IDEM’s Blue-Green Algae Monitoring Program

Cyndi Wagner, Chief
Targeted Monitoring Section
Watershed Assessment and Planning Branch
Indiana Lakes
### World Health Organization Guidance Values for Probability of Acute Health Risks During Recreational Exposure to Microcystins and Cyanobacteria

<table>
<thead>
<tr>
<th>Relative Probability of Acute Health Effects</th>
<th>Cyanobacteria (cells/mL)</th>
<th>Microcystin – LR (μg/L)</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>&lt;20,000 cells/mL</td>
<td>&lt;10</td>
<td>Post Advisory Signs</td>
</tr>
<tr>
<td>Moderate</td>
<td>20,000 - 100,000 cells/mL</td>
<td>10 - 20</td>
<td>Post Advisory Signs and Restrict Swimming</td>
</tr>
<tr>
<td>High</td>
<td>100,000 - 10,000,000 cells/mL</td>
<td>20 - 2,000</td>
<td>Post Advisory Signs, Prohibit Swimming and Other Water-contact Activities</td>
</tr>
<tr>
<td>Very High</td>
<td>&gt;10,000,000</td>
<td>&gt;2,000</td>
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</table>

Since the Algal Bloom Guidance Values from the World Health Organization were established, aquatic communities have increased their monitoring efforts to detect cyanobacteria, Microcystin-LR, and algae blooms in their water systems. To determine the probability of acute health risks during recreational exposure to cyanobacteria, the 2004 WHO Guidance Values can be used. The cyanobacterial cell concentration and Microcystin-LR concentration must be determined for each sampling location. The cell concentration must be measured using a concentration method (e.g., direct microscopic examination). The Microcystin-LR concentration must be measured by an approved method for analysis of Microcystin-LR concentration (e.g., HPLC). If a Microcystin-LR concentration is not determined, the concentration of cyanobacteria can be used as an indicator of the probability of acute health effects. The cell concentration must be determined using a concentration method (e.g., direct microscopic examination). The Microcystin-LR concentration must be measured by an approved method for analysis of Microcystin-LR concentration (e.g., HPLC). If a Microcystin-LR concentration is not determined, the concentration of cyanobacteria can be used as an indicator of the probability of acute health effects. If cell concentrations are >2,000 cells/mL, Microcystin-LR concentrations of >10 μg/L activate a Post Advisory Sign and Restrict Swimming.
Dogs die after swimming in Salamonie Reservoir

Updated: Friday, 20 Jul 2012, 12:04 PM EDT
Published: Wednesday, 18 Jul 2012, 7:13 PM EDT

Adam Widener

ANDREWS, Ind. (WANE)--What began as playtime with the pets turned fatal at the Salamonie Reservoir Sunday. A couple from Wabash was playing fetch with four dogs in the water. 24-hours later, two of those animals were dead. The couple is blaming high levels of blue-green algae.

Salamonie Reservoir is a place Larry and Marge Young frequently play with their dogs. But Sunday’s good time suddenly took a turn for the worse for their three dogs and their daughter’s Labrador.

“Within two hours one of them was deathly ill and was dead within 12 or 14 hours,” Larry Young said. “The second died within 24 hours.”

Friday Update: As of Friday morning, Marge Young said the two other dogs seemed to be doing better and acting as though back to normal. She thinks they may have liver damage but believes they will make a full recovery.

The reason wasn’t clear to the Youngs at the time, but they think the killer was a toxic blue-green algae hiding in the water. The Youngs said their vet told them blue-green
# SALAMONIE – LOST BRIDGE WEST

<table>
<thead>
<tr>
<th>DATE</th>
<th>COUNT</th>
<th>DOMINANT</th>
<th>MICROCYSTIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/26/12</td>
<td>750,320</td>
<td><em>Microcystis</em>&lt;br&gt;<em>Planktolyngbya</em>&lt;br&gt;<em>Merismopedia</em></td>
<td>1.618</td>
</tr>
<tr>
<td>7/09/12</td>
<td>1,265,360</td>
<td><em>Aphanocapsa</em>&lt;br&gt;<em>Planktolyngbya</em>&lt;br&gt;<em>Merismopedia</em></td>
<td>2.653</td>
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<tr>
<td>7/23/12</td>
<td>877,500</td>
<td><em>Planktolyngbya</em>&lt;br&gt;<em>Merismopedia</em>&lt;br&gt;<em>Synechocystis</em></td>
<td>1.497</td>
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<tr>
<td>8/06/12</td>
<td>1,500,000</td>
<td><em>Synechocystis</em>&lt;br&gt;<em>Merismopedia</em>&lt;br&gt;<em>Microcystis</em></td>
<td>0.963</td>
</tr>
<tr>
<td>8/20/12</td>
<td>910,000</td>
<td><em>Synechocystis</em>&lt;br&gt;<em>Merismopedia</em>&lt;br&gt;<em>Planktolyngbya</em></td>
<td>1.553</td>
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<tr>
<td>8/27/12</td>
<td>940,000</td>
<td><em>Merismopedia</em>&lt;br&gt;<em>Synechocystis</em>&lt;br&gt;<em>Microcystis</em></td>
<td>0.306</td>
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</table>
## POTATO CREEK STATE PARK - WORSTER LAKE

<table>
<thead>
<tr>
<th>DATE</th>
<th>COUNT (Cells/ml)</th>
<th>DOMINANT</th>
<th>MICROCYSTIN (Ug/l)</th>
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</thead>
<tbody>
<tr>
<td>8/28/12</td>
<td>1,000,000</td>
<td>Cylindrospermopsis <em>Microcystis</em> <em>Pseudanabaena</em></td>
<td>0.799 (No cylindrospermopsin)</td>
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<tr>
<td>8/21/12</td>
<td>880,000</td>
<td>Aphanocapsa <em>Microcystis</em> <em>Raphidiopsis</em> <em>Cylindrospermopsis</em></td>
<td>0.499 (No cylindrospermopsin)</td>
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<tr>
<td>8/7/12</td>
<td>1,100,000</td>
<td>Cylindrospermopsis <em>Raphidiopsis</em></td>
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<tr>
<td>7/24/12</td>
<td>1,480,000</td>
<td>Cylindrospermopsis <em>Raphidiopsis</em></td>
<td>0.298 (No cylindrospermopsin)</td>
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<tr>
<td>7/9/12</td>
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<td><em>Planktolyngbya</em> <em>Aphanizomenon</em> <em>Raphidiopsis</em></td>
<td>0.261</td>
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<tr>
<td>6/25/12</td>
<td>384,000</td>
<td><em>Planktolyngbya</em> <em>Raphidiopsis</em> <em>Snowella</em></td>
<td>0.237</td>
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</table>
## MISSISSINEWA – MIAMI

<table>
<thead>
<tr>
<th>DATE</th>
<th>COUNT</th>
<th>DOMINANT</th>
<th>MICROCYSTIN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cells/ml</td>
<td></td>
<td>Ug/l</td>
</tr>
<tr>
<td>6/26/12</td>
<td>51,360</td>
<td>Aphanocapsa, Microcystis, Merismopedia</td>
<td>&lt;0.150</td>
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<td>Planktolyngbya, Cylindropermopsis, Aphanocapsa</td>
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<td>Planktolyngbya, Cylindropermopsis</td>
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<tr>
<td>8/27/12</td>
<td>1,200,000</td>
<td>Planktolyngbya, Microcystis, Aphanocapsa</td>
<td>0.313</td>
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</tbody>
</table>
### WHITEWATER MEMORIAL STATE PARK - WHITEWATER LAKE

<table>
<thead>
<tr>
<th>DATE</th>
<th>COUNT</th>
<th>DOMINANT</th>
<th>MICROCYSTIN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cells/ml</td>
<td></td>
<td>Ug/l</td>
</tr>
<tr>
<td>6/19/12</td>
<td>33,920</td>
<td>Aphanocapsa Microcystis</td>
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<td>7/17/12</td>
<td>304,667</td>
<td>Aphanocapsa Synechocystis Synechocystis Planktolyngbya</td>
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<td>7/30/12</td>
<td>180,000</td>
<td>Aphanocapsa Synechocystis Aphanizomenon</td>
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<td>8/14/12</td>
<td>240,000</td>
<td>Aphanocapsa Synechocystis Anabaena Anabaena</td>
<td>3.670</td>
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<tr>
<td>8/28/12</td>
<td>610,000</td>
<td>Aphanocapsa Anabaena Aphanizomenon</td>
<td>&lt;0.150</td>
</tr>
</tbody>
</table>
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Reporting to the Public

- [www.algae.IN.gov](http://www.algae.IN.gov)
  - Provide public with information about:
    - Weekly lake sampling results
    - Indiana State Department of Health precautionary advisories
    - Toxins from algae
    - Risks associated with toxins
    - Precautions you can take
    - Information from other organizations and states
    - Several links to other websites
Welcome

The Indiana Department of Environmental Management, in coordination with the Center for Earth and Environmental Science at Indiana University-Purdue University Indianapolis, the Indiana State Department of Health, and the Indiana Department of Natural Resources are working to provide information about blue-green algae in our waterways.

The effort formed due to concerns over blue-green algae in Indiana and a general lack of understanding regarding the threat they actually pose. Algae are commonly found in Indiana lakes and streams without concern, however the concentrated presence of blue-green algae can be linked to some health effects and has prompted this project. Factors promoting algal growth can include sunlight, warm water, low turbulence, and nutrient sources, such as phosphorus and nitrogen. Often nutrient inputs come from nonpoint source pollution, but fortunately, there are many ways to reduce or stop nonpoint source pollution, many of which are simple things we can do right in our own backyards.

This website will be updated regularly to provide information about blue-green algae levels in central Indiana, as well as links to other websites such as the World Health Organization, the USGS Kansas Water Science Center, and assorted information available through other states.

Indiana Reservoir and Lake Update

August 10, 2012

The Indiana State Department of Health cautions Hoosiers of possible high levels of blue-green algae, also known as Cyanobacteria, at many of Indiana’s reservoirs and lakes. Swimmers and boaters should be careful in all recreational waters during this time of the year. Precautionary measures include avoiding contact with visible algae and swallowing water while swimming. Take a
Test Results

Test Results

IDEM Cyanophyte Counts [PDF] (August 10, 2012)

IDEM Toxin Report

- *Cylindrospermopsis Report [PDF]* (August 6, 2012)
- *Cylindrospermopsis Report [PDF]* (August 2, 2012)
- *Cylindrospermopsis Report [PDF]* (July 25, 2012)
- *Cylindrospermopsis Report [PDF]* (July 12, 2012)
- *Cylindrospermopsis Report [PDF]* (July 6, 2012)
- *Microcystis Report [PDF]* (August 8, 2012)
- *Microcystis Report [PDF]* (August 1, 2012)
- *Microcystis Report [PDF]* (July 25, 2012)
- *Microcystis Report [PDF]* (July 12, 2012)
- *Microcystis Report [PDF]* (July 6, 2012)
- *Microcystis Report [PDF]* (June 29, 2012)
- *Microcystis Report [PDF]* (June 22, 2012)

Cell Count and Toxin Guide

Cell Counts:

For protection of human health, the World Health Organization uses a guideline level of greater than 100,000 cells per milliter (cells/ml) for a high risk health alert in recreational waters.

Toxin Production:

- < 0.1 parts per billion (ppb): Very low/minimal risk. Corresponds to World Health Organization Level 1 Recreational Water Guideline. Use common sense practices.
- 0.1 - 4 ppb: Low to moderate risk of adverse health affects. Corresponds to World Health Organization Level 2 Recreational Water Guideline. Reduce recreational contact with water.
- > 4 ppb: Seriously consider avoiding contact with water until levels of toxin decrease.
Blue-Green Algae

With summer approaching, BOAH veterinarians advise animal owners to learn more about blue-green algae, often called pond scum. The algae is a health concern for both people and animals. The algae grows best on hot, dry, calm days, just like our summers here in Indiana.

What is blue-green algae?

Blue-green algae, also known as cyanobacteria, is microscopic bacteria found in freshwater lakes, streams and ponds where water is warm and stagnant. Most people refer to the algae as pond scum.

What's so bad about blue-green algae?

It's poisonous. While some types of algae are harmless, the blue-green type produces a natural powerful toxin. Some form toxins that affect the nervous system and others produce toxins that affect the liver.

Livestock, pets and wild animals can be poisoned by the toxins produced by some algal blooms. Lighter weight animals can ingest a toxic dose quickly. Dogs are particularly susceptible to blue-green algae poisoning because the scum can attach to their coats and be swallowed during self-cleaning.

What does the algae look like?

Blooms look like green paint floating on water, foam or scum, or mats on the surface of freshwater lakes and ponds. The blooms can be blue, bright green, brown or red. Some blooms may not affect the appearance of the water but as algae in the bloom dies, the water may smell bad. Blue-green algae is not the type that grows in mats of plant material along shorelines. When you pick it up, the algae disperses in the water and does not hang together in a stringy mass.

How does your animal get poisoned by the algae?

Swimming or drinking from water that has been contaminated with blue-green algae can
Swimmers, Boaters and Pet Owners

BLUE GREEN ALGAE
MAY BE FOUND
IN THIS LOCATION

Levels of blue-green algae are currently high in some local lakes and reservoirs and may produce toxins. Please use caution when swimming, skiing, or participating in other recreational water activities. Avoid swallowing lake water or coming into direct contact with the algae.

Keep a close eye on pets or small children, who may not watch where they are swimming or wading and may ingest water containing the toxins produced by these algae.

Exposure to blue-green algae during swimming, wading, and water-skiiing can lead to rashes, skin, eye irritation, and other uncomfortable effects such as nausea, stomach aches, and tingling in fingers and toes. Animals drink and self-clean after they leave the water, and can ingest large amounts of toxins which may result in serious illness or death.

After you swim, wade or ski, be sure to shower with warm soapy water and wash your hands carefully. Consider carrying fresh water for your animals to drink.

Blue-green algae varies in appearance, but it is usually found in shallow water or in coves/bays where water movement is limited. However, algae may be producing toxins in one area of a lake or pond, and not in another. For more information about blue-green algae, visit [www.algae.com](http://www.algae.com) or pick up a copy of our FAQ sheet at the property office or gate.
Blue-Green Algae Resources

• Cyndi Wagner
  – cwagner@idem.IN.gov
  – (317) 308-3381

• www.algae.IN.gov