



**IDEM Update
CITES 40th Annual
Environmental Symposium
April 21, 2011**

Bruno Pigott
Assistant Commissioner
Office of Water Quality
IDEM



of Protecting Hoosiers and Our Environment





Agenda

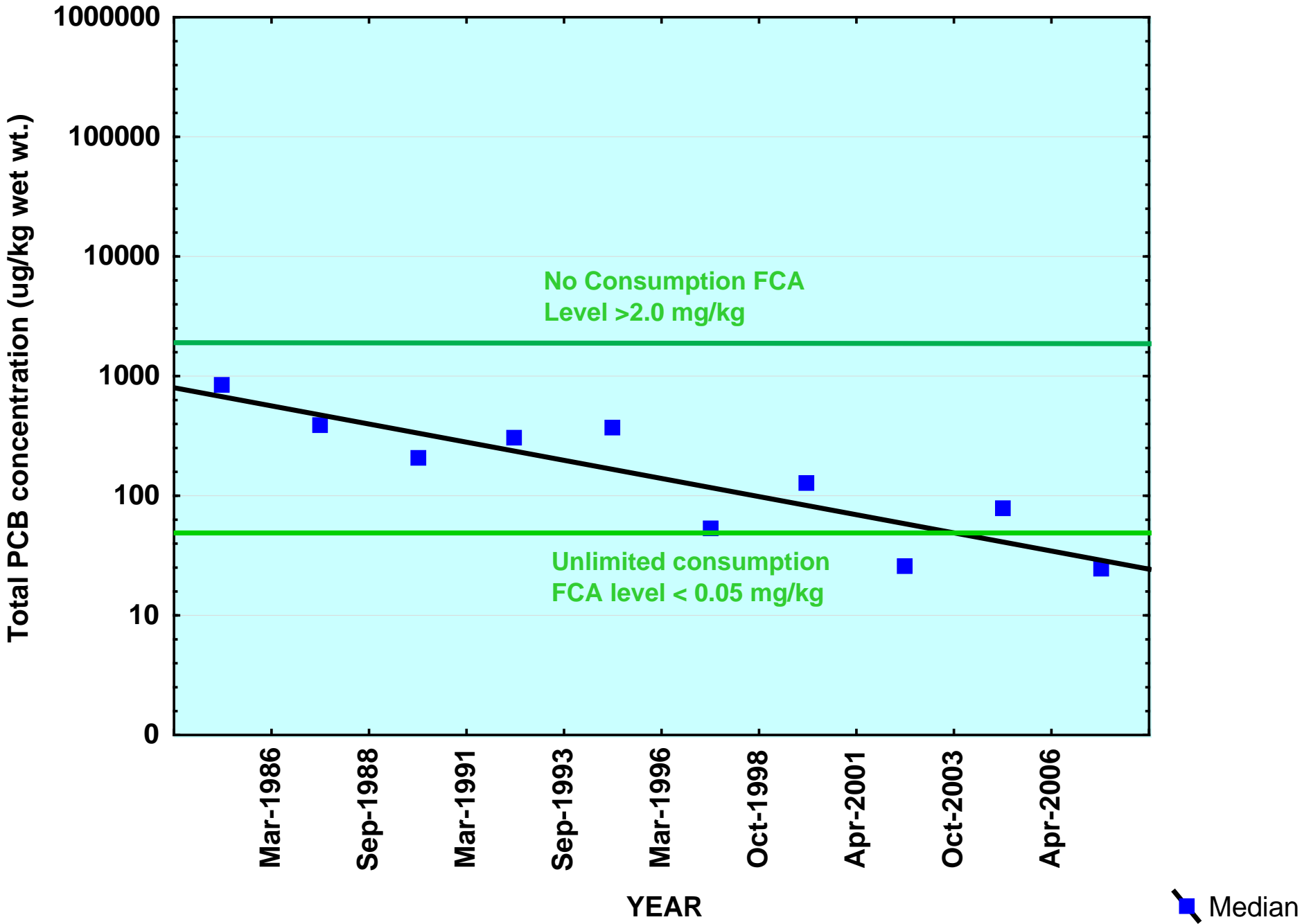
- Water Quality Changes over Time
- Success Stories 2010
- Priorities 2011



Indiana Water Quality Changes over 25 Years

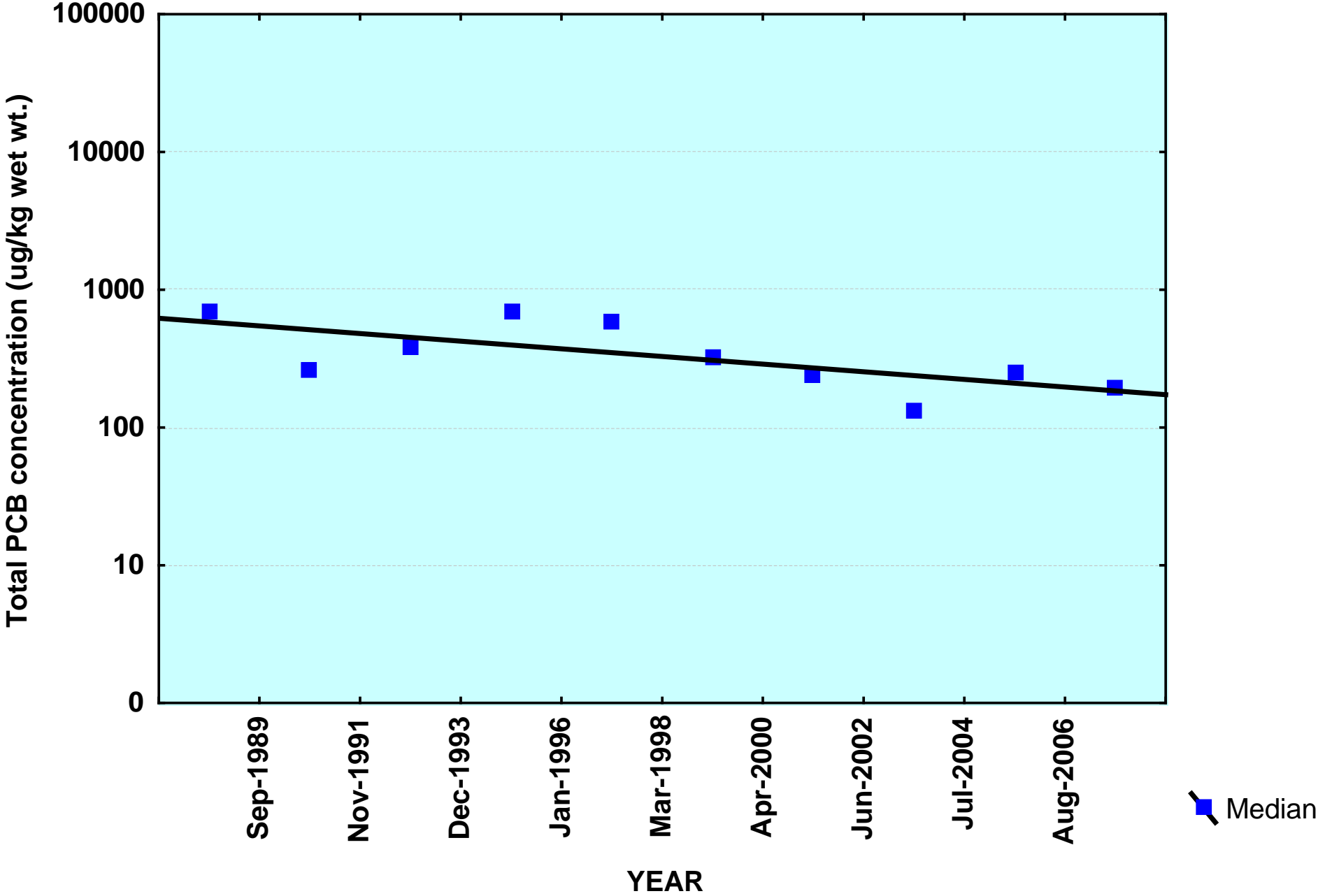
- Improvements in Water Quality Noted in Fish Tissue Analysis:
 - PCBs
 - Mercury
 - Dieldrin
 - DDT

Trend of Total PCB in Indiana Fish 1983-2008

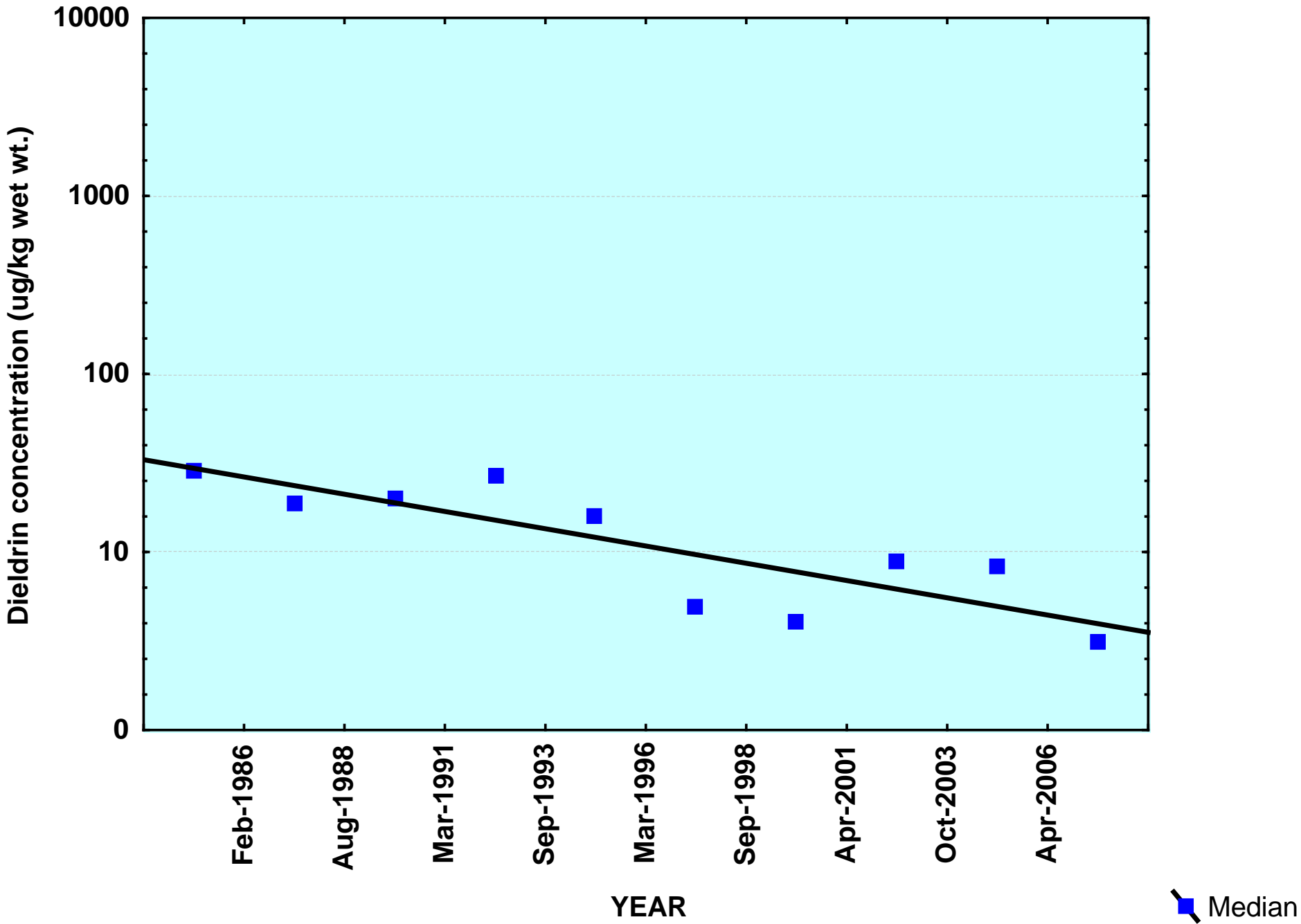


Trend of PCB in Fish 1987-2008

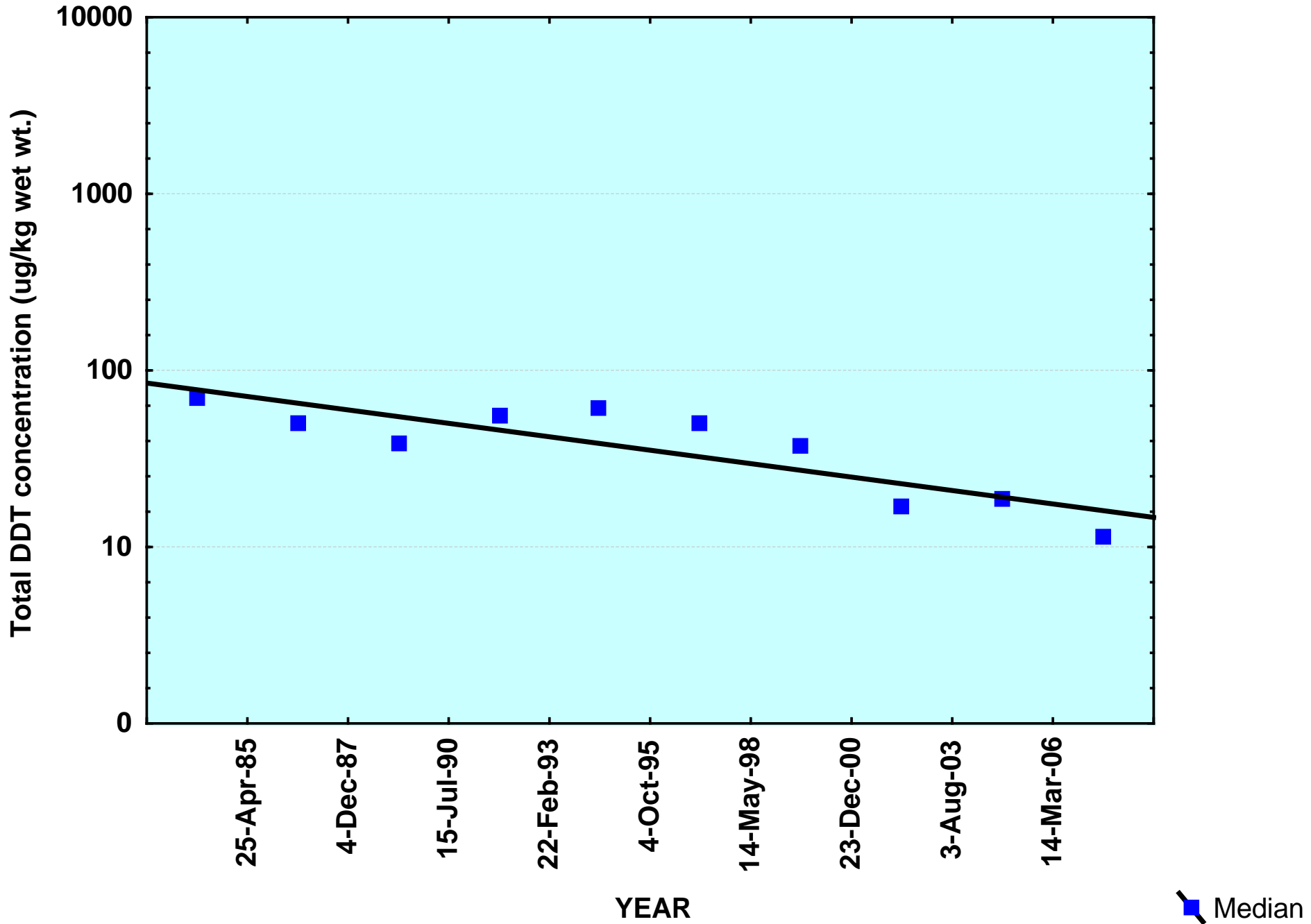
Common Carp Skin on Fillets From Rivers and Streams



Trend of Dieldrin Concentration in Indiana Fish 1983-2008



Trend of Total DDT in Indiana Fish 1983-2008





Success Stories 2010

- Staff worked hard with fewer people
- Completed core work with reduced resources
- Two Notable projects
 - Ground Water Monitoring Network
 - Blue Green Algae Monitoring



Ground Water Monitoring Network

- Determine the quality of ground water in the state's aquifers by examining private residential wells and public water supply wells across Indiana
- Fill in the ground water data gap from previous years in Indiana's Water Monitoring Strategy
- Provide the public with access to the ground water sampling data

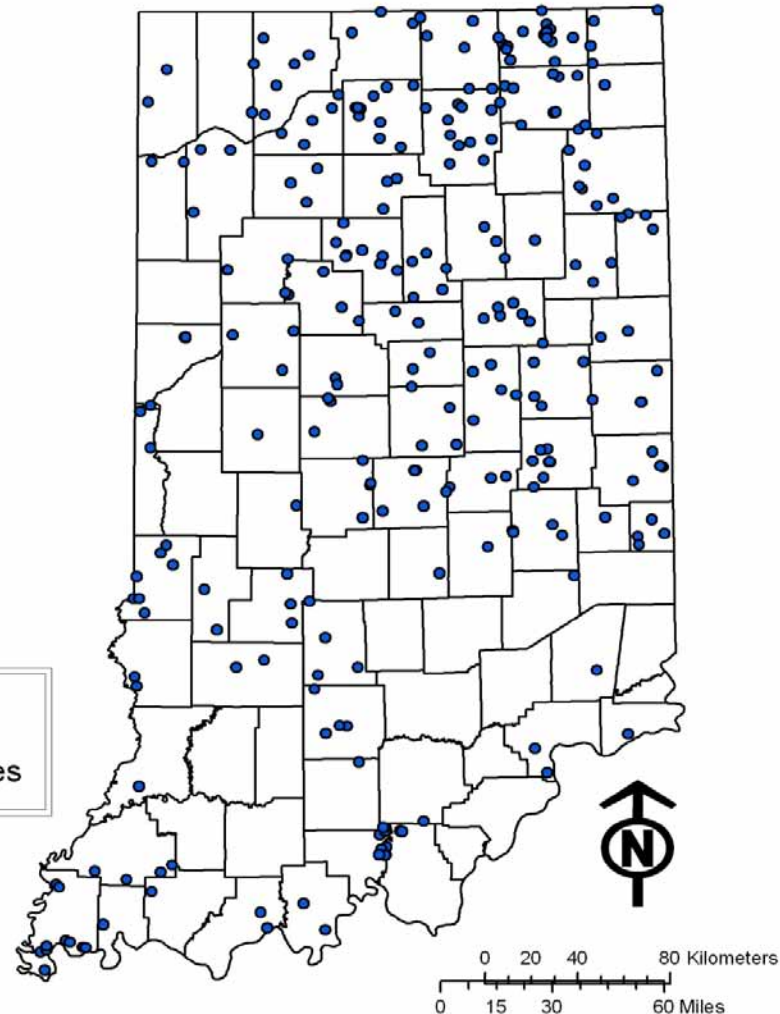


Ground Water Monitoring Network

- Scope of the Project
 - Establish a statewide network of sites that will be sampled on a yearly basis
 - Identify and expand sampling in areas with notable contamination (naturally occurring and/or anthropogenic)



GWMN Site Locations



Legend

- GWMN Sample Sites

Mapped By:
Rebecca Travis
Office of Water Quality
January 2010

Map Projection: UTM Zone 16 N
Map Datum: NAD83



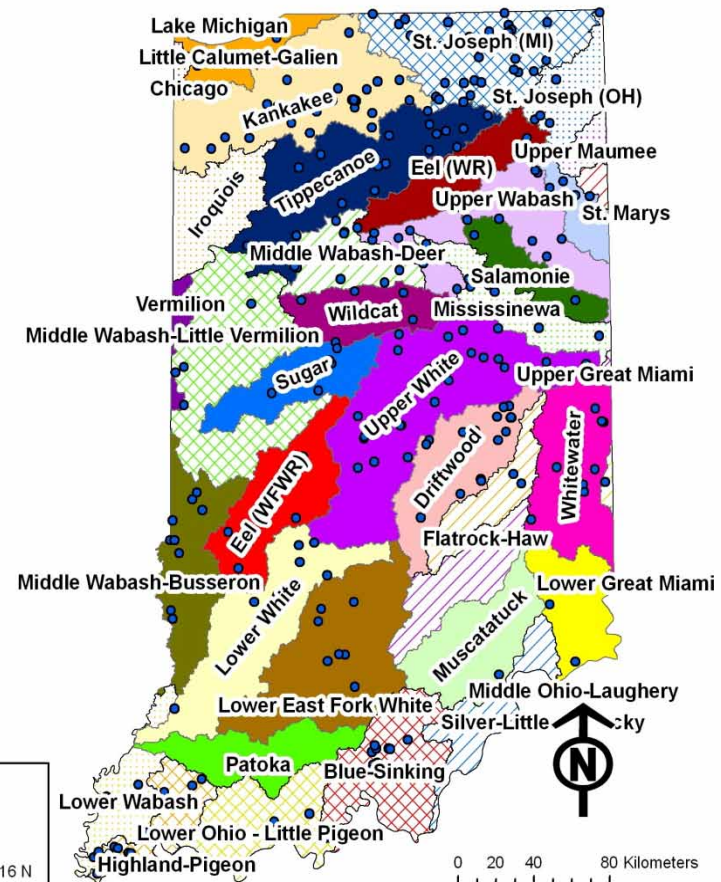
Ground Water Monitoring Network

- 2010 Milestones:
 - Distributed 2008 and 2009 results to participants
 - 2008 and 2009 Summary Report near completion
 - Completed a full round of sampling in 2010
 - Distributed data to interested groups
 - USGS, IGS
 - Indiana Water Monitoring Council (2011)

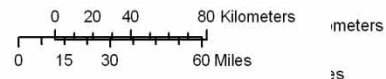


Next Steps

- Create website
 - Reports , fact sheets, SOPs
 - Interactive data download
- Additional Sites
 - Fill in data gaps in underrepresented, highly sensitive hydrogeologic settings near nitrate and degradate detections (implemented in 2010 site selection)
 - Better coverage per county
 - Study area near nutrient-impaired
 - 303d list stream
 - Develop watershed relationships



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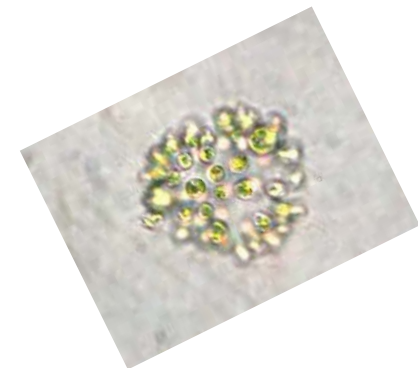
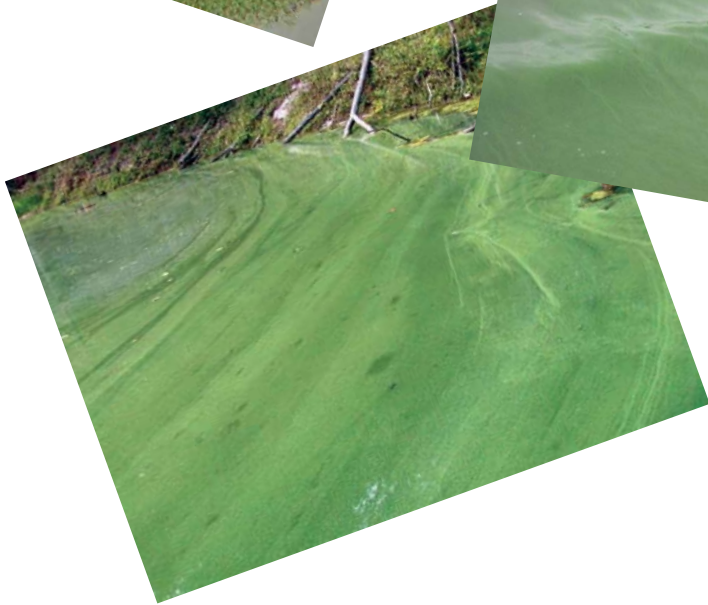
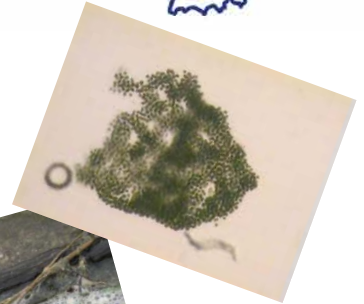
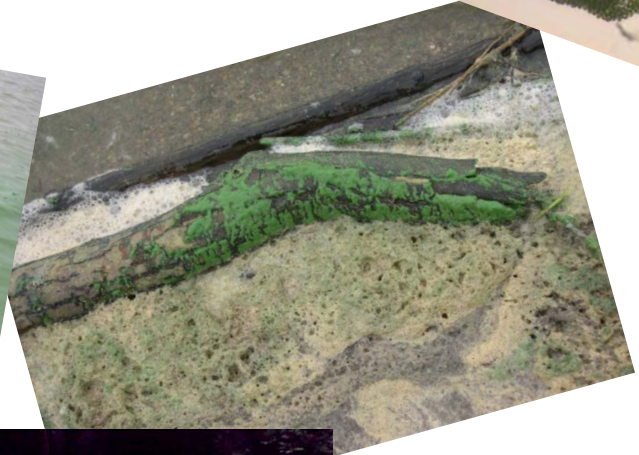
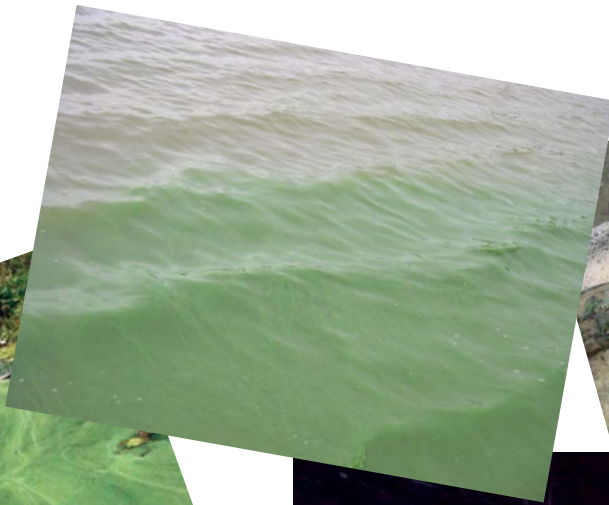
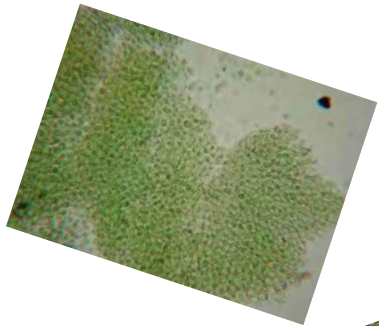


Summary

- The GWMN is a “snapshot” of ambient ground water quality across Indiana
- Goal: create a robust dataset representative of ground water quality across Indiana
- The GWMN is a planning tool to help address point source and non-point source contamination



Why Worry About Blue-Green Algae?





The Problem

- Drinking Water
 - Taste and Odor Compounds
 - Geosmin and MIB (methylisoborneol)
 - Not toxic
- Recreation
 - High cell counts: Dermatitis
 - Toxin Production: Neuro and hepatotoxins
 - Microcystin, Cylindrospermopsin, Saxitoxin, Anatoxin
 - Ingestion/inhalation while swimming
- Ecological
 - Dissolved Oxygen Depletion



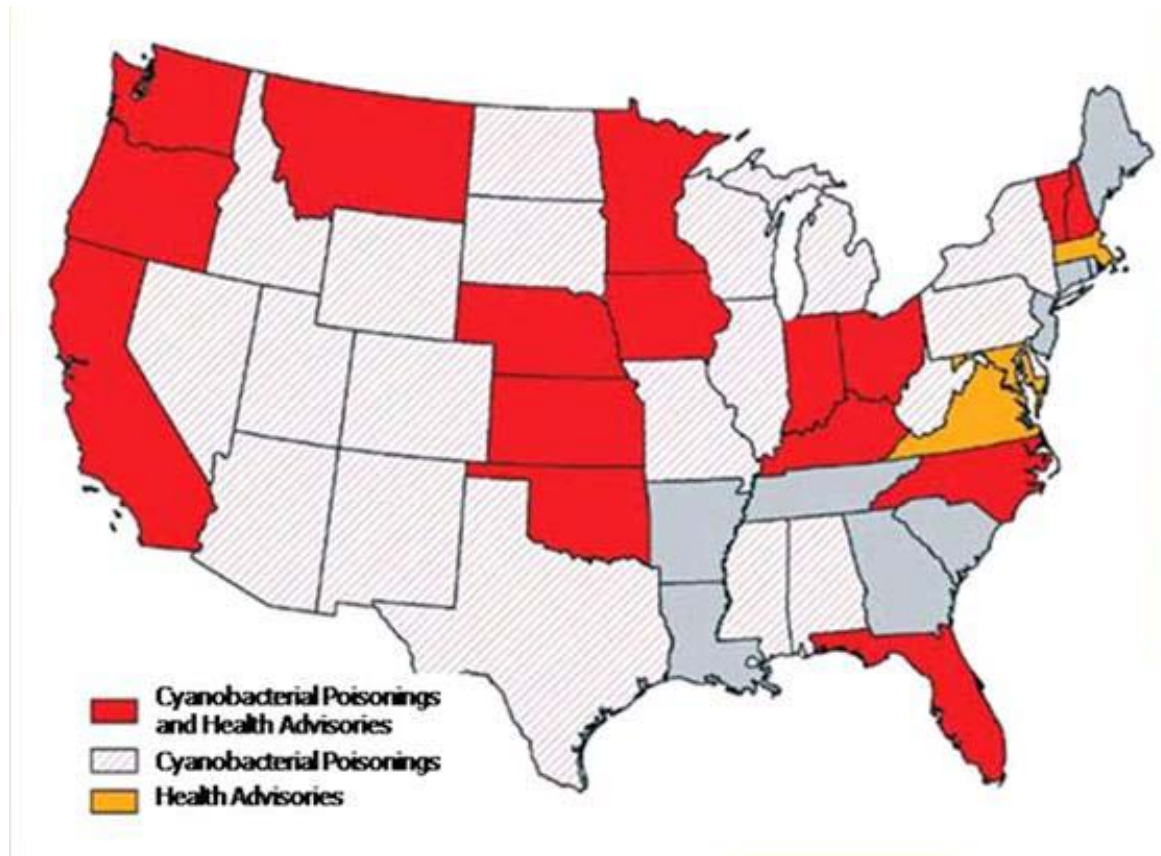
Blue-Green Algal Blooms: Causes



- Complicated lake system dynamics
 - Eutrophic systems
 - Anthropogenic acceleration
 - Warm stagnant/still water
 - Seasonality
 - Nutrients
 - Phosphorus
 - Total Nitrogen plays a role, too
 - Water column and sediments



U.S. States with Reports of Acute Cyanotoxin Poisonings



States with anecdotal reports of acute cyanotoxin poisonings of animals and/or humans and states that have issued recreational health advisories. (Compiled from the literature by Yoo et al. 1995; Chorus and Bartram 1999; Huisman et al. 2005) and newspaper articles.

Source: Graham, J. L., K.A. Loftin, and N. Kamman. Monitoring Recreational Freshwaters. Lakeline. Summer 2009. pp 18-24.



Microcystin

- Most commonly detected algal toxin is microcystin.
- Only Toxin With risk associated criteria established by the World Health Organization (WHO).
 - 1 ppb for drinking water.
 - 20 ppb for recreational contact.
- No National standard for any algal toxin.



World Health Organization

Guidance values for the relative probability of acute health effects during recreational exposure to cyanobacteria and microcystins, based on information presented in Chorus and Bartram 1999

Relative Probability of Acute Health Effects	Cyanobacteria ¹ (cells/mL)	Microcystin-LR ² (ug/Liter)	Chlorophyll-a ³ (ug/Liter)
Low	< 20,000	< 10	< 10
Moderate	20,000 - 100,000	10 - 20	10 - 50
High	100,000 - 10,000,000	20 - 2,000	50 - 5,000
Very High	> 10,000,000 (Scums)	> 2,000	> 5,000

Source: WHO. 1999. Toxic Cyanobacteria in Water: A Guide to Their Public Health Consequences, Monitoring and Management. ISBN 0-419-23930-8.



Indiana's Guidance Values

- 6.0 ug/Liter (ppb) microcystin and nodularins (as determined by Microcystin ADDA indirect ELISA method)
- 1.0 ug/Liter (ppb) for drinking water
- Greater than 100,000 cells/mL Cyanobacteria



Blue-Green Algae Monitoring in Indiana

- IU Bloomington
 - Clean Lakes Program
 - Bill Jones, Director
- IUPUI
 - Center for Earth and Environmental Science
 - Lenore Tedesco, PhD
- IDEM
 - Watershed Assessment and Planning Branch



IDEM's Pilot Blue-Green Monitoring Program

- Funded by a U.S. EPA Supplemental 106 Grant
- Two year funding cycle
- July through late September
 - Five lakes in 2010
 - Eleven in 2011
- Partnering with IUPUI Center for Earth and Environmental Science (CEES)

IDEM 2010 Lakes



This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.

Mapped By:
Cindy Martin, OWQ
Date: 5/3/2010

Sources:
Obtained from the State of Indiana Geographic Information Office Library

Map Projection: UTM Zone 16 N
Map Datum: NAD83



IDEM 2011 Lakes

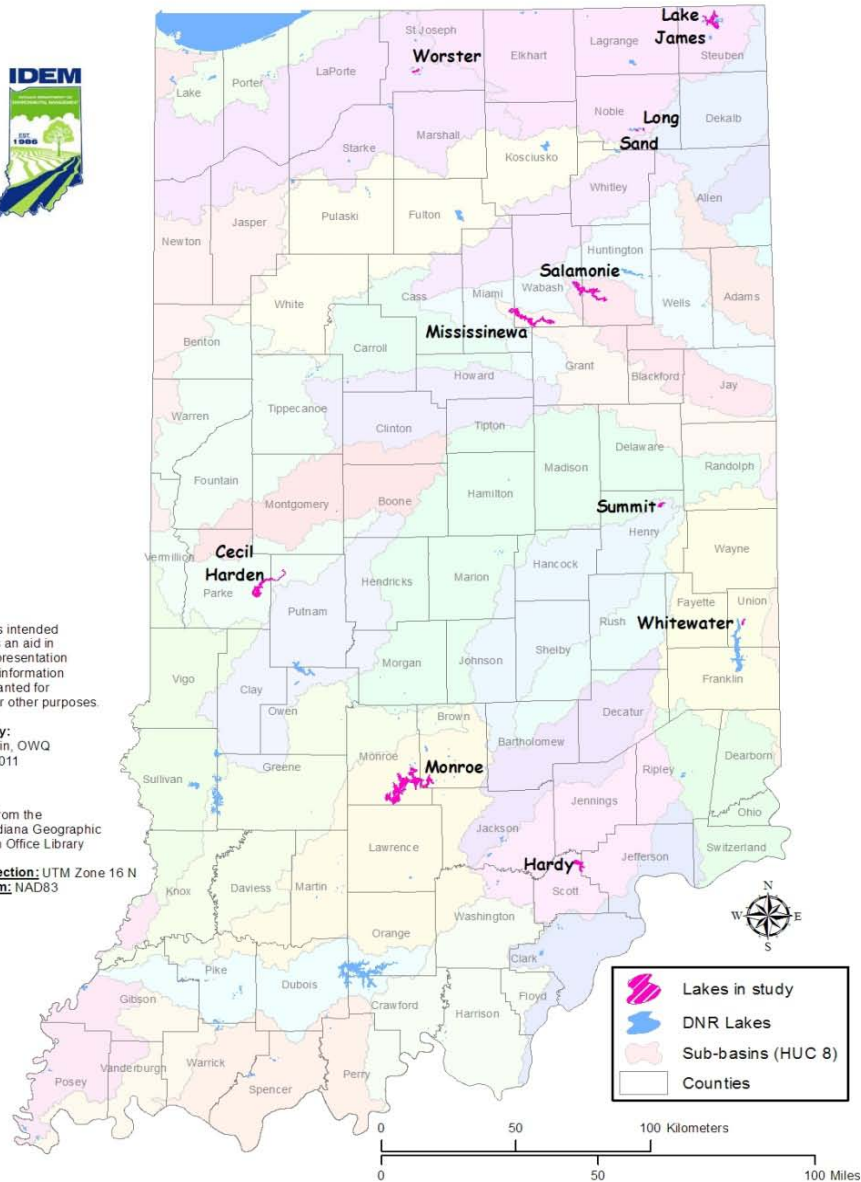


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Mapped By:
Cindy Martin, OWQ
Date: 3/8/2011

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IDEM's Pilot Blue-Green Monitoring Program





IDEM's Pilot Blue-Green Monitoring Program





IDEM's Pilot Blue-Green Monitoring Program



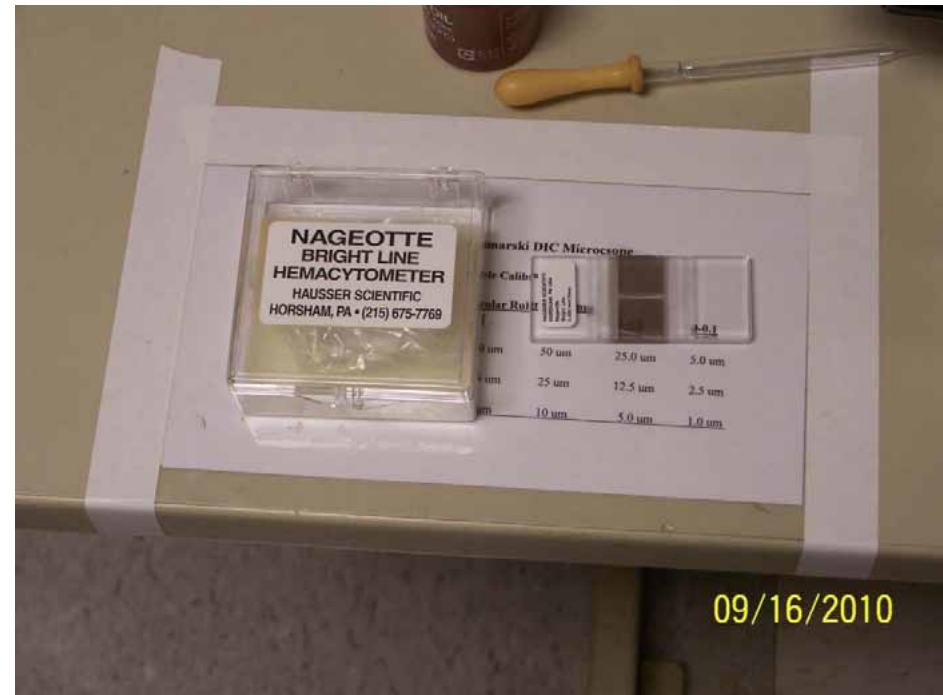


IDEM's Pilot Blue-Green Monitoring Program





IDEM's Pilot Blue-Green Monitoring Program





Reporting To the Public

- www.algae.IN.gov
- IUPUI CEES reports cell counts and toxin levels to IDEM for posting
- Provide public with information about:
 - Toxins from algae
 - Risks associated with toxins
 - Precautions you can take
 - Information from other organizations and states
 - Several links to other websites
 - Post IDEM/ISDH precautionary advisories

IN.gov

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Addressing Concerns About Blue-Green Algae

Blue-Green ALGAE

Bulletins

Indiana Reservoir and Lake Update for September 17, 2010

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 bath or shower with warm, soapy water after coming in contact with untreated water in ponds and lakes, especially before preparing or consuming food. Pets and livestock should also not be allowed to swim in or drink untreated water from these sources. Exposure to a blue-green algae during recreational activities, such as swimming, wading, and water-skiing may lead to rashes, skin, eye irritation, and other uncomfortable effects such as nausea, stomach aches, and tingling in fingers and toes. If you should experience any symptoms after water recreational activities, please contact your doctor.

These are the most recent cyanobacterial cell counts. For protection of human health, the World Health Organization uses a guideline level of greater than 100,000 cells/ml for a high risk health alert in recreational waters. For more information on Blue-Green algae, please contact the Indiana Blue-Green Algae Information Line at (877) 650-0033 (Toll Free) or (317) 233-7181.

- Eagle Creek Reservoir: Total cyanobacterial cell counts were above 100,000 cells/ml on 9/13/10
- Geist Reservoir: Total cyanobacterial cell counts were above 100,000 cells/ml on 9/7/10
- Morse Reservoir: Total cyanobacterial cell counts were above 100,000 cells/ml on 9/7/10
- Mississinewa Reservoir at Miami State Recreational Area Beach: Total cyanobacterial cell counts were above 100,000 cells/ml on 9/13/10
- Salamonie Reservoir at Lost Bridge West State Recreational Area Beach: Total cyanobacterial cell counts were below 100,000 cells/ml on 9/13/10
- Roush Reservoir at Little Turtle State Recreational Area Beach: Total cyanobacterial cell counts were below 100,000 cells/ml on 9/13/10
- Summit Lake State Park - Summit Lake Beach: Total cyanobacterial cell counts were below 100,000 cells/ml on 9/14/10
- Whitewater Memorial State Park - Whitewater Lake Beach: Total cyanobacterial cell counts were below 100,000 cells/ml on 9/14/10
- Patoka Reservoir:
 - Main Reservoir - Total cyanobacterial cell counts were below 100,000 cells/ml on 8/3/10
 - Lick Fork - Total cyanobacterial cell counts were above 100,000 cells/ml on 8/3/10

Online Services FIRST IN LINE EVERY TIME

- Virtual File Cabinet
- Real-Time Monitoring
- Publication Catalog
- Wastewater Certification Renewal
- Acronyms List
- Online Air Permit Search
- Enforcement Database
- Safe Drinking Water Information Search
- Forms IN.gov

More Online Services > Account Center >

Top FAQs I Want To...

- Where can I recycle?
- What should I do with my old computers and electronics?
- What are "Pay-as-You-Throw" programs?
- What is "household hazardous waste"?
- Why is mercury dangerous?
- How can I get funding for recycling programs?
- Where can I find information about available IDEM grants, loans, or funds?
- What is composting and how do I do it?
- What are the benefits of recycling?
- I'm interested in internships/employment opportunities working with environmental...

More FAQs >

Information for Swimmers and Boaters

WHY IS THE WATER GREEN?

Levels of blue-green algae are currently high in a number of locations at Mississinewa Lake. Please use caution when swimming, skiing, or participating in other recreational water activities. Avoid coming into direct contact with the algae, or swallowing lake water. Keep a close eye on pets or small children, who may not watch where they are swimming or wading and may ingest water.

Exposure to blue-green algae during swimming, wading, and water-skiing can lead to rashes, skin, eye irritation, and other uncomfortable effects such as nausea, stomach aches, and tingling in fingers and toes.

After you swim, wade or ski, be sure to shower with warm, soapy water and wash hands carefully.

Additional Information

What are blue-green algae?

Blue-green algae are a group of photosynthetic bacteria. They are most often blue-green in color, but can also be blue, green, reddish-purple, or brown. They generally grow in lakes, ponds, and slow-moving streams when the water is warm and enriched with nutrients like phosphorus or nitrogen. When environmental conditions are just right, they can multiply quickly. Most species float to the surface, where they form floating mats. When this happens, we call this a "blue-green algae bloom." These usually occur in late summer.

Is all algae blue-green algae?

No. Many kinds of algae, most of which are microscopic and serve as an important supply of food for aquatic organisms, are found in Indiana lakes and streams.

Can blue-green algae make me sick?

Blue-green algae are capable of producing several different toxins. People may be exposed to these toxins through contact with the skin (e.g., when swimming), through inhalation (e.g., when motor boating or water skiing), or by swallowing contaminated water. Rashes, skin, eye irritation, and other uncomfortable effects such as nausea, stomach aches, and tingling in fingers and toes may occur.

Can blue-green algae make my pet sick?

Animals are not necessarily more sensitive to blue-green algal toxins than humans. However, many animals enjoy being in the water. Animals may consume large quantities of blue-green algae if they drink the water, and if those blue-green algae happen to be producing toxin(s), the animals can become very ill. Symptoms may range from lethargy and loss of appetite to seizures, vomiting, and convulsions. Dogs are particularly susceptible because scum can stick to their coats and be swallowed during self-cleaning.

Is our drinking water safe?

Yes. Water treatment processes remove any toxins from blue-green algae. Do not use lake water for cooking or bathing.

Can I eat fish from water containing blue-green algae?

Some blue-green algal toxins can accumulate in the tissues of fish. Whether or not the levels are sufficient to pose a risk to humans is uncertain. The World Health Organization advises that people who choose to eat fish taken from water where a blue-green algae bloom is present eat them in moderation and avoid eating the guts, where accumulation of toxins may be greatest. Do not cut into organs when filleting the fish, and rinse the fillets with clean water to remove any liquids from the guts or organs before freezing or cooking.

Do other Indiana lakes have this same problem? Can I swim at Salsome or Kouth?

Several agencies are working together to better understand blue-green algae blooms in our lakes. There are nine reservoirs throughout the state being monitored. Information on test results is posted at <http://www.in.gov/ideam/algae/>. As of July 21, cell counts at Salsome, Kouth, Summit Lake, Whitewater and Proke Lake's beaches were below the levels recommended for high risk health alerts.

Are blue-green algae blooms a new problem?

No. Although we have not normally seen this level of blue-green algae at Mississinewa, fossil evidence suggests that blue-green algae have been around for millions of years. Scientists have recorded blue-green algae blooms dating back to the 12th century and they have documented the toxic effects to livestock for more than 100 years.

More information at www.algae.in.gov.





Top OWQ Priorities 2011

- Implement new water quality monitoring strategy.
- Develop General Permits for permits currently issued under general permit rules.
- Complete remaining Long Term Control Plan reviews.
- Anti-degradation rulemaking.
- Maintain focus increasing compliance at small wastewater systems.
- Develop Nutrient Water Quality Standard for lakes.
- Reissue ArcelorMittal East and West NPDES permits.

