Addressing HABs and Cyanotoxins in Drinking Water with the Drinking Water State Revolving Fund

Communities may use the Drinking Water State Revolving Fund (DWSRF) to reduce this public health concern in their drinking water systems.

BACKGROUND

Cyanobacteria, also known as blue-green algae, naturally occur in marine and fresh waters. Under certain conditions, cyanobacteria can grow rapidly, producing cyanobacterial blooms. These blooms are often referred to as harmful algal blooms (HABs). Some blooms may produce toxins, called algal toxins or cyanotoxins, which can pose health risks to humans and animals through exposure from drinking water, recreational water, or other surface waters. There are no current federal regulations for HABs and their cyanotoxins in drinking water. In 2015, EPA developed health advisories for the cyanotoxins microcystin and cylindrospermopsin in drinking water. These health advisories are not a federally enforceable, regulatory limit, rather they are developed to assist federal, state, and local officials, and managers of public water systems in protecting public health during a HABs event.

TREATING FOR HABS AND CYANOTOXINS

Some treatment options are effective at removing or inactivating some cyanotoxins, but not others.

Effective management strategies depend on understanding the growth patterns and species of cyanobacteria that dominates the bloom, the properties of the cyanotoxins, and appropriate treatment processes. For example, proper oxidation of microcystin depends on the chlorine dose, pH, and the temperature of the water. Applying the wrong treatment process at a specific stage in treatment could damage cells and result in the release rather than removal of cyanotoxins.

When selecting a treatment strategy, it is important for a water system to evaluate the costs along with any potential impacts on their ability to meet other treatment goals (e.g., turbidity removal, disinfection byproducts precursor control, disinfection, taste and odor control, corrosion control, etc.) and associated operational issues (such as filter backwash and sludge handling).

Detailed information on tools available for managing cyanotoxins in drinking water systems:

https://www.epa.gov/ground-water-and-drinking-water/what-cyanotoxin-tools-are-available-public-water-systems

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DWSRF ASSISTANCE

The DWSRF can provide financial assistance to publicly-owned and privately-owned community water systems, as well as non-profit non-community water systems, for drinking water infrastructure projects. Projects must either facilitate the system's compliance with national primary drinking water regulations or significantly further the health protection objectives of the Safe Drinking Water Act.

Each of the 50 states and Puerto Rico operates its own DWSRF program. They receive annual capitalization grants from the EPA, which in turn provide low-interest loans and other types of assistance to water systems. Repayments of DWSRF loans begin one year after project completion, with loan terms up to 30 years for most communities, or up to 40 years for disadvantaged communities.

Additionally, states may use a portion of their capitalization grant from the EPA as "set-asides" to help communities build the technical, managerial, and financial capacities of their systems. With an emphasis on small systems, these funds help ensure sustainable infrastructure and public health investments.

Communities benefit when state DWSRF programs foster cooperation with other funding sources. One option is the Clean Water State Revolving Fund (CWSRF), which can provide complimentary funding for source water protection, as well as other funding options that could be used in tandem with the DWSRF.

Equipment

DWSRF assistance can be used to fund equipment and upgrade technologies, like building a new treatment plant or an expansion to an existing facility to add cyanotoxins removal capability. Set-asides may be used for laboratory or testing equipment for research or contamination prevention.

Monitoring

Although routine/compliance monitoring is not eligible for DWSRF funding, HABs and cyanotoxins monitoring may be eligible under the Local Assistance Set-Aside if used to obtain a baseline for contamination levels or to assess the proper operation of new equipment. The activity must be consistent with a state's capacity development strategy.

Training

Training for water system operators may be funded with set-asides. This may include one-time monitoring at a system to show operators how to conduct the monitoring themselves. Water systems can also request reimbursement for training on the analysis of toxins associated with HABs.

Source Water Protection

Through source water protection, HABs can be prevented before they enter the drinking water treatment facility. States can use the State Program Management Set-Aside to administer or provide technical assistance through source water protection programs. In addition, the Local Assistance Set-Aside can be used to build capacity of individual water systems to carry out source water protection, such as nutrient reduction strategies, which could mitigate the presence of HABs. Examples of eligible activities under these two set-asides include source water management plans, buffer establishment and upkeep, and storm water management and reconstruction activities.

The Local Assistance Set-Aside can also be used by states to help water systems develop public outreach and educational programs and materials. The State Program Management Set-Aside can provide funding for states to develop source water protection ordinance templates for city and county governments, and provide technical assistance for water systems through workshops, training, and certification programs.

APPLY FOR FUNDING

Water systems receive DWSRF assistance directly from state agencies. Each state has its own application procedure. Contact information for each state is posted at https://www.epa.gov/drinkingwatersrf/state-dwsrf-website-and-contacts.

DWSRF Case Studies: HABs in Drinking Water

How communities are using the Drinking Water State Revolving Fund (DWSRF) to address this public health concern in their drinking water systems.

SANDUSKY CITY, OH

In Sandusky City, Ohio, microcystin (algal toxin) was detected in the raw water source. To prevent contamination of the finished drinking water, the existing Powdered Activated Carbon (PAC) feed system required upgrading. The original PAC system fed up to 5 parts per million (ppm) of PAC for toxin removal. The Ohio EPA recommends that a public water system feed up to 40 ppm of PAC for microcystin toxin removal. With financial assistance from the DWSRF, the City installed a new feed system meeting the state standard of 40 ppm of PAC feed. DWSRF assistance totaled approximately $2.1 million. Since project completion, there has been no detection of microcystin levels in the finished drinking water. This project, completed in 2017, serves approximately 76,000 residents.

GREENVILLE, TX

The City of Greenville, Texas, used $305,000 in DWSRF assistance to install six solar-powered floating mixers in its raw water source. These mixers provide circulation, preventing blue-green algal growth and improving water quality. The floating mixers provide continuous movement in the upper layers of the raw water body and greatly reduce (or even eliminate) the use of aquatic herbicides to control algal growth. This project provides the population of 28,000 with improved drinking water quality and was completed with funding provided to the DWSRF program via the American Recovery and Reinvestment Act of 2009.

Detailed treatment information on cyanotoxins:
https://www.epa.gov/sites/production/files/2017-06/documents/cyanotoxin-management-drinking-water.pdf

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BOWLING GREEN, OH

In 2015, microcystins were detected in Bowling Green's raw water source. To prevent contamination of the finished drinking water, the Ohio DWSRF provided assistance for the construction and installation of a new pump station, wet well, reservoir intakes, piping, and controls. The project was completed in July 2017 with approximately $3.35 million in DWSRF assistance and additional state funding. Because of this public health project, system capacity increased, and microcystins were not detected in 2018. This project serves approximately 30,000 people.

ANDERSON, SC

The City of Anderson, South Carolina, installed ozone treatment (with hydrogen peroxide addition) at its Lake Hartwell Water Treatment Plant due to taste and odor issues caused by algal blooms in the source water. While the algal blooms did not produce toxins, there were concerns about future cyanotoxin occurrence in the source water. Lake Hartwell, where Anderson gets its drinking water, is the only source for over 200,000 customers. While the primary focus of this project addressed drinking water taste and odor issues, it also helped Anderson prevent potential future cyanotoxin contamination issues. The City received $13.5 million in DWSRF assistance for this water treatment plant upgrade.

MERIDEN, CT

The City of Meriden, Connecticut, rehabilitated and upgraded the Broad Brook Water Filtration Plant (BBWFP) using approximately $20 million in DWSRF assistance. Seasonal algal blooms resulted in taste and odor complaints from customers. The algal blooms, in combination with seasonal manganese level increases, forced the BBWFP to shut down during the fall season. The BBWFP project was completed in 2015 and is now operational year-round. This DWSRF project, serving approximately 58,000 residents, improved drinking water quality and led to fewer taste and odor complaints.

OH'S REDUCED INTEREST RATE PROGRAM

The Ohio Water Supply Revolving Loan Account program offers a reduced interest rate for community water systems that are implementing projects related to HABs. Projects eligible for this reduced interest rate include:

- Treatment system components for HABs treatment
- Interconnections with other public water systems
- Elevated storage
- Development of improved source waters

Nominations for design and/or construction projects related to HABs can be submitted to the OH Environmental Protection Agency at any time.

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