



# **Louisville District Harmful Algal Bloom Response Plan**

## **Louisville District Water Quality Program**

Document Name: Louisville District Harmful Algal Bloom Response Plan

Revision: 2

Updated By: Zac Wolf

Document Manager: Adam Connelly

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## Introduction

The Louisville District U.S. Army Corps of Engineers (hereinafter, District) Water Quality Program's (WQP) area of responsibility includes 17 reservoirs and 542 miles of the Ohio River (Figure 1). The District's reservoirs exist in three states: Indiana, Kentucky, and Ohio. The land use in the basin is predominantly agricultural, some residential, and some resource extraction.

The primary responsibility of the District's WQP is to meet each reservoir's authorized purposes as described in the project's Water Control Manual (WCM). Water quality monitoring, including the monitoring of harmful algal blooms (HABs) and associated toxins, supports this responsibility. Another of the District WQP's responsibilities is to uphold state and federal water quality standards, whenever possible. This includes noting the presence of, reporting, and monitoring of freshwater HABs.

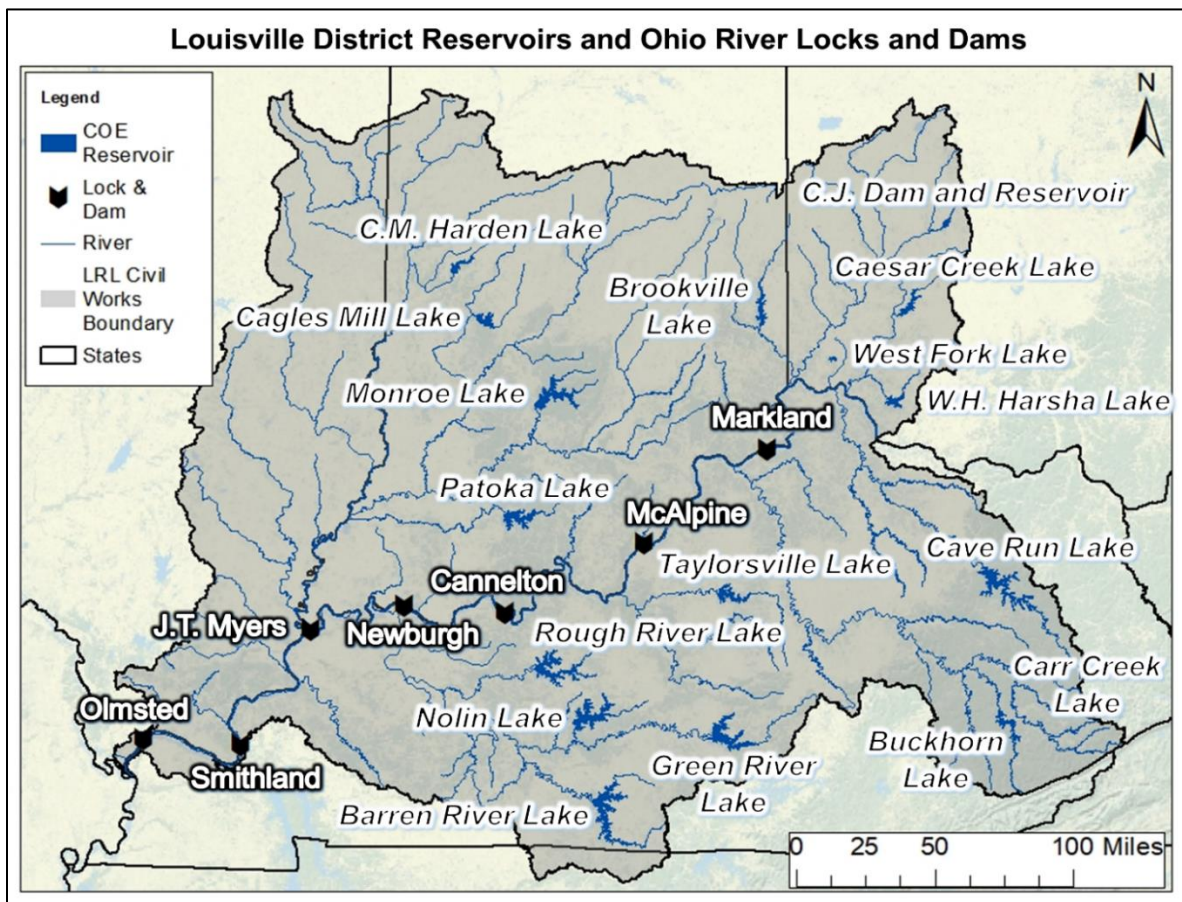


Figure 1: Louisville District reservoirs and Ohio River locks and dams.

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As states refine and revise their statewide procedures, the District WQP continues to coordinate with them in order to have a cohesive approach. The District WQP also provides information to the Invasive Species Leadership Team (ISLT) HAB Liaison for vertical communication regarding HAB issues.

The purpose of this document is to serve as the response plan to HABs at the District's reservoir projects. This version supersedes previous documentation and is intended to serve as a reference for HAB response for all waterbodies within the District's area of responsibility.

## What are HABs?

Freshwater HABs are significant and excessive growths of blue-green algae, also known as cyanobacteria. All freshwater reservoirs are inhabited by native cyanobacteria species that can produce HABs. Several of these species can at times produce toxins (called cyanotoxins) that are harmful to the nervous system (neurotoxins), the liver (hepatotoxins), and the skin (dermatotoxins) of humans and other animals. In addition to cyanotoxins, HABs can be harmful to the reservoir ecosystem and can cause depletion of oxygen levels which can cause fish mortality. Frequently asked questions (FAQs) about HABs are included in this document as Appendix A: Frequently Asked Questions about HABs.



Figure 2: HAB at Monroe Lake in 2016.

## What Causes HABs?

General contributing factors that promote the formation of HABs are:

- Ample/excessive sunlight
- Warm temperatures
- Low-water or low-flow conditions
- Excessive nutrients (nitrogen and phosphorus)

Although some HABs occur during the cold seasons, they most frequently occur during the summer when temperatures are high, sunlight is ample, and the flow of incoming water is low. Also, one of the most influential factors of HAB growth is the concentration of nutrients,

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particularly nitrogen and phosphorus. Nitrogen and phosphorus are both required by cyanobacteria to live and are often scarce in the environment, therefore limiting growth. Most nitrogen and phosphorus pollution (also known as nutrient overloading or eutrophication) comes from the runoff of agricultural fertilizer, lawn fertilizer, untreated human sewage (storm overflows), and untreated animal sewage from concentrated animal feeding operations.

## Why is the Corps Involved in HAB Response?

In a 29 June 2012 Memorandum from Great Lakes and Ohio River Division (LRD) Commander BG Margaret Burcham (available by the WQP upon request), Districts were directed to develop HAB Response Plans in order to protect the public from the potential threats posed by HABs. In accordance with this memorandum, these plans are to be coordinated with the appropriate state agencies. This Response Plan will be revised as needed to reflect any changes from ongoing state coordination. The District WQP coordinates with the appropriate state agencies in Indiana, Kentucky, and Ohio.

In addition to working in accordance with the memorandum, it is evident from historical and current analyses of the District's water quality data that cyanobacteria, which contribute to HABs, dominate the phytoplankton populations in the District's waters. Any data collected in response to Harmful Algal Blooms, including data collected by state agencies, will be reviewed by the District's WQP and distributed, analyzed, and documented as appropriate. Any relevant data analysis will be used to aid the project in meeting authorized purposes as described in the WCM or other Corps policies. Water quality monitoring, including the monitoring of HABs and associated toxins, supports the ability to meet authorized purposes described in each project's WCM.

Research and literature described in ERDC/EL TR-17-11 indicate that reservoir operations impact algal populations within the reservoir. Several algal-related research projects are occurring at the Corps nationally, indicating the need for response and data collection. Information regarding these projects are described in ERDC/EL TR-11-13 and ERDC/EL TR-19-19.



Figure 3. HAB at W.H. Harsha Lake in 2017.

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## HAB Response at Indiana Reservoirs

If HAB conditions are observed at an Indiana reservoir, or if reports are received from the public, an Algal Bloom Notification Form (Appendix B: Indiana Algal Bloom Notification Form) is used to report the conditions. The Algal Bloom Notification Form can be found by searching for Form 55581 on the Indiana State Forms Online Catalog at the following link: <https://www.in.gov/iara/services-for-public/state-forms-online-catalog/state-forms-online-catalog-all-agencies-all-formats/>.

Completed forms should be emailed to the following POCs at the Indiana Department of Health (IDOH), Indiana Department of Environmental Management (IDEM), Indiana Department of Natural Resources (IDNR) and the LRL District WQP.

- IDOH: Grace Bassett, [gbassett@health.in.gov](mailto:gbassett@health.in.gov) and Madison Asbell, [masbell@health.in.gov](mailto:masbell@health.in.gov)
- IDEM: Ali Meils, [AMEILS@idem.IN.gov](mailto:AMEILS@idem.IN.gov)
- IDNR: Ginger Murphy, [GMurphy@dnr.IN.gov](mailto:GMurphy@dnr.IN.gov)
- LRL WQP: Zac Wolf, [Zachary.L.Wolf@usace.army.mil](mailto:Zachary.L.Wolf@usace.army.mil) and Kristin Berger, [Kristin.M.Berger@usace.army.mil](mailto:Kristin.M.Berger@usace.army.mil)

Reporting HAB conditions via the Algal Bloom Notification Form concludes the District's responsibilities.

If the public reports potential HAB related illness to District personnel, they should be advised to contact the Poison Control Center at 1-800-222-1222 or to seek immediate medical attention from a licensed medical provider.

The HAB response SOP for beaches at Indiana Department of Natural Resources (IDNR) properties is available by contacting the Division of State Parks at 317-232-4140 or [gmurphy@dnr.IN.gov](mailto:gmurphy@dnr.IN.gov).

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## HAB Response at Kentucky Reservoirs

If HAB conditions are observed at a Kentucky reservoir, or if reports are received from the public, the following POCs at the Kentucky Division of Water (KDOW) and the District WQP POC should be notified.

- Nick Reif, [Nicholas.Reif@ky.gov](mailto:Nicholas.Reif@ky.gov)
- Robbie Johnson, [RobertC.Johnson@ky.gov](mailto:RobertC.Johnson@ky.gov)
- Connie Coy, [Constance.Coy@ky.gov](mailto:Constance.Coy@ky.gov)
- LRL WQP (Zac Wolf, [Zachary.L.Wolf@usace.army.mil](mailto:Zachary.L.Wolf@usace.army.mil)) and Kristin Berger, [Kristin.M.Berger@usace.army.mil](mailto:Kristin.M.Berger@usace.army.mil))

The email should contain the following information:

- Date the conditions were observed
- Description of bloom
- Location of bloom evidence (map and/or GPS coordinates)
- Pictures or measurements (e.g., Secchi) that were taken. Pictures should show:
  - A close-up of the bloom/algae
  - Extent of the bloom

Reporting HAB conditions via email concludes the District's responsibilities. The KDOW may ask the District to assist in collecting samples and shipping to the state laboratory for analysis. It is the decision of the reservoir personnel or LRL WQP to determine if they have the availability to assist. HAB sampling kits may be made available to District teams to assist with any sampling efforts. See Appendix C: Sample Collection Instructions for KY Lakes for sampling instructions.

If the public reports potential HAB related illness to District personnel, they should be advised to contact the Poison Control Center at 1-800-222-1222 or to seek immediate medical attention from a licensed medical provider.

Kentucky's HAB response SOP may be available upon request by the WQP. For more information, contact the KDOW at (502) 564-3410 or visit their website at <https://eec.ky.gov/Environmental-Protection/Water/Monitor/Pages/HABS.aspx> .

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## HAB Response at Ohio Reservoirs (except West Fork Lake)

If HAB conditions are observed at an Ohio reservoir (except for West Fork Lake), or if reports are received from the public, an Algal Bloom Report Form, (Appendix E: Ohio Algal Bloom Report Form)) is used to report the conditions. The form can also be filled out and submitted electronically at the following link:

<https://survey123.arcgis.com/share/ac459f1f0b344bfa93c0486b028fbba6> . (If the form is filled out and submitted electronically, the District WQP POC should still be notified via email.)

Scanned hardcopies of the form (or a simple notification of the submittal of an electronic form) should be emailed to the Ohio EPA's HAB mailbox and the District WQP POC.

- Ohio EPA's HAB mailbox, [HABmailbox@epa.ohio.gov](mailto:HABmailbox@epa.ohio.gov)
- LRL WQP (Zac Wolf, [Zachary.L.Wolf@usace.army.mil](mailto:Zachary.L.Wolf@usace.army.mil) and Kristin Berger, [Kristin.M.Berger@usace.army.mil](mailto:Kristin.M.Berger@usace.army.mil))

Reporting HAB conditions via the Algal Bloom Report Form concludes the District's responsibilities.

If the public reports potential HAB related illness to District personnel, they should be advised to contact the Poison Control Center at 1-800-222-1222 or to seek immediate medical attention from a licensed medical provider. Additionally, healthcare providers who rule out other potential causes of the symptoms and suspect a HABs illness should notify their local health district epidemiologist or the Ohio Department of Health (ODH can be contacted at [BEH@odh.ohio.gov](mailto:BEH@odh.ohio.gov) or 614-644-1390).

Ohio's HAB response SOP may be available upon request by the WQP or online. The Ohio HAB Strategy for PWS can also be found online at <https://epa.ohio.gov/static/Portals/28/documents/habs/PWS-HAB-Strategy.pdf>. The Ohio HAB Strategy for Recreational Waters can also be found at <https://epa.ohio.gov/static/Portals/35/hab/HABResponseStrategy.pdf?ver=2020-10-28-164629-413>. For more information, contact the OEPA at (614) 644-2160 or visit their website at [ohioalgaefinfo.com](http://ohioalgaefinfo.com).

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## HAB Response at West Fork Lake

If HAB conditions are observed at West Fork Lake (aka Winton Woods Lake), or if reports are received from the public, the following POCs at Great Parks of Hamilton County and the District WQP POC should be notified.

- Amanda Nurre, [anurre@greatparks.org](mailto:anurre@greatparks.org)
- LRL WQP (Zac Wolf, [Zachary.L.Wolf@usace.army.mil](mailto:Zachary.L.Wolf@usace.army.mil) and Kristin Berger, [Kristin.M.Berger@usace.army.mil](mailto:Kristin.M.Berger@usace.army.mil))

The LRL WQP will coordinate with Great Parks of Hamilton County to determine who should collect samples to send off for lab analysis. Depending upon availability, the LRL WQP or LRL staff at West Fork Lake may be asked to assist with sample collection. HAB sampling kits may be made available to District teams to assist with any sampling efforts.

If the public reports potential HAB related illness to District personnel, they should be advised to contact the Poison Control Center at 1-800-222-1222 or to seek immediate medical attention from a licensed medical provider. Additionally, healthcare providers who rule out other potential causes of the symptoms and suspect a HABs illness should notify their local health district epidemiologist or the Ohio Department of Health (ODH can be contacted at [BEH@odh.ohio.gov](mailto:BEH@odh.ohio.gov) or 614-644-1390).

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## HAB Response on the Ohio River

If the District observes any signs of HABs on the Ohio River, or if reports are received from the public, the District will report them to the Ohio River Valley Water Sanitation Commission (ORSANCO) and the District WQP POC.

- Greg Youngstrom, [gregy@orsanco.org](mailto:gregy@orsanco.org)
- Sam Dinkins, [sdinkins@orsanco.org](mailto:sdinkins@orsanco.org)
- LRL WQP (Zac Wolf, [Zachary.L.Wolf@usace.army.mil](mailto:Zachary.L.Wolf@usace.army.mil) and Kristin Berger, [Kristin.M.Berger@usace.army.mil](mailto:Kristin.M.Berger@usace.army.mil))

Reporting HAB conditions via email concludes the District's responsibilities.

If the public reports potential HAB related illness to District personnel, they should be advised to contact the Poison Control Center at 1-800-222-1222 or to seek immediate medical attention from a licensed medical provider.

ORSANCO's HAB response SOP may be available upon request by the WQP or on their website. For more information, contact ORSANCO at 513-231-7719 or visit their website at <http://www.orsanco.org/programs/harmful-algae-blooms/> .

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## Appendix A: Frequently Asked Questions about HABs

### **BACKGROUND INFORMATION FOR HABs**

#### **What is a HAB?**

Harmful algal blooms (HABs) are significant and excessive growths of algae or microorganisms that have the potential to produce toxins harmful to humans and animals. HABs occur in marine and freshwater environments and can be caused by different types of algae or microorganisms. In the Louisville District, HABs are almost exclusively caused by cyanobacteria (also known as blue-green algae). For the purpose of this document, we will focus on cyanobacteria HABs.

All freshwater bodies have native cyanobacteria species that can produce HABs. Several of these species can produce toxic chemicals (called cyanotoxins) that can be harmful to the nervous system (neurotoxins), the liver (hepatotoxins), and the skin (dermatotoxins) of humans and other animals. In addition to cyanotoxins, HABs are harmful to freshwater ecosystems, especially when they die-off and deplete oxygen levels which can result in fish mortality.

#### **What causes HABs to form?**

Some factors that can contribute to HABs include ample sunlight, low-water or low-flow (stagnant) conditions, warmer temperatures, and excess nutrients (i.e., phosphorus and/or nitrogen). The primary sources of nutrient pollution are runoff of fertilizers, animal manure, sewage treatment plant discharges, storm water runoff, and failing septic tanks.

#### **Can you see the algae blooms?**

Blooms can grow and be visible, at which time they often form mats or scums that can be seen on or just below the water surface. Visible algae scums are indicative of a high risk of negative health effects for humans and other animals. However, blooms are not always visible and that is why many states rely on toxin testing to detect HABs.

#### **Do HABs mean that the lake will be closed to recreation?**

Sometimes the beaches, particularly at Ohio and Indiana reservoirs, are closed as a result of the presence of HABs, however boating may be permitted and businesses may still remain open in the case of advisories or cautions. Visitors are encouraged to enjoy the reservoir, but must be aware of the possibility of adverse health impacts associated with contact with water and know that immediate healthcare is needed if there is a sudden onset of symptoms associated with HAB exposure.

### **Is this part of climate change?**

We do not know. What we do know is lower water levels, higher water temperatures, and increased levels of nutrients impact algal growth.

### **What does interagency cooperation accomplish in terms of assessing and improving water quality?**

Interagency cooperation provides for better communication between federal, state, and local governmental agencies, and non-governmental agencies all having vested interests and responsibilities for care of the environment including our water resources. To protect our reservoirs and streams, a holistic watershed approach to develop best management practices is needed. Because different agencies have different authorities and specific areas of focus, and because of the complexity and interdependency of urban development, infrastructure, agriculture, recreational and economic interests, cooperation among all stakeholders is needed for an effective response plan for HABs.

## **ADVERSE HEALTH EFFECTS**

### **Is it safe to have contact with the water?**

Visitors to the reservoir should consider risks before participating in water-related activities. It is difficult to determine where and at what concentration toxins are present in a certain part of the waterbody. Best judgement should be used by observing safe practices, such as monitoring for alerts/advisories provided by the state and assessing visual signs of HABs.

### **What are the risks if I am exposed to water with a HAB?**

Adverse health effects from exposure to cyanotoxins may range from a mild skin rash to serious illness. Acute illnesses caused by short-term exposure to cyanobacteria and cyanotoxins during recreational activities include hay fever-like symptoms, skin rashes, respiratory and gastrointestinal distress. Exposure to drinking water contaminated with elevated concentrations of microcystin and cylindrospermopsin could cause liver and kidney damage.

If you suspect you are experiencing health related issues due to HAB exposure, please contact the Poison Control Center at 1-800-222-1222 or seek medical attention from a licensed medical provider. The Corps is not licensed, nor permitted, to provide medical advice.

### **If I get my water through a public utility, is it safe to drink if the water is drawn from the reservoir?**

If a reservoir provides water to local water/utility companies, the utility companies are notified of the HAB so that they can take precautionary measures in treating the drinking water. For specific inquiries about your drinking water quality, contact your utility office.

## **What about clothing, life jackets and equipment used in reservoir water impacted by HABs?**

Wash all clothing and equipment including life jackets after contact with algal blooms and scum. At a minimum use fresh water to wash life jackets but for additional precaution use soap. Algal cells can accumulate under swimwear so it is especially important to rinse clothing and skin with fresh water and soap.

## **What are some precautionary measures I can take?**

Precautionary measures include:

- Avoiding contact with visible algae and not swallowing water while swimming.
- Taking a bath or shower with warm, soapy water after coming in contact with water in ponds and reservoirs, especially before preparing or consuming food.
- Pets and livestock should not be allowed to swim in or drink untreated water from these sources. Livestock, pets and wild animals can be poisoned by the toxins produced by some algal blooms. Small animals can ingest a toxic dose quickly.
- Dogs are particularly susceptible to cyanobacteria poisoning because the scum can attach to their coats and be swallowed during self-cleaning.
- When consuming fish, remove the guts, liver, and skin and rinse fillets in tap water before cooking/eating, do not consume or allow pets/animals to consume the organs or skin.
- If you are picnicking, wash your hands before eating if you have had contact with lake water or shore debris.
- Wash all clothing and equipment including life jackets after contact with algal blooms and scum. At a minimum, use fresh water to wash life jackets and swimwear but for additional precaution use soap.

## **Who does a HAB affect?**

Discomfort and illness can happen to people, pets, livestock, and all other animals. Children, pets, and individuals susceptible or already experiencing illness or a rash are at a much higher risk of effects of cyanotoxins than others.

## **What if I or (my) animals feel sick after contact with the water?**

First, seek immediate care through your physician or care center if you feel you or your family have been impacted by algal blooms.

If you suspect you are experiencing health related issues due to HAB exposure, please contact the Poison Control Center at 1-800-222-1222 or seek medical attention from a licensed medical provider. The Corps is not licensed, nor permitted, to provide medical advice.

In **Kentucky** you may also contact or report a diagnosed illness to the local county health department.

In **Indiana** you may also contact or report a diagnosed illness to the Indiana State Department of Health at the following link: <https://www.in.gov/isdh/25974.htm> .

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In **Ohio** you may also contact or report a diagnosed illness to the local county health department.

### **What health effects in animals should we watch for?**

Clinical signs of cyanobacteria poisoning in animals include vomiting, diarrhea, decreased appetite, weakness, seizures, and sudden death, especially in livestock. If you see a cyanobacteria bloom in the water where you visit, do not allow pets or livestock to swim in or drink from areas where blooms are seen. If pets swim in scummy water, rinse them off with soap and water immediately to remove the toxin. Do not let them lick the algae off their fur. Direct livestock to water sources away from infected waters. If your animal shows any of the clinical signs listed above, contact your veterinarian immediately.

## **THE WAY AHEAD**

### **What agencies does the Louisville District work with to determine HAB conditions?**

In Indiana, the District works with the Indiana Department of Natural Resources (IDNR) and the Indiana Department of Environmental Management (IDEM). In Kentucky, the District works with the Kentucky Division of Water (KDOW). In Ohio, the District works with the Ohio Department of Natural Resources (ODNR) and the Ohio EPA. For HABs on the Ohio River, the District works with the Ohio River Valley Water Sanitation Commission (ORSANCO) and the state leads affected by the HAB.

### **How does a reservoir get “cleaned up” from an overabundance of nutrients or algae or bacteria?**

The health of a watershed is related to many factors: environmental, human, global conditions, etc. Through natural processes, organic elements will break down over time entering watersheds. It is critical that agencies work together to employ and educate stakeholders and generate interagency partnerships. Equally critical to understanding the natural processes are educating landowners about establishing buffer boundaries, erosion, farm ponding, and conservationist policies.

### **What can the Corps do to fix this problem?**

It will take a cooperative interagency effort to develop and implement best watershed management strategies to address this problem. Improvement in water quality will require a rather extensive time period for system stabilization once strategies are in place. Strategy development with participation on the part of all parties involved (farmers, developers, cities, towns, municipalities, economic offices, and the general public) will also take time.

### **Where can I find information on algal blooms?**

- U.S. Army Corps of Engineers, Louisville District HABs  
<http://www.lrl.usace.army.mil/Missions/CivilWorks/WaterInformation/HABs.aspx>
- World Health Organization Guidelines (2003)

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- [http://www.who.int/water\\_sanitation\\_health/bathing/srwg1.pdf](http://www.who.int/water_sanitation_health/bathing/srwg1.pdf)
- Kentucky Division of Water  
<https://eec.ky.gov/Environmental-Protection/Water/Pages/default.aspx>
  - Indiana Blue-Green Algae  
<http://www.in.gov/idem/algae/>
  - Ohio Beach Guard  
<http://publicapps.odh.ohio.gov/beachguardpublic/>
  - Ohio Environmental Protection Agency  
<https://www.epa.state.oh.us/>
  - Ohio Department of Health  
<https://odh.ohio.gov/wps/portal/gov/odh/know-our-programs/harmful-algal-blooms/welcome-to-habs>
  - Ohio Algae Information  
<http://epa.ohio.gov/HAB-Algae>

# Appendix B: Indiana Algal Bloom Notification Form



**ALGAL BLOOM NOTIFICATION**  
 State Form 55581 (3-14)  
 INDIANA STATE DEPARTMENT OF HEALTH  
 INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

State use only  
 HABISS # \_\_\_\_\_  
 Date \_\_\_\_\_

**Notifying Party**

Public  State Agency  
 Healthcare Provider  County Agency  
 Other (specify): \_\_\_\_\_

Contact Name \_\_\_\_\_  
 Telephone Number \_\_\_\_\_

**Location Information**

Date bloom observed \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
mm dd yyyy

Time bloom observed \_\_\_\_\_:\_\_\_\_\_  
hh mm am/pm

Private Water body  
 Public Water body  
 Unknown

Name of water body \_\_\_\_\_  
 Location: \_\_\_\_\_

Is this body of water a drinking water source?  
 Yes  No  Unknown

Is near a public recreational area?  
 Yes  No  Unknown

Attached map with bloom location noted (e.g. Google Map image)?  
 Yes  No  Unknown

Digital photos attached?  
 Yes  No  Unknown

**Environmental Conditions**

Visible algae present  
 Yes  No  Unknown  
 If yes, what color: \_\_\_\_\_

Unusual odors  
 Yes  No  Unknown

Any sick or dead animals \_\_\_\_\_  
 Yes  No  Unknown

If yes species & count \_\_\_\_\_  
 Additional information \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Bloom Description and Sampling Information**

Please describe the location of the bloom in the water body (e.g. center of lake, at boat dock, at the beach)  
 \_\_\_\_\_  
 \_\_\_\_\_

Please check any colors you see  
 Green  Blue  Red  Rust  Brown  Milky White  Purple  Black

Were samples taken?  Yes  No  Unknown  
 If yes, when were they taken and where were they sent? \_\_\_\_\_  
 \_\_\_\_\_

Is there any other information you would like to add? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Please FAX completed forms to: Indiana State Department of Health: (317) 233-7047 or E-MAIL to [epb@isdh.in.gov](mailto:epb@isdh.in.gov).

## Appendix C: Sample Collection Instructions for KY Lakes

1. Line cooler with trash bag and fill trash bag with ice.
2. Arrive at sample location. Take picture of water and record GPS coordinates (can pull from Google Earth if needed).
3. Write the date, time and location on bottle label using permanent marker (if available). Label should read “Lake Name Site #1, MM/DD/YYYY HHSS”. Place clear tape over the label once complete (if available) to protect from damage.
4. Put on nitrile gloves.
5. Open bottle and dip into lake to collect from water surface. Fill up all the way. Cap it when done.
6. Place sample bottle in a bubble bag (bubble wrap bag) to protect from breakage. Make sure each sample bottle is in its own bubble bag.
7. Place in cooler with fresh ice and pony tie the trash bag as tight as possible. Shipping tape can be used to help seal it. The key is to minimize potential ice-melt water from leaking out during shipping.
8. Complete Chain of Custody form (see Appendix D). Once complete, place in zip top bag and tape to the lid of the cooler.
9. Tape cooler lid down and send to:

Attn: Colin Arnold Water Quality Branch  
100 Sower Blvd, Suite 104  
Frankfort, KY 40601
10. Send email to the following to notify POCs of shipment of sample and include any pictures (especially close-up pictures of the algae/bloom, and pictures showing the extent of the bloom) and GPS coordinates of sample locations:
  - Nick Reif, [Nicholas.Reif@ky.gov](mailto:Nicholas.Reif@ky.gov)
  - Robbie Johnson, [RobertC.Johnson@ky.gov](mailto:RobertC.Johnson@ky.gov)
  - Colin Arnold, [Colin.Arnold@ky.gov](mailto:Colin.Arnold@ky.gov)
  - LRL WQP (Zac Wolf, [Zachary.L.Wolf@usace.army.mil](mailto:Zachary.L.Wolf@usace.army.mil) and Kristin Berger, [Kristin.M.Berger@usace.army.mil](mailto:Kristin.M.Berger@usace.army.mil))

## Appendix D: KY DOW Chain of Custody (COC) form and Instructions

Instructions for completing COC (see next page for blank COC, and following page for completed example COC):

1. Project: “Lake Name” – Algal Toxins
2. Prog. Code: Blank
3. Fill out a row for each site
  - a. Sample Type: Regular
  - b. Method & Matrix & Depth: Grab, Water, 0
  - c. Station ID, Waterbody, County: Site name (e.g. “Lake Name Site 1”), Lake Name, County Name
  - d. GPS Coordinates: Give Latitude/Longitude for location sample was taken
  - e. Date/Time: MM/DD/YYYY, HHMM
  - f. Write “Yes” in the row with column header “10 Algal Toxins”, and place checkmarks next to the appropriately numbered box/boxes. Check box 1 for total microcystins, box 2 for cylindrospermopsin, and/or box 3 for anatoxin-a (this info is also located at the bottom of the COC.
  - g. For # Containers, write 1.
  - h. Leave DEPS Lab ID blank.
4. Fill in Collectors box with name(s) of collector(s). Leave program supervisor and project coordinator boxes blank
5. In Program Supervisor and Project Coordinator boxes, write “Robbie Johnson”.
6. If shipping samples, sign your name in the “Relinquished By” field, fill in Date and Time, and write USACE in the “Representing” field. Place the completed COC in zip top bag and tape to underside of lid of the cooler before taping cooler shut. If dropping samples off, keep COC with cooler. When handing samples over to lab, sign your name in “Relinquished by”, USACE in “Representing”, and give date and time.

<b>Project:</b>					<b>Prog. Code:</b>
					<b>Ship Temp:</b>
Sample Type	Method & Matrix & Depth	Station ID, Waterbody, County	GPS Coordinates	Date/Time (24 hr)	Analyte Groups Requested (Yes / No or Checkmark)
					Algal Toxins
					<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3
					# Containers: <input type="text"/> DEPS Lab ID: <input type="text"/>
					<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3
					# Containers: <input type="text"/> DEPS Lab ID: <input type="text"/>
					<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3
					# Containers: <input type="text"/> DEPS Lab ID: <input type="text"/>
					<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3
					# Containers: <input type="text"/> DEPS Lab ID: <input type="text"/>
					<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3
					# Containers: <input type="text"/> DEPS Lab ID: <input type="text"/>

<b>Collectors:</b>			
<b>Program Supervisor</b>		<b>Project Coordinator</b>	

Relinquished by: _____	Date: _____	Received by: _____	Date: _____
Representing: _____	Time: _____	Representing: _____	Time: _____
Relinquished by: _____	Date: _____	Received by: _____	Date: _____
Representing: _____	Time: _____	Representing: _____	Time: _____

Water Matrix Analyses		
Parameter	Preservation	Analyses
Algal Toxins	Cool to 4C	Analyses: (1) Total <u>microcystins</u> , (2) <u>Cylindrospermopsin</u> , (3) Anatoxin-a

Project:		Green River Lake – Algal Toxins			Prog. Code:	
		Ship Temp:				
Sample Type	Method & Matrix & Depth	Station ID, Waterbody, County	GPS Coordinates	Date/Time (24 hr)	Analyte Groups Requested (Yes / No or Checkmark)	
Regular	Grab, Water, 0ft	Green River Lake #1, Adair Co.	37.216902, -85.277032	08/01/2022, 1100	Algal Toxins	
					Yes	
					<input checked="" type="checkbox"/> 1	<input checked="" type="checkbox"/> 2
		# Containers:	1	DEPS Lab ID:		
Regular	Grab, Water, 0 ft	Green River Lake #2, Taylor Co.	37.291300, -85.283099	08/01/2022, 1200	Algal Toxins	
					Yes	
					<input checked="" type="checkbox"/> 1	<input checked="" type="checkbox"/> 2
		# Containers:	1	DEPS Lab ID:		
					Algal Toxins	
		# Containers:		DEPS Lab ID:	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	
					Algal Toxins	
		# Containers:		DEPS Lab ID:	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	
					Algal Toxins	
		# Containers:		DEPS Lab ID:	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	
					Algal Toxins	
		# Containers:		DEPS Lab ID:	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	
					Algal Toxins	
		# Containers:		DEPS Lab ID:	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	

<b>Collectors:</b>	Z. Wolf, K. Berger		
<b>Program Supervisor</b>	Robbie Johnson	<b>Project Coordinator</b>	Robbie Johnson

Relinquished by: <u>Zachary Wolf</u>	Date: <u>8/1/2022</u>	Received by: _____	Date: _____
Representing: <u>USACE</u>	Time: <u>1600</u>	Representing: _____	Time: _____
Relinquished by: _____	Date: _____	Received by: _____	Date: _____
Representing: _____	Time: _____	Representing: _____	Time: _____

Water Matrix Analyses		
Parameter	Preservation	Analyses
Algal Toxins	Cool to 4C	Analyses: (1) Total <u>microcystins</u> , (2) <u>Cylindrospermopsin</u> , (3) <u>Anatoxin-a</u>

# Appendix E: Ohio Algal Bloom Report Form

Bloom Report Form			
<p>Please provide information about the potential blue-green algae bloom observed. Information can be entered into this electronic form and saved on your computer using Word or Adobe Reader (version 9+).  <b>Please save and email a completed copy of this form to <a href="mailto:HABmailbox@epa.ohio.gov">HABmailbox@epa.ohio.gov</a>.</b>            You are encouraged to include digital photographs as additional email attachments (close-up, and landscape showing extent and location of bloom). If possible, consider including an image from an online mapping application such as Google, Bing or Yahoo Maps, with a marker at the bloom location. For more information go to the <a href="http://ohioalgaefinfo.com">ohioalgaefinfo.com</a> website.</p>			
Bloom Location:			
Water body:		Date bloom observed: / /	
County (optional):		Drinking Water Source? Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/>	
Publicly Owned Lake? Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/>		Attached map with bloom location noted (e.g. Google Map image)? Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Digital photos attached? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Report Completed By:			
Name:		Organization:	
Title:	Phone: ( ) - ext.	Email:	
Bloom Description and Sampling Information:			
Please describe the location of the bloom in the water body ( e.g. center of lake, at the boat dock, at the beach):			
Do you notice any colors in the water column? Yes <input type="checkbox"/> No <input type="checkbox"/>			
Please check any colors you see, or describe the color(s) below: Green <input type="checkbox"/> Blue <input type="checkbox"/> Red <input type="checkbox"/> Rust <input type="checkbox"/> Brown <input type="checkbox"/> Milky White <input type="checkbox"/> Purple <input type="checkbox"/> Black <input type="checkbox"/>			
Please estimate the size (sq. feet) or the extent of bloom:			
Can you see a surface scum (an accumulation at the surface) or algae floating near the water surface? Algae floating at the surface can look like grass clippings, green cottage cheese curds, or spilled paint. Yes <input type="checkbox"/> No <input type="checkbox"/> Uncertain <input type="checkbox"/>			
Is the bloom near a public beach? If yes, please specify the beach name or location below. Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/>			
Is the bloom near a drinking water intake? (Specify water system name if known) _____ Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/>			
Were samples taken? Yes <input type="checkbox"/> No <input type="checkbox"/>			
If yes, what type of samples; when and where were they collected; and where were they sent for analysis?			
Do you know if other water quality information is available? (Specify what data is available and where) Yes <input type="checkbox"/> No <input type="checkbox"/>			