

Cyanobacterial Harmful Algal Blooms (CHABs)

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Oregon is renowned for its natural beauty and water resources. In recent years, cyanobacterial harmful algae blooms (CHABs) have been gaining attention as a potential danger when recreating in ponds, lakes and even rivers. The following is a brief introduction to CHABs and how they are dealt with in the state of Oregon.



What are CHABs?

Cyanobacterial Harmful Algal Blooms (CHABs) are blue-green algae that occur naturally in surface waters. Given the right conditions of light and temperature, nutrients (like phosphorous and nitrogen, and the ratio of the two), and lack of water turbulence, blue-green algae can quickly multiply into a bloom. As the algae die off, toxins are released into the water. If ingested these toxins may cause nausea, headache, vomiting, abdominal pain, diarrhea, gastroenteritis, muscle weakness, pneumonia, paralysis, and in severe cases death. Contact with affected water has been known to lead to problems such as skin rashes, swollen lips, eye irritation and redness, ear ache and itchiness, sore throat, hay fever symptoms, and/or asthma.

There are several species of blue-green algae but some produce toxins and others do not. The main toxin forming cyanobacteria in Oregon are *Microcystis*, *Anabaena*, and *Aphanizomenon*, pictured below.

Microcystis



Golden Gardens Pond, Eugene, OR, August 2011, (photo courtesy of Dreher Lab, OSU)

Anabaena Morphotypes



Dexter Reservoir, Lane County, OR, August 2011, (photo courtesy of Dreher Lab, OSU)

Aphanizomenon



Golden Gardens Pond, Eugene, OR, August 2011, (photo courtesy of Dreher Lab, OSU)

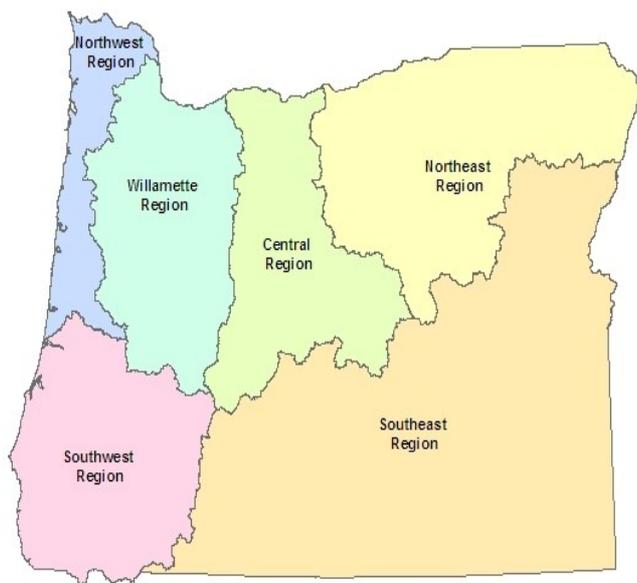
Background

The first documented case of CHABs in Oregon occurred in 1998 at Lake Oswego in Clackamas County. The outbreak did not lead to an advisory; however, the significant presence of algal blooms alarmed locals and created awareness of the issue in that area. Since then, outbreaks have been reported in different water bodies throughout the state with an increase in reports most notably since 2004, when official advisories began. In recent years (2009 and 2010), there have been reports of dogs dying after exposure to CHABs in Douglas County, OR. These incidents have sparked greater awareness and concern towards CHABs.

Interest continues to grow as education and awareness of this important issue increase. Future research will contribute to greater understanding and better decision making with respect to issuing advisories and monitoring strategies. It must be noted that not all water bodies are monitored. People are encouraged to exercise caution and avoid small pools where water sits stagnant, especially if there is evidence of algae. Avoid contact with water that is green, brown or brownish-red, scummy, smelly and/or slimy



*Algae blooms, Lawson Bar, Douglas County, OR, July 2012
photos courtesy of Courtney Beerman,*



Map courtesy of the Oregon Health Authorities web site

In Oregon advisories are issued for lakes, reservoirs and rivers. Oregon is divided into six different regions; Northwest, Willamette, Central, Northeast, Southwest, and Southeast. If sampling confirms the species of blue-green algae present is a non-toxin producing variety such as “Aphanizomenon,” or that cyanotoxin levels are below health advisory guidelines for recreational waters, the advisory issued for a water body is lifted.

The number of counties, water bodies and cumulative number of days affected by CHABs in Oregon, from 2007 to 2011 are presented in the chart below from data compiled from the Oregon Health Authority website. All regions have had some incidence of harmful blue-green algae, although not all regions are affected every year. For a full archive of affected regions and counties, please visit the [Harmful Algae Blooms website](#) maintained by Oregon Department of Health.

Year	No. Regions Affected	No. Counties Affected	No. Waterbodies Affected	No. Days
2007	5	6	7	311
2008	5	8	11	732
2009	5	10	17	727
2010	5	9	20	1412
2011	5	9	16	1175

The Effects of CHABs in Oregon

CHABs affect several areas of society, primarily in areas where tourism and agriculture are of great importance to the economy. The table below briefly describes the impacts of CHABs to various sectors

Who	How
Agriculture	Death to livestock drinking contaminated water. Crop contamination via irrigation with contaminated water.
Aesthetic	Discoloration of water, scummy, slimy appearance. Some species cause pungent, distasteful odors.
Tourism	Accumulation of toxins in fish tissues may deter people from fishing affected waters. Public health risk deters visitors from using affected lakes, reservoirs, rivers and other surface waters.
Public Health	Ingestion of contaminated water can cause nausea, headache, vomiting, abdominal pain, diarrhea, gastroenteritis, muscle weakness, pneumonia, paralysis, and in severe cases death. Contact with skin can cause issues such as skin rashes, swollen lips, eye irritation and redness, ear ache and itchiness, sore throat, hay fever symptoms and/or asthma.
Pets and other wild animals	Consumption by animals can cause illness or even death. Blue-green algae have been implicated in the poisoning of wild animals including rodents, amphibians, fish, pelicans, waterfowl, bats, and zooplankton.

Who's Who in the CHABs Scene

There is limited monitoring of CHABs in Oregon. Most monitoring is left to watershed councils and other organizations that take interest in public health and environmental issues. There may be harmful algae present in waters that are not monitored and hence, awareness and education are integral to public safety when it comes to CHABs. Citizens are encouraged to notify local health authorities of any algae sighting or any symptoms that occur after contact with potentially contaminated water.

Players	Specific Roles
Watershed Councils and Non-profit Organizations	Obtain grants for monitoring, outreach and education Conduct some monitoring for CHABs
Center for Disease Control	Funds the Oregon HABs Surveillance Program and works with other state agencies, universities and federal partners to investigate the impact of harmful algae blooms on human health.
Oregon State University	Tests samples to identify specific species Genetic research
Oregon Health Authority	Issues/removes advisories to public when necessary Educates public of symptoms and what to look for in waters
Citizens	Report sightings of algae to local health authority Report of dog deaths/illnesses associated with exposure to CHABs

Strategies for Minimizing Occurrence of CHABs in Oregon:

- Integrated land and water management practices aimed at reducing nutrient flows into waterways from natural and artificial sources.
- Promoting natural algal grazers through selective fish stocking, aquatic plant restoration, and reduction in the contamination of waterways with pesticides.
- Supporting the maintenance and restoration of riparian vegetation .
- Community involvement in tackling catchment management issues.
- Research programs focused on toxin identification, rapid testing procedures for field use, toxin stability and degradation under different environmental conditions.

Future Management of CHABs in Oregon:

There is no way to fully prevent CHABs because they are naturally occurring and an integral part of the ecosystem. Cyanobacteria form the basis of the food chain and hence, their existence is essential for all life. The goal is to minimize outbreaks and keep populations from out-competing other species of bacteria, plants and animals. Some strategies for achieving this goal are to:

- Minimize nutrient concentrations in streams and storages; target fertilizing practices and waste management.
- Encourage water conservation measures; better irrigation practices and fewer withdrawals from surface water.
- Develop or improve techniques to treat and/or detoxify contaminated water.

Additional Resources

Centers for Disease Control and Prevention (CDC)

Harmful Algal Blooms (HABs) site

<http://www.cdc.gov/nceh/hsb/hab/default.htm>

Oregon Health Authority (OHA)

Blue-green Algae Advisories in Oregon, archived advisories, etc...

<http://www.healthoregon.org/hab>

Cyanosite

Image gallery, brief information, and some useful links

<http://www-cyanosite.bio.purdue.edu/>



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