



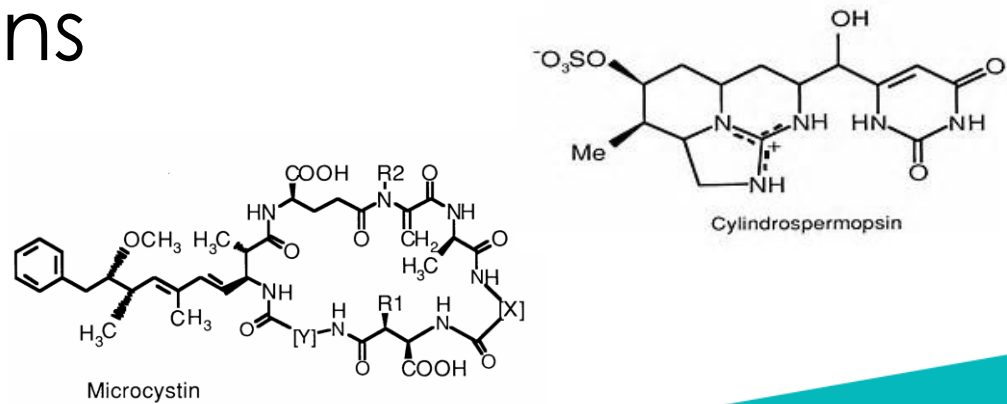
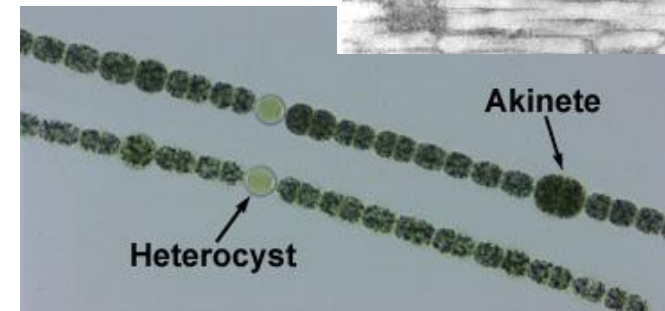
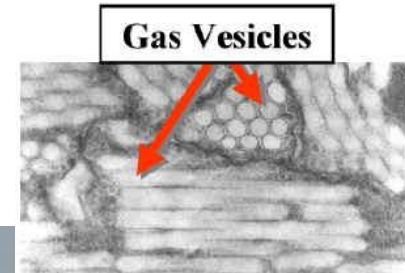
MONITORING HARMFUL ALGAL BLOOMS IN ARKANSAS

Preliminary steps toward establishing
a statewide HAB program

Arkansas Chapter of the American Fisheries Society
Pine Bluff, AR
January 24 – 26, 2018

Cyanobacterial Blooms

- Optimal conditions (generally!)
 - High water temp.
 - Increased N, P
 - Decreased N:P
 - Low water circulation
- Can produce toxins
 - Neurotoxins
 - Dermatotoxins
 - Hepatotoxins





GRDA: Algae Bloom Like This One Has Never Happened In Oklahoma

July 2011





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July 2011

June 2014

Harmful Algal Bloom and Hypoxia Research and Control Amendments Act of 2014

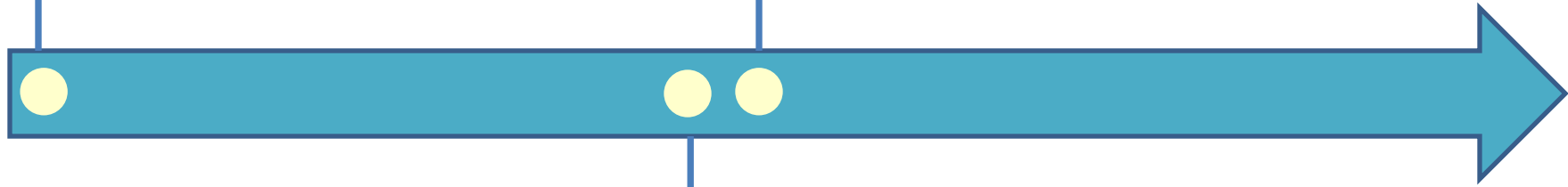


GRDA: Algae Bloom Like This One Has Never Happened In Oklahoma

Lake Nimrod closes after possibility of harmful algae discovered

July 2011

July 2014



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Harmful Algal Bloom and Hypoxia Research and Control Amendments Act of 2014



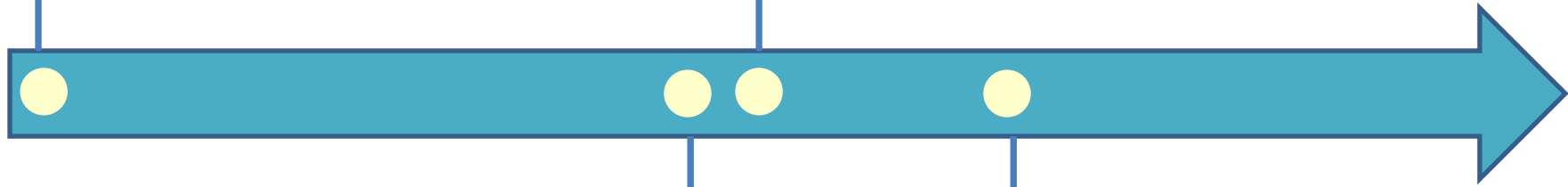
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Harmful Algal Bloom and Hypoxia Research and Control Amendments Act of 2014

June 2015

Toxin	10-day Health 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



GRDA: Algae Bloom Like This One Has Never Happened In Oklahoma

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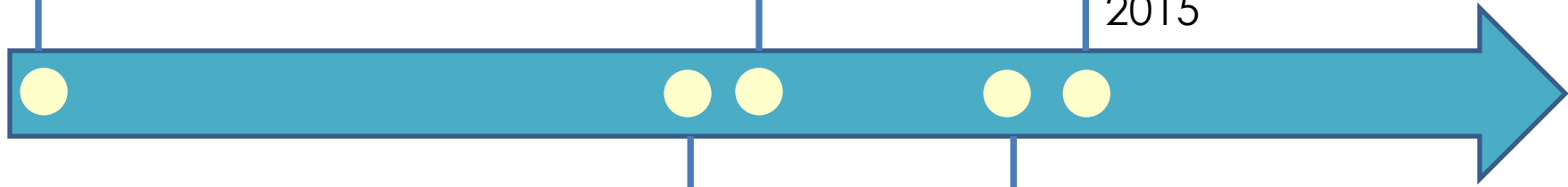


Lake Nimrod closes after possibility of harmful algae discovered

July 2014

1st Arkansas Harmful Algal Bloom Workgroup Meeting

August 2015



June 2014

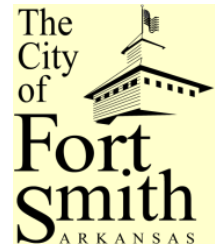
Harmful Algal Bloom and Hypoxia Research and Control Amendments Act of 2014

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Arkansas HAB Workgroup

- Who are we?



US Army Corps of Engineers®



Arkansas HAB Workgroup

- What is the mission?
 - 1) Form a plan for state-wide assessment of risks to public health from cyanotoxins
 - 2) Develop sampling, testing, and protocols for harmful algal blooms and cyanotoxins
 - 3) Develop strategies to reduce nutrient pollution in watersheds across Arkansas to prevent future HABs

Pre-Workgroup Sampling

EPA

Samples phytoplankton and toxins during NLA

CFS

Samples phytoplankton on Lake Fort Smith

BWD

Samples phytoplankton and toxins on Beaver Lake

U of A Fayetteville/ Little Rock

Faculty study HABs

USACE

Sampled on Nimrod during bloom

HSV POA

Samples for algae if Secchi is <1 m

HAB Workgroup Goal

Standardize sampling methods statewide.

Provide and manage an easily accessible HAB database for interested parties.

Arkansas Water Resources Center 2016 Annual Conference

Session 5

The Growing Threat of Harmful Algal Blooms

Session 6

Monitoring HABs and Cyanotoxins

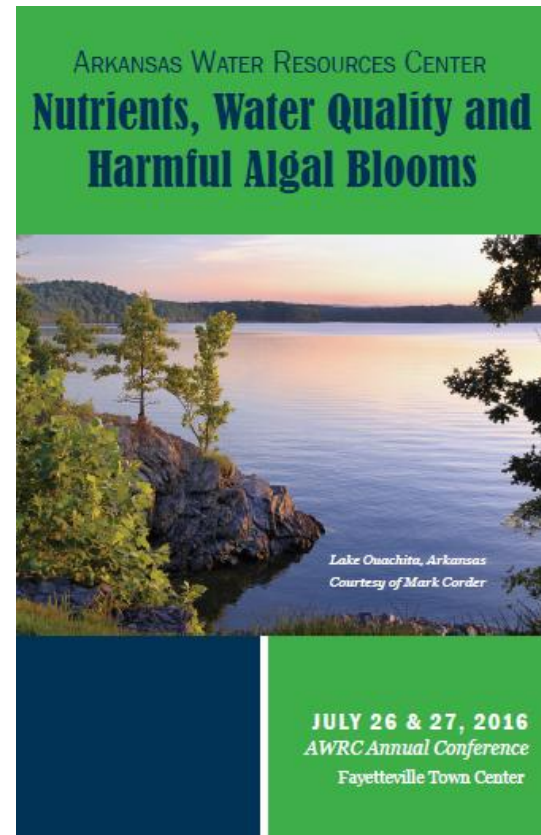
Session 7

Responding to Blooms: Lakes Managers' Perspectives

Session 8

Regulating Cyanotoxins and the Risks to Public Health

**17 speakers
representing 8 states**



EPA Suggested Actions for Preparing and Responding to Blooms

[epa.gov/nutrient-policy-data/monitoring-and-responding-cyanobacteria-and-cyanotoxins-recreational-waters](https://www.epa.gov/nutrient-policy-data/monitoring-and-responding-cyanobacteria-and-cyanotoxins-recreational-waters)

- Prioritize recreational waterbodies based on risk
- Develop a response plan
- Develop a monitoring plan
- Develop a control and treatment plan
- Develop signage and other communication methods to notify public
- Prepare response for media and other inquiries

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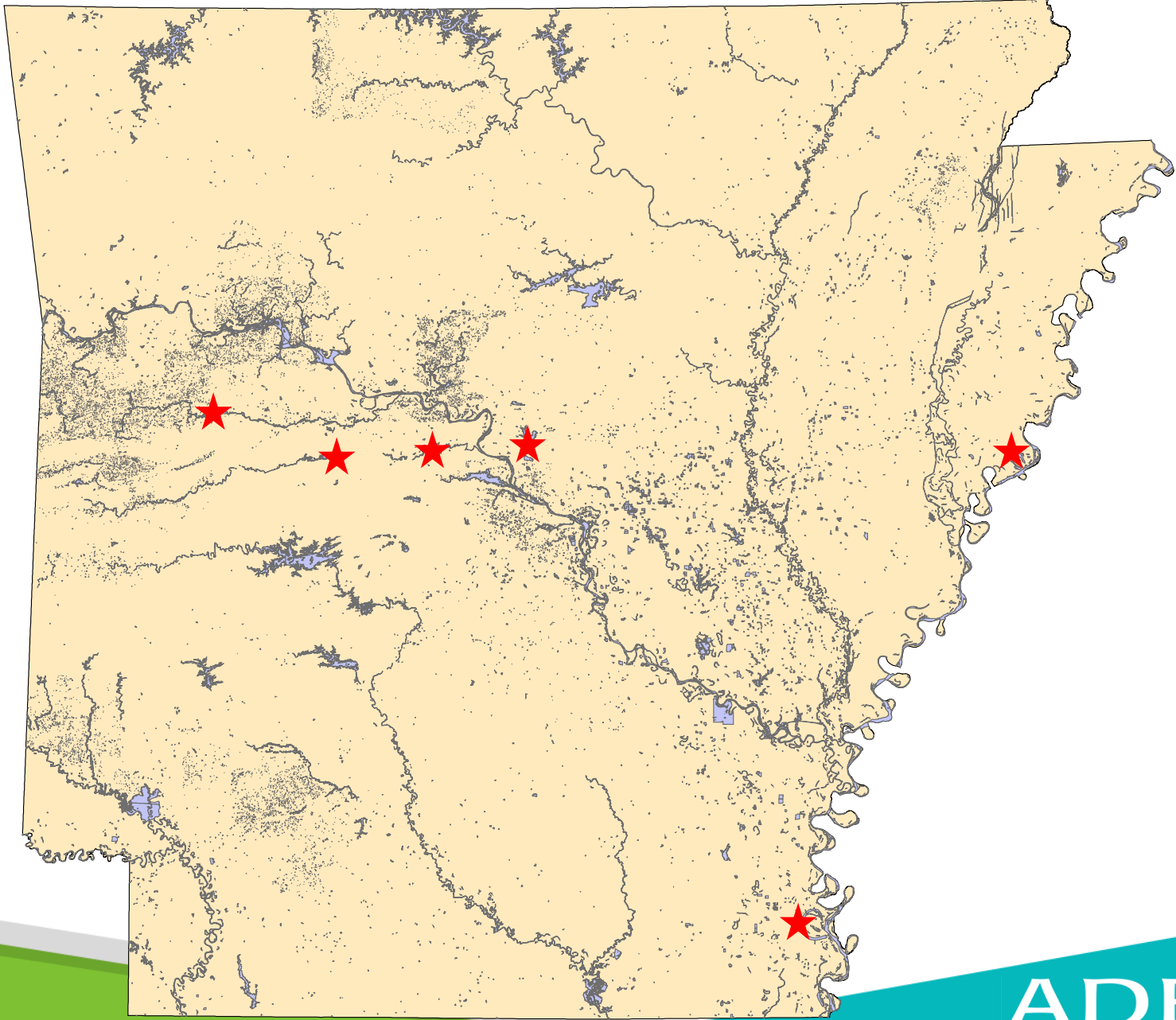
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“Prioritization may consider past occurrences of HABs, current environmental conditions, and waterbody use”

Limnological Sampling through ADEQ

- 1989, 1995, 1999, 2004 – Arkansas Significantly Owned Lakes
 - Water Quality Act of 1987
 - Assess trophic status, degraded or impaired lakes
- Special projects and reference studies
- 2011-Current: 16 USACE lakes



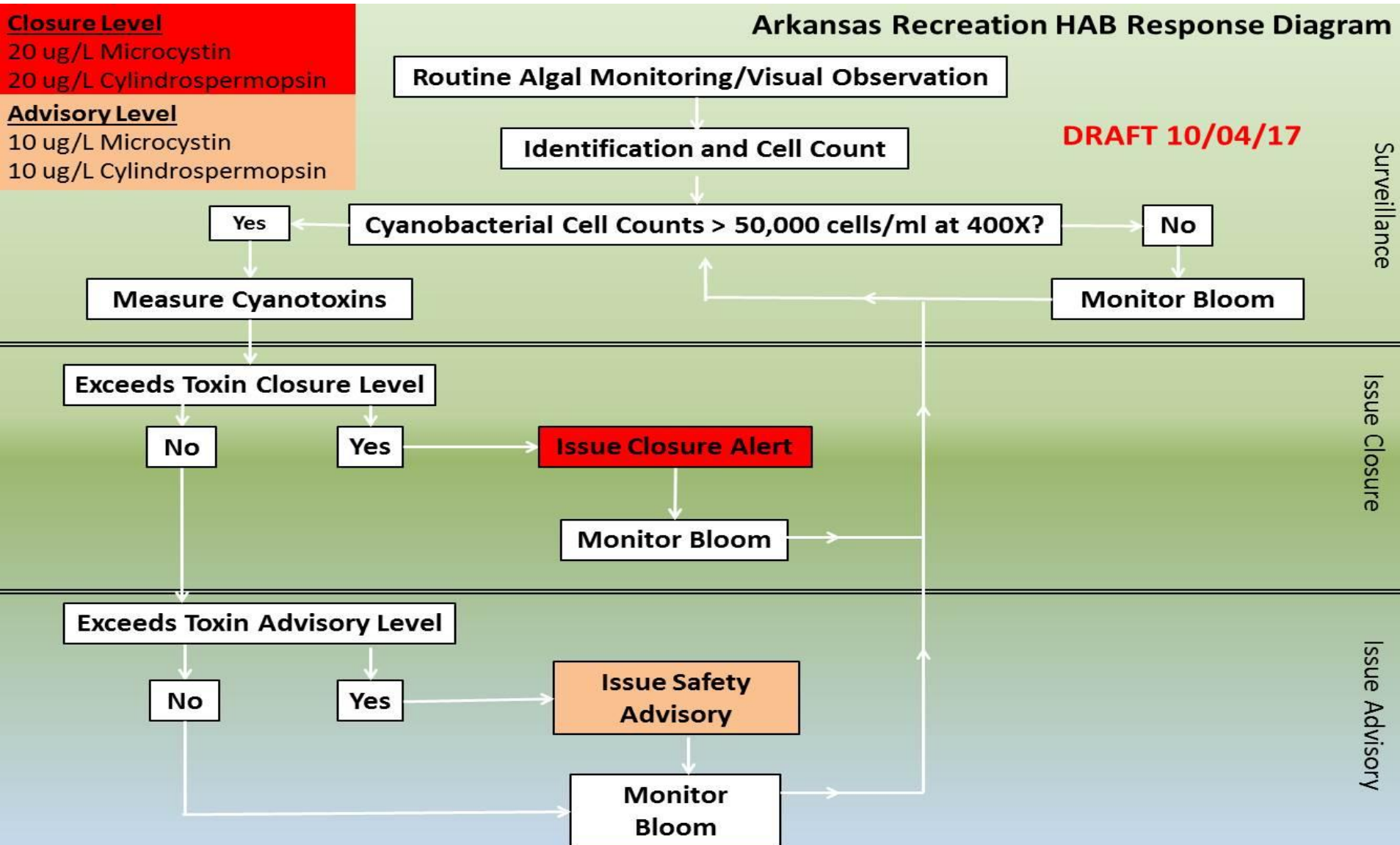
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1) Identify water health advisory levels

2) Take specific actions on waterways exceeding levels



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Draft Monitoring Plan for Priority Lakes: Cells and Toxins

Phytoplankton counts
> 50,000 cells/ml

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Next sample sent with
<4°C whole water



Whole water tested with
10ppb Abraxis test strip



Test strip \geq 10ppb, further
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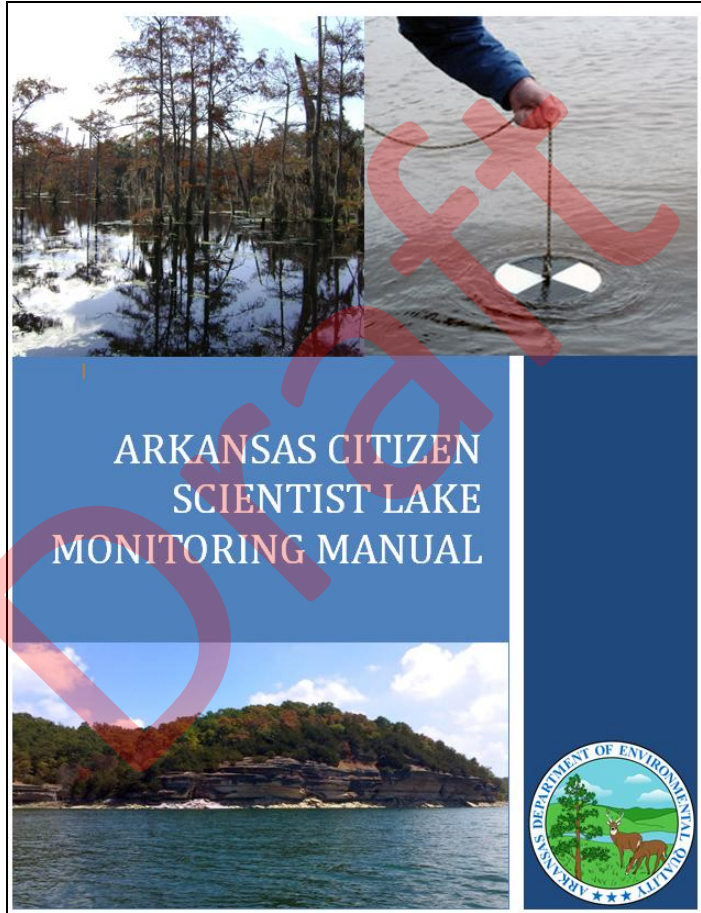
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Cylindrospermopsin
>20 ug/l

Microcystin/
Cylindrospermopsin
10 – 20 ug/l

Issue advisory and continue to sample for
toxins until conc. are <10ug/L.
Proceed with weekly monitoring.

Issue closure and
continue to sample
for toxins until conc.
are 10 - 20ug/L

Utilizing the Public



- Create database with **more** frequent **data** collection on more lakes
- Verify predictions based on GIS (watershed size and land use)
- Identify changes that may indicate or result in low water quality events
- Prioritize lakes that may be more vulnerable to low water quality events (eutrophic to hypereutrophic)

Volunteer Monitoring Pilot Project

- Start simply
 - User groups collect Secchi data on one drinking water reservoir for one season
- Gauge interest of citizens and partners
- Better understand resource allocation
- Understand what does & does not work

Reporting Tool: LakeObserver

Verizon LTE 13:56 82%

< Back Secchi Depth Submit...

Secchi depth*

Water depth*

Platform

Disk resting on bottom?

Disk type

Viewscope used?

Comment

Location

Date


Time

0 Notifications

Verizon LTE 14:28 76%

< Back Cloud Cover Submit...

Cloud cover*



Comment

Location

Date

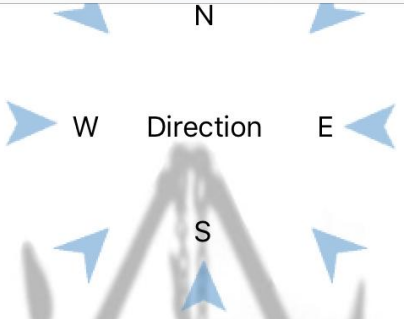
Time

* indicates a required field

0 Notifications

Verizon LTE 14:12 80%

< Measurements Wind Submit...



Speed*

and/or

Comment

Location

Date

Time

0 Notifications

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Reporting Platforms and Communications

Nuisance and Harmful Algae Blooms: A Guide to Reporting Blooms in Arkansas



ARKANSAS DEPARTMENT OF ENVIRONMENTAL QUALITY
Office of Water Quality

Online Harmful Algae Bloom Complaint Reporting Form

* Asterisk indicates item is mandatory; all others are optional

Owner/Location Information

Instructions

Property Owner (if known):

* County (if known):

Select County (or Unknown)

* Location/Driving Directions:

Provide the exact address, including street, city, and zip and/or location/driving directions.

Description of Problem

Instructions

Public Access:

Yes

No

* Size of Bloom:

Select Size (or Unknown)

Unknown

Larger than a football field

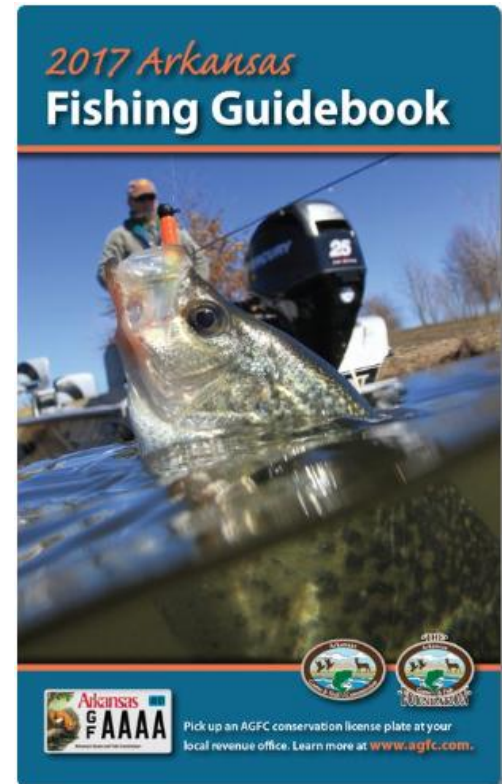
Between a football field and a compact car

Less than a compact car

*Description of Problem (in Detail)

Attach Photos:

Up to six .jpg, .gif, .jpeg, or .tif photos. Photos must be 10 MB or under per file.

ADEQ
ARKANSAS
Department of Environmental Quality



Questions or Suggestions?

Brie Olsen

Office of Water Quality

501.682.0947

olsen@adeq.state.ar.us