

Draft ORSANCO Harmful Algae Bloom Monitoring, Response and Communication Plan

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Goals

This guidance document will outline ORSANCO's actions to monitor, anticipate, identify, and respond to Harmful Algae Blooms (HAB). The goals of these actions are to:

- A. Allow the States and health departments to manage the Ohio River's use as a source of recreation.
- B. Allow water utilities to use the Ohio River as a source of safe drinking water.

Introduction

Algae are present in the Ohio River throughout the year. During optimal conditions some algae may rapidly proliferate causing a "bloom". During a bloom the algal concentration may go from a few thousand cells per milliliter (cells/ml) of water to hundreds of thousands or even millions of cells/ml. Algae blooms are most common in the summer although they may occur at any time of the year. On the Ohio River the conditions that allow these blooms to occur are typically low and slow flow, clear water and, warm water.

Sampling on the Ohio River has identified over 300 different species of algae. These algae are divided into 8 taxonomic divisions with the most common being diatoms (Bacillariophyta), green algae (Chlorophyta) and blue-green algae (Cyanobacteria).

Cyanobacteria can produce toxins (cyanotoxins) which can be harmful if ingested. For this reason an algae bloom which consists primarily of Cyanobacteria is considered a HAB. These toxins can affect people and animals who ingest them, either through recreation (such as swimming), or in drinking water.

Many algae can produce compounds which cause taste and odor problems for drinking water utilities. The presence of taste and odor compounds may indicate the presence of an algae bloom. While these blooms may not be HABs, they do require increased treatment of drinking water.

According to US EPA the 4 most commonly identified cyanotoxins are microcystins, cylindrospermopsin, anatoxins and saxitoxins. Each of these toxins can be produced by several genus/species of cyanobacteria. Nearly all cyanobacteria produce lipo-poly saccharides which can cause contact dermatitis or intestinal illness if ingested. A list of genera and the toxins they produce is in **Attachment A**.

On August 19, 2015, ORSANCO received an NRC report of a paint-like green material on the Ohio River at Pike Island Locks and Dam (mile 84.2) which covered 100 X 200 feet. This was quickly identified as the blue-green algae *Microcystis aeruginosa*. The bloom produced instream levels of the toxin microcystin as high as 1,900 ug/L. Over the next month this bloom expanded to cover the Ohio River from Pike Island L&D to Cannelton L&D (river mile 84.2 to 720.7). Prior to this event, the largest algal bloom recorded on the Ohio River covered about 30 miles.

A number of actions are underway as a result of this event, including increased monitoring to detect HABs, in-house toxin analytical capabilities, the development of this plan, and examination of the 2015 data to investigate the causes of the bloom

Algae/Toxin Standards

Currently there are no Federal drinking water or contact recreation standards for the toxins produced by algae. In May 2015 US EPA proposed Drinking Water Health Advisories for two algae toxins, microcystin and cylindrospermopsin (table 1). These advisories are based on a 10 day exposure. US EPA is expected to publish contact recreation standards in 2016-2017. When these standards are published ORSANCO will reference them in this document.

Table 1: US EPA Finished Drinking Water Health Advisories for Algal Toxins

Threshold	Microcystin (ug/L)	Cylindrospermopsin (ug/L)
Children under 6 years	0.3	0.7
Children over 6 years and adults	1.6	3.0

Ohio EPA published cyanotoxin thresholds for drinking water in the Public Water System Harmful Algal Bloom Response Strategy (Ohio EPA, 2014) (Table 2). These thresholds were derived mainly from a draft US EPA Toxicological Study.

Table 2: Ohio EPA Finished Drinking Water Advisories for Algal Toxins

Threshold (ug/L)	Microcystin	Anatoxin a	Cylindrospermopsin	Saxitoxin
Drinking Water- Do Not Drink	1	20	1	0.2
Drinking Water- Do Not Use	20	300	20	3

Because of the lack of standards, most States use the World Health Organization (WHO) Guidelines for managing recreational waters. WHO published guidelines for both determining the severity of a bloom and for concentrations of toxins (Tables 3 and 4).

Table 3: WHO Guidelines for HABs in Recreational Waters

Guidance Level	Concentration	How Guidance Level Derived	Health Risks
Low probability of health effects	20,000 cells/ml or 10 ug/L of chlorophyll <i>a</i> with cyanobacteria dominant	Human bathing epidemiological study	Short term- skin irritations, gastrointestinal illness
Moderate probability of health effects	100,000 cells/ml or 50 ug/L of chlorophyll <i>a</i> with cyanobacteria dominant	Provisional drinking water guideline value for microcystin and other cyanotoxins	Potential for long term illness as well as short term health effects
High probability of health effects	Cyanobacteria scum formation in areas where whole body contact occurs	Inference from oral animal lethal poisonings and human illness case histories	Potential for acute poisoning

Table 4: OEPA Guidelines for Algal Toxins in Recreational Waters

Threshold (µg/L)	Microcystin	Anatoxin-a	Cylindrospermopsin	Saxitoxin*
Informational Sign	<6	<80	<5	<0.8
Recreational Public Health Advisory	6	80	5	0.8
Recreational No Contact Advisory	20	300	20	3

These guidelines and advisory concentrations are provided for information purposes only. ORSANCO will defer to the individual States to determine if a drinking water or recreation advisory needs to be reported.

Advisories

ORSANCO’s role is to provide timely information so that State resource managers can advise the public concerning use of the Ohio River as both a source of drinking water and for recreation.

ORSANCO will not issue recreation advisories for the Ohio River. Recreation advisories will be issued by each State, typically through their local health departments. ORSANCO will refer any questions from local health departments to the appropriate State Department of Health.

ORSANCO will not issue “Do Not Drink” advisories for drinking water. These will be issued by each State, typically through their State Department of Health. ORSANCO will refer any questions about “Do Not Drink” advisories to the appropriate State agency.

ORSANCO will provide a link on its website to each States public information concerning HABs on the Ohio River.

Monitoring

Algae blooms may occur anywhere on the Ohio River and at all times of the year. On the Ohio River HABs occur during the months when flows are low and temperatures are high. The primary months for HABs are July-September.

Potential algal blooms will be identified using multiple methods. This will identify potential areas of algal growth which will allow field crews to investigate. Any potential algae blooms being investigated will be reported to the State HAB contacts (Attachment C).

Direct Observation

ORSANCO personnel will observe sections of the river as part of their normal sampling routine. In 2016 the biological survey crews will be in the Willow Island, Greenup, and Cannelton pools. Bi-Monthly sampling crews will also be out in July and September which will cover 15 main-stem and 14 tributary locations each month.

During the July-September period ORSANCO will make a monthly request from all Ohio River water utilities for the current conditions of their raw water (temperature, pH, and turbidity data), as well as notes on any taste and odor complaints, increased use of carbon treatment or visible algae scums on the River. We will also ask for timely notification of any noted algal problems during the month. For those utilities with greater capabilities we will ask for toxin concentrations, and chlorophyll/algae concentrations.

ORSANCO will also work with Dam Operators (US Army Corps of Engineers) and other public river users to identify potential HABs.

A guide to identifying HABs will be provided to Dam Operators, water utilities, and other interested parties.

Datasondes

ORSANCO operates 2 datasondes with telemetry systems. Sensors on these datasondes collect pH, Conductivity, Turbidity, Dissolved Oxygen, Temperature, and Chlorophyll *a* data every 30 minutes. The telemetry systems allow the data to be available in real-time from ORSANCO's website.

Satellite Imagery

ORSANCO can use imagery from LANDSAT satellites to identify areas of increased algal growth. Because of the temporal nature and spatial extent of HABs, satellite imagery will be a valuable tool to help focus limited resources on areas of probable HAB development.

These satellites provide images about every two weeks, although cloud cover may impact the usability of the images.

Currently there are good algorithms to identify chlorophyll concentrations. Processing of the image can take about 24 hours. After processing the maps will be forwarded to the Primary Contacts and WUAC. When areas of high chlorophyll are identified, ORSANCO will coordinate with State and Local personnel to investigate.

Response

Sampling

To assist the States in managing the Ohio River ORSANCO will identify HABs and determine their extent. ORSANCO will coordinate with the States to ensure adequate coverage of on-going HABs.

Samples will be screened using in-house resources both to identify the type of algae and the presence/absence of toxins. Samples collected for making management decisions (e.g. recreation advisories) will be sent to a certified laboratory identified by the affected States.

Final data will be available on ORSANCO's website with weekly updates.

All ORSANCO sampling crews will follow the Standard Operating Procedures listed in **Attachment B**.

Communication

Communication and coordination is the primary role of ORSANCO during an HAB event. This section will delineate ORSANCO's responsibilities to its stakeholders. The Contact List in **Attachment C** denotes the Primary Contact, Health Department Contact, and Public Information Contact for each State and Federal Agency.

When an algae bloom is identified on the Ohio River ORSANCO will inform the Primary Contacts and Water Users Advisory Committee (WUAC), whether or not it is an HAB. When a HAB is identified ORSANCO will convene a weekly conference call with the Primary Contacts, WUAC, and Health Department Contacts. These organizations will be responsible for including others from their organizations (e.g. sampling personnel). The purpose of this call will include, but not be limited to:

- Discuss sampling results
- Coordination of State/ORSANCO crews for follow up sampling
- Identification of laboratories for sample analysis
- Identify the need for advisories

Separate calls to subgroups may be used as needed (e.g. Public Information Officers to coordinate press releases)

Sample Results

In general, data that is collected by ORSANCO is available to the public. Toxin analytical results are often reported to ORSANCO by the laboratories prior to them being confirmed. These preliminary results are not

available to the public. Typically confirmation of the results is received within 2-3 days at which point it will become public.

The preliminary data may be used by ORSANCO and State/Federal resource managers to make decisions regarding the response to the HAB. ORSANCO will gather all available State and Federal generated data and act as the repository. This will allow easier decision making by the resource managers. ORSANCO will provide access to this data through a password protected website.

Commissioners

ORSANCO will provide a weekly update of on-going HAB events to the Commissioners.

Water Utilities

ORSANCO will inform the WUAC and the general Spills list when algae blooms are identified on the Ohio River, whether or not these blooms are HABs. During a HAB event ORSANCO will provide weekly updates to these groups regarding sample results and extent.

Drinking water system advice and communication related to treatment will be done by the appropriate State Environmental Agency to the individual water systems.

Media Contact

Media contacts will be handled by ORSANCO by providing general information. Specific questions about advisories or the impact of sample results on advisories will be referred to the PIO contact for each State Environmental or Health agency. A general fact sheet for media contacts is available in **Attachment D**.

General Information

A number of Federal, State or Local agencies and NGO's may ask for updates on a HAB event. ORSANCO will provide weekly email updates of on-going HAB events to these groups as they are identified.

Resources

ORSANCO

<http://www.orsanco.org/harmful-algae-blooms>

Illinois

<http://www.epa.illinois.gov/topics/water-quality/surface-water/algae-bloom/index>

Indiana

<http://www.in.gov/idem/algae/>

Kentucky

<http://water.ky.gov/waterquality/Pages/HABS.aspx>

Ohio

<http://epa.ohio.gov/habalgae.aspx#147744472-basics>

Pennsylvania:

West Virginia:

http://www.wvdhhr.org/oehs/public_health/blue_green_algae.asp

US EPA

<http://www2.epa.gov/nutrient-policy-data/cyano-habs>

Centers for Disease Control

<http://www.cdc.gov/nceh/hsb/hab/default.htm>

US ACE

http://www.lrd-wc.usace.army.mil/OhioRiver/WaterQuality/WaterQuality_OHRIV.html

Louisville District: <http://www.lrl.usace.army.mil/Missions/CivilWorks/WaterInformation/HABs.aspx>

Pittsburgh District: <http://www.lrp.usace.army.mil/Missions/WaterManagement/WaterQuality.aspx>

Huntington District:

ATTACHMENT A
List of Toxic Algae

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**ATTACHMENT B
SAMPLING SOP**

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ATTACHMENT C
STATE AND FEDERAL CONTACTS

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	Public Information	Primary Contact	Health Department
Illinois	Kim Biggs IL EPA 217-558-1536 kim.biggs@illinois.gov	Spills List Gregg Good Gregg.Good@illinois.gov 217-782-7082 Tony Dulka 217-254-7923 ANTHONY.DULKA@illinois.gov Dave McMillan Dave.McMillan@illinois.gov	Justin Albertson
Indiana	Amy Smith IDEM Program Director of Media Relations 317-233-4927 asmith@idem.in.gov	Cyndi Wagner CWAGNER@idem.IN.gov 317-308-3381	Jennifer O'Malley 317-233-7315
Kentucky	Lanny Brannock KY DEP Executive Staff Advisor 502-564-2150 lanny.brannock@ky.gov	Peter Goodman Peter.Goodmann@ky.gov (502) 564-3410 Melanie.arnold@ky.gov Andrea.keatley@ky.gov	Connie.White@ky.gov 502-564-3970
Ohio	Heidi Greismer OH EPA Chief of Public Interest Center 614-644-2782 heidi.griesmer@epa.ohio.gov	Craig Butler Craig.butler2@epa.ohio.gov Mike Baker Mike.Baker@epa.ohio.gov Amy.Klei@epa.ohio.gov EMAWatch@dps.ohio.gov	Gene Phillips Gene.Phillips@odh.ohio.gov
Pennsylvania	John Poister PA DEP Community Relations Coordinator 412-442-4203 jpoister@pa.gov	Ron Schwartz roschwartz@pa.gov 412-442-4181	Ron Schwartz roschwartz@pa.gov
West Virginia	Kelley Gillenwater WV DEP Chief Communications Officer 304- 926-0499 ext. 1331 Kelley.J.Gillenwater@wv.gov	Scott Mandirola Scott.G.Mandirola@wv.gov Walt Ivey walter.m.ivey@wv.gov Bill Toomey William.J.Toomey@wv.gov 304-356-4298	Allison Adler WV Department of Health and Human Resources Office of Communications 304-558-7899 Allison.C.Adler@wv.gov
USEPA		Tim Henry Henry.timothy@epa.gov (312-886-6107)	
USACE		Erich Emery Erich.B.Emery@usace.army.mil 513-684-3041	
USGS		Aubrey Bunch aurbunch@usgs.gov	

ATTACHMENT D
GENERAL HAB INFORMATION FOR PRESS CONTACTS

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General HAB information for press

Consistent message: put together a list of talking points for messaging. Include health effects and recommended precautions. Run it by advisory group. Run it by Lisa/PIO group. Include differences between recreational and drinking water advisories and proactive steps that individuals can take to protect themselves from exposure

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