



ILLINOIS DEPARTMENT OF PUBLIC HEALTH

IDPH

PROTECTING HEALTH, IMPROVING LIVES

Harmful Algal Bloom Surveillance in Illinois: A Public Health Perspective

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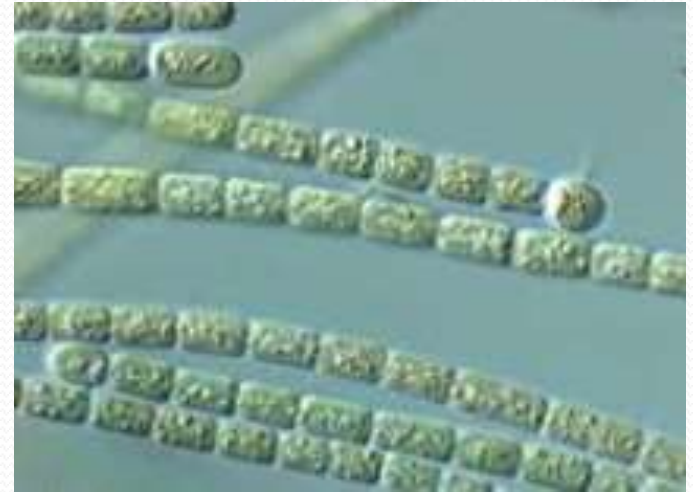
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Outline

- Describe blue-green algae and harmful algal blooms (HABs)
- Discuss recent HAB events and outbreaks
- Explain and describe HAB reporting and surveillance

Blue-Green Algae

- Also called cyanobacteria
- Photosynthetic bacteria
- Natural part of aquatic environment
- Concentration can vary widely
 - Depends on season and location
 - Thrive in warm, shallow, nutrient-rich water



Harmful Algal Blooms

- Increase in nutrients can lead to sudden, rapid growth of blue-green algae, a “bloom”
 - May be due to fertilizer runoff and an increase in nitrogen and phosphorus
- Harmful algal blooms occur when blue-green algae produce toxins that may adversely affect humans, animals, and the environment
- Microcystis is a common type of cyanobacteria present during HABs
 - Produces microcystin toxin
 - Other types of cyanobacteria and toxins (saxitoxin, anatoxin-a, cylindrospermopsin) may be present

Harmful Algal Blooms

- Blooms may appear as scum, or green paint on surface, though not always visible
- May produce foul odor
- May contribute to fish kills and habitat destruction due to depletion of oxygen
- Toxins can cause a variety of symptoms in humans
 - May affect the skin, liver, GI tract, and nervous system









Cell Density guidelines/risk levels

- World health organization has provisional guidelines for drinking water and recreational water exposure

| Relative Probability of Acute Health Effects (Advisory Level) | Microcystin-LR (ug/L) | Total Cyanobacteria (cells/mL) |
|---|-----------------------|--------------------------------|
| Low | <10 | <20,000 |
| Moderate | 10-20 | 20,000-100,000 |
| High | 20-2,000 | 100,000-10,000,000 |
| Very High | >2,000 | >10,000,000 |

- No US federal guidelines, criteria, standards, or regulations in drinking water or ambient recreational water

Algal-Bloom Associated Outbreaks

- Reported to CDC Prior to 2009
 - Hawaii 1981
 - New Hampshire 2001
 - Nebraska 2004 (2 separate outbreaks)
 - Florida 2007

Algal-Bloom Associated Outbreaks

- Reported to CDC 2009-2010
 - 11 total outbreaks
 - New York, Ohio, and Washington
 - Occurred in summer months (June, July, August)
 - All associated with recreational activities at freshwater lakes

Algal-Bloom Associated Outbreaks

- 61 cases of illness, 2 hospitalizations, 0 reported deaths
- 66% < 20 years of age
- 8 of 11 outbreak investigations included detection of algal toxins

Algal-Bloom Associated Outbreaks

- Symptoms can develop quickly, from minutes to hours after exposure
- Symptoms were wide-ranging
 - General (fever, fatigue, aches, weakness, dizziness)
 - Gastrointestinal (abdominal cramps, vomiting, diarrhea)
 - Dermatologic (skin irritation, rash, sores)
 - Respiratory (cough, wheezing, shortness of breath)
 - Neurologic (confusion, tingling)

Kansas 2011

- 38 water bodies with a confirmed HAB in 2011
- 34 reports of human and animal health events associated with HABs in 2011
 - 5 dog deaths
 - 13 human cases, 2 hospitalizations

Algal Bloom- Ohio 2014

- Near Toledo, Ohio
- Contaminated water supply
- Aug. 1: microcystin toxin detected at water treatment plant. Aug. 2: advisory issued. Aug. 4: advisory lifted
- “Do not consume” advisory – affected an estimated 450,000 people

Algal Bloom- Ohio 2014

- Residents banned from using water (drinking, cooking, bathing)
- Affected restaurants, hospitals, dentists/doctors offices
- Police/Fire departments called in to set up distribution centers
- Within 12 hours of advisory, cases of water were sold out within 75 miles of Toledo



Aerial view of western Lake Erie and the bloom near Toledo, OH



HAB Surveillance

- Increased surveillance is needed to:
 - Determine risk associated with exposure to blue-green algae
 - Link cases of illness with the environmental event
 - Characterize HAB events, illnesses, and outbreaks
 - Determine if HAB events are changing in frequency or geographic distribution
 - Inform public policy and prevention efforts
 - Refine definitions of HAB events and HAB-related illnesses

Challenges of surveillance

- Cross-disciplinary nature of HABs means multiple state agencies could be involved (EPA, DPH, DNR, Ag)
- Transient nature of contamination
- Limited testing

Challenges of surveillance

- Under reporting
- Limited illness severity/non-specific symptoms
 - Cases of illness are difficult to confirm in the absence of clinical diagnostic tests and rapid sample tests
- Establishing case definitions

Surveillance in Illinois

- Illinois EPA has been working on HAB events for several years
- Developed a statewide HAB program beginning in 2013,
 - Consists of routine observation and sample collection
- Sites:
 - 30 Lake County beaches
 - 3 Fox River sites
 - 40-45 lakes across Illinois
- Respond to events: Blooms/scums observed during routine monitoring or reported by the public

Surveillance in Illinois

- If you suspect that blue-green algae are blooming on your lake, or a public lake you've visited, you can report it via the Illinois EPA HAB webpage
- Report form captures the environmental event
 - Includes space for bloom location, size, and various characteristics (odor, color, etc)
 - Pictures of bloom can be uploaded



Blue-Green Algae and Harmful Algal Blooms (HABs)

Home / Topics / Water Quality / Surface Water / Harmful Algal Blooms

Background

Blue-green algae are microscopic organisms that occur naturally in Illinois lakes and streams. When certain conditions are present algae can reproduce very quickly. These conditions include; warm, shallow, undisturbed surface water that receives a lot of sunlight. The rapid growth of algae is called a "bloom." Algal blooms can discolor the water or produce floating scums on the surface of the water, especially along shorelines. These blooms are primarily a concern during the summer months. Certain types of blue-green algae can produce algal toxins that could pose a health risk to people and animals when they are exposed to them in large enough quantities. These are collectively called Harmful Algal Blooms (HABs).



Surface water affected by blue-green algae often is strongly colored such that it can develop a paint-like appearance.

How can blue-green algae or HABs be harmful to my health?

While most blue-green algal blooms are not harmful, some produce algal toxins. Health effects can occur when surface scums or waters containing high levels of algal toxins are swallowed, come in contact with skin, or when airborne droplets containing toxins are inhaled. Symptoms can include nausea, vomiting, skin or throat irritation, allergic reactions or difficulty breathing. The toxins produced by blue-green algae can affect the liver and nervous system when water is consumed in sufficient quantities. The safest thing to do is to treat every algal bloom as if it could be dangerous. Recreational contact such as swimming, bathing, or showering with water not visibly affect by a blue-green algal bloom is not expected to cause health effects.

SECTION NAVIGATION

- Go Back
- Identifying HABs
- Reporting HABs
- Contact Information
- 2012 Drought and HAB Monitoring
- Working Together
- 2013 Statewide HAB Program
- 2014 Statewide HAB Program
- Other HAB Resources

FIND SERVICES

- VIM Testing Station
- Medication Disposal Locations
- E-Waste Collection Sites
- Hazardous Waste Collection Sites

Within 10 miles of

Address or City or ZIP



Illinois Environmental Protection Agency

Bureau of Water • 1021 North Grand Avenue East • P.O. Box 19276 • Springfield • Illinois • 62794-9276

Bloom Report Form

Please provide information about the potential blue-green algae bloom observed. Information can be entered into this electronic form and saved onto your computer. Please save and e-mail a completed copy of this form to EPA.HAB@Illinois.gov. Please include at least two digital photographs (one close up & one landscape photo to show the surroundings) as additional e-mail attachments.

NOTE: All submitted Bloom Report Forms will be reviewed by Illinois EPA staff. If warranted, a sample may be collected for analysis of microcystin. You will be notified what (if any) action will be taken.

Bloom Location:

Water Body Name:

County: Date bloom observed:

Drinking water source: Publicly owned lake:

Digital photos attached:

Report Completed By:

Name:

Organization:

Title: Phone: E-mail:

Are you a VLMP volunteer/coordinator?

Bloom Description and Sampling Information:

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

Did you notice any colors in the water column?

Please describe the color(s) you see:

Was there a foul smell associated with the bloom (e.g., septic, rotten, fishy, earthy)?

Please describe

Please estimate the size (sq. feet) of the bloom:

Can you see a surface scum (an accumulation of algae at the surface) or algae floating near the water surface (algae at the surface can look like grass clippings, green/blue thick foam, spilled paint)?

Is the bloom near a public beach, boat ramp or marina? (please specify name)

Is the bloom near a public water supply intake? (specify water system name if known)



IDPH's Role

- Looking to expand surveillance to capture human and animal illnesses associated with HABs
- Coordinating with Illinois EPA to respond to HAB events and may collect additional information as needed
- IDPH will work to increase awareness and coordinate with other partners, including:
 - Medical providers
 - Veterinarians
 - Local health departments
 - Beach and lake associations
 - Other state agencies

CDC's Role

- CDC is implementing a reporting module on NORIS- the National Outbreak Reporting System
- Several states will input data on HAB events and illnesses associated with HABs
- Will establish a national surveillance system for HABs

Future Needs

- Clinical diagnostic tests to assess algal toxin exposures (e.g. urine)
- Rapid and affordable water sampling tests
- Federal guidelines to inform HAB definitions and exposure assessments
- Resources/capacity within state and local health departments for surveillance, monitoring, investigation and reporting

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