

ASDWA Drinking Water Harmful Algal Bloom (HAB) Survey

Summary of Responses (Collected in April 2014)

August 8, 2014

Background: The Drinking Water Harmful Algal Bloom (HAB) and Toxins Discussion Group was formed following the October 2013 Association of State Drinking Water Administrators (ASDWA) Annual Conference where attendees from Oregon, California, and Ohio sparked a discussion about what other states are doing regarding cyanobacteria, drinking water, and the associated toxins from HABs. This discussion between states evolved into an ASDWA supported discussion group with additional states and a few other relevant stakeholders, that aims to share information and knowledge regarding cyanotoxins science, health threshold levels, public notification, source water protection and nutrients, sampling and analytical methods, and water treatment and optimization. The impetus for conducting this survey came from Ohio representatives as well as the collective discussion group.

Survey Respondents: A total of 34 states, the Navajo Nation, and Quebec, Canada responded to the survey. Please note that the term “state” is used as a general term in this summary which also includes the responses from the Navajo Nation and Quebec.

Survey Summary: In the absence of U.S. Environmental Protection Agency (EPA) regulations and health advisory thresholds for cyanotoxins, it is left to each state to create their own program and undertake relevant activities to assess and address HAB related toxins. The purpose of the survey was to learn what states are doing regarding cyanobacteria and drinking water. The survey responses indicate that while a small number of states have created programs, developed health thresholds, and enacted policies and protocols for sampling and issuing public notices, all of the respondents would like to have more Federal (or national) leadership to help them address these issues. The respondents specifically noted in their comments that help is needed to:

- Provide Federal guidance values and analytical methods.
- Develop appropriate notification language to better inform the public when: a cyanobacteria bloom is occurring; experiencing taste and odor complaints from customers; gastro-intestinal illnesses are being reported; and toxin concentrations exceed thresholds in drinking water supplies.
- Address issues when toxins concentrate in treatment facility sludge without any blooms in the water source (e.g., one state had a bloom on the filters in a direct filtration plant in addition to experiencing a bloom at the water intake).
- Develop risk communication strategies, in view of the lack of HAB toxin drinking water standards/MCLs.
- Consider the impacts to Ground Water Under the Direct Influence (GWUDI) of surface waters that have toxic blooms.

Survey Answers: The following pages summarize of the tabulated responses, along with associated charts showing the percentages of how respondents answered each of the questions. The table below provides a summary of responses from states and other organizations with relevant web links, activities, and established drinking water health advisory thresholds (based on responses to questions 9-11).

State	Web Site	HAB Response Policy?	Raw & Finished water testing?	Public Notice Language?	Threshold Microcystin - LR (ug/L)	Threshold Anatoxin-A (ug/L)	Threshold Cylindrospermopsin (ug/L)	Threshold Saxitoxin (ug/L)
Ohio	LINK	Yes	yes	yes	1	20	1	.2
Oregon	LINK	yes	yes	yes	1	3	1	3
Minnesota					.04*			
Florida					10**			
Oklahoma		yes	yes		1**			
Illinois	LINK	yes	yes					
Rhode Island				yes				

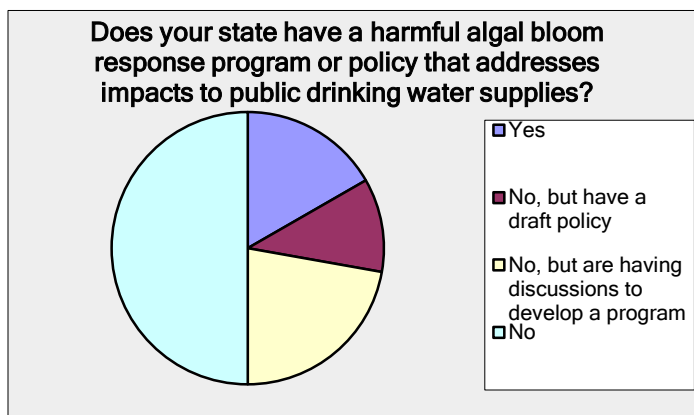
Wisconsin	LINK							
Indiana	LINK							
Quebec	LINK	yes	yes		1.5	3.7		
USEPA***	LINK				Being developed	On CCL list	Being developed	
Health Canada	LINK				1.5			
WHO	LINK				1			
* The Minnesota level for microcystin is intended to be protective of a short-term exposure for bottle-fed infants.								
** Florida and Oklahoma do NOT have official microcystin drinking water guideline values.								
*** EPA has included these three toxins on its Contaminant Candidate List (CCL3) and is currently developing health advisory levels for Microcystin and Cylindrospermopsin (as noted).								
Note: The shaded rows include information from other sources that was not provided through the survey.								

RESPONSES TO INDIVIDUAL QUESTIONS

Q1 and Q2: *These are not included here as they were not actual questions, but provided details about the purpose of the survey and asked for the respondents contact information.*

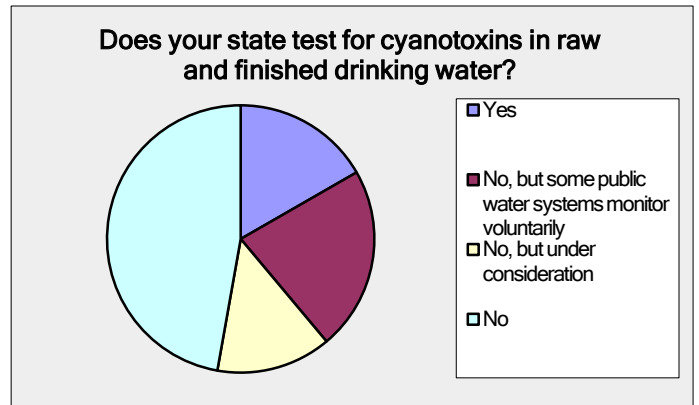
Q3: HAB Response Policy? Of the 36 respondents, five of them (four states plus Quebec) indicated that they have a drinking water HAB response policy, and 12 others either have a draft policy or are developing one. As this indicates, half of the 36 respondents either have a policy or are developing a policy, and half do not have policies and did not indicate that they are planning to develop a policy.

Does your state have a harmful algal bloom response program or policy that addresses impacts to public drinking water supplies?	
Answer Options	Response Count
Yes	5
No, but have a draft policy	4
No, but are having discussions to develop a program	8
No	19
<i>answered question</i>	36
<i>skipped question</i>	0



Q4: Cyanotoxin Testing? Of the 36 respondents, only six indicated that they conduct testing for cyanotoxins in drinking water. However, eight respondents indicated that some public water systems (PWSs) monitor voluntarily, and a few other states indicated in their comments that they are conducting some selective or limited monitoring and studies in high risk areas.

Does your state test for cyanotoxins in raw and finished drinking water?	
Answer Options	Response Count
Yes	6
No, but some public water systems monitor voluntarily	8
No, but under consideration	5
No	17
<i>answered question</i>	36
<i>skipped question</i>	0

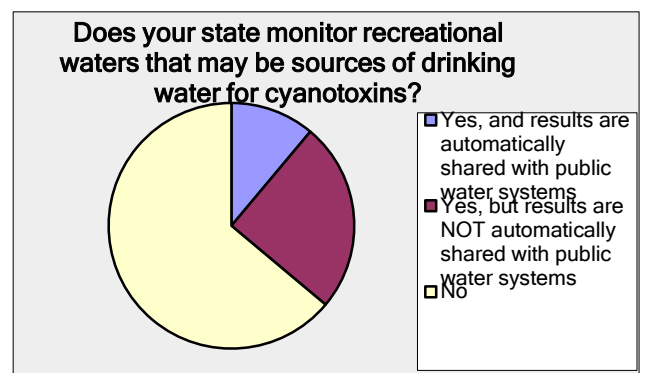


Q5: Cyanotoxin Testing Details? Of the six respondents that indicated they conduct testing: none of them conduct routine monitoring; five of them conduct the testing on an incident response (case by case) basis; and only two require their PWSs to monitor.

If your state does test for cyanotoxins in raw and finished drinking water, please check all that apply.			
Answer Options	Yes	No	Response Count
Conduct incident-response based (case by case) cyanotoxin testing	5	0	5
Conduct routine cyanotoxin monitoring	0	5	5
Require public water systems to monitor for cyanotoxins	2	4	6
Public water systems monitor voluntarily and share data with state	3	3	6
<i>answered question</i>			6
<i>skipped question</i>			30

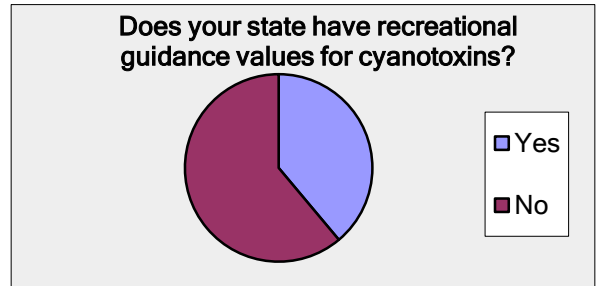
Q6: Recreational Waters Monitoring? The majority (23 out of the 36) of respondents indicated that their state does not monitor recreational waters. However, several of the respondents commented that other agencies or programs at the Federal (i.e., US Army Corps of Engineers), state, and local levels undertake these activities in water supplies, and in some cases do share this information with PWSs and the state drinking water program.

Does your state monitor recreational waters that may be sources of drinking water for cyanotoxins?	
Answer Options	Response Count
Yes, and results are automatically shared with public water systems	4
Yes, but results are NOT automatically shared with public water systems	9
No	23
<i>answered question</i>	36
<i>skipped question</i>	0



Q7: Recreational Guidance Values? Fourteen out of 36 respondents indicated that they have recreational guidance values for cyanotoxins in their state. However, this number may be higher because seven of the respondents were unsure of the answer, as the issue is addressed by a separate agency. Based on the responses, we can conclude that more states have guidance values for recreational waters than drinking water (14+ versus six). See questions 9-11 and the related table at the beginning of the document for more information on drinking water guidance values.

Does your state have recreational guidance values for cyanotoxins?	
Answer Options	Response Count
Yes	14
No	22
<i>answered question</i>	36
<i>skipped question</i>	0

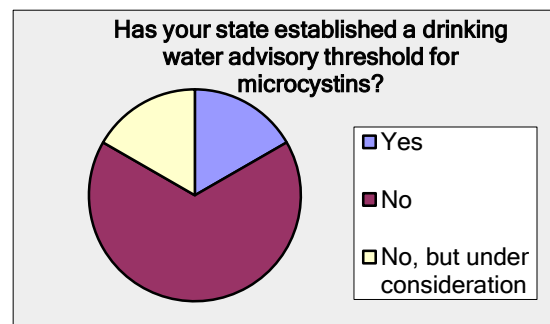


Q8: Using Recreational Guidance Values for Drinking Water? Five of the 13 states that responded to this question (which includes 13 out of the 14 who indicated they had state recreational guidance values), indicated that they have used, or will use the recreational guidance values to develop drinking water guidance protocols or standards.

If your state does have recreational guidance values for cyanotoxins, have you used, or are you planning to use them, to develop drinking water guidance protocols and/or standards in the future (in the absence of national guidance)?	
Answer Options	Response Count
Yes	5
No	8
<i>answered question</i>	13
<i>skipped question</i>	23

Q9: Drinking Water Advisory Thresholds? Of the 36 respondents, six of them indicated that they have developed drinking water advisor thresholds for microcystins, and another six indicated that they are considering developing them. *Note: This information is also represented in the table at the beginning of document.*

Has your state established a drinking water advisory threshold for microcystins?	
Answer Options	Response Count
Yes	6
No	24
No, but under consideration	6
<i>answered question</i>	36
<i>skipped question</i>	0



Q10: Level and Basis for Microcystin Threshold? This question asked the respondents to provide the microcystin threshold level as well as a more accurate description of the basis for the threshold level. *Note: These threshold levels are also provided in the table at the beginning of document.*

- Ohio – 1 ug/L, Based on Microcystin-LR, but meant to include all microcystin congeners
- Oregon - 1 ug/L – microcystin should be below 1 ug/L in finished water, otherwise a DO NOT DRINK public notice will be posted. Based on all microcystin congeners.
- Minnesota - .04 ug/L, Based on Microcystin-LR, but meant to include all microcystin congeners (<http://www.health.state.mn.us/divs/eh/risk/guidance/gw/microcystin.pdf>)
- Florida – 10 ug/L, Based on Microcystin-LR only. *Note: The state does not have an official guideline value.*
- Oklahoma - 1 ug/L – the goal is non-detect, Based on all microcystin congeners. *Note: The state does not have an official guideline value.*
- Quebec – 1.5 ug/L Microcystins expressed as microcystin-LR toxic equivalents including congeners LA, RR, YR, YM

Q11: Other Cyanotoxin Advisory Thresholds? Three respondents (Ohio, Oregon, and Quebec) have developed advisory thresholds for cyanotoxins other than microcystin. *Note: These threshold levels are provided in the table at the beginning of document.*

Q12: Thresholds in Statutory Rules? Two respondents (Minnesota and Quebec) indicated that their health advisory thresholds are included in their regulations. One state (Rhode Island) indicated that they are drafting regulations, based on Ohio’s advisory thresholds.

Q13: Microcystin Detections in Finished Water? Six respondents indicated that they had detected microcystin in finished water.

Q14: Levels of Microcystin Detections in Finished Water and State Response? Four of the six respondents that indicated microcystin had been detected in finished water, provided the levels of detection as follows.

- *Ohio - 3.56 ug/L
- Quebec - .17 ug/L
- New York - <0.1 ppb
- Oregon - 0.3 ug/L

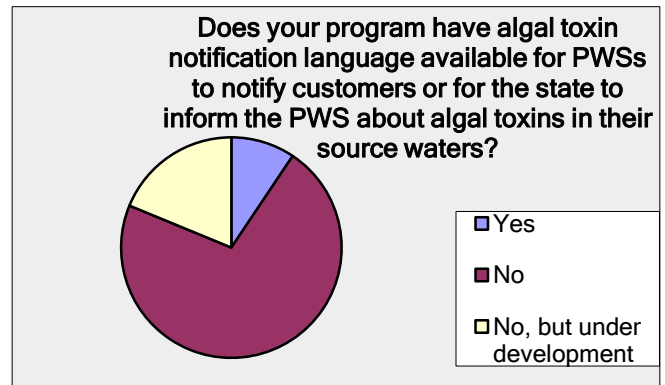
*Of these four, only Ohio had a detection above the state’s threshold value, which occurred in Carroll Township in 2013. To respond, the Ohio EPA offered technical assistance to the water system throughout the occurrence, including recommending that the public water system issue a “Do Not Drink” advisory and establishing an emergency connection with another water supply. Ohio EPA also conducted a site visit to assess the situation and offered additional assistance. Carroll Township spent over \$250,000 in treatment plant upgrades in response to the finished water microcystin detections.

Q15: Cyanotoxins Detected in Raw (Source) Water? Following is a summary of the survey responses for specific toxin detections in raw (source) waters. However, less than half of the respondents provided answers to this question, and of those who did, many did not conduct sampling for these toxins, or were unaware of possible sampling efforts and detections by the PWS or other agencies.

- **Microcystin:** Eight respondents indicated that they have had detections of microcystin in their source waters.
- **Cylindrospermopsin:** Three respondents noted that they have had detections of cylindrospermopsin in drinking water sources and one noted that they have had a few detections in recreational waters.
- **Anatoxin-A:** One respondent (Oregon) noted that they had multiple detections of anatoxin-a at several PWS intakes, and two other respondents noted that their samples for anatoxin-a were non-detects.
- **Saxitoxin:** Two respondents noted that they have had detections of saxitoxin in drinking water sources and one noted that they have had a few detections in recreational waters.

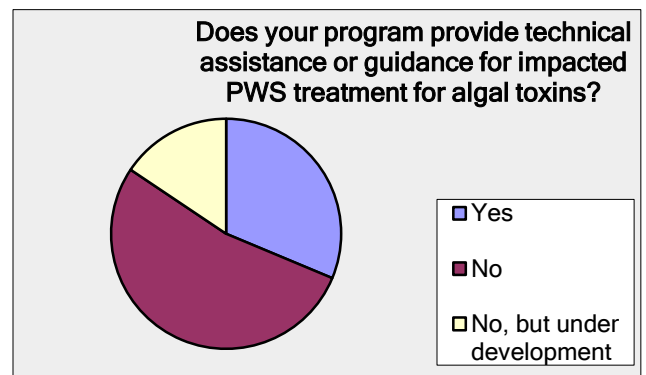
Q16: Algal Toxin Notification Language for Public Water Systems and the State? Of the 32 respondents that answered the question, only three have public notice language, though another six are developing language.

Does your program have algal toxin notification language available for PWSs to notify customers or for the state to inform the PWS about algal toxins in their source waters?	
Answer Options	Response Count
Yes	3
No	23
No, but under development	6
<i>answered question</i>	32
<i>skipped question</i>	4



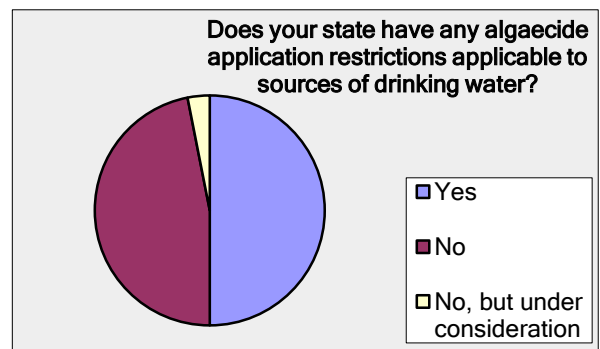
Q17: Technical Assistance or Guidance for Impacted PWS Treatment for Algal Toxins? About half of the 32 respondents that answered the question either provide technical assistance or guidance for treatment of algal toxins (10 respondents) or are developing assistance/guidance for their PWSs (5 respondents).

Does your program provide any technical assistance or guidance for impacted PWS treatment for algal toxins?	
Answer Options	Response Count
Yes	10
No	17
No, but under development	5
<i>answered question</i>	32
<i>skipped question</i>	4



Q18: Algaecide Restrictions in Source Waters? About half of the 32 respondents that answered the question have algaecide application restrictions, and one is considering them. Two of the respondents noted in their comments that they review the permits coming from another agency, and other respondents noted that they are not involved with these NPDES permitting or pesticide registration processes undertaken by other state agencies or programs.

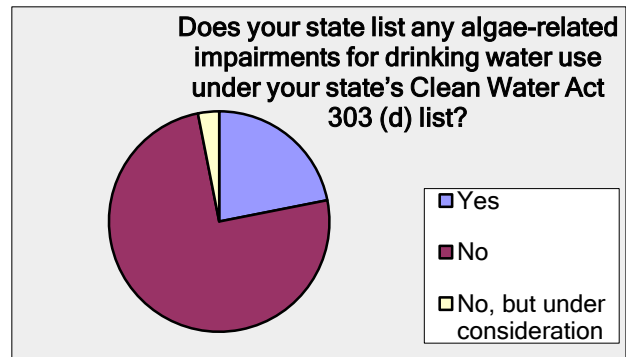
Does your state have any algaecide application restrictions applicable to sources of drinking water?	
Answer Options	Response Count
Yes	16
No	15
No, but under consideration	1
<i>answered question</i>	32
<i>skipped question</i>	4



Q19: Algae-related Impairments for Drinking Water Use under CWA 303(d) Listings? Only seven of the 32 respondents that answered this question indicated that they had algae related impairments for drinking water supply beneficial use under the state’s CWA 303(d) list, while one other state is considering develop water quality criteria for algae-related contaminants. Other information reflected in the comments includes:

- Two states have had impairments for chlorophyll a.
- Two states have had impairments, or will list impairments this year due to ongoing Disinfection By-Product violations (from Total Organic Carbon (TOC) due to algae) and taste and odor problems at the PWS.
- One state has a narrative nutrient standard that can be interpreted to include algae-related contaminants.
- One state has had to abandon a lot of small, eutrophic water supply lakes due to HABs.

Does your state list any algae-related impairments for drinking water supply beneficial use under your state’s Clean Water Act 303 (d) list?	
Answer Options	Response Count
Yes	7
No	24
No, but under consideration	1
<i>answered question</i>	32
<i>skipped question</i>	4



Q20: Description of Efforts to Address HABs at PWSs? Following are descriptions provided by some of the respondents about their HAB related programs and activities. After this survey was completed, some of the respondents who have HAB response policies in place (Ohio, Oregon, Oklahoma, Illinois, and Quebec) provided some additional information about their programs and associated activities (that is reflected here in the first part of this section). This information should help provide some more insight into how states are assessing and address HABs and their associated toxins in drinking water supplies.

- **OHIO:** Ohio’s Harmful Algal Bloom Response Strategy provides standardized definitions, sample collection procedures, public notice language, and cyanotoxin guidelines. Ohio EPA's Division of Drinking and Ground Waters has worked with the Ohio American Water Works Association to develop a cyanotoxin treatment optimization white paper for PWSs and to provide technical assistance to public water systems. HAB Reporting is voluntary in the state because Cyanotoxins are not regulated under the Safe Drinking Water Act (SDWA) and water systems are not required to monitor, though some do it voluntarily. The state will conduct incident response based sampling for the systems where blooms are occurring. Ohio EPA will monitor for toxins if there is a likelihood of toxins breaking through treatment. Consideration factors include: bloom severity; proximity to intake; treatment capabilities; algaecide use; and history of toxins, human illness, and screening data. For more information, please contact Heather Raymond at: Heather.Raymond@epa.ohio.gov
- **OREGON:** Oregon’s internal procedure, which is based off of the 1999 WHO guidance document, focuses their staff to request weekly toxin samples when a PWS is impacted by a HAB. In 2011 Oregon started paying for PWS toxin analysis and shipping costs through SRF set-asides drinking water protection implementation funds. In 2012, Oregon collaborated with several PWS, toxicologists, consultants and other water professionals to develop BMP's. Oregon has developed several resources for PWSs such as; health threshold values for four toxins, a flow chart, a list of labs, algae maps, monitoring guidelines, FAQ’s, public notice templates and lots of other resources that are all on their [algae resources for drinking water website](#). For more information, please contact Casey Lyon at casey.lyon@state.or.us
- **OKLAHOMA:** The Oklahoma DEQ has been working to keep drinking water safe from algal toxins since 2011. ODEQ, along with other agencies respond to and investigate reports of HABs in lakes and streams in Oklahoma. ODEQ follows up with operational advice to potentially affected water supplies to reduce the

likelihood of algal toxins being present in water served to the public. ODEQ also samples those water supplies for cyanobacteria ID and enumeration as well as appropriate algal toxins based on the toxigenic genera present. Follow up sampling is conducted monthly or as conditions change. For more information, please contact Kay Coffey at kay.coffey@deq.ok.gov.

- **ILLINOIS:** Monitoring conducted by the Illinois Environmental Protection Agency (Illinois EPA) from 2005-2008 showed that microcystin was frequently detected in Illinois lakes and streams at concentrations that were generally below levels of concern. Unfortunately, the 2012 summer drought revealed a different story (see "[2012 Drought and HAB Reconnaissance Monitoring Effort](#)") that pointed out a critical need in Illinois to provide information to local residents and water resource managers about harmful algal blooms (HABs). In 2013, Illinois EPA began discussions with the Illinois Department of Natural Resources, the Illinois Department of Public Health, and the U.S. Geological Survey to develop a statewide HAB program in Illinois and to determine the role that each agency might fill. Illinois EPA has now created a mechanism for individuals to report suspected blooms. Individuals are asked to complete a [Bloom Report Form](#) as soon as possible after seeing what they suspect to be a bloom. The forms (and photographs) can then be transmitted to the Illinois EPA at EPA.HAB@illinois.gov. Once reports are available to the Illinois EPA, an evaluation can be made by technical staff from appropriate program areas, including the Drinking Water Program, to determine necessary follow-up actions to protect public health. For more information, please contact Dave McMillan at dave.mcmillan@illinois.gov.
- **QUEBEC:** The province has a program in place to address HABs which includes drinking water actions. Since 2007, Quebec government has had a procedure for PWS impacted by a HAB. This procedure includes weekly toxin and cyanobacteria cells analysis which Quebec is paying for, for the duration of the bloom. Quebec government has a standard for toxins in its regulation and has developed several resources such as monitoring guidelines, [daily monitoring register](#), guidelines to help [impacted facilities](#) to improve their protection and other resources that are all on its website (but only in French): <http://www.mddelcc.gouv.qc.ca/eau/potable/index-en.htm>. Since 2012, Quebec government has worked with several PWS that are impacted each year with HAB to improve the procedure with the use of qualitative toxin strip tests, so they can take charge of the procedure by their own eventually. For more information, please contact Anouka Bolduc at anouka.bolduc@mddelcc.gouv.qc.ca.

Other HAB Efforts and Activities by State (in alphabetical order):

- **CALIFORNIA:** In California, HABs are addressed by: supporting interested PWSs with optimizing treatment during blooms; managing source waters; and providing other assistance to PWSs, on a case-by-case basis. General HAB efforts include operator training; a website compiling currently available information; and a list of available laboratories for conducting cyanotoxin related analyses.
- **KENTUCKY:** The state has established a HAB stakeholder group; is developing a HAB policy, FAQs, and guidance for PWSs; and is evaluating analytical methods for toxin testing.
- **MASSACHUSETTS:** The state is finalizing a new fact sheet and emergency response checkoff list regarding cyanobacteria. The completed checkoff lists will be returned to the Department of Environmental Protection (DEP) to enhance the state's collection of information and growing knowledge about HABs in drinking water. The DEP is working with other state and Federal agencies, as well as the New England Interstate Water Pollution Control Commission's (NEIWPCC) cyanobacteria work group to try to develop standards and consistent protocols.
- **MICHIGAN:** The state is looking to Ohio for help with their efforts, particularly for helping the one PWS that uses Lake Erie as its water supply. Michigan has purchased and installed a blue-green algae probe for that intake as part of their real time monitoring system.

- **MINNESOTA:** Drinking water treatment facilities in Minnesota do not usually test for microcystins but treatment seems to be effective for removal (based on conclusions from the Minnesota Department of Health (MDH) 2011/2012 Assessment Study). Future effort by MDH will focus on providing public education material relating to HABs; providing information about what are they; how they get into the environment; how to avoid exposure; and what can be done to prevent an algal bloom; etc. The state will also focus further intra-agency coordination on issues relating to drinking water sources, such nutrients, TMDLs, and the CWA 303(d) impaired waters program.
- **NEBRASKA:** The state conducted a study entitled, [Fremont Lake in Dodge County, Nebraska - Microcystin Toxin Migration, Bioaccumulation, and Treatment](#), that is intended to assist PWSs and provide information to the public.
- **NORTH CAROLINA:** North Carolina does not have any official policies regarding HABs. However, any water system that suspects a HAB in their source is encouraged to collect samples and send them to the state water quality lab for analysis and identification. Larger public water systems are encouraged to establish their own collection and analysis capabilities and procedures. If the samples are identified as containing potentially toxic cyanobacteria, they can be sent on to the state Division of Public Health for microcystin analysis and risk determination. State Division of Water Resources personnel are available to assist water systems with questions about HABs.
- **RHODE ISLAND:** The state has purchased lab equipment to test for toxins and will test regularly at all surface water sources this summer. Next year, the state will develop regulations for testing and MCLs.
- **NEW HAMPSHIRE:** The state has developed a fact sheet for PWSs.
- **UTAH:** The state works with the Utah Water Quality Alliance that has developed a monitoring program for algal blooms.
- **WISCONSIN:** The state has conducted a survey of treatment plants and treatment processes for systems using the single water body with algal blooms.

Other Resources: ASDWA, EPA, Health Canada, and the World Health Organizations all have web sites that include helpful resources on HABs and cyanotoxins as follows:

- **ASDWA:** [ASDWA's HAB web page](#) provides information and resources for state drinking water programs on assessing and addressing HABs and their associated toxins in drinking water supplies.
- **EPA:** [EPA's Web Site on Cyanobacterial Harmful Algal Blooms \(CyanoHABs\)](#) shares information and resources on this topic with navigation quick tabs to learn more about: what causes cyanobacterial toxins; how to prevent, detect, mitigate and treat for them; the health and ecological effects of cyanotoxins; current research activities in the U.S.; and policies and regulations for cyanotoxins at the state and international levels. The web site also includes a fact sheet for public water suppliers with basic information on human health effects, analytical screening tools, and the effectiveness of various treatment processes.
- **Health Canada:** [Current Canada Drinking Water Quality Guideline for microcystin-LR](#): (This is a current guideline, please ignore the notice that says that this is archived content, this is a mistake from recent changes to web site architecture).
- **WHO:** [Guidelines for Drinking-water Quality, Chapter 12 which includes a fact sheet on Microcystin-LR](#)