

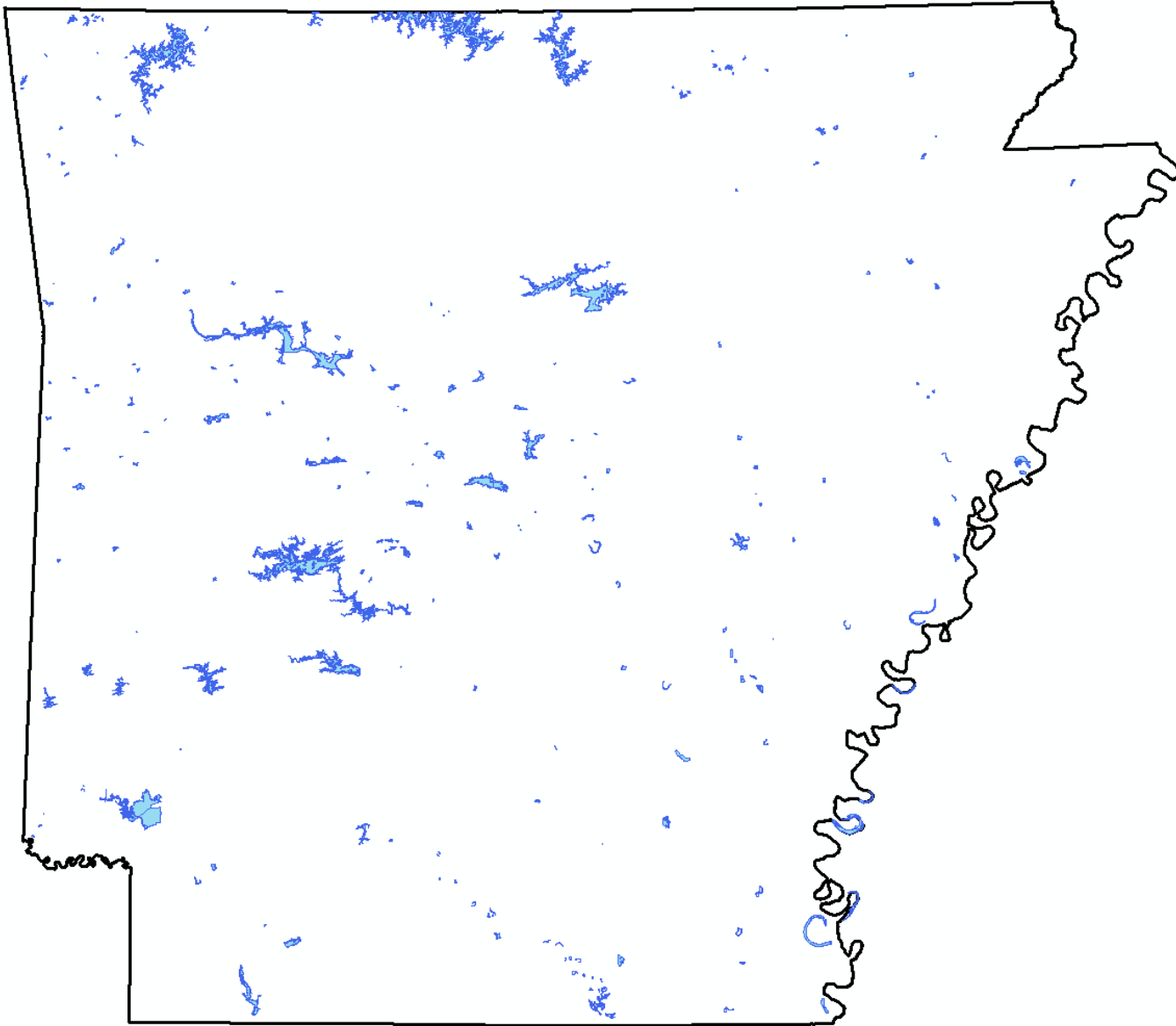
Overview of Harmful Algal Blooms in Arkansas: From Monitoring to Advisories

ACWA Water Quality Standards Workshop
Felicia Osburn, Ph.D. – Ecologist Supervisor
April 22, 2026



ARKANSAS
ENERGY & ENVIRONMENT

Lake Sampling Program



- ~90 publicly accessible lakes in the state
- Quarterly monitoring of ~30 lakes on a 3-year cycle
 - Current cycle April 2026 - March 2029
 - 52 sites on 34 lakes

Lake Sampling Procedures

- Example parameters collected:
 - Dissolved and total nutrients
 - Chlorophyll-a
 - Secchi depth
 - Vertical profile
 - Cyanotoxins
 - Turbidity
 - Metals
- Typically collected at the deepest area of the lake
 - For some larger lakes there may be additional sites, such as near the transition zone



Grand Lake, AR - Arkansas Division of Environmental Quality

All data is publicly available

https://www.adeg.state.ar.us/techsvs/env_multi_lab/water_quality_station.aspx

<https://www.adeg.state.ar.us/infosvs/website/apps.aspx>

Information

- [Guide to Water Quality Monitoring Data](#)

Water Quality Monitoring Data Search

Make your selection(s), then click the Search button. Scroll below search fields to view results. [Search Tips](#)

Station

Station IDs (comma separated): [Find Station ID](#) [Station Location Map](#)

Major Basin:

Station Description:

Station Type:

Lab Number:

Water Source:

Parameter:

Parameter Group:

Location

State:

County: *(Requires State)*

HUC:

Ecoregion:

DEQ Planning Segment:

[Reset](#) [Search](#)

[Data Qualifiers or Flags](#)

Interactive R Shiny Apps

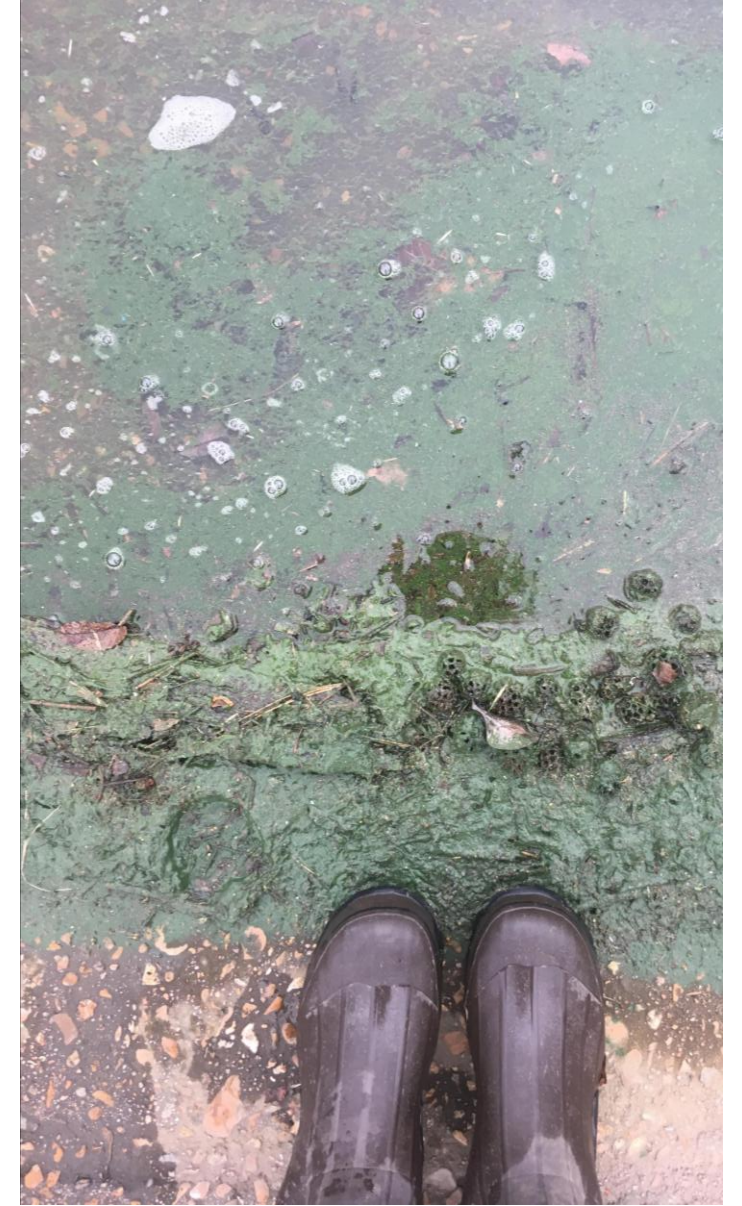
These web applications allow for interactive access to environmental datasets. Data may be viewed and plotted dynamically with the option to download available data.

- [Lake Vertical Profiles Dashboard](#)
The Lake Vertical Profiles Dashboard provides access to vertical profile data collected by DEQ's Office of Water Quality from lakes across the state. Users can view a map of lakes with available data, interactively plot and filter profiles, and download plots and data files.
- [Water Quality Explorer](#)
Water Quality Explorer allows users to easily view and access data from the Water Quality Monitoring Database. Users can search and filter available data, and download both plots and data files.



All images from Arkansas Division of Environmental Quality

HABs – Arkansas field examples



HABs – Arkansas field examples



Arkansas Division of Environmental Quality

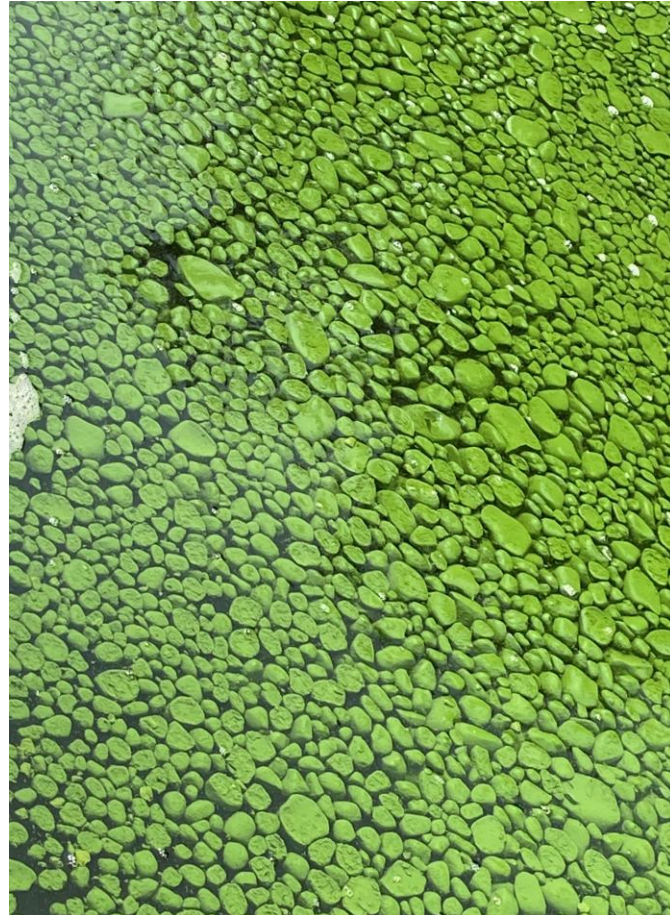


Image courtesy of Brett Timmons with AGFC



Arkansas Division of Environmental Quality

MODES OF TRANSMISSION



INGESTION

Consuming HAB contaminated water, seafood, or algal supplements



INHALATION

Breathing aerosols from HAB contaminated water sources



DERMAL CONTACT

Skin contact during recreational activities in HAB contaminated water

RESPIRATORY

Inhalation of HAB toxins may cause inflammation and weaken walls of the lungs



HEPATIC

HAB toxins such as microcystins may increase liver inflammation and lipid accumulation, pyroptosis of hepatocytes, and promote carcinogenic effects



GASTROINTESTINAL

Exposure to HAB toxins may lead to inflammation, cell death and increased risk for colorectal cancer



NEURO

Some HAB toxins can cross the blood brain barrier and target cholinergic synapses or voltage-gated ion channels, can damage neurons by inducing oxidative stress and inflammation



CARDIOVASCULAR

Exposure to HAB toxins may lead to cardiac inflammation and fibrosis as well as cardiac hypertrophy



RENAL

Exposure to HAB toxins induces oxidative stress, inflammation and cell death in renal cell types, thus potentially leading to decreased renal function



Health Impacts of Cyanotoxins

Note: Not all cyanotoxins lead to all of these health impacts. These listed impacts are caused by microcystins or cylindrospermopsin, the two cyanotoxins that EPA has issued Health Advisories for.

IN HUMANS

Brain

Source: Ingestion

Symptoms:

- Headache
- Incoherent speech
- Drowsiness
- Loss of coordination

Respiratory System

Source: Inhalation

Symptoms:

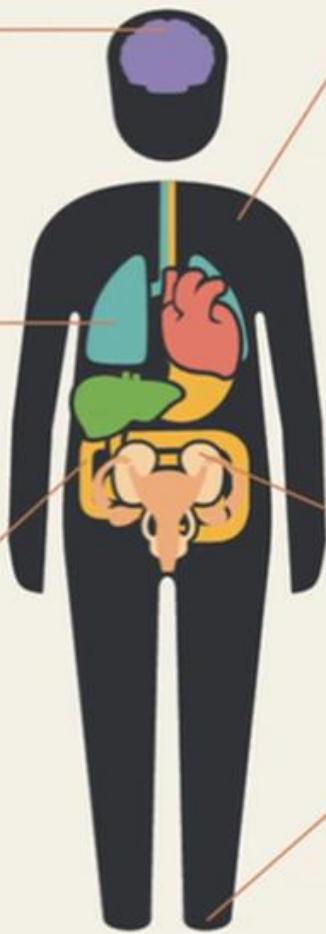
- Dry cough
- Pneumonia
- Sore throat
- Shortness of breath
- Loss of coordination

Digestive System

Source: Ingestion, drinking contaminated water, or eating contaminated fish

Symptoms:

- Abdominal pain
- Nausea
- Vomiting
- Diarrhea
- Stomach cramps



Body

Source: Contact, e.g. swimming

Symptoms:

- Irritation in eyes, nose, and throat
- Blistering around the mouth
- Skin rash, including tingling, burning and numbness
- Fever
- Muscle aches (from ingestion)
- Weakness (from ingestion)

Organs

Source: Ingestion

Symptoms:

- Kidney damage
- Abnormal kidney function
- Liver inflammation

Nervous System

Source: Ingestion

Symptoms:

- Tingling
- Burning
- Numbness

IN PETS

Symptoms:

- Vomiting
- Fatigue
- Shortness of breath
- Difficulty breathing
- Coughing
- Convulsions
- Liver failure
- Respiratory paralysis leading to death



Stages of an advisory in Arkansas

Arkansas Harmful Algal Bloom Management Plan:

<https://www.adeg.state.ar.us/water/pdfs/HAB-ResponsePlan-Manual-bookmarks-2019-12-12-Final.pdf>

HAB Complaints

- Most HAB complaints are received from the public or lake managers
- Multiple ways to submit a HAB complaint
 - Online complaint form
 - E-mail ee.habs@arkansas.gov
 - Call directly

To submit a HAB complaint: <https://seek.ee.arkansas.gov/ext/nform/app/?allowAnonymous=true#/formversion/8be2bc1a-8680-48d9-b92f-61d020ea4b19>

Complaint

VERSION 1.4

INSTRUCTIONS

Pollution Complaints

Reports from citizens are vital for effective enforcement of Arkansas' environmental laws. You can report anything that you think is polluting air, land, or water. When in doubt, contact us.

Submit a pollution complaint by using the following form.

The information you submit will be forwarded to DEQ environmental enforcement personnel. If you send a complaint to the wrong office, it will be referred to appropriate staff.

To Report An Emergency

If you are reporting a spill, leak, or release of petroleum products, hazardous materials, gases, or a geohazard event that requires an immediate emergency response, please call the:

Arkansas Division of Emergency Management
501-683-6705

then contact the **Arkansas Department of Energy and Environment:**

E&E Emergency Management
501-682-0716

If after hours, please leave a message and your call will be returned.

CONTACT INFORMATION

Main Address

Arkansas Energy & Environment
5301 Northshore Drive
North Little Rock, AR 72118-5317

CONTACTS

E&E Main Switchboard/Crude Oil and Petroleum Spill:
501-682-0744
E&E Main Switchboard - Toll-Free: 888-233-0326
Air Pollution: 501-682-0773
Asbestos: 501-682-0718
Harmful Algae Bloom: 501-682-0957
Hazardous Waste: 501-682-0833
Mining - Coal: 479-646-6611
Mining - Non-Coal: 501-682-0805
Solid Waste and Illegal Dumps: 501-682-0877
Water Pollution: 501-682-0972



Begin Form Entry

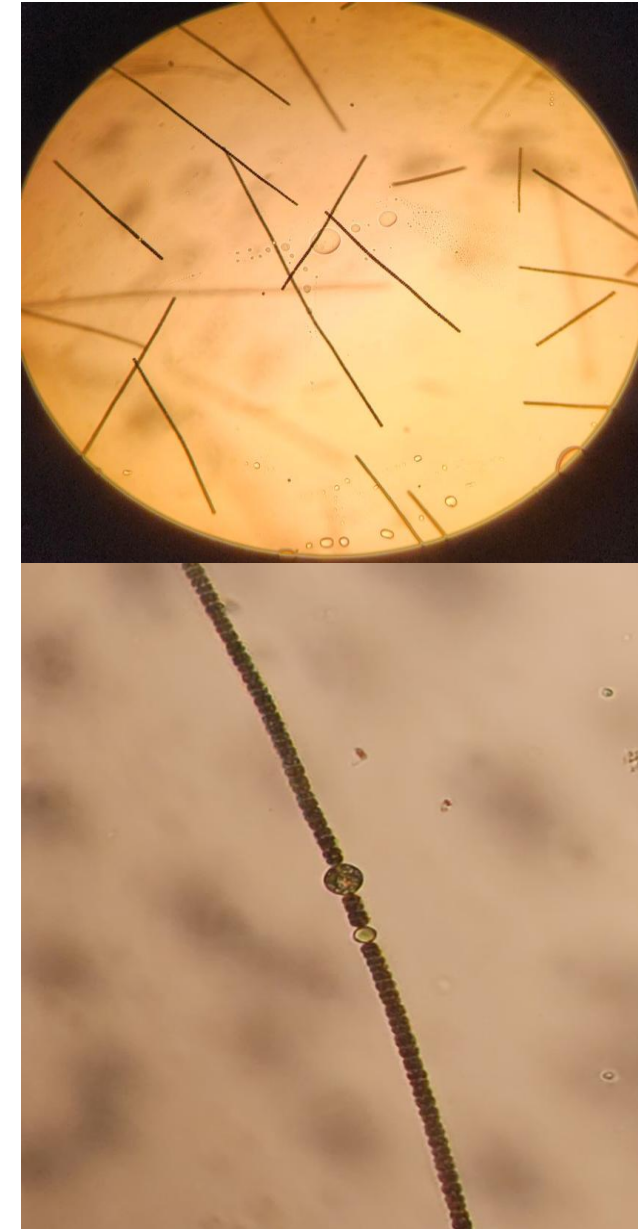
Information provided in a HAB Complaint

- Required information
 - Location of the HAB, coordinates are helpful
 - Lake/property manager, if known
- Optional information
 - Personal information
 - Can remain anonymous on the complaint form
- Images of the HAB
 - Not required but strongly encouraged

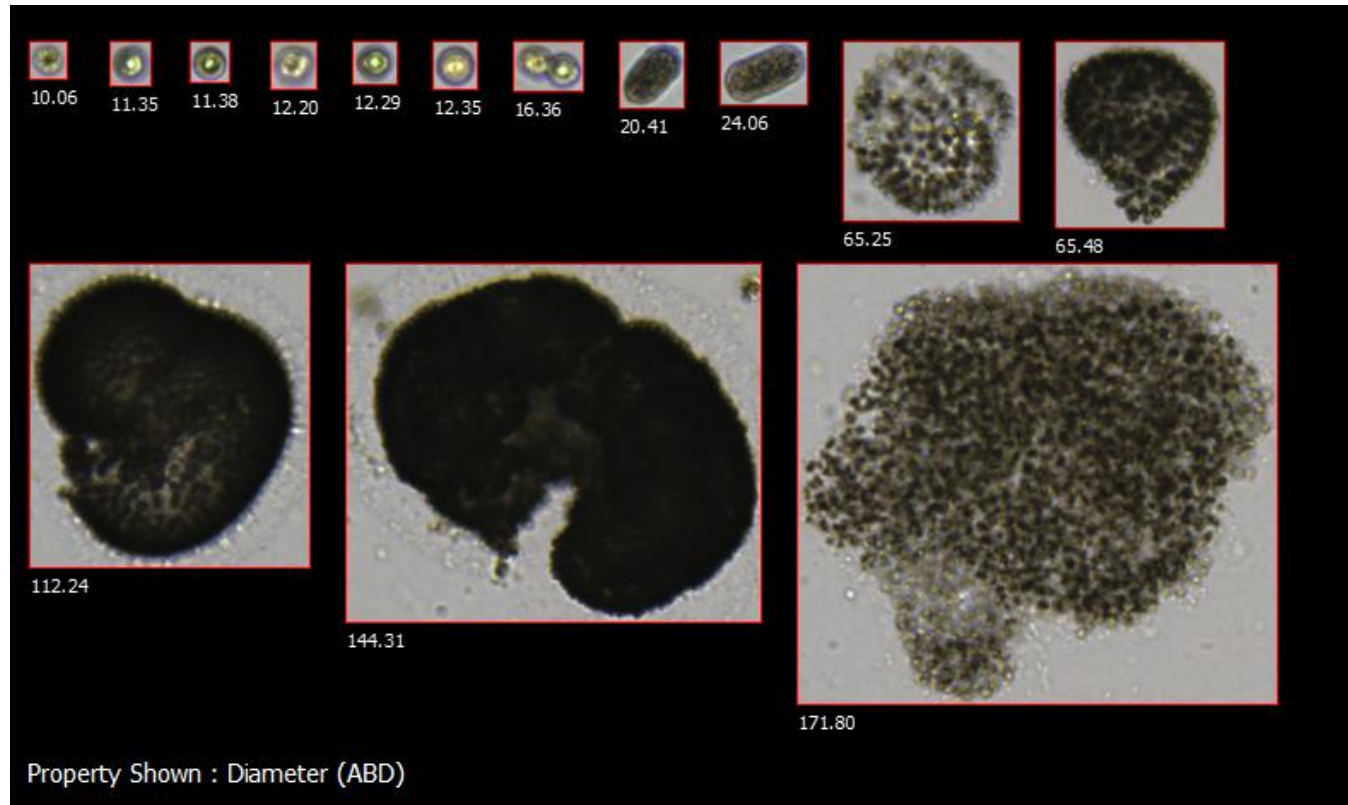


Investigating the Complaint

- Most times, a surface bloom can be determined by photograph as a possible HAB or nuisance algae
- If a sample is sent to the main office, we can also confirm a HAB via microscopy
 - Preferred method to determine if a bloom is mainly cyanobacteria



Lakewood Lake #1



Lake Bennett



Posting an Advisory

- Can be based on visual confirmation
 - Posted on DEQ's website (<https://www.adeg.state.ar.us/water/planning/hab/>)
 - Notifying contacts
 - This may be a lake manager, mayor, local parks department, etc.
 - If requested, the initial complainant is also notified
 - Posting signage
 - Posted at areas of high public use
 - Surface water samples are collected to run cyanotoxins



ADVISORY

HARMFUL ALGAE MAY BE PRESENT UNTIL FURTHER NOTICE:

- Use caution when contacting lake water and wash with clean water afterward
- May pose a higher risk to infants and small children
- Avoid areas of algae accumulation
- Do not eat dried algae or drink untreated water
- Keep pets and livestock away from water
- Do not let pets or livestock eat dried algae or drink untreated lake water
- Clean fish well and discard guts

NO SWIMMING (Prohibited swimming icon)

NO PETS (Prohibited pets icon)

In case of harmful algae contact, call your doctor or veterinarian if you or your animals have nausea, vomiting, diarrhea, rash, irritated eyes, seizures, breathing problems, or unexplained illness.

BLUE-GREEN ALGAE MAY BE HARMFUL TO HUMANS AND ANIMALS, CALL OR EMAIL TO REPORT:

NEW ALGAE-BLOOMS (501) 682-0744 Arkansas Energy & Environment's Division of Environmental Quality	POSSIBLE ALGAE-BLOOM ILLNESS (501) 280-4168 Arkansas Department of Health
--	---

 ee.habs@arkansas.gov

POSTED BY: _____ POSTED ON: _____

EPA Recreational Advisory Recommendation

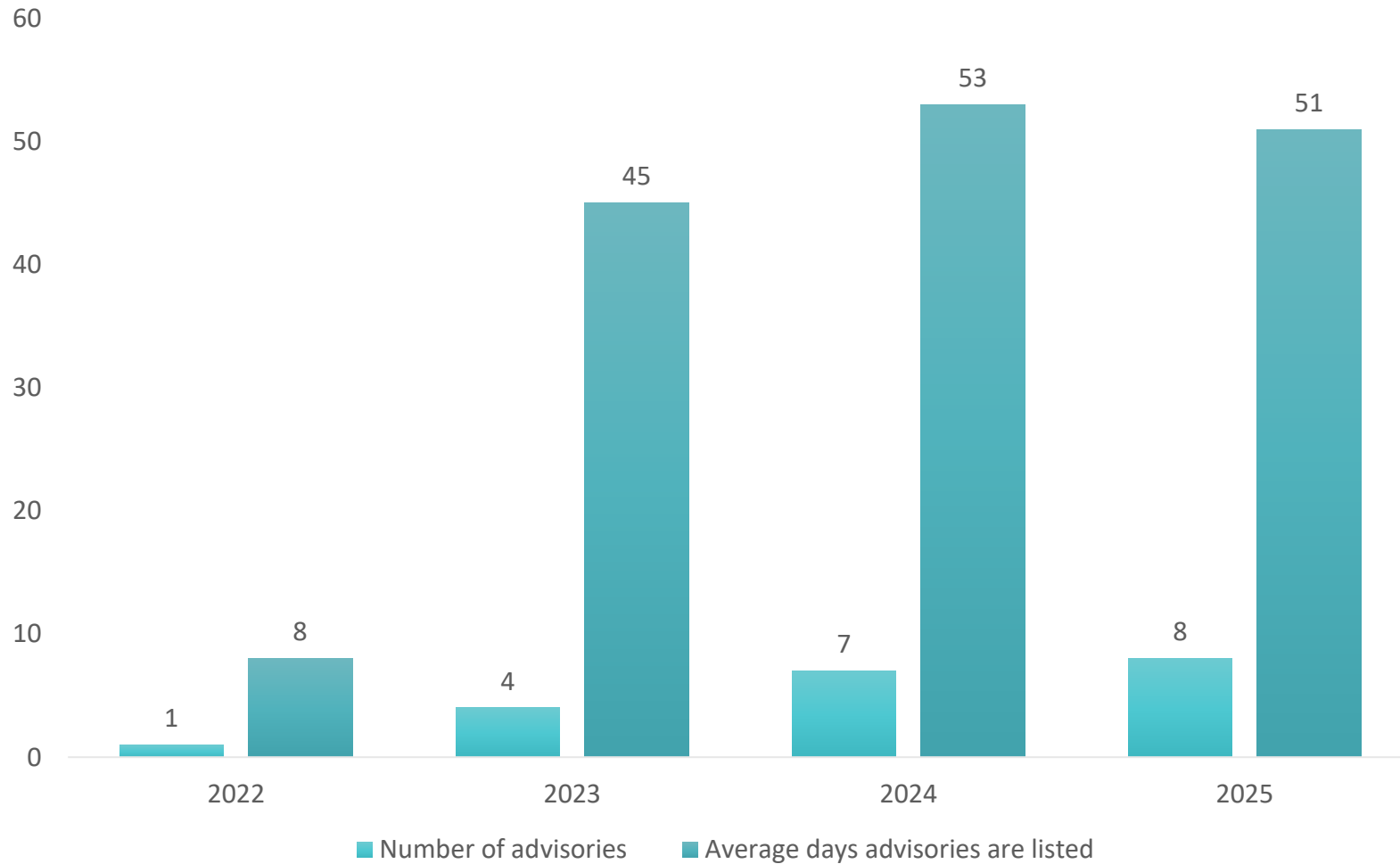
Total Microcystins (µg/L)	Cylindrospermopsin (µg/L)
8	15

EPA recommended values for recreational advisories. From EPA report titled “Recommendations for Cyanobacteria and Cyanotoxin Monitoring in Recreational Waters” September 2019.

Monitoring/Lifting an Advisory

- Waterbodies with Advisories are monitored at least bi-weekly
- Each sample is analyzed either at another lab or at AR DEQs water lab for microcystin(s) and/or cylindrospermopsin
 - If the HAB community indicates the possibility of producing anatoxin-a an associated test strip will be ran, even though EPA does not currently have a recreational standard
 - If possible, nutrients, phytoplankton, and chlorophyll-*a* are also analyzed
- After two consecutive tests have come back below recreational standards for the relevant cyanotoxin, the advisory is lifted
 - HABs are unpredictable, and due to changing weather conditions a bloom could be low for one test and high for the next
 - Requiring two consecutive tests helps keep the public safe
 - Educational signs are posted
 - Records are kept in archives and have been used to assist with prioritizing

Summary of Past HAB Advisories in AR



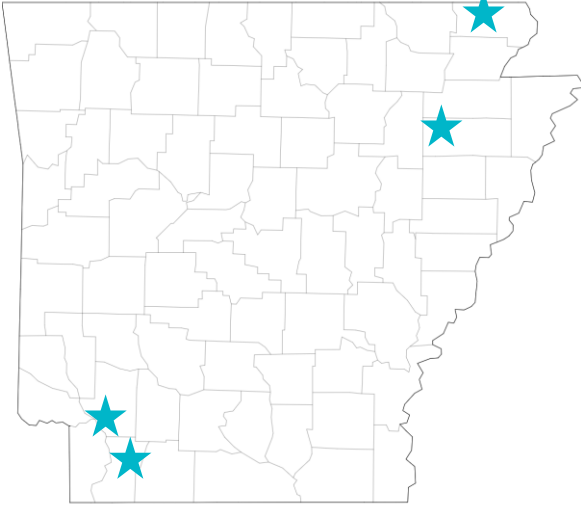
- We are seeing more advisories each year, as well as longer average advisory durations.
- Likely more are going unreported

* Data for 2025 includes two advisories that began in 2024 and were lifted at the end of January 2025. Data shown is publicly available on DEQ's HAB webpage

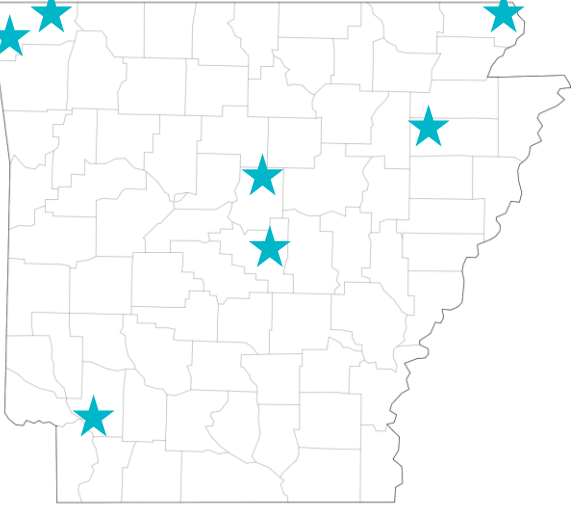
Historic HAB Advisories in AR



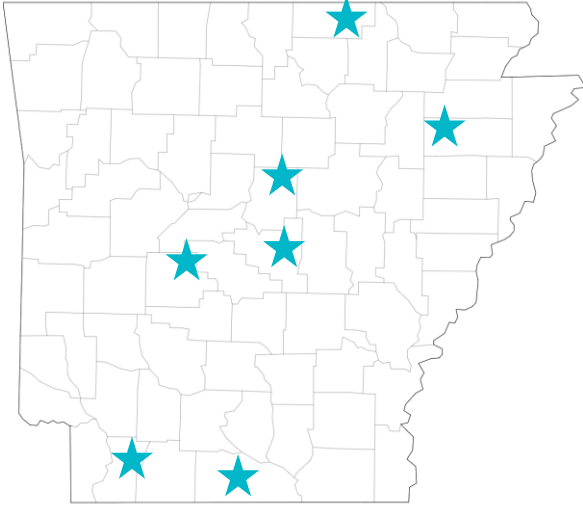
2022



2023



2024



2025

Assessing water quality based on HAB advisories

Arkansas Advisories and Assessments

- 2026 Assessment Methodology introduced mechanism for impairment based on HAB advisories

6.13 HARMFUL ALGAL BLOOMS

This section establishes the protocol for listing and delisting waterbodies based on harmful algal blooms (HABs) within Arkansas's surface waters.

ASSESSMENT METHODOLOGY FOR HARMFUL ALGAL BLOOMS

Harmful algal bloom listings are based on HAB advisories issued by the Arkansas Division of Environmental Quality. Advisories may be issued year-round based on visual confirmation, microscopy, cell counts, or cyanotoxin levels.

LISTING METHODOLOGY:

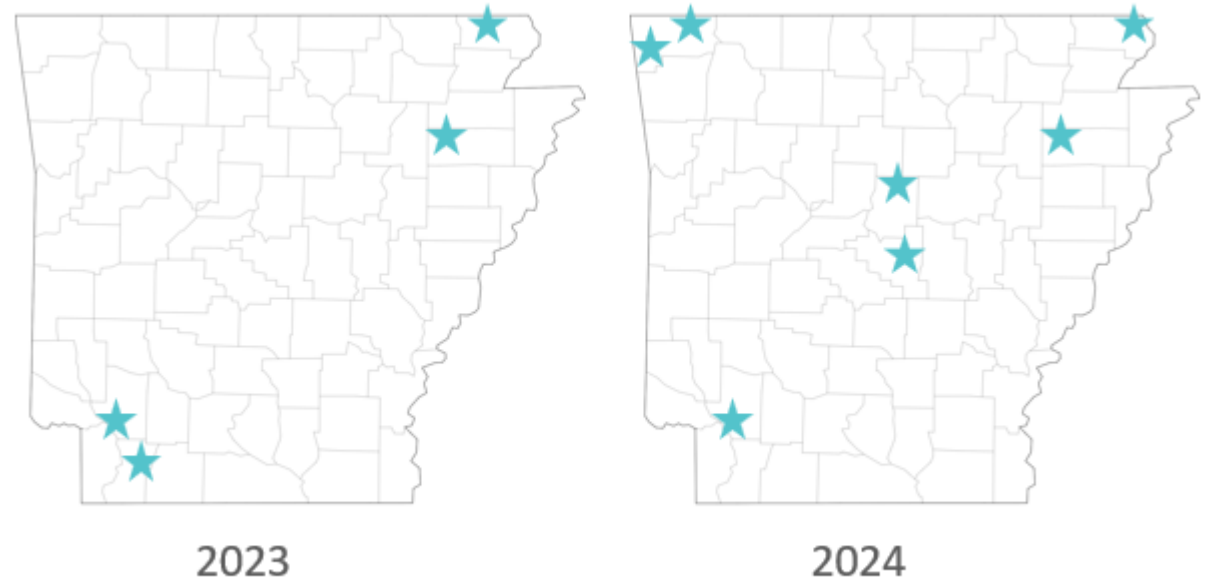
Stream, river, lake and reservoir AUs may be assessed as non-support if two or more new advisories are issued for the AU within the period of record. In cases where a lake or reservoir consists of two AUs, both AUs may be assessed as non-support if two or more new advisories are issued for **either** AU within the period of record.

DELISTING METHODOLOGY:

Stream, river, lake and reservoir AUs may be assessed as support if, since the time that the AU was listed, a minimum of six quarterly samples evenly distributed over two years have returned microcystin(s) concentrations less than 8 µg/L and cylindrospermopsin concentrations less than 15 µg/L, and no new HAB advisories have been issued for the AU.

Arkansas Advisories and Assessments

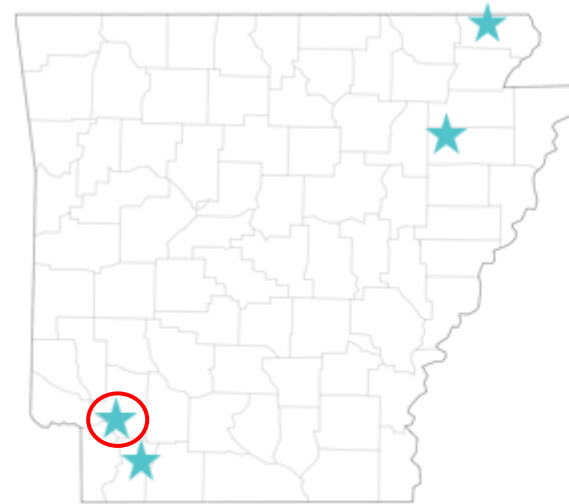
- 2026 draft 303(d) list includes two impaired lakes based on HAB advisories



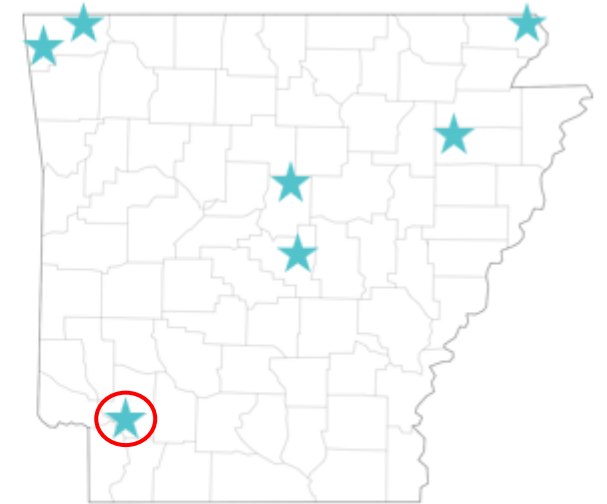
Arkansas Advisories and Assessments

- 2026 draft 303(d) list includes two impaired lakes based on HAB advisories

Bois d'Arc Lake



2023



2024

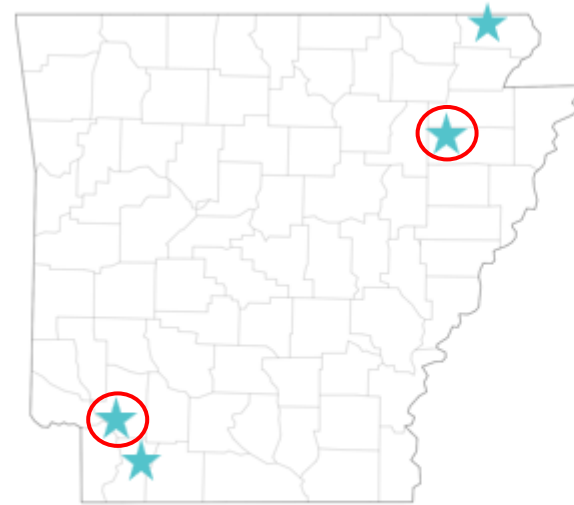
Arkansas Advisories and Assessments

- 2026 draft 303(d) list includes two impaired lakes based on HAB Advisories

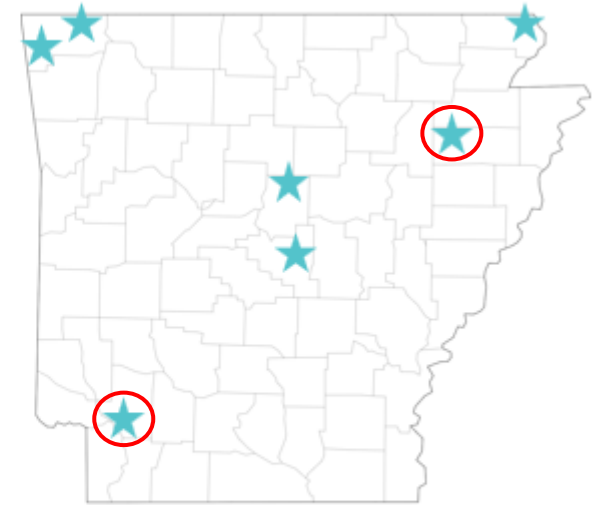
Bois d'Arc Lake



Lake Hogue

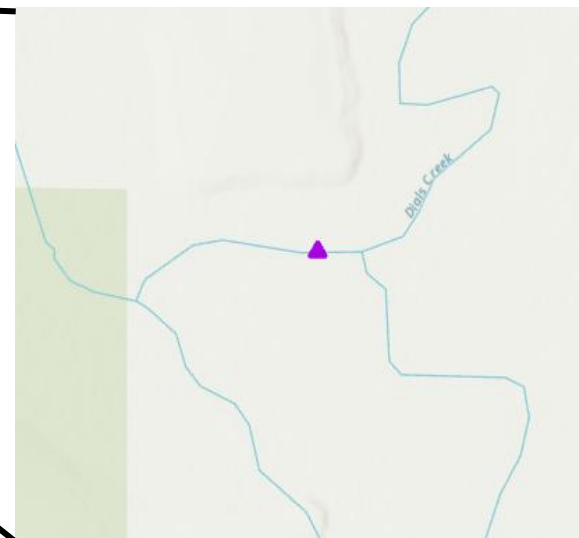
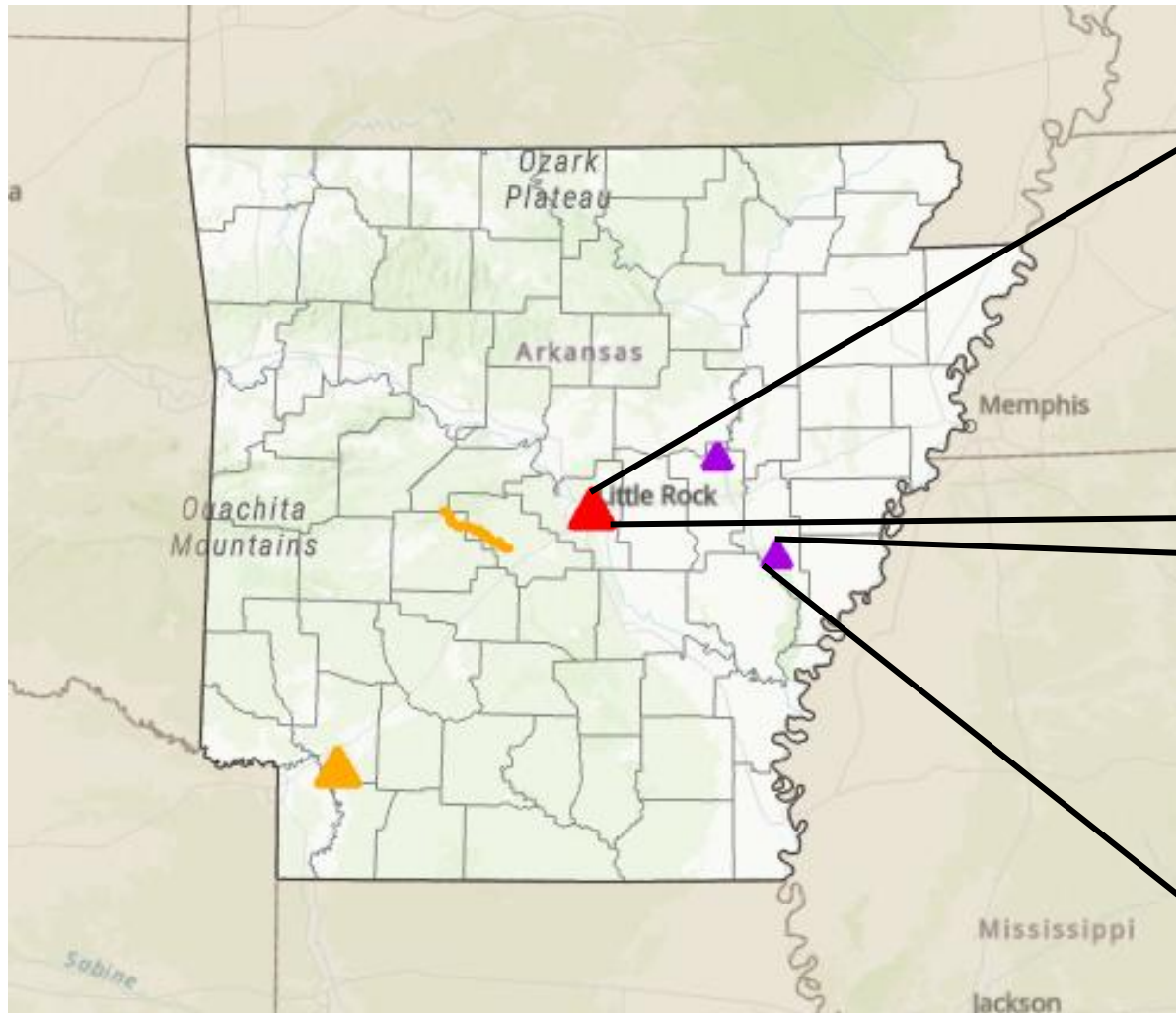


2023



2024

Arkansas HABs – looking forward



Please note - HAB map is currently in development

Keep in Touch



E&E-DEQ-OWQ

5301 Northshore Drive
North Little Rock, AR 72118



PHONE

501.682.0957
501.682.0850



EMAIL

felicia.osburn@arkansas.gov



WEBSITE

<https://www.adeq.state.ar.us/water/planning/>



@AREnergyEnvironment



@ArkansasEE



ARKANSAS
ENERGY & ENVIRONMENT