

Harmful Algal Blooms Status of Surveillance in Iowa



Presentation to Water Resources Coordinating Council
February 17, 2016

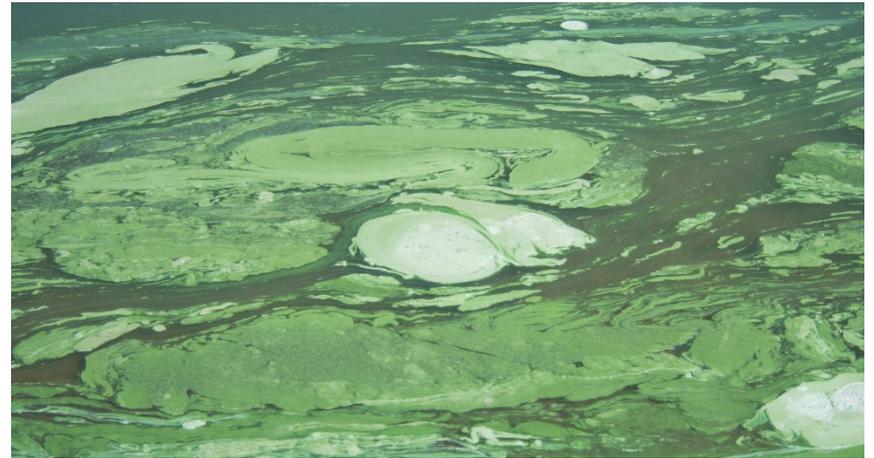
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What are algal blooms?

- ❑ A quick growth of algae in lakes and rivers
- ❑ They are actually bacteria, not algae. The scientific name is “cyanobacteria”
- ❑ These small bacteria have chlorophyll, like plants, which give them a green or blue-green color. They are photosynthetic bacteria.
- ❑ Ecologically important
 - Nitrogen cycle
 - Symbiotic relationships
 - ❑ Plants, fungi

Algae Blooms

- ❑ Abundant nutrients, proper light conditions, and warm, stagnant water
- ❑ Typically occur in late summer/early autumn
- ❑ Often float to the surface and form scums
- ❑ Accumulate along shorelines



Harmful Algae Blooms (HABs)



- ❑ Negative impact on aquatic life

- Block sunlight
- Deplete dissolved oxygen
- Produce toxins

- ❑ Indicators of toxic blooms

- Fish kills
- Dead waterfowl and other animals in close proximity to the water



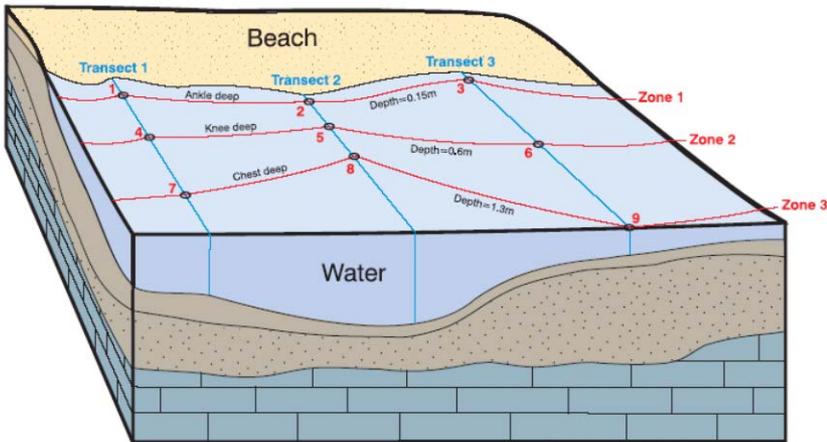
What are cyanotoxins?

- Diverse group of natural toxins
 - Cyclic peptides (hepatotoxins)
 - Alkaloids (neurotoxins, cytotoxins, dermatotoxins)
 - Irritant toxins (lipopolysaccharides)
- Biological function unclear
- Harmful concentrations during blooms
- Microcystins
 - Commonly occurring in fresh water; produced by several genera of cyanobacteria

Monitoring Program Structure

- Sampling design
 - Focus has been on recreational waters, primarily state park beaches
 - Weekly samples for total microcystins
- Survey with rapid turnaround
 - Public health decisions
 - Action threshold of 20 µg/L total microcystins
- Samples collected Monday/Tuesday
 - Results available Thursday afternoon
 - Resample results by Friday, if needed

Sampling Protocol



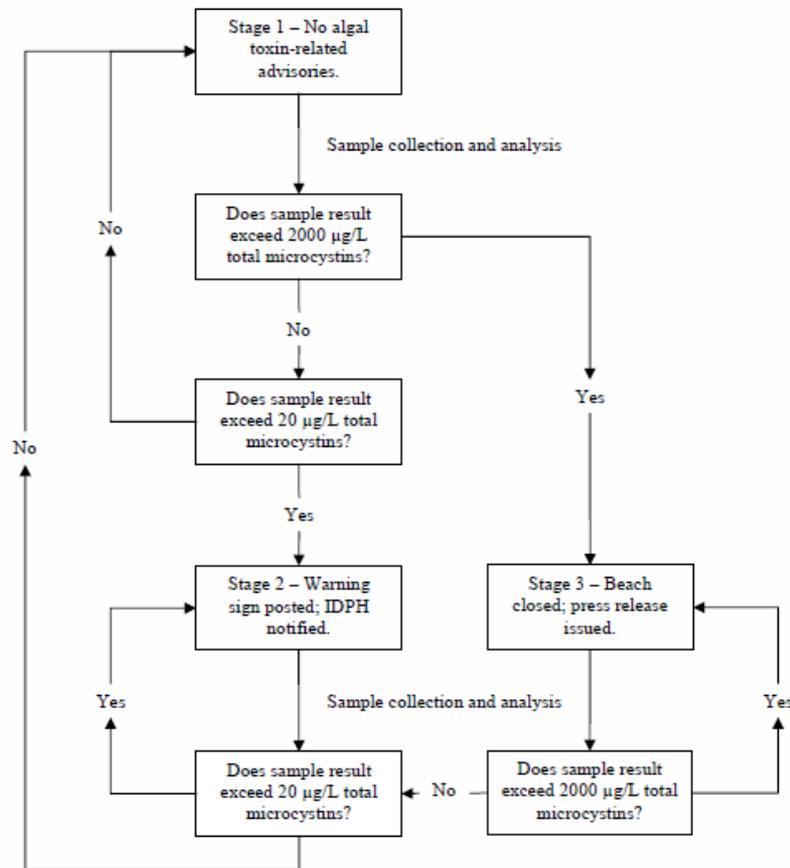
- Visual assessment
 - General appearance
 - Scums

- Sample collection
 - Composite
 - Discrete

- Transferred in coolers in dark conditions



Cyanotoxin Advisory Policy



■ Three-tiered advisory policy

- Based on results from both composite and discrete samples
- *Stage 1* (no algal toxin-related advisories)
- *Stage 2* (advisory) - sample result exceeds 20 µg/L total microcystins
- *Stage 3* (closure) – toxin result > 2000 µg/L; reported health case(s).

Informing the Public

- General information signs
- Park staff notified; post advisory signs
- Iowa Department of Public Health HAN
- IDNR Beach Monitoring website
- Beach Monitoring Hotline
- Press releases



Microcystin Poisoning

- Exposure to elevated levels of microcystin can cause health impacts from different routes of exposure
 - Dermal exposure (swimming and wading in water)
 - Ingestion (drinking water, mostly incidentally for humans)
 - Inhalation (breathing – boating, water skiing)
- Health impacts are related to exposure amount
 - A low dose where no adverse health impacts are seen
 - Increasing dose causes increasing adverse health impacts

Health Impacts from Microcystin Poisoning

□ Dermal Impacts

- Skin irritation
- Rash
- Blistering

□ Ingestion Impacts

- Gastrointestinal distress
- Muscle weakness
- Liver impacts (hepatitis)
- High doses can cause liver failure

□ Inhalation Impacts

- Slight respiratory distress
- Severe allergic response

Illness Surveillance

- ❑ The Iowa Department of Public Health (IDPH) is responsible for tracking illness in humans attributed to microcystin poisoning
- ❑ Reporting of suspected cases of microcystin poisoning required of health care providers
- ❑ The IDPH works cooperatively with local health care partners in this tracking process
 - Local county environmental health
 - Local network of health care providers

How Illness Surveillance Works

- ❑ Mandatory report requires all suspected cases to be reported to IDPH
- ❑ Results from IDNR monitoring indicates elevated microcystin toxin at state beaches
- ❑ IDPH informs local environmental health, local health care providers, and other partners to be on the alert for microcystin poisoning cases
- ❑ Reports of cases are investigated further by IDPH staff and cases entered into database.

Summary of Elevated Levels of Microcystin

- Top 8 Locations and Weeks of Elevated Microcystin Levels (2011-2015)
 - Black Hawk Lake (Sac) 21 Weeks
 - Green Valley Lake (Union) 15 Weeks
 - Lake of Three Fires (Taylor) 9 Weeks
 - Union Grove Lake (Tama) 9 Weeks
 - Lake Geode (Henry) 8 Weeks
 - Big Spirit Lake (Dickinson) 6 Weeks
 - Rock Creek Lake (Jasper) 4 Weeks
 - Big Creek (Polk) 4 Weeks

Summary of Elevated Levels of Microcystin

□ Lake-Weeks* of Elevated Levels of Microcystin (2011-2015)

■ 2011	10 Lake-Weeks
■ 2012	12 Lake-Weeks
■ 2013	23 Lake-Weeks
■ 2014	19 Lake-Weeks
■ 2015	37 Lake-Weeks

* Lake-week is defined as a week in which an elevated level of microcystin was noted at a particular lake

Suspected Cases of Microcystin Poisoning

□ Number of suspected cases reported

- 2011 10 cases *
- 2012 2 cases
- 2013 2 cases
- 2014 4 cases
- 2015 8 cases

* Four cases were at triathlon

Suspected Cases of Microcystin Poisoning

□ Most common adverse symptom complaints

- Diarrhea 7 complaints
- Stomach or abdominal pain 7 complaints
- Rash 6 complaints
- Fatigue 4 complaints
- Fever 4 complaints
- Nausea 4 complaints
- Headache 4 complaints
- Shortness of breath 3 complaints

Thank You! Questions?



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