U.S. EPA's Support Tools for Managing Cyanotoxins in Drinking Water

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Office of Water Webinar

EPA

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Presentation Overview

- Overview of harmful algal blooms (HABs) and drinking water impacts
- EPA's recent and ongoing HAB-related activities in drinking water
- Discussion of key support tools for managing cyanotoxin risks in drinking water

Harmful Algal Blooms

- Naturally occurring cyanobacteria in surface water can rapidly form HABs
- Leading factors causing HABs:
  - Excess nutrient loadings and concentrations
  - Slow moving surface water
  - Elevated water temperature
- Some species of cyanobacteria produce toxic compounds, called algal toxins or cyanotoxins
- Significant impacts of HABs include:
  - Adverse human health effects
  - Adverse ecosystem impacts from toxins and hypoxia
  - Drinking and recreational water quality concerns
  - Economic losses

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HAB-Related Drinking Water Challenges

- Drinking water quality
  - Taste and odor problems
  - Human health effects from ingesting toxins: gastroenteritis, liver and kidney damage
  - Potential development of disinfection byproducts
- Public water systems
  - Increasing operational costs
  - Needing additional research on how to prevent, predict, analyze, monitor and treat toxins
  - Developing and implementing cost effective methods to reduce HABs in source waters
  - Determining how to communicate risk to the public

Highlights from Recent Bloom Seasons

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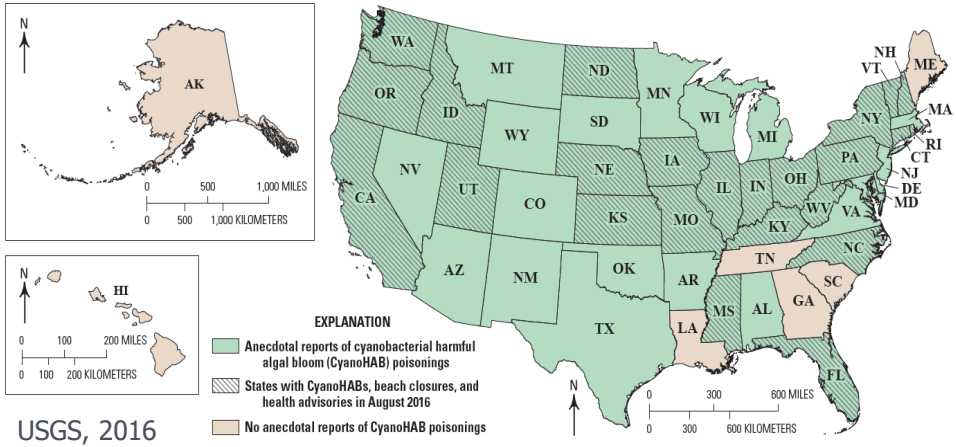
Ohio River 2015

- Approximately 700 mile bloom
- Source of drinking water for over 5 million people
- Did not result in any drinking water advisories



USGS, 2016

Florida 2016, 2017, 2018

- Lake Okeechobee, rivers, and estuaries

Utah 2016

- Utah Lake

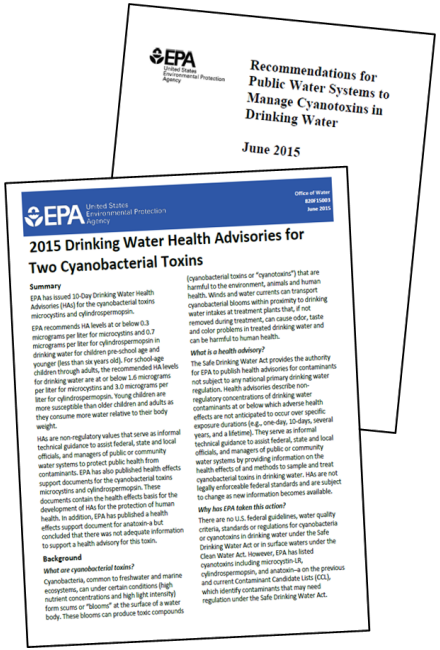
Selected Drinking Water Detects 2016-18

- Ingleside, Texas (Jan./Feb. 2016)
  - Resulted in advisory
- *Des Moines, Iowa (Aug. 2016)
- *Cayuga County, New York (Sept./ Oct. 2016)
- *Syracuse, NY (Sept./Oct. 2017)
- Salem, Oregon (May-July 2018)
  - Resulted in advisory

* Below U.S. EPA Health Advisory levels

Key OW Cyanotoxin Drinking Water Activities

- Developed drinking water Health Advisories for two cyanotoxins – 2015
- Released Recommendations document for public water systems to manage cyanotoxins in drinking water – 2015
- Submitted "Algal Toxin Risk Assessment and Management Strategic Plan for Drinking Water" to Congress – 2015
- Included algal toxins on the Safe Drinking Water Act's Contaminant Candidate Lists (CCLs), including CCL 4 – 2016
- Developed cyanotoxin drinking water tools – 2016
- Conducting cyanotoxins monitoring for the fourth Unregulated Contaminant Monitoring Rule (UCMR 4) – 2018-2020
- Facilitating Regional HABs Workshops - ongoing
- Enhancing source water protection partnerships - ongoing



H.R. 212: The Drinking Water Protection Act

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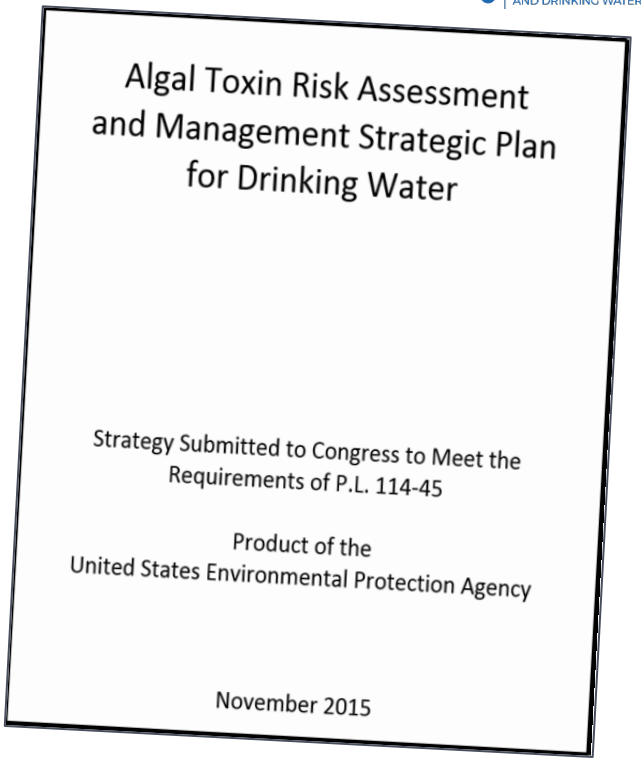
- The 2015 Drinking Water Protection Act amended the SDWA, adding Section 1459
- Directed EPA to develop and submit a strategic plan for assessing and managing risks associated with algal toxins in drinking water provided by public water systems

Algal Toxin Risk Assessment and Management Strategic Plan for Drinking Water

- Includes steps and timelines for:
  - Assessing human health effects
  - Developing list of algal toxins of concern
  - Publishing Health Advisories
  - Assessing treatment options
  - Developing analytical and monitoring approaches
  - Summarizing the causes of HABs
  - Recommending source water protection actions
  - Strengthening collaboration and outreach


Algal Toxin Risk Assessment and Management Strategic Plan for Drinking Water

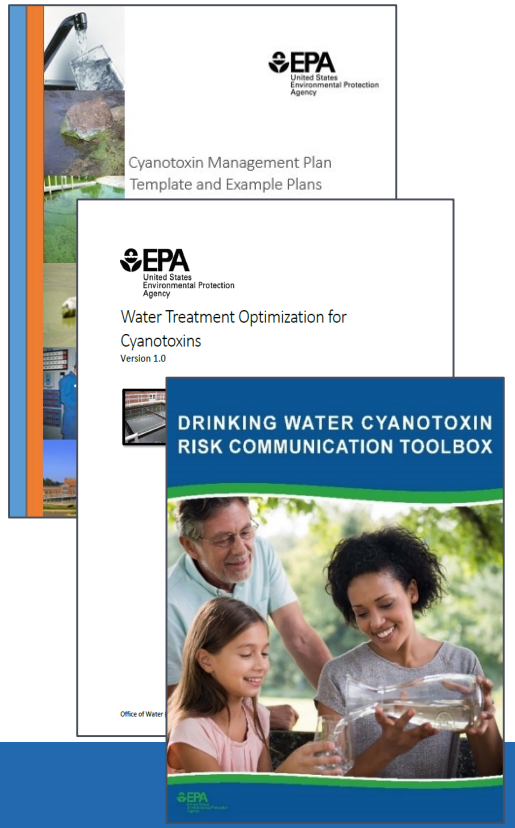
Strategy Submitted to Congress to Meet the Requirements of P.L. 114-45

Product of the United States Environmental Protection Agency

November 2015

EPA HAB Drinking Water Tools

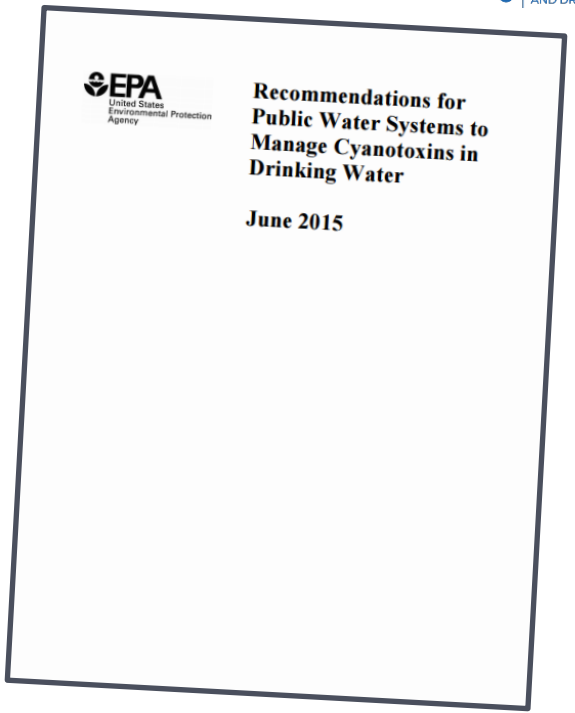
- Recommendations Document
- Cyanotoxin Management Plan Template and Example Plans
- Water Treatment Optimization for Cyanotoxins
- Cyanotoxin Risk Communication Toolbox
- Factsheet: Possible Funding Sources for Managing Cyanobacterial Harmful Algal Blooms and Cyanotoxins in Drinking Water
- Video summarizing tools for managing cyanotoxins in drinking water – linked here



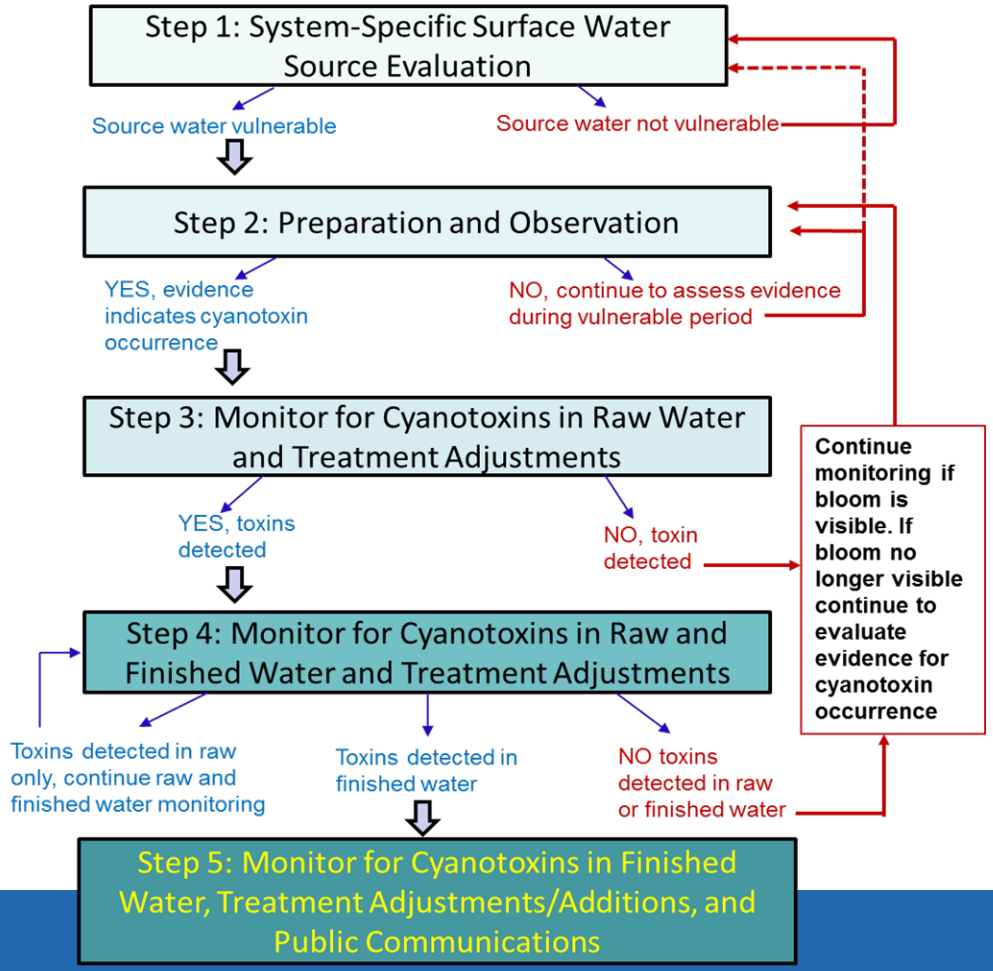
Tools available online at: https://www.epa.gov/ground-water-and-drinking-water/what-cyanotoxin-tools-are-available-public-water-systems

Recommendations Document

- Potential 5-step framework for managing risks of toxins in drinking water
- Monitoring, treatment and communication components in every step



Available online:
https://www.epa.gov/sites/production/files/2017-06/documents/cyanotoxin-management-drinking-water.pdf



5 Step Risk Management Framework

Cyanotoxin Management Plans

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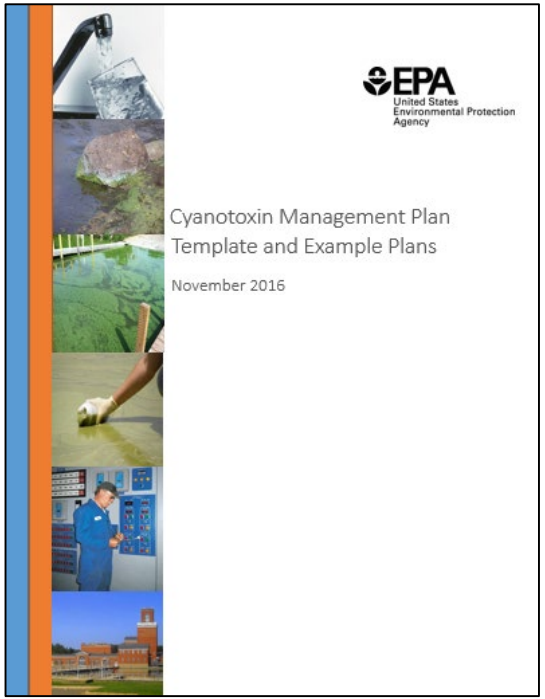
Two parts:

1. Template
   - Framework for public water systems (PWSs) to develop their own cyanotoxin management plans as they deem appropriate – 5-step process
2. Five example cyanotoxin management plans
   - Examples from five partner PWSs representing diversity in system characteristics and geography

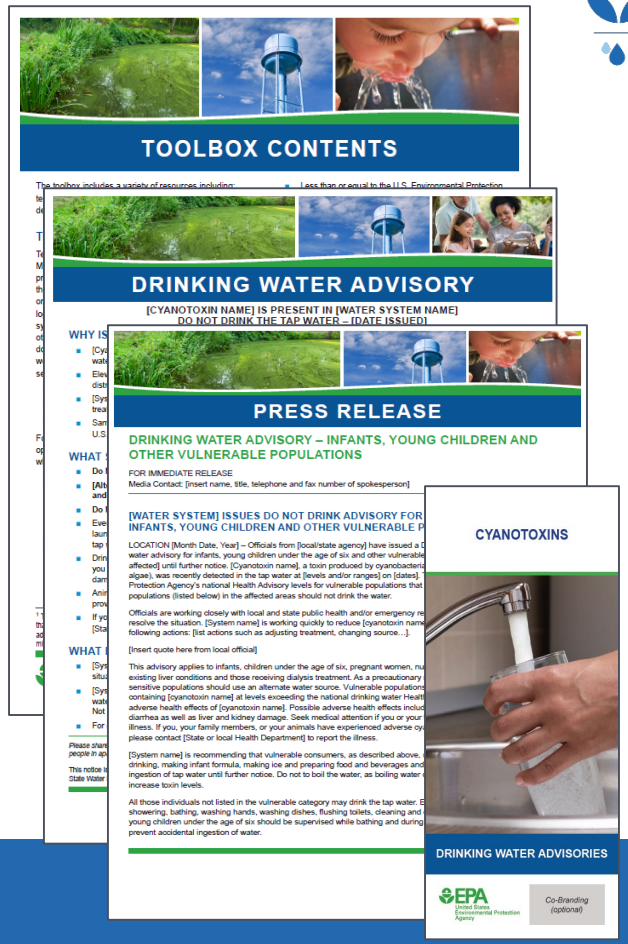


Available online at : https://www.epa.gov/sites/production/files/2018-11/documents/cyanotoxins_management_plan_template_and_example_plans.pdf

Risk Communication Toolbox

- Ready-to-use, "one-stop shop" for communicating risks of cyanotoxins in drinking water
- Tools developed for use by local and state governments and PWSs
- The public is the target audience
- Available in English and Spanish

Available online at:
https://www.epa.gov/ground-water-and-drinking-water/drinking-water-cyanotoxin-risk-communication-toolbox
and
https://espanol.epa.gov/espanol/caja-de-herramientas-para-la-comunicacion-del-riesgo-de-cianotoxinas-en-el-agua-potable



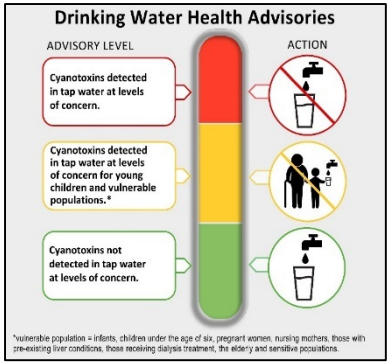
EPA's Health Advisories for Cyanotoxins Used as Example

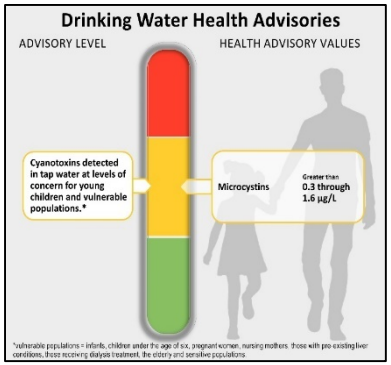
- U.S. EPA's national drinking water Health Advisory levels are used as example cyanotoxin levels that inform public communication decisions in the toolbox.
- Templates are editable to include state and local action levels.

chemical	10-day advisory	
	Bottle-fed infants and pre-school children	School-age children and adults
microcystins	0.3 µg/L	1.6 µg/L
cylindrospermopsin	0.7 µg/L	3 µg/L

Risk Communication Toolbox Contents

- Templates
  - Press releases
  - Drinking Water Advisories
  - Social Media and Text Alerts
- General Information
  - Public Messaging
  - Frequently Asked Questions
  - Factsheets
- Graphics
  - Menu of multiple downloadable options





HABs Funding Fact Sheet for Drinking Water Systems

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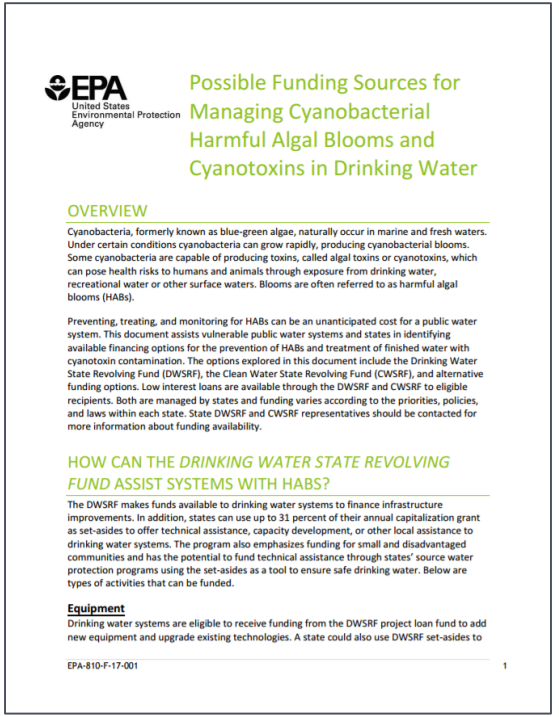
- Provides overview of funding mechanisms:
  - Drinking Water State Revolving Fund
  - Clean Water State Revolving Fund
  - Additional funding sources
  - State examples



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Possible Funding Sources for Managing Cyanobacterial Harmful Algal Blooms and Cyanotoxins in Drinking Water

OVERVIEW

Cyanobacteria, formerly known as blue-green algae, naturally occur in marine and fresh waters. Under certain conditions cyanobacteria can grow rapidly, producing cyanobacterial blooms. Some cyanobacteria are capable of producing 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. Blooms are often referred to as harmful algal blooms (HABs).

Preventing, treating, and monitoring for HABs can be an unanticipated cost for a public water system. This document assists vulnerable public water systems and states in identifying available financing options for the prevention of HABs and treatment of finished water with cyanotoxin contamination. The options explored in this document include the Drinking Water State Revolving Fund (DWSRF), the Clean Water State Revolving Fund (CWSRF), and alternative funding options. Low interest loans are available through the DWSRF and CWSRF to eligible recipients. Both are managed by states and funding varies according to the priorities, policies, and laws within each state. State DWSRF and CWSRF representatives should be contacted for more information about funding availability.

HOW CAN THE *DRINKING WATER STATE REVOLVING FUND* ASSIST SYSTEMS WITH HABS?

The DWSRF makes funds available to drinking water systems to finance infrastructure improvements. In addition, states can use up to 31 percent of their annual capitalization grant as set-asides to offer technical assistance, capacity development, or other local assistance to drinking water systems. The program also emphasizes funding for small and disadvantaged communities and has the potential to fund technical assistance through states' source water protection programs using the set-asides as a tool to ensure safe drinking water. Below are types of activities that can be funded.

Equipment

Drinking water systems are eligible to receive funding from the DWSRF project loan fund to add new equipment and upgrade existing technologies. A state could also use DWSRF set-asides to

EPA-810-F-17-001 1

Available online at: https://www.epa.gov/sites/production/files/2017-01/documents/cyanohabs_funding_fact_sheet.pdf

Ongoing EPA HAB Activities

- Developing innovative cyanotoxin treatment optimization, analytical methods and monitoring designs
- Correlating HABs with changes in the formation of disinfection byproducts and their precursors
- Comparing toxicity of bloom extracts with toxicity of mixtures of pure toxins
- Characterizing microcystin health effects through epidemiology studies
- Developing predictive models/satellite imaging (collaboration with USGS, NOAA and NASA)
- Investigating interactive effects of temperature and nutrient loadings on HAB formation
- Evaluating the effectiveness of cost-effective source water protection measures for reducing nutrient pollution and other drivers of HAB formation
- Enhancing source water protection partnerships

Contact Information

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CyanoHABs website:

https://www.epa.gov/nutrient-policy-data/cyanobacterial-harmful-algal-blooms-water

Cyanotoxins in Drinking Water website:

https://www.epa.gov/ground-water-and-drinking-water/cyanotoxins-drinking-water


QUESTIONS ?