



Oregon's Strategy to Build Capacity and Address Harmful Algal Blooms in a Changing Climate

Overview

Oregon is taking proactive steps to minimize Harmful Algal Bloom (HABs) and their impacts to drinking water supplies and recreational activities. After solidifying recommendations to improve the State's overall capacity to address HABs with the *Harmful Algal Bloom Strategy*, State agencies have been working collaboratively to better monitor, respond to, and prevent HAB events. Key actions include reducing HABs through TMDLs and proactive water quality management planning, providing HAB response assistance to water system operators, and using climatic change projections to assess regional and local adverse health impacts.

Background

In 2010, Oregon's Climate Change Research Institute concluded that the State was already experiencing climate change impacts, with projected increases in temperature and precipitation, warmer and drier summers, sea level rise, and the abundance of HABs (*Oregon Climate Assessment Report, 2010*). HABs are rapidly reproducing populations of cyanobacteria caused by conditions expected to become more common with climate change, such as excess nutrient concentrations from runoff, warmer temperatures, and lower hydrologic flows. Warming air and water temperatures suggest algal blooms will occur earlier in the year and be more abundant. More frequent HABs events can heighten cyanobacteria exposure risks to people and animals from recreational activities and drinking water consumption, causing serious health implications and illness.

Since 2000, the Oregon Health Authority (OHA) has issued public health advisories for more than 40 waterbodies due to the presence of HABs. The Public Health Division (OPHD) in OHA runs the [HAB Surveillance Program](#), which is working to gain a better understanding of the occurrence of toxic algae blooms and their impact on human health. Once OHA identifies a HAB, the Department of Environmental Quality (DEQ) is responsible for investigating the causes and sources of pollution, and writing a pollution reduction plan. DEQ began to include waters with HAB health advisories on the Clean Water Act (CWA) 303(d) list of

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impaired waters in 2010. The process requires DEQ to assess HAB impaired waters, determine causes of the blooms, and establish a restoration plan known as a Total Maximum Daily Load (TMDL).

Developing Oregon's Harmful Algal Bloom Strategy

As the number of waters experiencing HABs will likely increase with climate change, DEQ developed a 2011 *Harmful Algal Bloom Strategy* containing recommendations to improve the State's overall capacity to address HABs and their causes, as well as future preventative actions. Recommendations focused on both CWA and SDWA program activities (see box).

Following the *Strategy*, DEQ provided a comprehensive regulatory response to control HABs and restore water quality in impaired waters through TMDLs and other approaches for developing pollution reduction plans. DEQ established a [Total Maximum Daily Loads Internal Management Directive](#) that describes in detail how DEQ will develop TMDLs and Water Quality Management Plans, and evaluate the adequacy of implementation. TMDL modeling currently integrates forecasted projections of precipitation, temperature, and other climate related data under future climate scenarios. DEQ is also focused on protective actions, such as identifying and mapping high risk waters for HABs events.



A key objective of the *Strategy* was to enhance communication and collaboration between the OHA and DEQ programs responsible for managing HABs. Increased coordination between the State agencies has been a key factor in Oregon's ability to monitor, respond to, and prevent HAB events. OHA and DEQ presently collaborate to identify and notify public water systems with a HABs impaired water source.

Responding to HAB Detections and Protecting Drinking Water Sources

OHA has taken several steps to improve the State's capacity to respond to blooms and, in collaboration with DEQ, identify vulnerable drinking water sources to help prioritize prevention efforts. Although not required by law, OHA requested that HABs impacted drinking water systems perform toxin testing and collect waterbody monitoring data, in addition to developing targeted protection plans. OHA provides free drinking water testing and shipping for HABs impacted systems, tools, best management practices, and other resources for system operators on their [website](#).

The [Best Management Practices for Harmful Algae Blooms](#) document offers drinking water providers guidance on responding to HABs, including sampling and testing procedures, monitoring waterbodies for HABs, toxin testing at treatment plants, the public notifications process, and algal removal treatment options. Additional resources include maps displaying the location of historical blooms and their proximity to public water systems, along with various exhibits. The exhibits contain [general information](#) on cyanobacteria and their health effects, a [list](#) of cyanobacteria genera and their associated toxins, [bloom monitoring guidelines](#), and a directory of [local expert contacts and labs](#) that conduct algae testing. Communications materials are also available, such as a [public notice template](#) for HABs toxins and a [brochure](#) that systems can distribute to explain HABs and health risks to the public. Moreover, OHA developed guidance for lake managers on [issuing public health advisories](#) and [sampling in recreational waters](#) where potentially harmful blooms are detected. Oregon also developed an innovative [Circuit Rider Program](#) in which Drinking Water State Revolving Fund Set Asides are used to provide on-site technical services for smaller, not-for-profit community water systems. The Program includes funding for sampling, reporting,

and planning assistance to encourage systems to implement the HABs actions recommended by OHA.

Aside from supporting water system operators, the Authority is promoting public awareness of adverse health impacts caused by HABs along with climate change. Citizens can stay informed by signing up for email alerts that provide up to date advisory information, or viewing an online map displaying the locations of current HABs advisories. OHA's website also houses brochures, posters, fact sheets, and scientific articles containing basic HABs and health information. The [Resilience Planning Toolkit](#) includes climate projection data to help localities develop climate and health adaptation plans. OHA also uses the climate projection data to conduct their health impact assessments, evaluate the extent of future adverse health impacts, and assess regional or local vulnerabilities.

DEQ and OHA are currently updating the individual Source Water Assessments for public water systems in Oregon. The new Assessments provide information on how to access in-depth climate change data and tools that water systems can use to develop informed plans for more resilient source area watersheds and recharge areas. For example, a potential climate change impact will be increased drought periods, leading to water temperature increases and low flows in surface water sources. More examples of these recommendations in the Updated Source Water Assessments can be found on the DEQ Drinking Water Protection [webpage](#).

ALGAE BLOOMS IN OREGON

What is this stuff?
Algae are tiny, harmless organisms that live naturally in water. A harmful algae bloom (HAB), is actually made of cyanobacteria, sometimes called blue-green algae. Some cyanobacteria species create toxins that can make people and pets sick.

So, what's the problem? HABs can:

- Create toxins that can cause illness in humans and animals
- Pollute Oregon lakes and other fresh waters with scums
- Limit recreational activities in lakes, reservoirs and rivers
- Cause challenges for public water suppliers including taste and odor problems and water filtration difficulties

Why are HABs a health concern?

- Water contact can cause skin irritation or rash
- Swallowing water can result in diarrhea, cramps, vomiting and dizziness
- More severe reactions occur when large amounts of water are swallowed
- Children and pets are at the greatest risk

How can I keep my family and pets safe?

- Do not wade, swim or water ski in waters that have signs of an algae bloom
- Never drink lake or river water
- If you decide to eat fish from affected waters, remove all fat, skin and organs before cooking
- Never cook with natural water from areas suspected to have a harmful algae bloom
- If you or your pet becomes ill, seek medical or veterinary attention immediately

When in doubt, stay out!

Know the signs of an algae bloom. Don't go in water that is foamy, scummy, thick like paint, pea-green, blue-green or brownish red.

Learn more about HABs at [healthoregon.org/hab](#) or call 1-877-290-6767.

Clean Water Act Related Recommendations

- In the 2010 assessment methodology, DEQ added the OHA HAB Health advisories as a basis for listing waters on the 303(d) impaired waters list.
- Utilize the authority under Section 303(d)(3) to estimate TMDLs for protecting and providing management targets for at risk waters from HABS.
- Establish and apply additional water quality criteria to control HABS- Chl-a, DO, pH, and specific cyanotoxins.
- Regulate a variety of activities related to HABS under various permitting authorities, including control of nutrient sources or other substances used in HAB control program.

Safe Drinking Water Act Related Recommendations

- Collect and assess more data to characterize public water supply vulnerability and determine risks to public health.
- Utilize data from source testing to prioritize staff technical assistance, BMP implementation, and project development.
- Use characterization of potential sources (with data) to develop pollutant reduction priorities for statewide policy work and to work with systems to develop and implement protection plans.
- Consider a number of new technologies or methodologies available that could improve aspects of the HABS Surveillance Program.