the park manager about any recent HABs because colorless toxins can still be in the water after visible blooms have faded.



Q: How can people and animals come in contact with HABs?

A: People and animals can encounter HABs that are in the environment by physically touching, ingesting, and inhaling cyanobacteria and/or cyanobacteria toxins while swimming and boating; eating fish caught in contaminated water; using contaminated water to prepare food; or drinking contaminated water.

For some sensitive populations, exposure to the air near HABs may cause allergic responses, such as difficulty breathing or skin rashes.

For dogs and livestock, eating scum or mats of algae, and licking fur after swimming in contaminated water could expose them to hazardous levels of biotoxins in HABs.

Q: What are the symptoms of HAB exposure?

A: Exposure to HABs may cause a range of mild to severe symptoms in both humans and animals.

Human symptoms may include:

- Rashes, blisters, or hives
- Eye and nose irritations
- Diarrhea
- Vomiting
- Abdominal pain
- Numbness of lips
- Tingling in fingers and toes
- Dizziness
- Headache

Animal symptoms may include:

- Staggering, stumbling, or falling
- Difficulty breathing
- Convulsions, tremors, or seizures
- Excessive drooling
- Foaming at the mouth
- Weakness
- Loss of energy or appetite
- Vomiting

Q: Is there medical treatment for people or animals who have been exposed to HABs?

A: There are currently no available tests or special treatments for HAB-associated illnesses in humans or animals. If a patient shows any of the symptoms listed above, determine if they may have been exposed to a HAB or if they have recently consumed fish or shellfish that could be contaminated with HAB toxins. If so, provide symptomatic and supportive treatment until they resolve. Symptoms usually resolve within a few days, with or without supportive treatment.

Q: Why do animals get sick more often than people from HABs?



A: Animals, such as dogs, cattle, birds, and fish, are more likely to be affected by HABs because they are more likely to drink from or swim in contaminated waters. Dogs are likely to get in a body of water even if it looks or smells bad.



Q: How do I protect myself, my family, and my pets from HABs?

- Follow any waterbody closures, advisories, and restrictions announced by local public health and other authorities.
- If near water bodies and allergy symptoms occur, such as difficulty breathing, or irritated, watery eyes, leave the beach area.
- Avoid playing, swimming, water skiing, boating, or practicing other activities in areas where the water has a bad

odor or any visible indications of HABs. If you or your pet swim in water that might contain HABs, rinse off with fresh water as soon as possible. Do not let pets lick water off their fur.

- Seek professional assistance to determine causes and prevention measures for HABs most relevant to a specific waterbody. Poor water quality from excessive nutrients promotes the development and persistence of HABs. Using only the recommended amounts of fertilizers on lawns and plants, properly maintaining household septic systems, and keeping a buffer of natural vegetation around ponds and lakes to filter incoming water may prevent excess nutrients from forming in a waterbody.
- You can use Penn State’s water testing services to test for excess nutrients (such as phosphorus or nitrate-nitrogen) that can make it easier for HABs to grow in any residential waterbody, including those used as a water source for livestock and fruit and vegetable gardens. However, a positive test for these nutrients does not necessarily mean HABs are present. More information on Penn State’s water testing services is available at <https://agsci.psu.edu/aasl/water-testing/pond-and-lake-water>.
- If you swallow water from where there is a known HAB, call your doctor or a Poison Control Center at 800-222-1222. For your pet, contact a veterinarian or an Animal Poison Control Center at 888-426-4435.

Q: What should I do if I suspect a HAB?

A: If you have concerns about the appearance, smell, or taste of water, avoid prolonged exposure, stay out of the water and contact your local park authority, environmental authority, or health department. You can send information on suspected HAB occurrences or any general HAB-related inquiries via email to HABs@pa.gov.

Q: How can I protect the quality of a waterbody?

A: Although the presence of some bacteria that can form HABs in water has an important role in an aquatic ecosystem, high levels of these bacteria are usually fueled by excess nutrients and extended conditions for suitable growth, both of which can degrade the water quality of a waterbody. Poor water quality from excessive nutrients promotes the development and persistence of HABs. To protect water quality and prevent excess nutrients, consider these practices:

- Limit fertilizer application. Use only recommended amounts of fertilizers on your yard and garden to reduce the amount that runs off into the environment.
- Properly maintain your household septic system.
- Maintain a buffer of natural vegetation around ponds and lakes to filter incoming water.
- Combat climate change by developing and maintaining habits that positively affect the environment, such as cutting down on non-renewable energy sources, carpooling or taking the bus instead of driving alone, and reducing, reusing, and recycling.

Q: How does climate change impact water quality and the formation of HABs?

A: In recent decades, climate change has had many effects on freshwater and marine environments, including creating ideal conditions for HABs to form. Scientists predict these effects, along with nutrient pollution, have caused HABs to occur more often, in more waterbodies, and to be more intense. Climate impacts that can affect HABs include:

- Warming water temperatures. HABs usually occur during late summer and early fall or when water temperatures are warmer than usual. Warmer water due to climate change might favor HABs in a number of ways: 1) warmer temperatures prevent water from mixing, allowing algae to grow thicker and faster; 2) warmer water is easier for small organisms to move through and allows algae to float to the surface faster; 3) HABs absorb sunlight, making water even warmer and promoting more HABs.
- Higher carbon dioxide levels. HABs need carbon dioxide to survive. Higher levels of carbon dioxide in the air and water can lead to rapid growth of HABs, especially toxic blue-green algae that can float to the surface of the water.
- Sea level rise. Scientists predict that sea level could rise up to one meter by the year 2100. This would create more shallow and stable coastal water, conditions that are perfect for the growth of HABs. This could also impact bodies of water that are connected to coastal water, including rivers and bays like the Delaware River and Delaware Bay.
- Changes in rainfall. Climate change might affect rainfall patterns, leading to alternating periods of drought and intense storms. This can cause more nutrient runoff into waterbodies, feeding more HABs.
- Coastal upwelling. Coastal upwelling is the process by which winds push surface water offshore and deep water moves towards the coast, bringing nutrients from the ocean floor to the surface. Climate change is expected to alter the timing and intensity of coastal upwelling. Along the coast of the United States, excess nutrients delivered by upwelling might lead to more HABs and affect waters connected to the coast.
- Changes in salinity. Climate change can lead to more droughts, which make freshwater saltier. This can cause marine algae to invade freshwater ecosystems. In the southwestern and south-central United States, toxic marine algae have been killing fish in freshwater lakes since 2000.

Q: Are fishing and other activities safe?

A: It is recommended to not consume fish from water with HABs. Research indicates toxin levels are highest in internal organs but can still be found in fillets. If you plan to eat the fish you catch, remove the guts and liver, and rinse fillets thoroughly in clean water before cooking. If you have had contact with contaminated water or shore debris, be sure to wash your hands before handling food.

Other activities near the water such as camping, picnicking, biking and hiking should be safe unless otherwise noted by an advisory in the area. However, if you begin to develop breathing problems, a rash, an allergic reaction, any abdominal discomfort, or dizziness/lightheadedness, you should leave the area and seek medical attention.

Q: Is there testing for HABs?

A: Confirmation of hazardous levels of bacteria or algae that make up HABs can only be made under a microscope, and levels of biotoxin(s) can only be quantified through professional testing. However, visual indicators at the waterbody can show when HABs are likely to be present.

Scientists are working to develop toxin test kits for water resource managers and others. You can test for excess nutrients (such as phosphorus or nitrate-nitrogen) that can make it easier for HABs to grow in any residential waterbody, including those used as a water source for livestock and fruit and vegetable gardens, using Penn State's water testing services. However, a positive test for these nutrients does not necessarily mean HABs are present. For more information, please visit: <https://agsci.psu.edu/aasl/water-testing>.

Q: What is the Pennsylvania Department of Health (DOH) doing to address HABs?

A: DOH is working closely with many other state entities, including the Department of Environmental Protection, the Department of Conservation and Natural Resources, the Fish and Boat Commission, and the Game Commission, to understand and prevent HABs from affecting Pennsylvania residents.

Specifically, DOH is doing the following:

- Assisting with the adoption of statewide recreational water use criteria from a public health perspective;
- Assisting with public health education and outreach activities for PA residents, health providers, and recreational workers; and
- Working on making all HAB-associated illness a required reportable disease/medical condition for improved surveillance. The identification of HABs is critical to determine their patterns of occurrence, to protect water and food supplies, and to alert the public when there is a problem. Currently, there is no mandatory reporting requirement for HAB-associated illnesses. HAB-associated outbreaks can be voluntarily reported in the National Outbreak Reporting System (NORS). However, NORS only captures collective information about two or more human cases of illness. Surveillance for individual cases of human and animal illness will provide additional information on the annual number of cases, where illnesses are occurring, and symptoms from exposure.

Q: What is the One Health Harmful Algal Bloom System?

A: Pennsylvania state officials can report individual people or animals affected by HABs. PA state officials are planning to report information about local HABs and associated illnesses to the Centers for Disease Control and Prevention (CDC) through the One Health Harmful Algal Bloom System (OHHABS). This voluntary reporting system is accessible to state and territorial public health departments and their designated environmental health or animal health partners. It collects data on individual human and animal cases of illnesses from HAB-associated exposures, and environmental data about HABs. The goal of OHHABS is to collect information to support the understanding and prevention of HABs and HAB-associated illnesses. **Q: How does PA report in OHHABS?**

A: The PA Department of Health is currently expanding our capacity to update OHHABS with all HAB and HAB-associated illness occurrences in PA via reported incidences sent to env.health.concerns@pa.gov or the HABs@pa.gov.

If you are a public health professional, environmental health professional, or animal health professional interested in reporting a suspected HAB or HAB-associated illness occurrence, please contact env.health.concerns@pa.gov.

If you are a member of the public and would like to report a suspected HAB, please contact HABs@pa.gov.

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.