



HARMFUL ALGAL BLOOMS

Other names: HAB, Toxic Algal Blooms, Red Tide



CAUSE

Harmful algal blooms (HABs) are caused by the rapid proliferation of aquatic photosynthetic microbes (collectively known as algae) harmful to animals and humans. HABs can be caused by a diversity of algal species including cyanobacteria, dinoflagellates, and diatoms. The variables that cause these algae to bloom depend upon the location and species of algae involved. Influxes of limiting nutrients (e.g. nitrates, phosphates, iron, carbon, silica) from anthropogenic pollution (e.g. run-off, sewage, etc.), or natural events (e.g. coastal upwelling, run-off, nutrients transported by wind, etc.), and increased water temperatures can promote the development of harmful algal blooms. Alterations to the food chain (i.e. the loss of filter feeding species) can influence frequency of algal bloom events. Additionally, natural and anthropogenic disturbances may also contribute to blooms.

SIGNIFICANCE

Many species are capable of producing toxins, which differ among species. These toxins can cause harm when they are released into the water, when they become aerosolized, and by entering the food chain when these algae are ingested by filter feeders. Some algae may cause physical damage to the gills of fish causing them to die of asphyxiation. Decay of dead algae after the bloom has completed can deplete oxygen within the water column resulting in hypoxic conditions and can lead to further die-offs of aquatic organisms in the area.

HABs are capable of causing massive die-offs of fish and filter feeding invertebrates, and may cause illness and/or mortality in water fowl, marine turtles, and aquatic mammals. Their impact is not limited strictly to organisms within the water as aerosolized toxins can affect humans and animals on or proximal to the water (e.g. on boats, beaches, coastal communities/habitats). These blooms can impose significant economic damages through their impacts upon aquaculture, fisheries, and tourism - resulting from the closure of coastal areas.

RISK TO HUMAN AND DOMESTIC ANIMAL HEALTH

The risk to humans and domestic animals are dependent upon the species of algae involved and the conditions surrounding the bloom. Toxic algae can accumulate in filter feeding shellfish causing them to subsequently become toxic to humans and requiring temporary closure of fisheries. Direct exposure to toxins can cause massive die-offs of fish, invertebrates, and may cause human illness and/or death. These toxins may also become aerosolized endangering people in watercrafts on the water, people and animals along shorelines, and in some cases can endanger entire coastal communities. As a result, harmful algal blooms represent a significant risk to human and animal health, as well as a risk to the seafood and aquaculture industries.

CLINICAL SIGNS

The clinical signs exhibited depend on the type of toxin being produced. Exposure to algal toxins often cause a variety of gastrointestinal and/or neurological symptoms and can be potentially life threatening. In Canada there are three major syndromes that result from the ingestion of toxins that have accumulated in fish or shellfish: Amnesiac Shellfish Poisoning (ASP), Diarrhetic Shellfish Poisoning (DSP), and Paralytic Shellfish Poisoning (PSP). Descriptions of the causes and symptoms of these forms of intoxication can be found on the [Canadian Food Inspection Agency's website](#).

MANAGEMENT AND PREVENTION

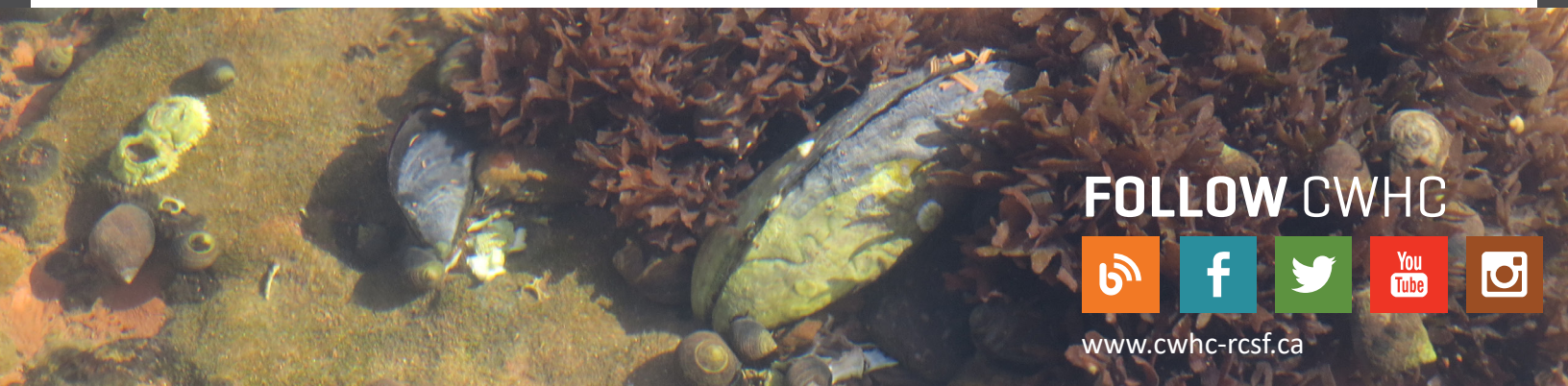
Routine testing conducted by Federal agencies (i.e. DFO, CFIA, ECCC) help prevent human exposure to these toxins through seafood and inform decisions for closures of shellfish harvests and of beaches.

Reducing nutrient run-off (e.g. fertilizer) and nutrient dumps (e.g. sewage) into aquatic environments can help reduce the potential for harmful algal blooms. Additionally, the following precautions can help reduce exposure to HABs:

- Avoid fishing, swimming, or other activities in/on the water in areas experiencing an algal bloom.
- Avoid beaches or waters where warnings for algal blooms have been posted.
- Never eat fish that are dead when caught.
- Never eat unshucked shellfish that appear to be dead prior to cooking.
- If you experience symptoms of shellfish poisoning or other algal toxicity seek immediate medical attention and have shellfish sent for testing if applicable.
- Report any sick or dead animals to the Canadian Wildlife Health Cooperative. Find your closest regional centre at: <http://www.cwhc-rcsf.ca/>

SUGGESTED READING

- http://www.cwhc-rcsf.ca/docs/fact_sheets/CMHO_CVO_Climate_Seafood.pdf
- <https://www.ec.gc.ca/grandslacs-greatlakes/default.asp?lang=En&n=6201FD24-1>
- http://hab.ioc-unesco.org/index.php?option=com_content&view=article&id=5&Itemid=16
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- <http://www.noaa.gov/what-is-harmful-algal-bloom>



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