



U.S. EPA's Efforts to Address Harmful Algal Blooms in Drinking Water

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- Brief Background on Harmful Algal Blooms
- EPA's Recent Activities to Address Harmful Algal Blooms in Drinking Water
- EPA's Possible Future Efforts to Address Harmful Algal Blooms in Drinking Water

What are Harmful Algal Blooms?



- Cyanobacteria, or blue-green algae, occur naturally in surface water
- When cyanobacteria rapidly multiply, they cause harmful algal blooms
 - Light, temperature, nutrient, and weather, etc. affect bloom formation
- Some species of cyanobacteria produce toxic compounds, cyanotoxins, that can be harmful to humans and animals
 - Most common cyanotoxins in the US: microcystins, cylindrospermopsin, and anatoxin-a



What are the issues?



- The prevalence and duration of HABs in freshwater is rapidly expanding in the U.S. and worldwide, causing:
 - Adverse health effects to animals and humans
 - Health effects of algal toxins include liver and kidney toxicity, neurotoxic, and dermatotoxic
 - Algal blooms can cause hypoxia, leading to fish kills
- Economic losses
 - In fishing and recreation industries
 - Increasing costs for managing and treating potable water supplies
- Drinking water quality concerns
 - Can cause taste and odor problems in treated drinking water
 - Toledo, Ohio (population ~500,000) - August 2014: > 1 µg/L total microcystins in finished water
 - Ohio River – Summer/Fall of 2015 -nearly 700 mile HAB presented challenges for drinking water systems



How has EPA Addressed HABs in Drinking Water?



- Past
- Cyanobacteria and cyanotoxins placed on the Safe Drinking Water Act's Contaminant Candidate List
 - CCL1, 2, 3, draft 4
- Public meeting on cyanotoxins in drinking water - May 2015
 - Input on states' and public water systems' needs
- Drinking Water Health Advisories for cyanotoxins - June 2015
 - Microcystins
 - Cylindrospermopsin
- Recommendations for public water systems to manage cyanotoxins in drinking water - June 2015
 - System-specific courses of action

EPA's Ten-Day Health Advisories for Cyanotoxins



- Exposure pathway: oral ingestion of drinking water
- Exposed life stage and population: children and adults

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

- 10-Day Health Advisory value is considered protective of non-carcinogenic adverse health effects over a 10-day exposure in drinking water.
- For those systems who choose to do so, it provides an opportunity to take actions to reduce exposure in finished drinking water by refining treatment processes to minimize public health risks.



Cyanotoxin management tools provided for public water systems

- Source water protection tools
- System-specific cyanotoxin vulnerability assessments
- Cyanotoxin management plans



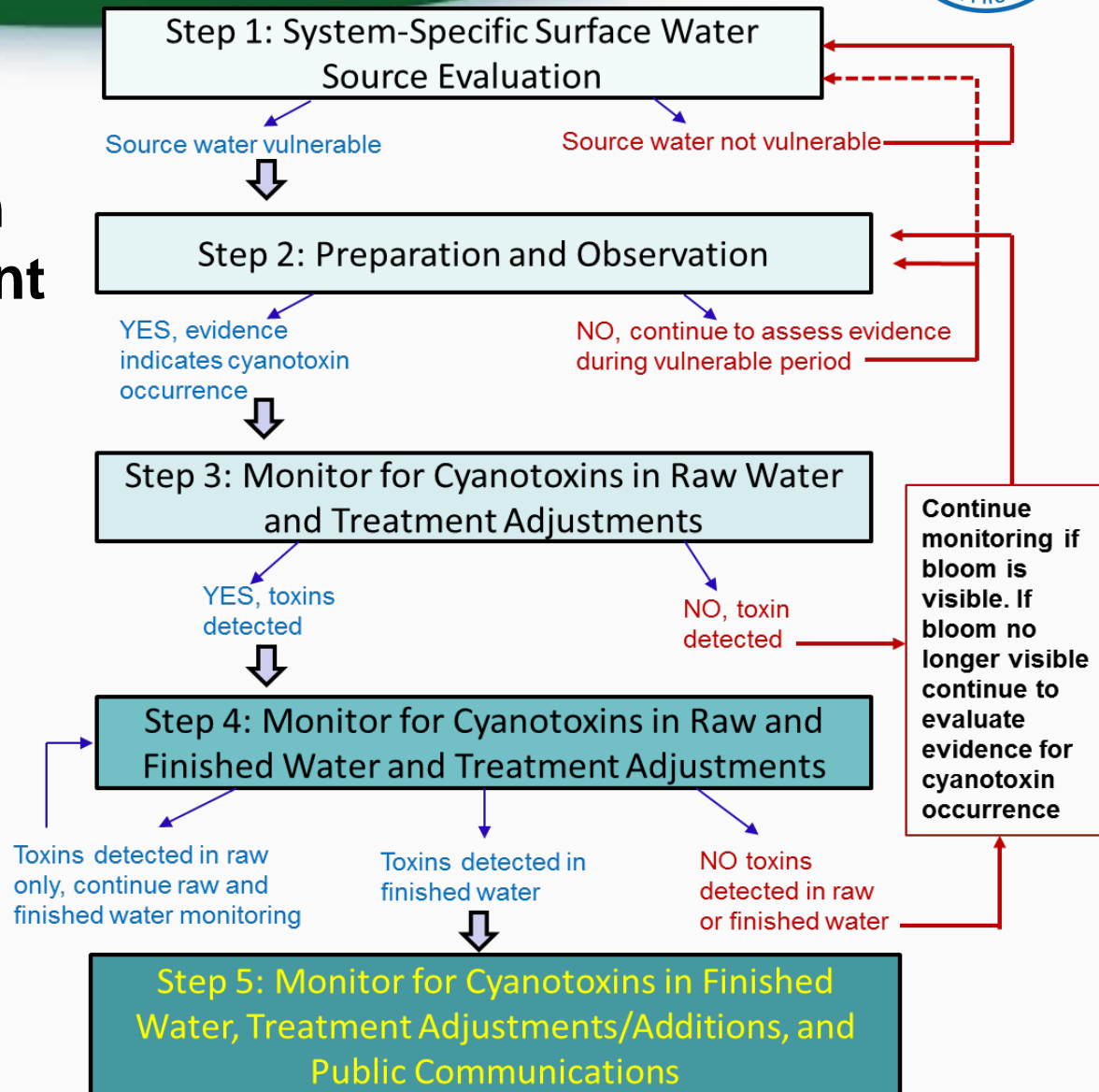
Recommendations for Public Water Systems to Manage Cyanotoxins in Drinking Water

June 2015

EPA Recommendations



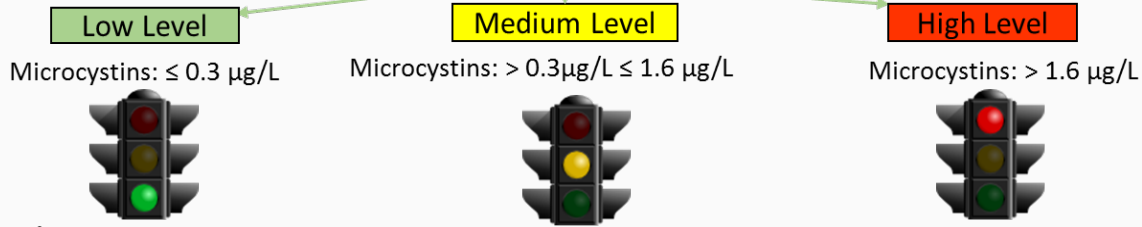
5 Potential Cyanotoxin Management Steps



EPA Recommendations



Step 5: Monitor for Cyanotoxins in Finished Water, Treatment Adjustments and Public Communications



Communication

Continue communication with State primacy agency and local health officials on monitoring results.	Notify local public health agency, primacy agency and the public. Recommend use of alternative sources for bottle-fed infants and young children of pre-school age.	Notify local public health agency, primacy agency and the public. Recommend ' <u>Do Not Drink/ Do Not Boil Water</u> ' advisory for all consumers.
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Treatment Actions

Modify treatment as necessary to keep algal toxins below HA values.	Adjust existing treatment to reduce the concentration to below $0.3 \mu\text{g/L}$ as soon as possible. Modify or amend treatment as necessary.	Adjust existing treatment to reduce the concentration to below $0.3 \mu\text{g/L}$ as soon as possible. Modify or amend treatment as necessary.
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Monitoring

Continue sampling raw and finished water at least 2-3 times per week until levels are below quantification in at least 2-3 consecutive samples in raw water, then return to Step 3.	Continue sampling raw and finished water daily until finished water levels are below quantification in at least 2-3 consecutive samples.	Continue sampling raw and finished water at least daily until finished water levels are below quantification in at least 2-3 consecutive samples.
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Source Water Protection Activities



- Protecting Source Water to reduce the formation of HABs is a significant challenge confronting EPA, States, drinking water utilities, and others.
- Key efforts include:
 - Source Water Collaborative
 - Source water protection and conservation partners toolkit
 - Source water protection funding tools
 - DWMAPS: Drinking Water Mapping Application for Protecting Source Waters
 - Web-based mapping tool that will allow users to identify and analyze potential risks to local source waters
 - Expected to be available to the states, utilities, and the public in 2015
 - Clean Water Act-Safe Drinking Water Act Coordination Toolkit
 - Designed to assist in protecting drinking water supplies using regulatory and non-regulatory provisions of the Clean Water Act to achieve mutual goals



- On August 7th, 2015, the President signed H.R. 212 (Drinking Water Protection Act)
- Amends the SDWA, adding Section 1459
- Directs 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





Includes steps and timelines to assess:

- Human health effects. Evaluating and summarizing risks to human health from drinking water systems contaminated with algal toxins.
- List of algal toxins. Developing and maintaining list of algal toxins which may have adverse human health effects.
- Health advisories. Determining whether to publish additional health advisories for the list of algal toxins.
- Treatment options. Evaluating and providing guidance on feasible treatment options.
- Analytical and monitoring approaches. Developing and providing guidance on analytical methods and monitoring techniques, particularly monitoring frequency.



- Includes steps and timelines to assess, continued:
 - Causes of HABs. Summarizing factors that cause toxin-producing HABs to proliferate and release toxins.
 - Source water protection. Evaluating and recommending feasible source water protection practices.
 - Collaboration and outreach. Entering into cooperative agreements and provide technical assistance to affected States and PWSs.
- Identifies information gaps and assembles and publishes information from each federal agency that has examined algal toxins or addressed public health concerns related to HABs



- Input on the development of the plan provided by:
- Various EPA offices and Regions
- Federal partners from the Interagency Working Group established by the Harmful Algal Bloom and Hypoxia Research and Control Act Amendments of 2014
- Stakeholders through a listening session webinar (September 16, 2015)
- Expected Delivery to Congress in November 2015

Key Questions



- How do we best work with states, drinking water utilities and other partners to implement effective source water protection practices that can reduce the formation of HABs in source waters?
- What other support do drinking water utilities need to address challenges with HABs?



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CyanoHABs website

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