

Lake Wallenpaupack Community Science Newsletter

Scientists for Community, Community for Science

Algal Blooms

Algae are a natural and even healthy part of aquatic ecosystems, regulating nutrient cycles and playing essential roles in food webs. However, too much of a good thing can be bad; when algae multiply rapidly (when they “bloom”), there can be detrimental environmental, economic, and public health consequences. Though not all blooms are visible, signs of a bloom can be a green tint to the water or surface scums¹. Some algae are even capable of producing toxins under the right conditions, coining the term “harmful algal bloom” (HAB). Toxin production can be stimulated by pH, salinity, light, temperature, and nutrient loading, particularly nitrogen and phosphorus¹.



Images of shoreline algal blooms on Lake Wallenpaupack in 2023 by Alexandra Bros.

Impacts of HABs

Environmental Consequences

- Oxygen depletion within waters, resulting in “dead zones”³.
- Death of a bloom may result in the release of cyanotoxins into surrounding water due to cell lysis¹.
- Impacts on wildlife such as toxin bioaccumulation, DNA damage⁴, clogged gills⁵, illness from ingestion, or death.
- Algal blooms can limit light penetration through the water, impacting or killing photosynthetic organisms like submerged aquatic plants^{1,3,5}.

Economic Consequences

- Impacts on regional and national economies affecting areas such as aquaculture and fisheries, recreation, and tourism¹.
- Cyanotoxins within drinking water are not easily removed using conventional water treatment methods⁶.
- Estimates from 2010 projected freshwater HABs would cost the US economy 2.2 to 4.6 billion dollars annually⁷.

Public Health Consequences

- Exposure to HABs can vary from simply swimming or ingesting water with toxins, eating fish or shellfish with toxins in their tissues, or from aerosolized HAB water¹.
- Boiling water or cooking food contaminated with cyanotoxins will not safely remove those toxins from those sources¹.
- There are numerous types of toxins with effects on the human body ranging from skin irritation to death if exposed to a high enough concentration¹.

More Information on Cyanotoxin Effects on the Human Body Below!

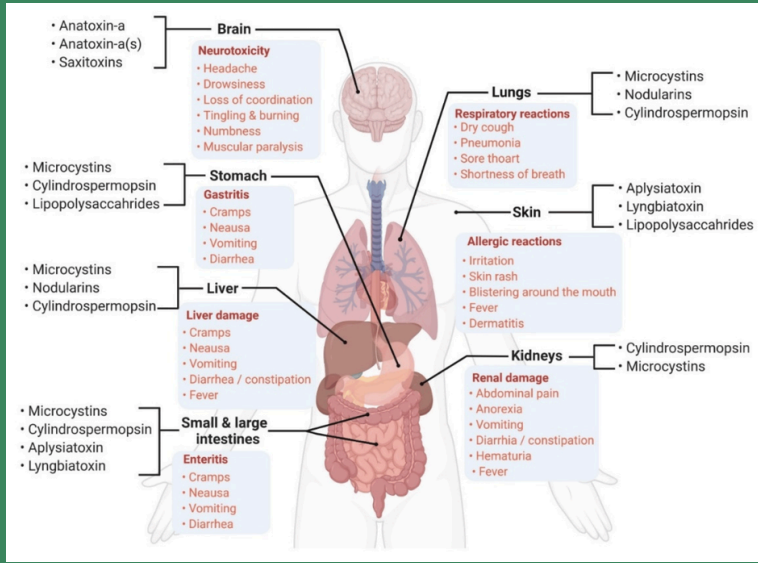


Figure 1. Clinical symptoms and the effects of cyanotoxins in the human body by Abdallah et al., 2021⁸. Above, the diagram illustrates many common toxins and their effects(s) on the human body. It is important to note both Microcystins and Cylindrospermopsin have multiple effects and impact many different systems of the body.

What to Do if you Suspect a Harmful Algal Bloom

ADVISORY AVISO

TOXIC ALGAE MAY BE PRESENT - BE ALERT
Algas tóxicas pueden estar presentes - Esté atento

DO NOT
ingest untreated water

no ingiera agua no tratada

WASH IMMEDIATELY
after contact with untreated water.

Lávase o dúchese inmediatamente después de contacto con agua no tratada.

CAUTION: Avoid contact with discolored water or scum
Precaución: Evite contacto con agua descolorida o espumada

Call your doctor, veterinarian, or the poison control center if you or your pet becomes ill or shows signs of poisoning.
Llama a tu médico, veterinario, o Centro de Toxicología si usted o su mascota tiene una enfermedad o síntomas de envenenamiento.

Poison Control Center: 800-222-1222
Animal Poison Control Center: 888-426-4435
For more information: HAB@pa.gov
Para más información: HAB@pa.gov

WARNING ALERTA

TOXIC ALGAE PRESENT
Algas tóxicas están presentes

DO NOT TOUCH
UNTREATED WATER

No toque el agua no tratada

Keep out of water - No swimming.
Manténgase fuera del agua - Prohibido nadar.

Do not ingest untreated water.
No ingiera agua no tratada.

Keep pets out of water and from drinking untreated water.
Mantenga a sus mascotas fuera del agua y de beber agua no tratada.

Do not boat or paddleboard in water with scum or discoloration.
No vaya en bote o remar en agua con discolorada o espumada.

Call your doctor, veterinarian, or poison control center if you or your pet becomes ill or shows signs of poisoning.
Llama a tu médico, veterinario, o Centro de Toxicología si usted o su mascota tiene una enfermedad o síntomas de envenenamiento.

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When in doubt, stay out! According to the Pennsylvania Department of Environmental Protection⁹, if a HAB is suspected one should:

- Avoid ingestion, inhalation, or contact with water with a suspected or confirmed bloom.
- Wash hands post contact with untreated water.
- Shower and bathe any individuals, especially children and pets, after water recreation.
- Follow guidelines posted around your waterbody (as seen above) to minimize HAB exposure risk.

If a pet or individual becomes sick following possible exposure, contact a veterinarian, doctor, or poison control center.

To report a potential HAB or for more information on HABs, contact the PA HABs Task Force at

[HABs@pa.gov](mailto:HAB@pa.gov).

Sources Cited:

- (1) Bláha, L., Babica, P., & Maršálek, B. (2009). Toxins produced in cyanobacterial water blooms - toxicity and risks. *Interdisciplinary toxicology*, 2(2), 36–41. <https://doi.org/10.2478/v10102-009-0006-2>.
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- (6) Murphy, C. A., Pollock, A. M. M., Arismendi, I., & Johnson, S. L. (2023). HABs and HAB nots: Dynamics of phytoplankton blooms across similar oligotrophic reservoirs. *Limnologia*, 103, 126110. <https://doi.org/10.1016/j.limno.2023.126110>.
- (7) Hudnell H. K. (2010). The state of U.S. freshwater harmful algal blooms assessments, policy and legislation. *Toxicon: official journal of the International Society on Toxinology*, 55(5), 1024–1034. <https://doi.org/10.1016/j.toxicon.2009.07.021>.
- (8) Abdallah, M.F.; Van Hassel, W.H.R.; Andjelkovic, M.; Wilmotte, A.; Rajkovic, A. Cyanotoxins and Food Contamination in Developing Countries: Review of Their Types, Toxicity, Analysis, Occurrence and Mitigation Strategies. *Toxins* 2021, 13, 786. <https://doi.org/10.3390/toxins13110786>.
- (9) Pennsylvania Department of Environmental Protection. (2024). Commonwealth of Pennsylvania. What are HABs? <https://www.dep.pa.gov/Business/Water/HABs/Pages/default.aspx>

Questions or input on potential Lake Wallenpaupack Community Science newsletter topics?

Want to join the Wallenpaupack Community Led Water Quality Monitoring Program?

Email pleon@lacawac.org