# Why Are The Lakes So Green?

## A Water Quality Project on the Fox Chain O' Lakes

# Presentation by
## Antioch Community High School students



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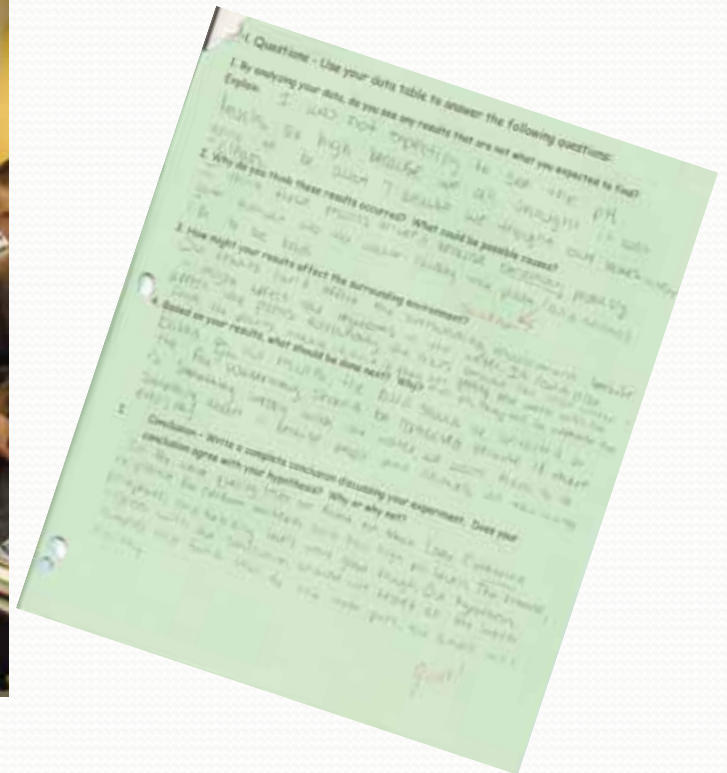
*DeKalb, IL*

# How We Got Started

- It started out as a question from a student in our science class,

"Why are our lakes so green?"

- A lab was developed to guide us in our research of algal blooms.

• All three 8th grade science classes (52 students) participated in the initial investigation.

- We pulled samples from various lakes.
  - Bluff Lake
  - Lake Marie
  - Spring Lake
  - Lake Catherine
- We also pulled a sample from Lake Antioch as a control.

# Data Collection

- We Tested each sample for:
  - Dissolved oxygen
  - Coliform bacteria
  - Nitrates
  - Phosphate
  - Temperature
  - Turbidity
  - pH

- We hypothesized that high levels of nitrates and phosphates would be the cause of the algae blooms.

Water Quality Test Data & Analysis  – Chain O' Lakes and Lake Antioch  September 2009

| Test | Lake Catherine | Bluff Lake | Lake Marie | Lake Antioch | Rank | Analysis |
|---|---|---|---|---|---|---|
| Coliform bacteria | Slightly Positive | | Slightly positive | Slightly positive | 1 - bad | Bacteria present-fecal contamination |
| Nitrates | 0 ppm | 0 ppm | 0 ppm | 0 ppm | 3 - good | No or trace nitrates/fertilizer present |
| pH | 9 | 8 | 8 | 9 | fair | Slightly basic |
| Phosphates | 1 ppm | 1 ppm | 2 ppm | 2 ppm | 2 - fair | Low level of phosphates present |
| Turbidity | 10 JTU | | 0 JTU | 15 JTU | 7-4 - very good 0 - Bluff | Clarity good. |
| Temperature | 25°C | 25°C | 25°C | 25°C | | Inaccurate – water at room temperature |

# Data Analysis

- After careful analysis of our data, we concluded that the presence of coliform bacteria was the primary cause of the algae blooms instead of nitrates and phosphates.
- We researched further and found that fecal matter is the main source of coliform bacteria.
- Our discovery led to more questions: where was it coming from - what was the source?
- Is this algae bloom dangerous?

# We Need Answers

- We had questions that we needed answered, so we called Mike Adam from the Lake County Health Department .
- He came to our class and spoke to us about the causes of algae blooms, the different types of algae, and the effects of a severe bloom.

- We also wondered what effects the algae bloom had on fish and wildlife.
- We contacted Frank Jakubicek from the IL Department of Natural Resources.  He also came and talked to us about our concerns.

# We Took It Further . . .

- We decided to enter our water quality project into the Siemen's *We Can Change The World Challenge.*
- The Challenge is "the nation's premiere sustainability competition that gives students the inspiration and tools to get involved and make a difference."
- We formed two teams using the same data, but focusing on different aspects of water quality.
  - One team focused on different causes and preventions of algae blooms.
  - The other team focused on water quality and pollution in the lakes.

# Siemen's 'Challenge' Results

- We continued to test the water samples, ask questions and gather data. We worked many hours on compiling our data and completing the report for the Challenge.
- In late April, we were notified that . . . one team received first place and the other an honorable mention at the state level!
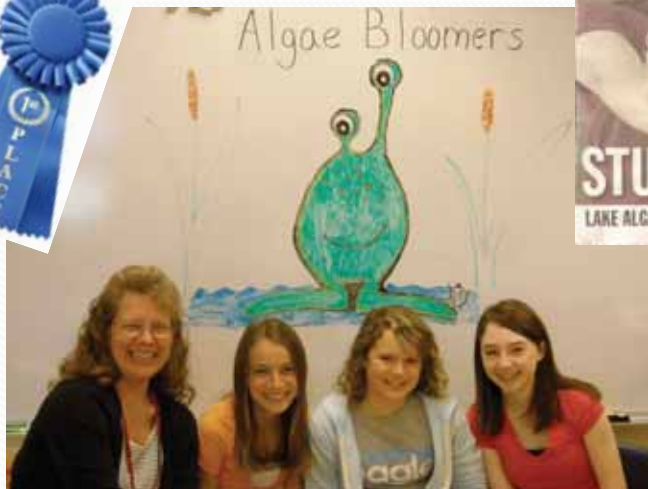
# Why Does It Matter?

- We live near and use the lakes.
- We wanted to know the causes of the algae bloom.
- We wanted to know what we could do to help keep the lakes healthy.

# How We Have Helped

- Inform the public of the causes of an algae bloom and what they can do to help prevent it.
- Continue taking part in waterway clean-ups.
- Volunteer to monitor the lakes.

# Tips For Healthy Lakes



- Use only phosphate free fertilizers.
- Reduce or eliminate pesticide / herbicide use.
- Use a buffer strip at the shoreline. Include native plants to filter runoff
  - Arrowhead
  - Brown fox sedge
  - Hardstem bulrush
- Relocate compost and burn piles away form shoreline.
- Homeowners should maintain septic tanks to prevent leakage.

# Tips For Healthy Lake



- Dispose of trash in proper containers, not in the lakes.
- Use proper care with boat waste – have portable toilets pumped out regularly.
- Do not overfill fuel tanks to prevent spillage into waterways.
- Stabilize shorelines to prevent erosion.
- Remember . . . everything from the watershed flows into the lakes.

# Volunteer Lake Monitoring

- Inspired by working with the students on the water quality project.
- Began VLMP in 2010
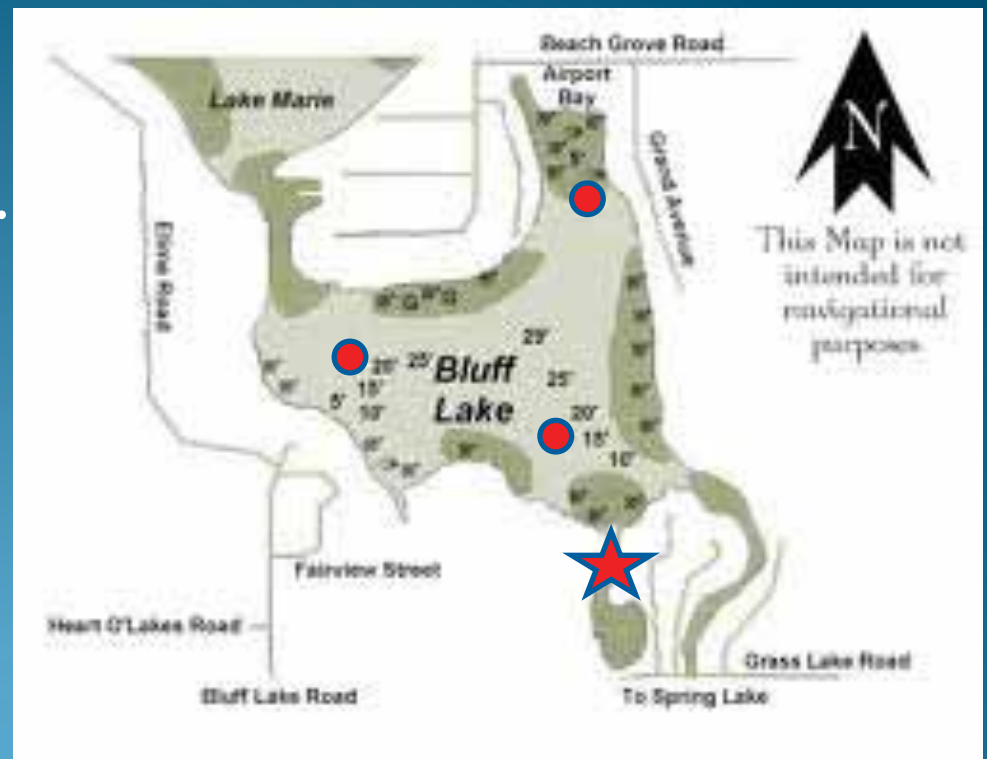- Included exact sites tested during the water quality project
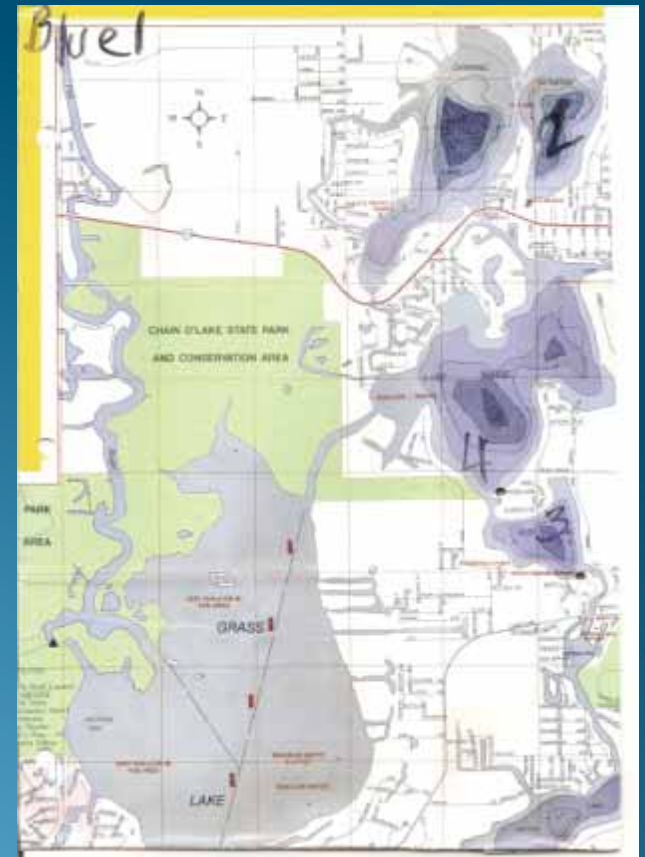
# Bluff Lake

Four locations monitored -
- Greatest depth ~30 ft.
- North bay ~ 17 ft.
- West inlet ~ 20 ft.
- South project site ~ 4 ft.
  - ⭐ area of severe algae bloom

•The data indicates that turbidity was less in May and June last year, but then increased throughout July –Oct. to more common values observed over several years of 24 – 34 inches, probably due largely to increased boat traffic .

•Aquatic plant and algae growth was greatest in the months of June and July especially in site #4 , however, nowhere near the level  that was observed in this area in September of 2009.
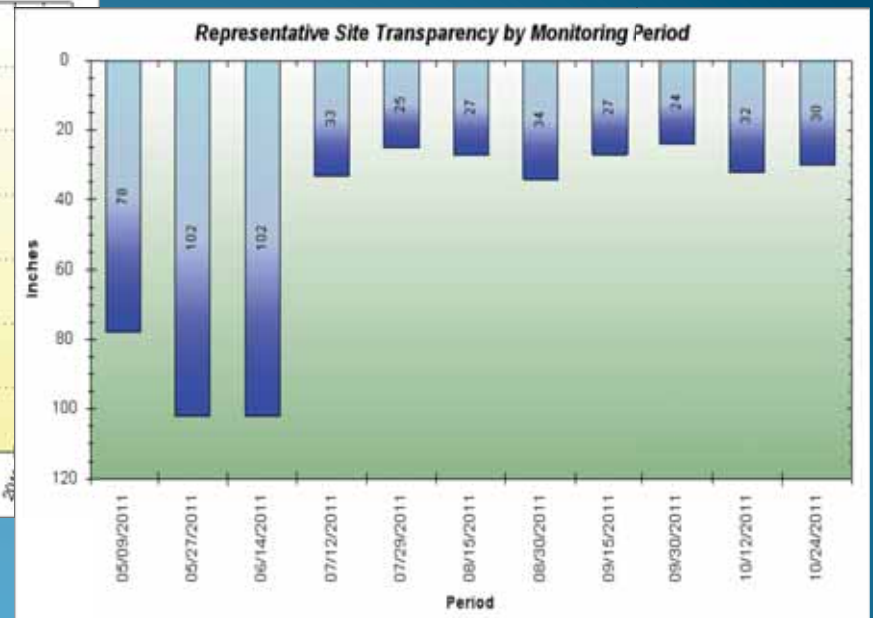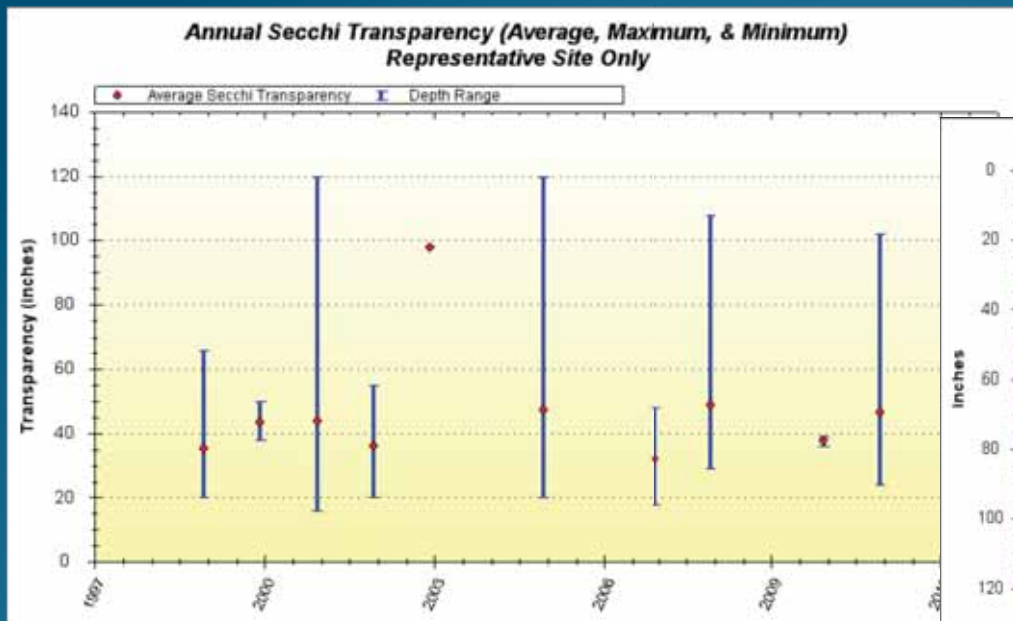
# Spring Lake



- Two locations monitored - greatest depth~6 ft. project site~4 ft.
- Data represents consistent values observed over past several years.
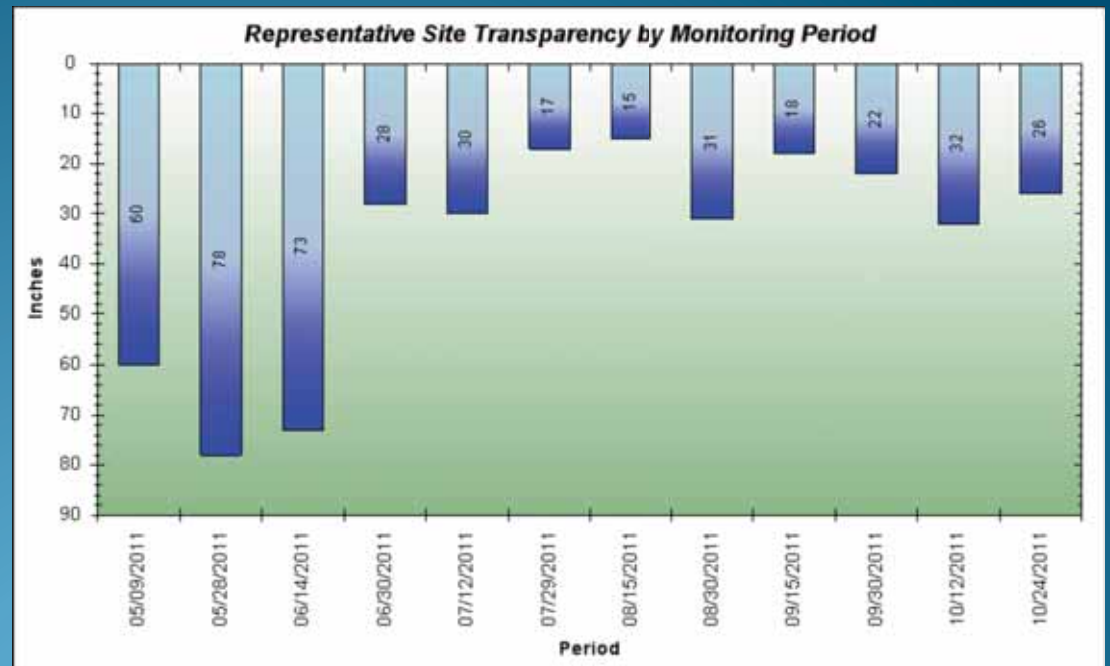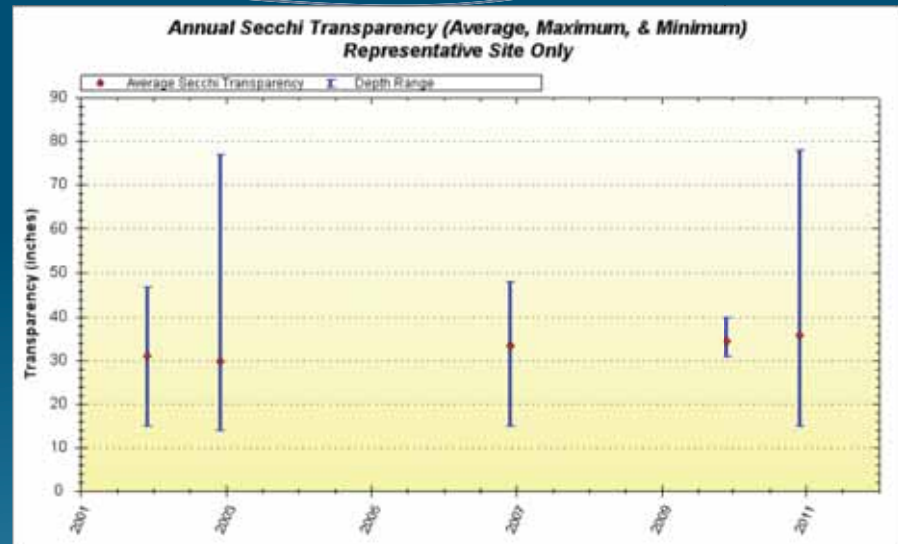- Vegetative growth was greatest in the months of August & September

**VLMP Spring Lake Data**

**2010**

| Date | | | | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 10/1/2010 | 5% to 25% | 1 | 0.0 | S | Partly Cloudy | Calm/Ripple | Below Normal | 1.0 | 11.0 | |
| 9/17/2010 | 26% to 50% | 1 | 0.0 | NONE | Sunny | Calm/Ripple | Normal or Full | 0.0 | 10.0 | light boat traffic; algae bloom resembles very small circular shape. |
| 8/30/2010 | 26% to 50% | 2 | 0.0 | SW | Partly Cloudy | Calm/Ripple | Normal or Full | 0.0 | 10.0 | typical boat traffic; current algae bloom resembles small blades of grass. |

**2011**

| Date | | | | | | | | | | Notes | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10/24/2011 | Less Than 5% | .5 | 0.0 | W | Sunny | Small Waves | Normal or Full | 0.0 | 10.0 | | light boat traffic |
| 10/12/2011 | Less Than 5% | 1 | 0.0 | NE | Partly Cloudy | Small Waves | Normal or Full | 0.0 | 10.0 | temperatures well above normal for past 10 days, no rain last 10 days | |
| 9/30/2011 | 5% to 25% | .5 | 1.0 | N | Partly Cloudy | Calm/Ripple | Above Normal | 2.0 | 8.0 | over 2 inches of rain, rained for 7 straight days | |
| 9/15/2011 | 5% to 25% | .5 | 0.0 | NW | Sunny | Small Waves | Below Normal | 4.0 | 14.0 | no significant rain in over 3 weeks, large temperature drop | much less grass-like algae and much shorter pieces |
| 8/30/2011 | Less Than 5% | .5 | 0.0 | SE | Overcast | Calm/Ripple | Below Normal | 1.0 | 11.0 | | small amount of algae present |
| 8/15/2011 | 5% | 1 | 0.0 | SE | Sunny | Calm/Ripple | Above | 2.0 | 8.0 | | |

- Tier 2 monitored for turbidity, temperature, DO
- Samples drawn and sent to lab for water chemistry-

nitrogen, phosphorous, chloride and alkalinity
- Observance of invasive species-

Eurasian Watermilfoil, Common Carp,

Zebra /Quagga mussels



Annual Secchi Transparency (Average, Maximum, & Minimum)
Representative Site Only



Representative Site Transparency by Monitoring Period

# Thank you!

Special thanks to ILMA for giving us the opportunity to share our experience.