Indiana's Cyanobacteria Monitoring Program: Analyzing Cyanobacteria and Cyanotoxins in Recreational Waters

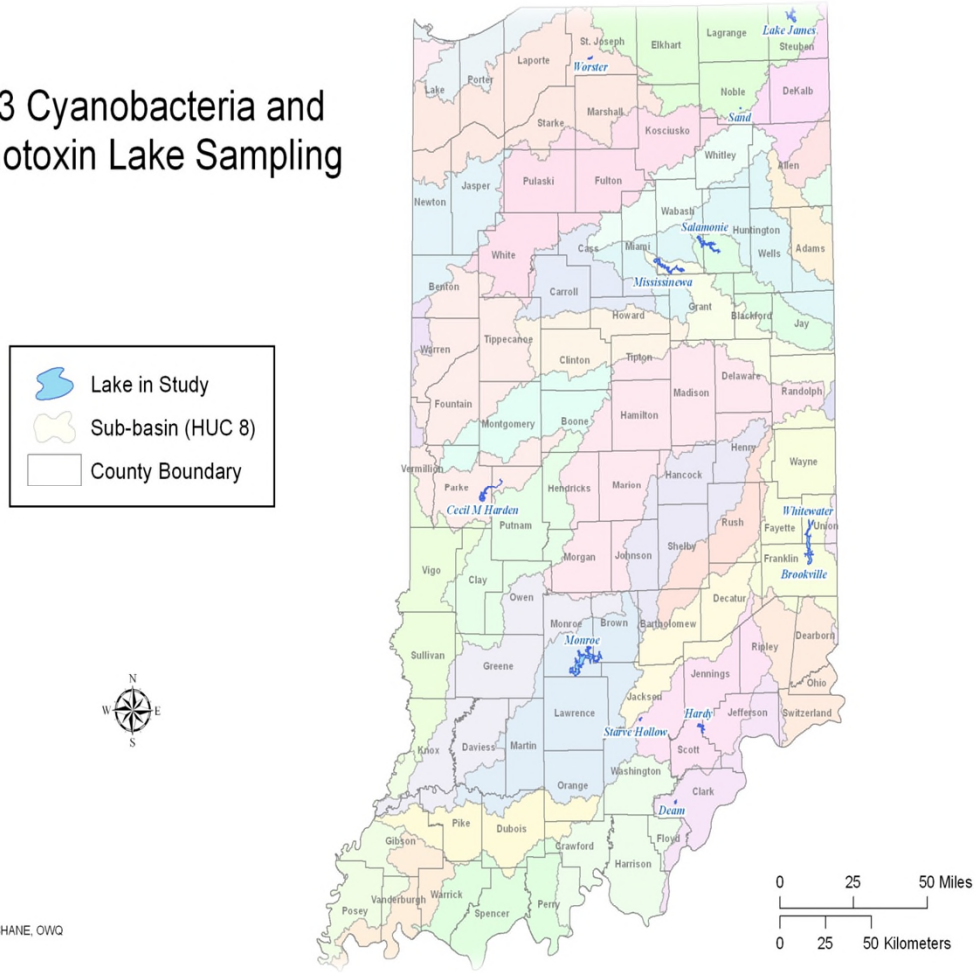
Cyndi Wagner and Kristen Arnold

Targeted Monitoring Section

Watershed Assessment and

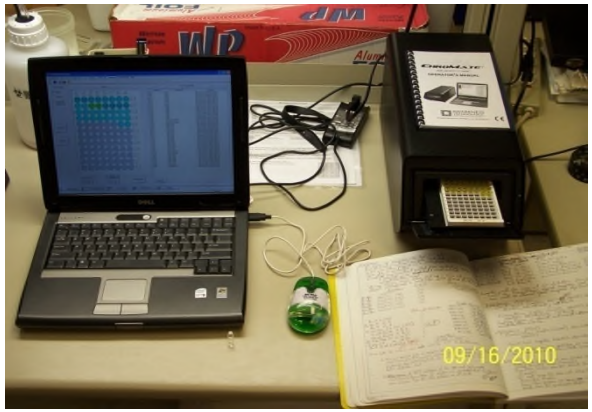
Planning Branch

2013 Cyanobacteria and Cyanotoxin Lake Sampling



- 14 Department of Natural Resources owned/operated swimming beaches on 12 lakes
- Sampled monthly from mid-May thru the end of August
- If counts go above 100,000, sampling frequency increases to biweekly
- Samples collected for TP, TKN, NH3-N, NO3-NO2
- Cyanobacteria are identified and counted
- ELISA analysis for microcystin, cylindrospermopsin and anatoxin A (2014)
- All analysis done by IDEM staff

Sample Collection and Analysis



Reporting to the Public

- www.algae.IN.gov
  - Provide public with information about:
    - Weekly lake sampling results
    - Precautionary advisories
    - Risks associated with toxins
    - Precautions you can take
    - Links to other websites
- www.dnr.gov
  - Advisory information posted on the property link
- www.in.gov/boah/2617.htm
  - Information for pets and livestock owners

IN.gov

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Addressing Concerns About Blue-Green Algae

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Indiana State Department of Health

BOAH

DNR

IDEM

Welcome

The Indiana Department of Environmental Management (IDEM), the Indiana Department of Natural Resources (DNR), the Indiana State Department of Health (ISDH), and the Board of Animal Health (BOAH) are working to provide information about blue-green algae, also known as cyanobacteria, in our lakes.

Algae are commonly found in Indiana lakes and streams without concern, however the concentrated presence of blue-green algae can be linked to some adverse health effects. Factors promoting algal growth include sunlight, warm weather, low turbulence, and nutrient sources, such as phosphorus and nitrogen. Phosphorous is particularly important in fueling cyanobacteria growth. 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 weekly during the sampling season to provide information about blue-green algae levels at the DNR lakes that IDEM samples and the Citizen Energy reservoirs in central Indiana. You can also check the status of the DNR lakes that IDEM samples at the DNR website for the specific property. This update may also include results for other lakes sampled by other entities wishing to post on this site. You will find links to IDEM's sampling results and laboratory tests as well as links to other websites such as the World Health Organization, the USGS Kansas Water Science Center, and assorted information available

Help

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 »
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Top FAQs | I Want To...

1. How do I file an IDEM complaint?
2. I'm interested in internship/employment opportunities working with environmental issues. How do I apply and what jobs are available?
3. What should I do with my old computers and electronics?
4. How do I get rid of electronic waste?
5. Where can I find information about available IDEM grants, loans, or funds?
6. What is "household hazardous waste"?

More FAQs »

Indiana Reservoir and Lake Update

AUGUST 29, 2013

IDEM began blue-green algae sampling the week of June 17th and will end the week of August 26th.

IDEM Sampling Results - High Cell Count Recreation Alert

- Mississinewa Lake - Miami State Recreation Area
- Potato Creek State Park - Worster Lake
- Salamonie Lake - Lost Bridge West State Recreation Area
- Monroe Lake - Paynetown State Recreation Area
- Hardy Lake State Recreation Area
- Cecil M. Harden Lake (Raccoon Lake) - Raccoon State Recreation Area
- Brookville Lake - Mounds State Recreation Area
- Brookville Lake - Quakertown State Recreation Area

Citizens Water Reservoir Update

Citizens Water collects water samples for blue-green algae at Geist, Morse and Eagle Creek reservoirs on a weekly basis. The data collected at these lakes is collected to inform Citizens Water of the quality of the raw water for drinking water treatment purposes. These counts can be applied to recreational purposes as noted below. Only the reservoirs with high cell counts will be reported.

High Cell Count Alert for Recreation:

- Eagle Creek Reservoir
- Morse Reservoir
- Geist Reservoir

IDEM 2013 Sampling Schedule

August 27th:

IN.gov

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- Interpretation
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- Brochures
- Cultural Resources & History
- How You Can Help
- Just For Kids
- Indiana State Parks Centennial Celebration

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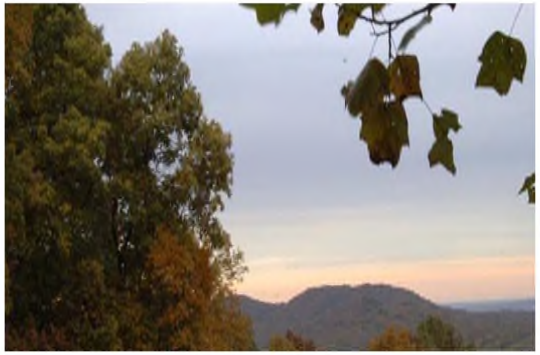
AMERICA'S STATE PARKS

SPR Home > Parks & Reservoirs > Hardy Lake

Hardy Lake

Blue-Green Algae ADVISORY at Hardy Lake: Swimming and boating permitted; Avoid contact with algae. Don't drink the water; shower after you swim. Keep pets out of the water or, at minimum, bathe them after swimming, and prevent them from licking algae/water from fur. For more information about blue-green algae visit www.algae.IN.gov. This notice will be removed when blue-green algae levels drop.



Mailing Address:
4171 E. Harrod Road
Scottsburg, IN 47170
(812) 794-3800

Mapping Address:
5620 N. Hardy Lake Road
Scottsburg, IN 47170

Scottsburg, IN
77 °F / 25 °C
Clear
at 07:53 AM
Click for Forecast

Hardy Lake Events

- Interpretive Services
- June 28 - July 4

Description | Activities | Raptor Center | Trails | Maps | Gallery

DESCRIPTION

2,178.16 acres - 741-acre lake

Online Services
FIRST IN LINE EVERY TIME

- CheckIN game online
- Sport License Gift Certificates
- Reserved Hunt Registration
- Purchase a Hunting License
- Purchase a Fishing License
- Purchase a Trapping License
- Reprint Hunt and Fish License
- Snowmobile/ATV Registration
- Sponsor Registration for Fishing Tournaments
- Water Permits
- State Park Permits

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Top FAQs | I Want To...

1. How much does it cost to visit an Indiana state park or reservoir?
2. How can I find out if my favorite campground has open sites, or reserve a campsite, picnic shelter or inn room at an Indiana state park or reservoir?
3. What kind of permit do I need to launch my boat at a state park, state reservoir or state forest and where can I purchase the permit
4. Where can I buy an annual pass to state parks and reservoirs?
5. Where can I ride my regular bicycle or my mountain bike?
6. Which state parks and reservoirs allow horseback riding? Which have saddle barns where I

US Army Corps of Engineers

IDEM

INDIANA STATE PARKS RESERVOIRS

DNR Indiana Department of Natural Resources

Photos courtesy of IDEM and DNR

Does the Beach Have Blue-green Algae?

Blue-green algae can be found in many of Indiana's lakes and reservoirs. Swimmers, boaters and pet owners can enjoy water based recreation, but should be on the lookout for evidence of harmful algal blooms (HABs).

Blue-Green Algae

Algae of many species occur naturally in Indiana's lakes and reservoirs. Blue-green algae is common and not a problem unless levels are high. When levels are high, toxins may be produced as algae cells grow and die.

How Can Exposure to High Levels of Blue-Green Algae Affect People, Pets and Fish?

Swimmers and boaters

Precautions:
Avoid contact with algae.

Avoid swallowing water while swimming.

Take a bath or shower with warm, soapy water after coming in contact with lake water.

Do not use lake water for cooking or bathing.

Pet Owners
Pets can be poisoned by the toxins produced by some algae.

Precautions:
Do not allow your pets to swim in or drink water where algae is present.

Rinse pets with soap and water if they swim in murky water.

Do not let your pet lick algae off their fur.

Fishing
Some toxins may accumulate in the tissues of fish.

Precautions:
Do not cut into organs when filleting your fish.

Rinse the fillets with clean water before freezing or cooking.

Avoid consuming the guts, where toxin accumulation is greatest.

Eat in moderation.

Blue-green algae and toxin levels are tested in this body of water. Alert levels vary with testing results:

LOW RISK
Don't drink the water
Shower after you swim

ADVISORY
Swimming and boating permitted.

Avoid contact with algae.

Avoid swallowing water while swimming.

Take a bath or shower with warm soapy water after coming in contact with lake water.

Do not use lake water for cooking or bathing.

Do not allow your pets to swim in or drink water where algae are present.

CAUTION
All Recreation Advisory precautions, plus . . .
Children and those with compromised immune systems should not swim.

BEACH CLOSED
Algae and toxin levels make this beach currently unsafe for swimming.

What Does Blue-Green Algae Look Like?

When conditions are right, HABs may occur. An HAB occurs when algae reproduce quickly, creating mats of algae or discoloration of the water because of the large quantity of algae cells present. High nutrient levels from lawn and agricultural fertilizers, sunlight and warm, shallow water all contribute to HABs.

Colors may vary from green, blue-green, brown, black, white, purple, red or black.

Algae may look like a film, crust, puff balls, grass clippings, dots, spilled paint, pea soup, foam, wool, streaks or cottage cheese curds.

Watch for signs that might indicate a blue-green algae bloom in this lake or reservoir and report your sighting to the property office.

Photos courtesy of the Indiana Department of Environmental Management.

Today's Alert Level

ADVISORY
Don't drink the water. Shower after you swim. Keep pets out of the water.

Indiana's lakes and reservoirs provide great recreational opportunities. Learn to recognize blue-green algae, be alert, take precautions and have fun on the water!

Video | Photo

Share Expand

- Toxic algae found in five Indiana lakes

Top Stories

Crash on I-469 kills one, hurts three
One man died and a woman and two children were hurt in a ...

Forum discusses how to prevent violence

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

Sampling Summary

Recreation Advisory Issued at 100,000 Cells

2012

10 Lakes

- 70 samples
- Highest cell count 1.8 million
- 76% over 100,000
- 16% over 1 million

2013

12 Lakes

- 63 Samples
- Highest cell count 3.3 million
- 57% of samples over 100,000
- 11% of samples over 1 million

Microcystin Toxin Summary

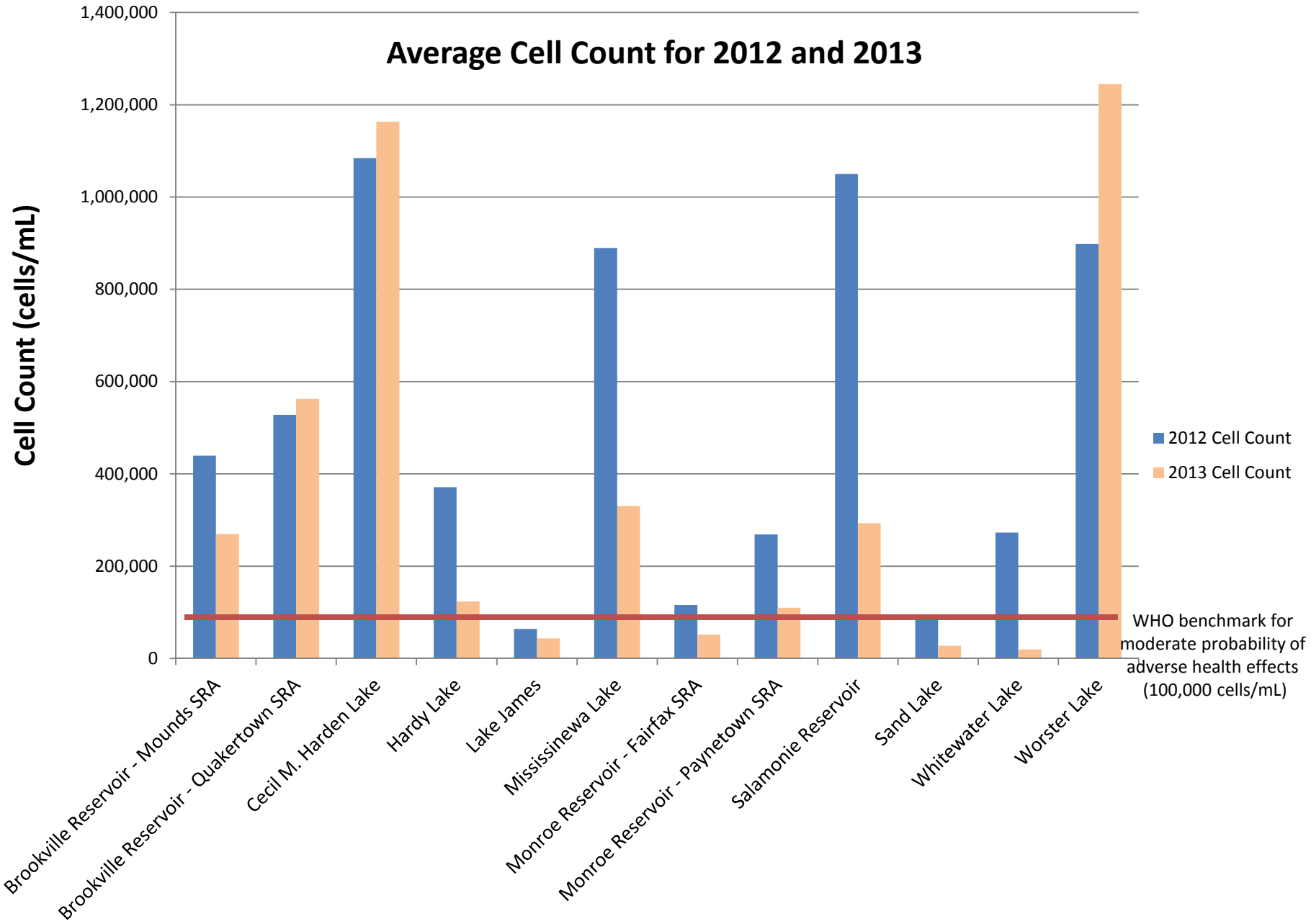
Sensitive Population Warning Level 6 ppb
Beach Closure at 20 ppb

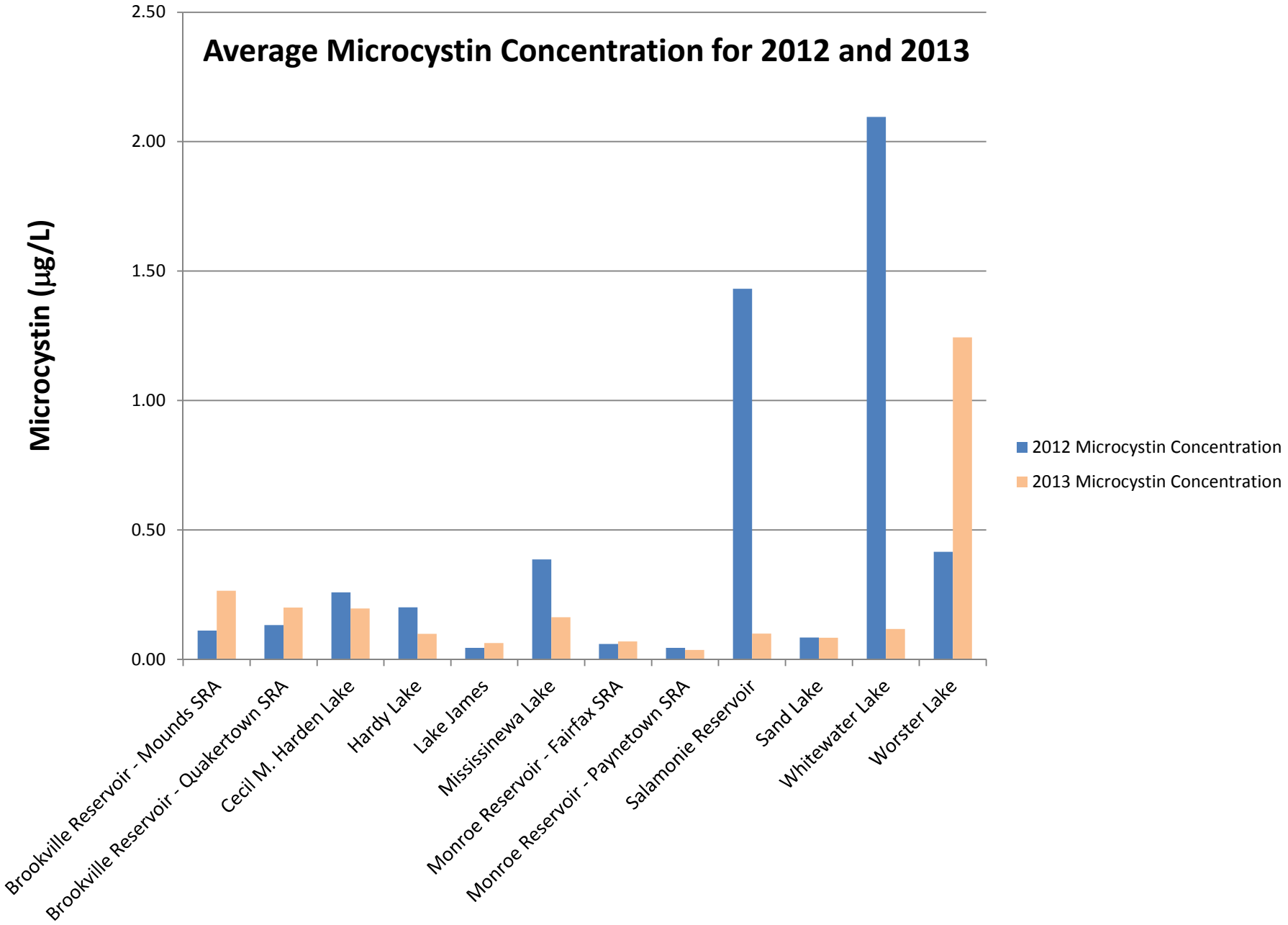
2012

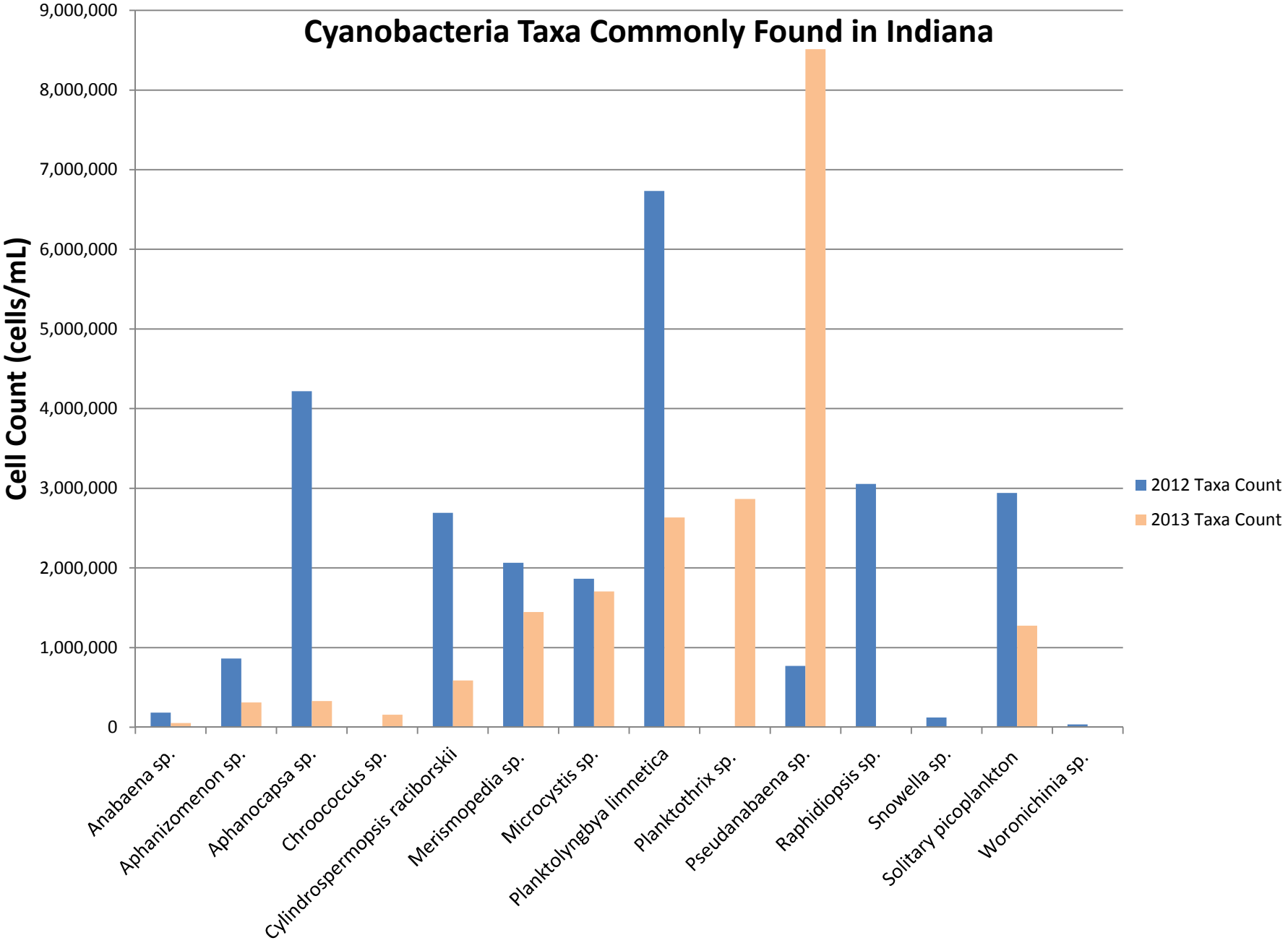
- Detected 44 % of the time
- Highest detection 4.3 ppb

2013

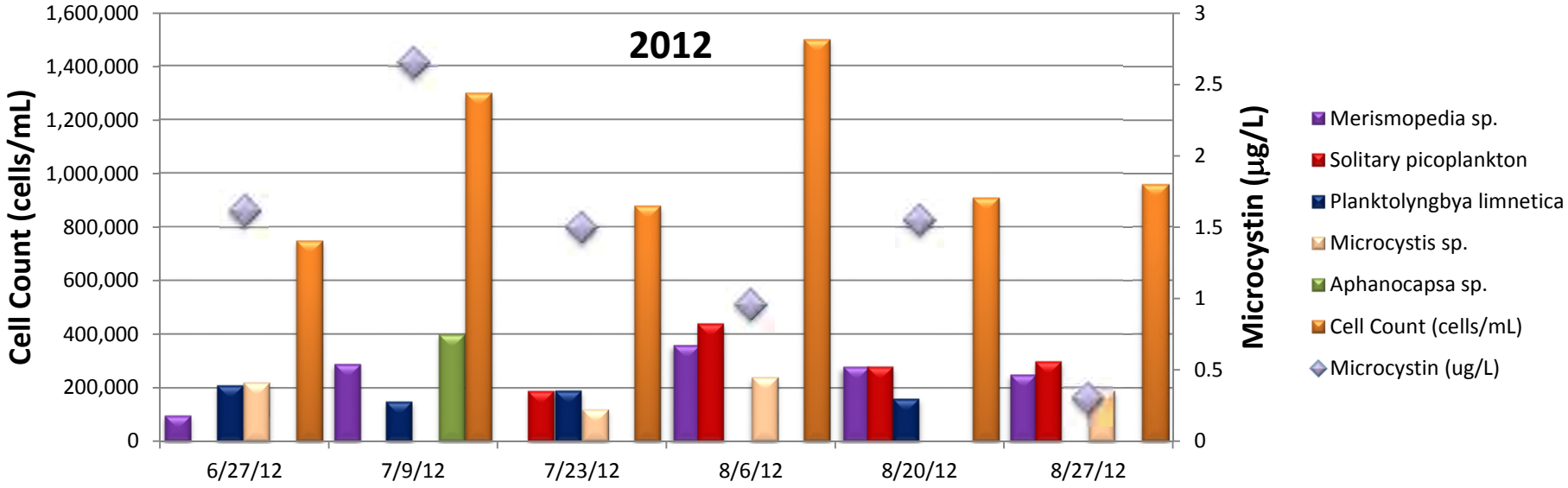
- Detected 30% of the time
- Highest detection 2.8 ppb

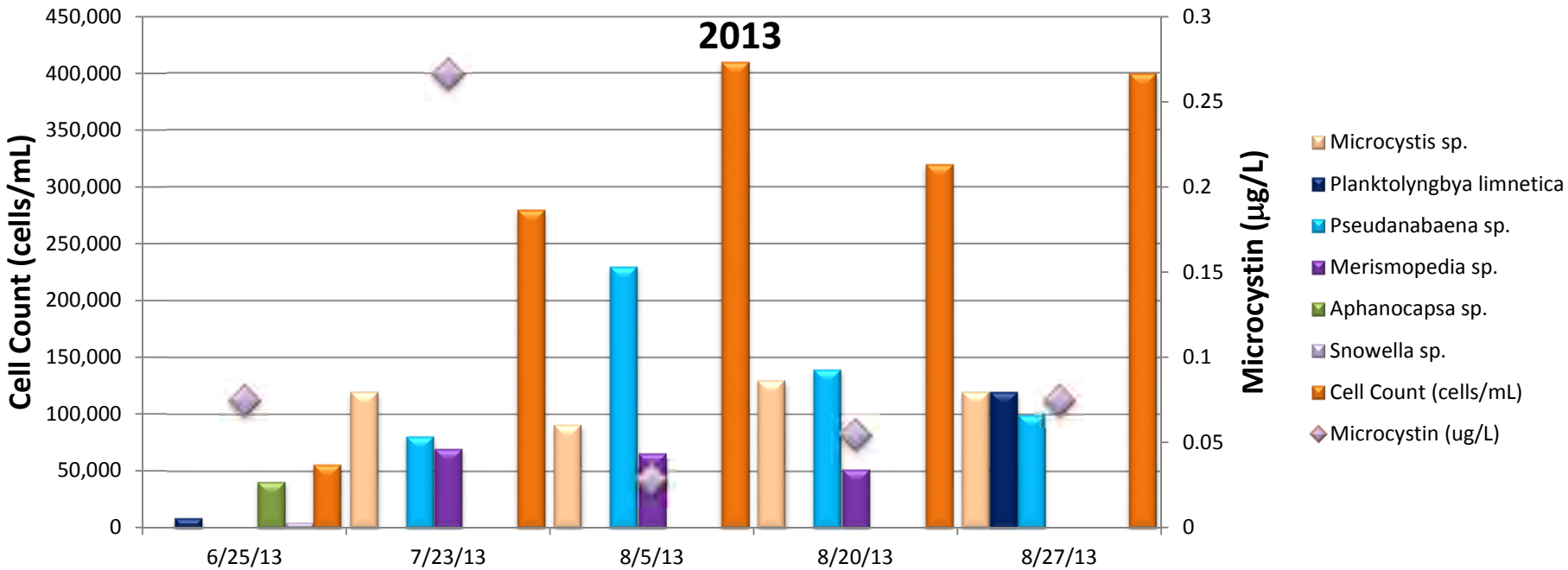

Average Cell Count for 2012 and 2013
Cell Count (cells/mL)
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
2012 Cell Count
2013 Cell Count
WHO benchmark for moderate probability of adverse health effects (100,000 cells/mL)
Brookville Reservoir - Mounds SRA
Brookville Reservoir - Quakertown SRA
Cecil M. Harden Lake
Hardy Lake
Lake James
Mississinewa Lake
Monroe Reservoir - Fairfax SRA
Monroe Reservoir - Paynetown SRA
Salamonie Reservoir
Sand Lake
Whitewater Lake
Worster Lake


Average Microcystin Concentration for 2012 and 2013
Microcystin (µg/L)
2.50
2.00
1.50
1.00
0.50
0.00
Brookville Reservoir - Mounds SRA
Brookville Reservoir - Quakertown SRA
Cecil M. Harden Lake
Hardy Lake
Lake James
Mississinewa Lake
Monroe Reservoir - Fairfax SRA
Monroe Reservoir - Paynetown SRA
Salamonie Reservoir
Sand Lake
Whitewater Lake
Worster Lake
2012 Microcystin Concentration
2013 Microcystin Concentration

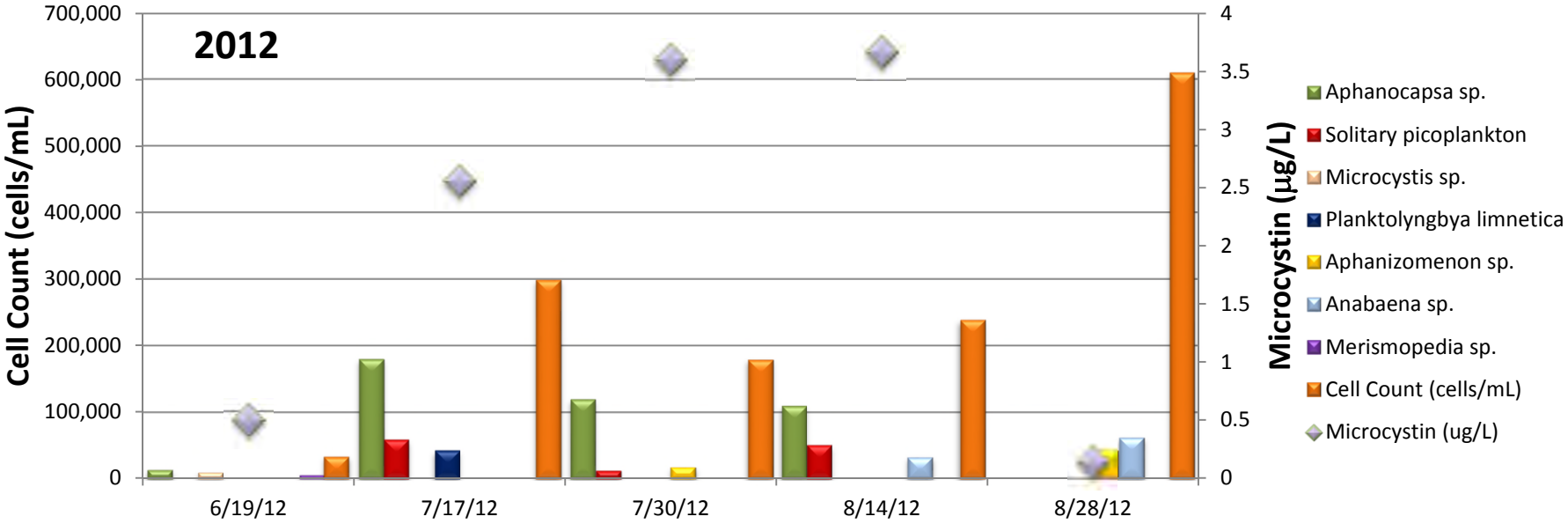

Cyanobacteria Taxa Commonly Found in Indiana
Cell Count (cells/mL)
9,000,000
8,000,000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
Anabaena sp.
Aphanizomenon sp.
Aphanocapsa sp.
Chroococcus sp.
Cylindrospermopsis raciborskii
Merismopedia sp.
Microcystis sp.
Planktolyngbya limnetica
Planktothrix sp.
Pseudanabaena sp.
Raphidiopsis sp.
Snowella sp.
Solitary picoplankton
Woronichinia sp.
2012 Taxa Count
2013 Taxa Count

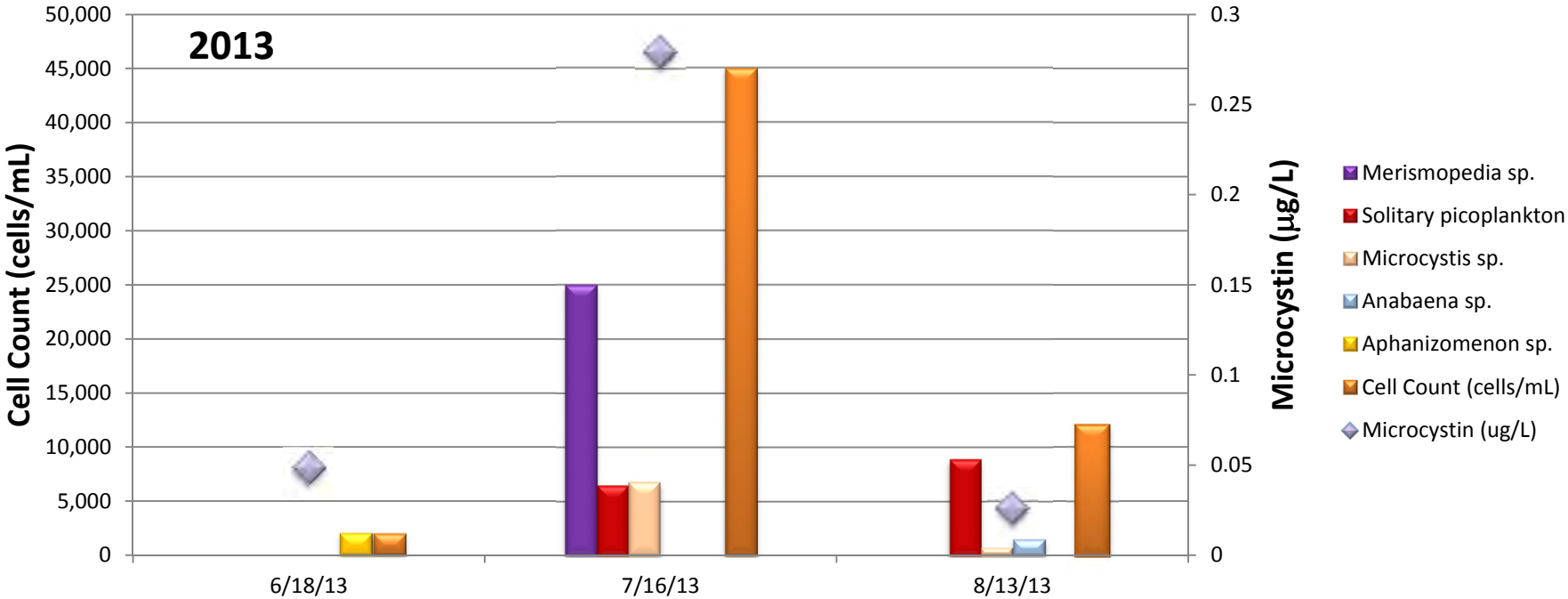
Salamonie Reservoir

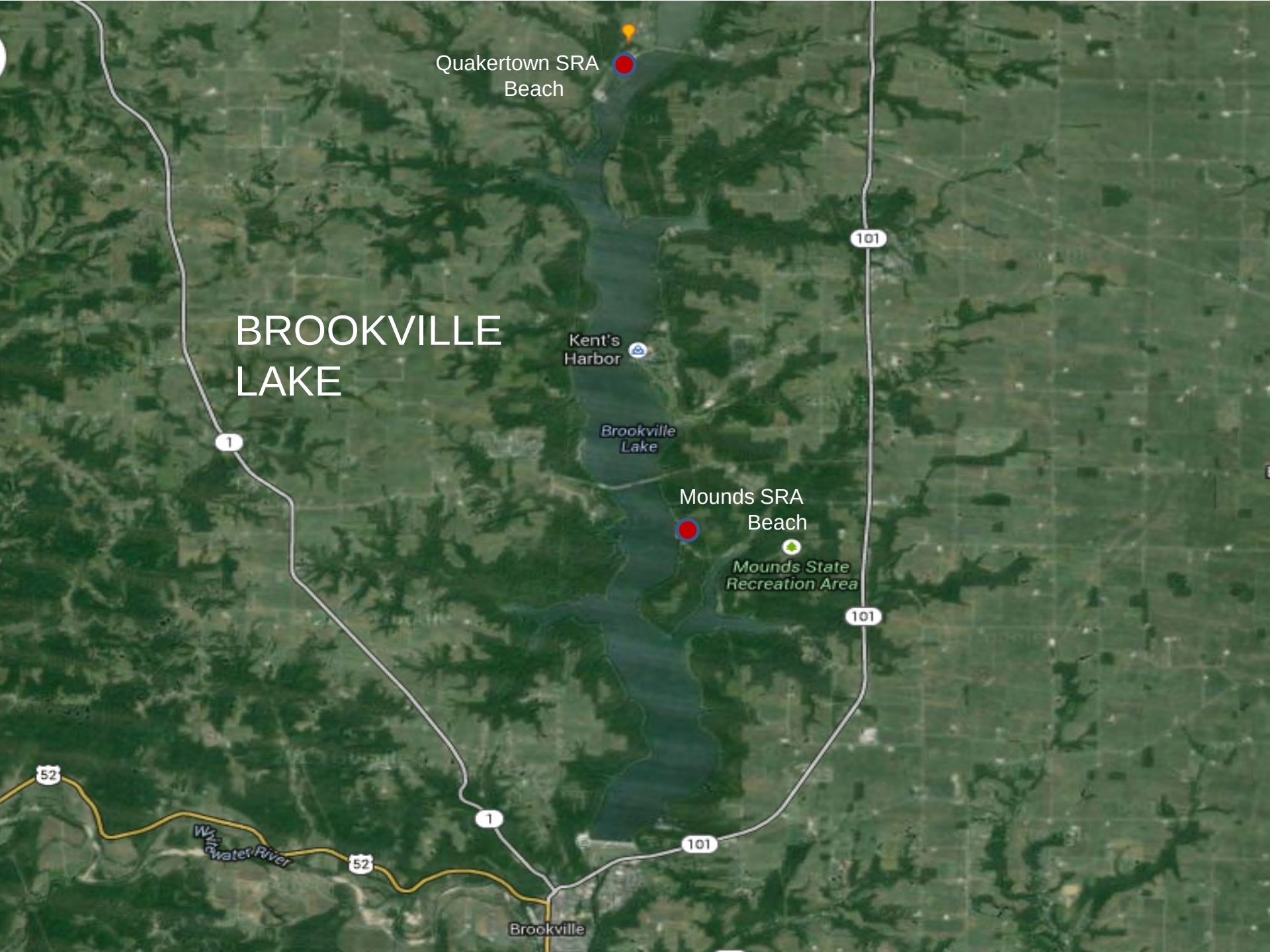




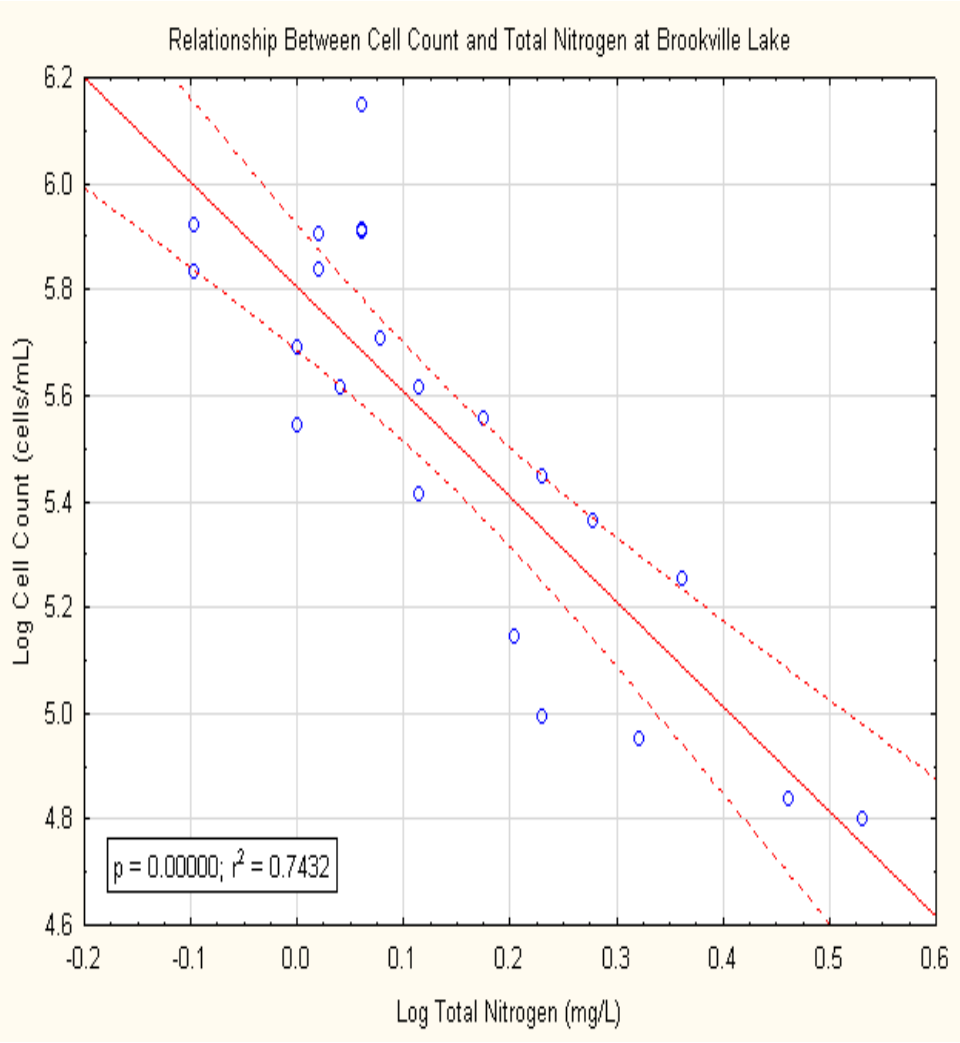
Whitewater Lake

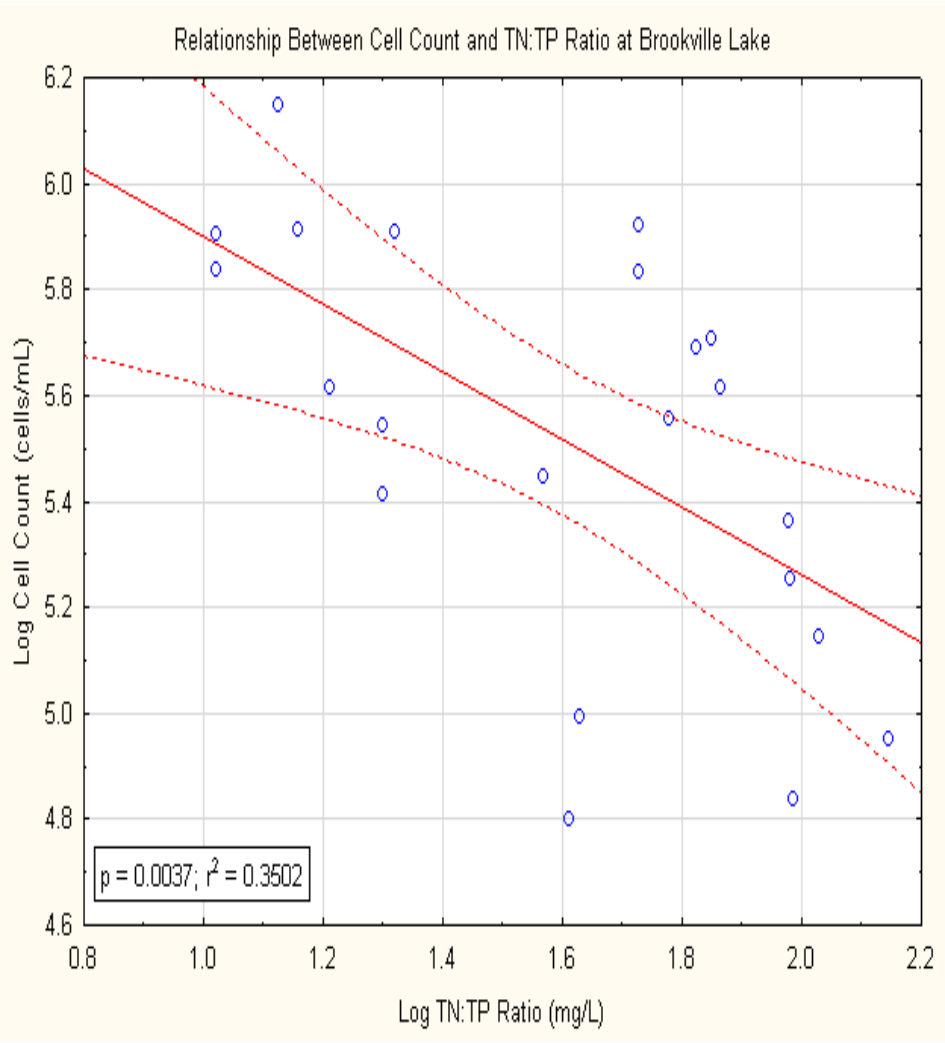





Quakertown SRA
Beach
BROOKVILLE
LAKE
Kent's
Harbor
Brookville
Lake
Mounds SRA
Beach
Mounds State
Recreation Area
101
1
52
Wye
Water River
Brookville

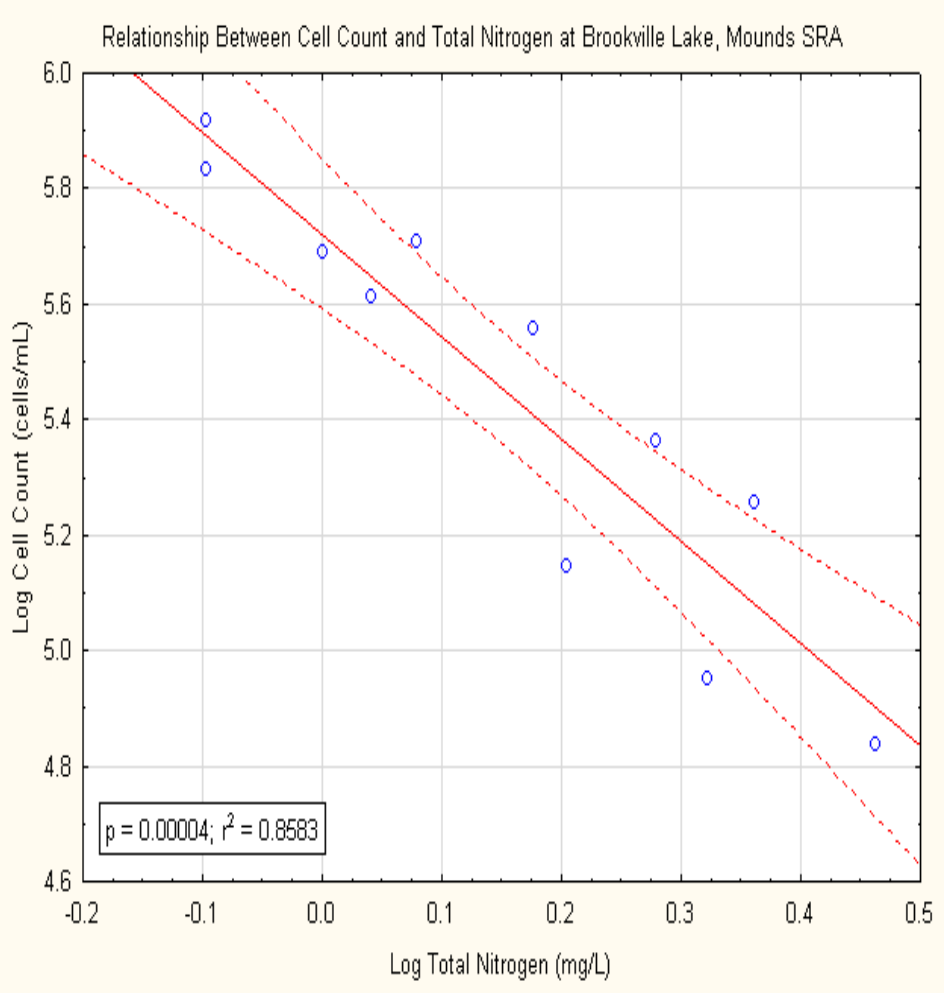
Brookville Lake

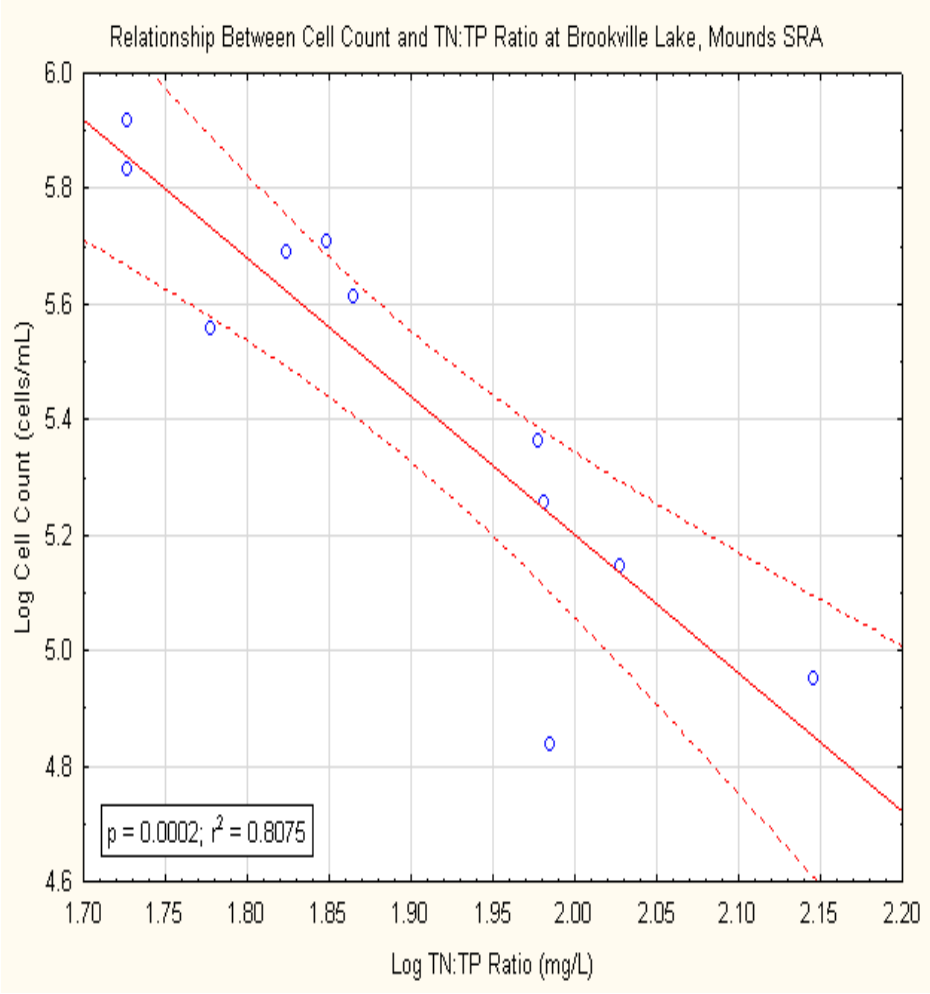




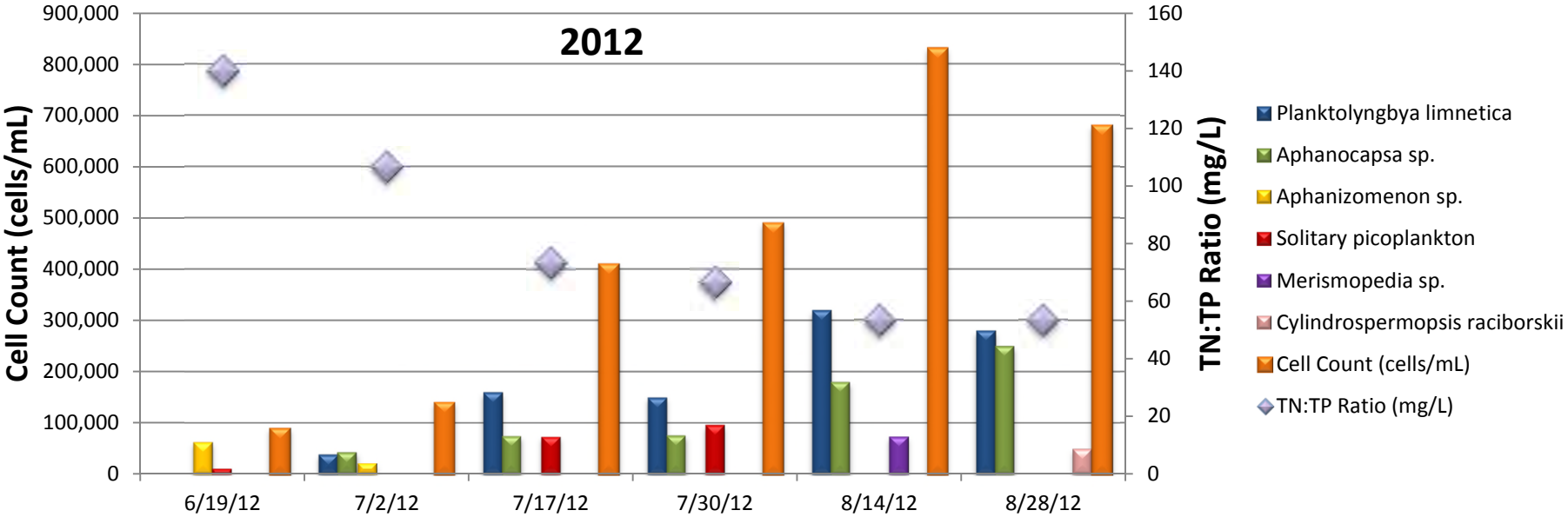
Brookville Lake

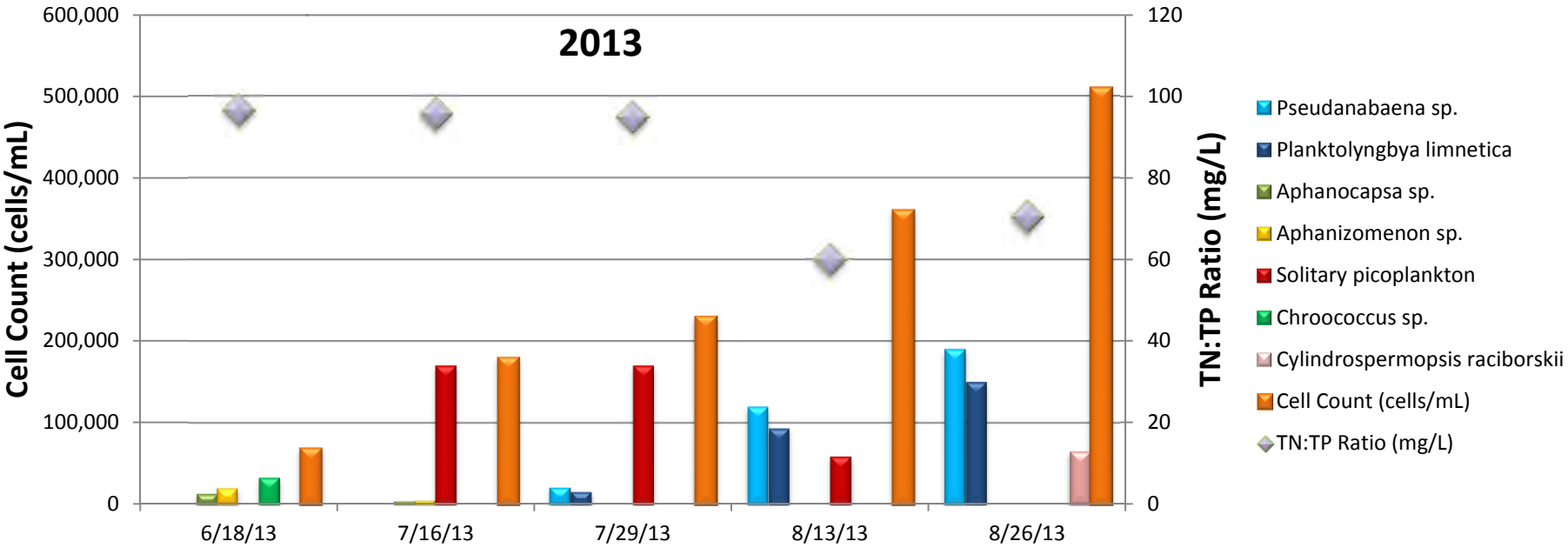
Mounds State Recreation Area



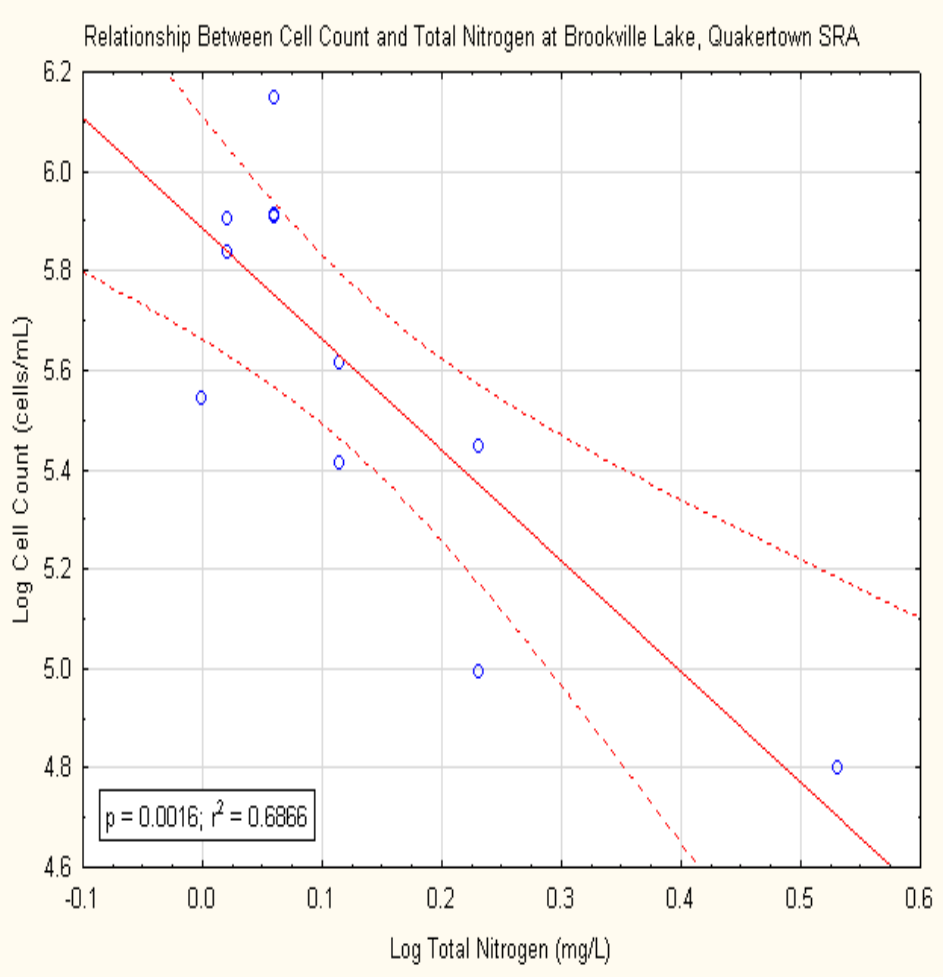


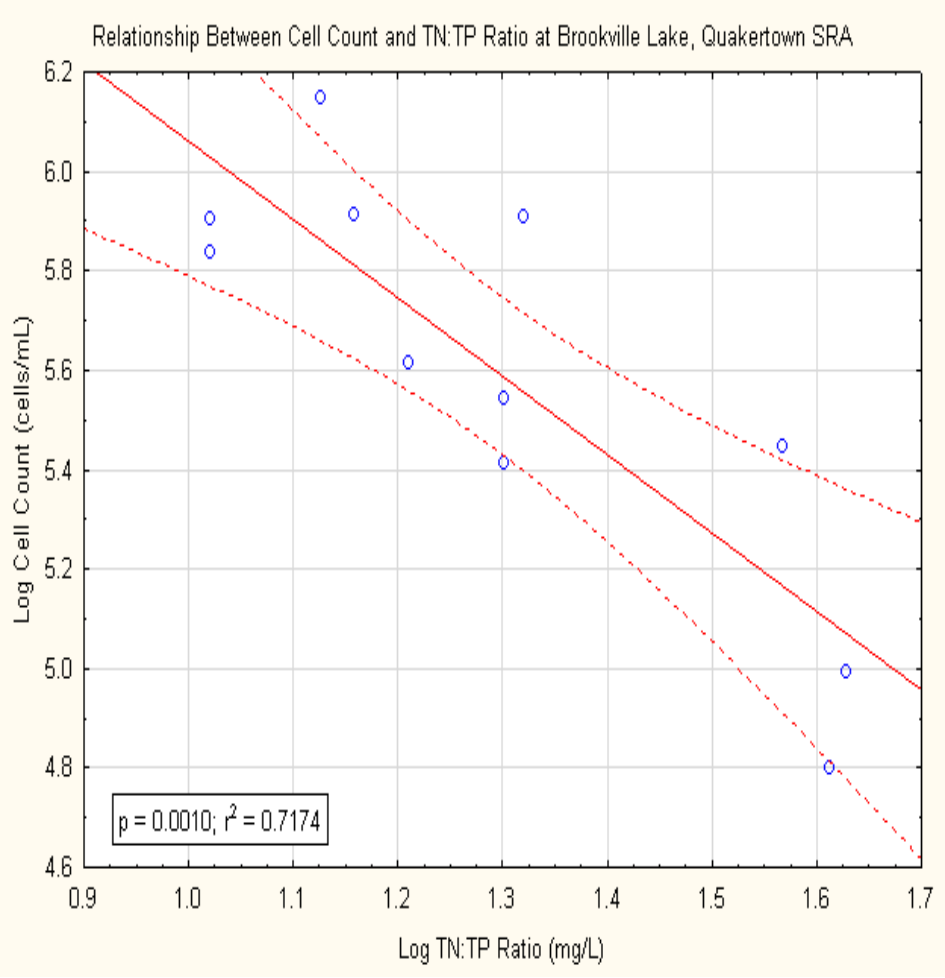
Mounds SRA, Brookville Lake



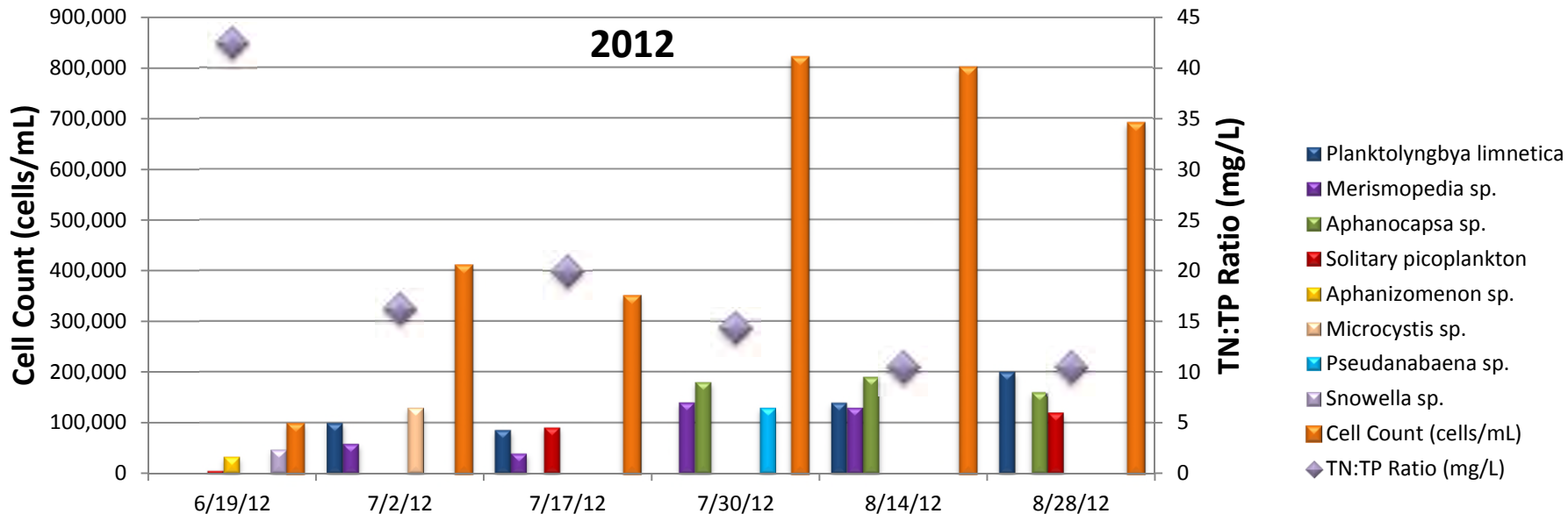


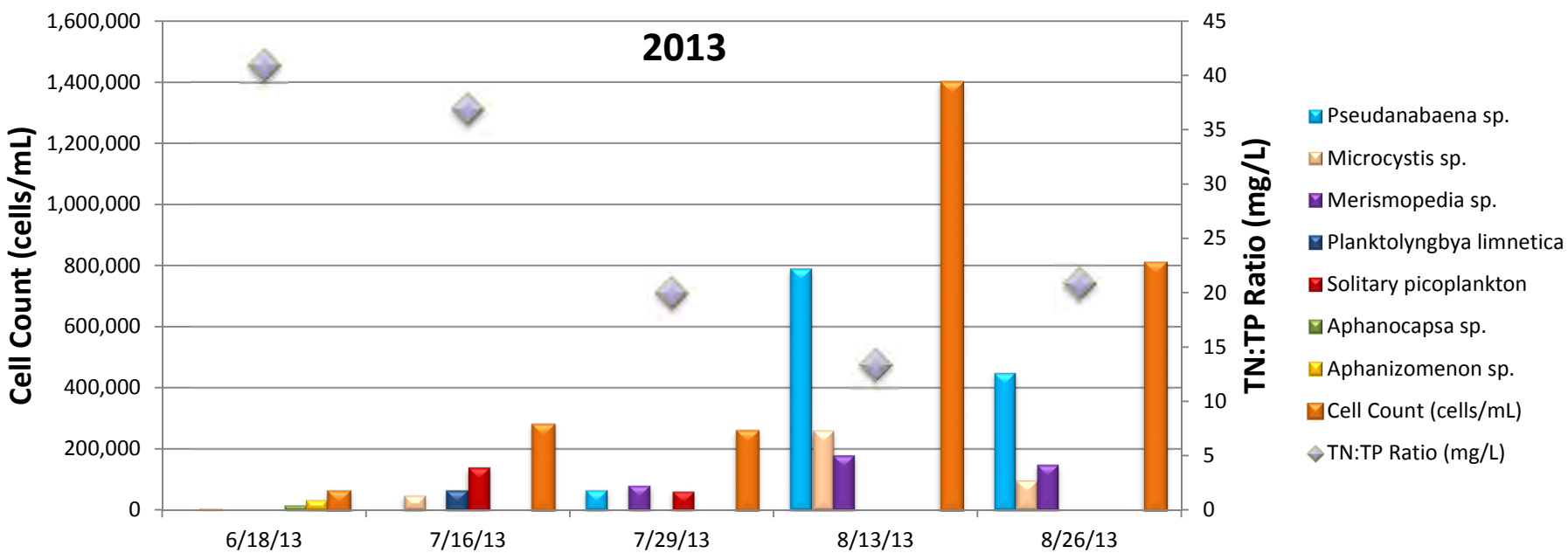
Brookville Lake
Quakertown State Recreation Area





Quakertown SRA, Brookville Lake





Contact

Cyndi Wagner

cwagner@idem.IN.gov

Kristen Arnold

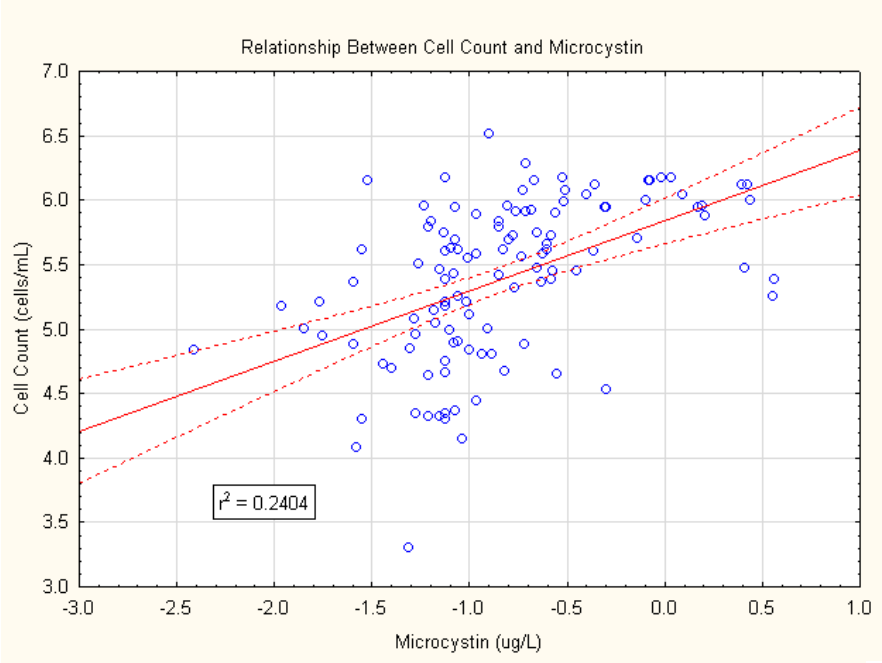
karnold@idem.in.gov

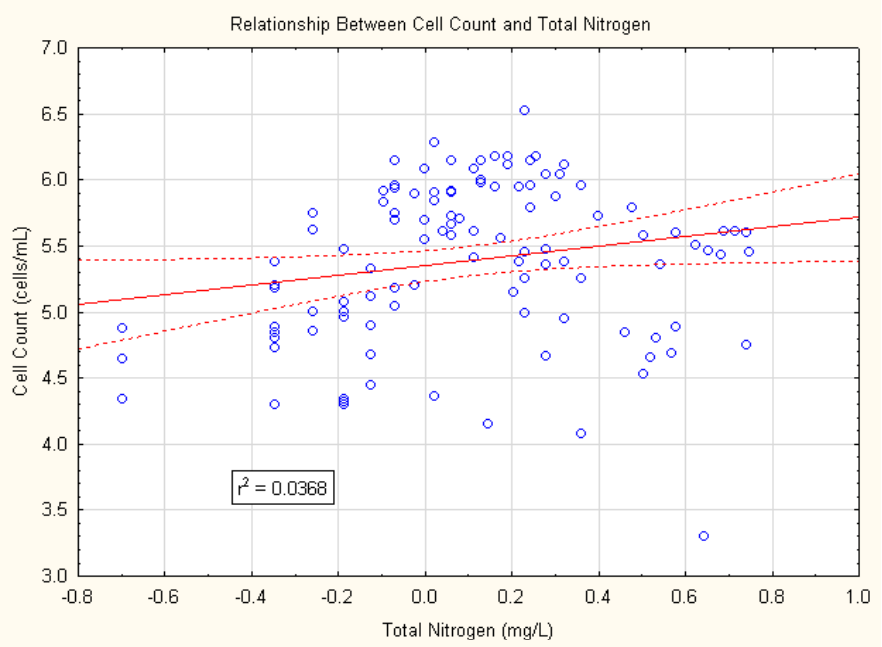
Targeted Monitoring Section

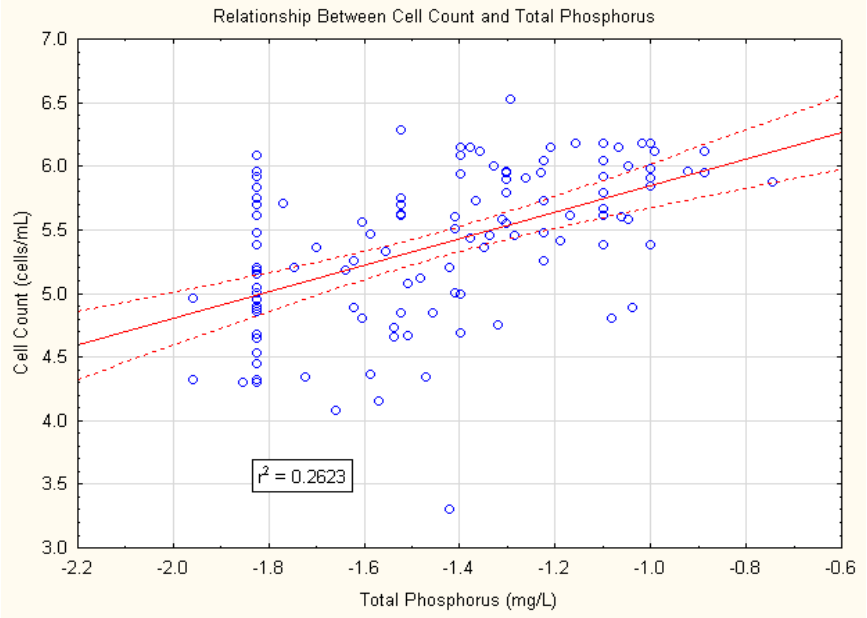
Watershed Assessment and Planning Branch

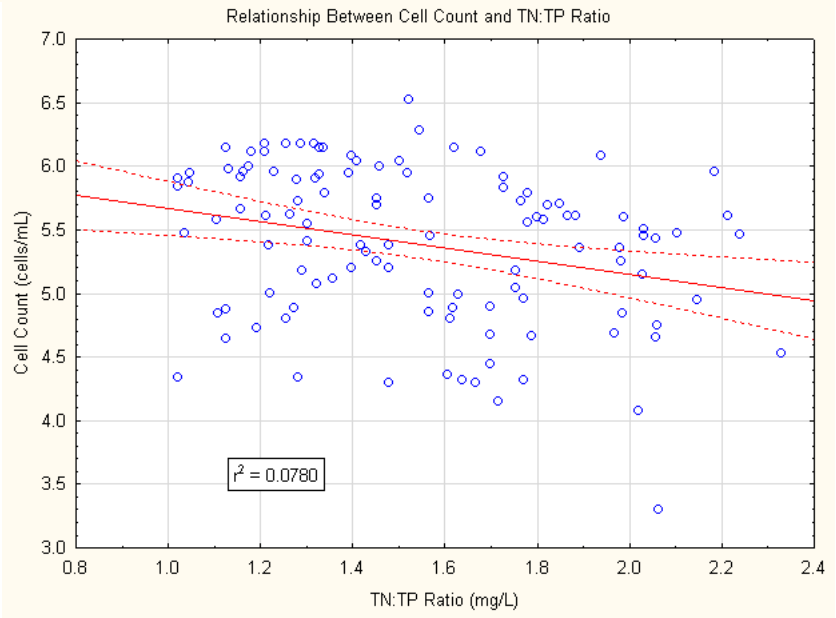
(317) 308-3173

Nutrient Relationships: Cell Counts All Lakes

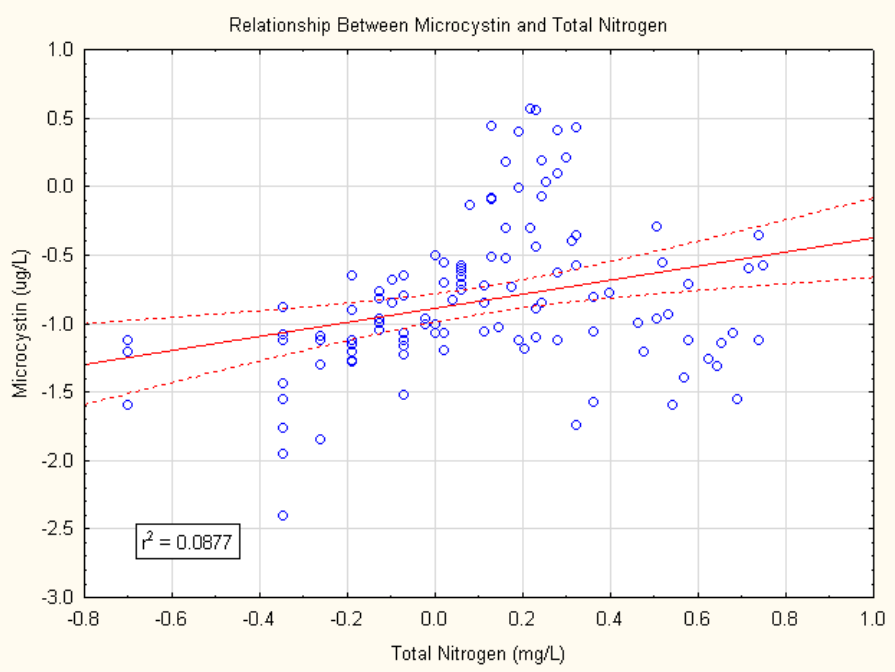


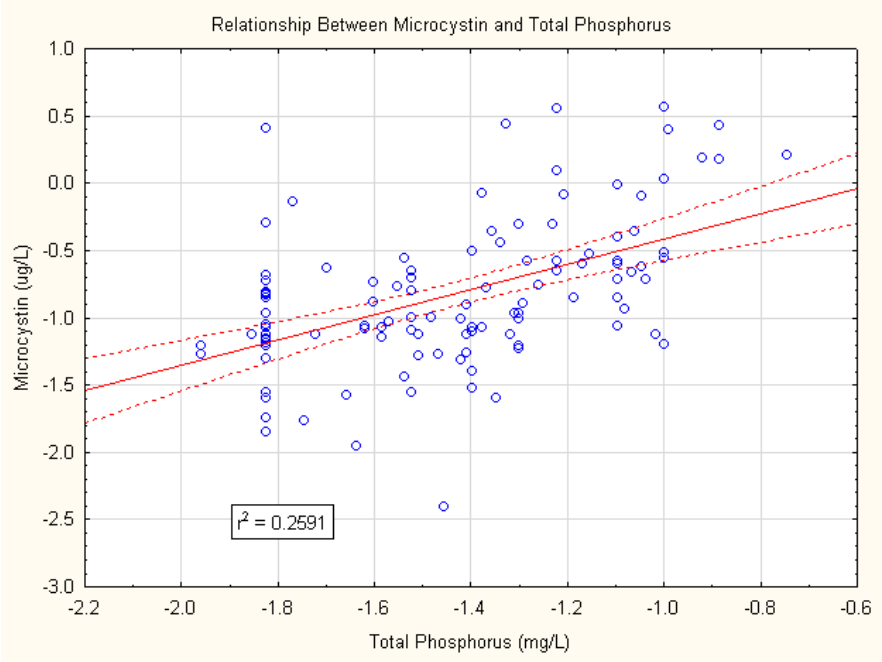


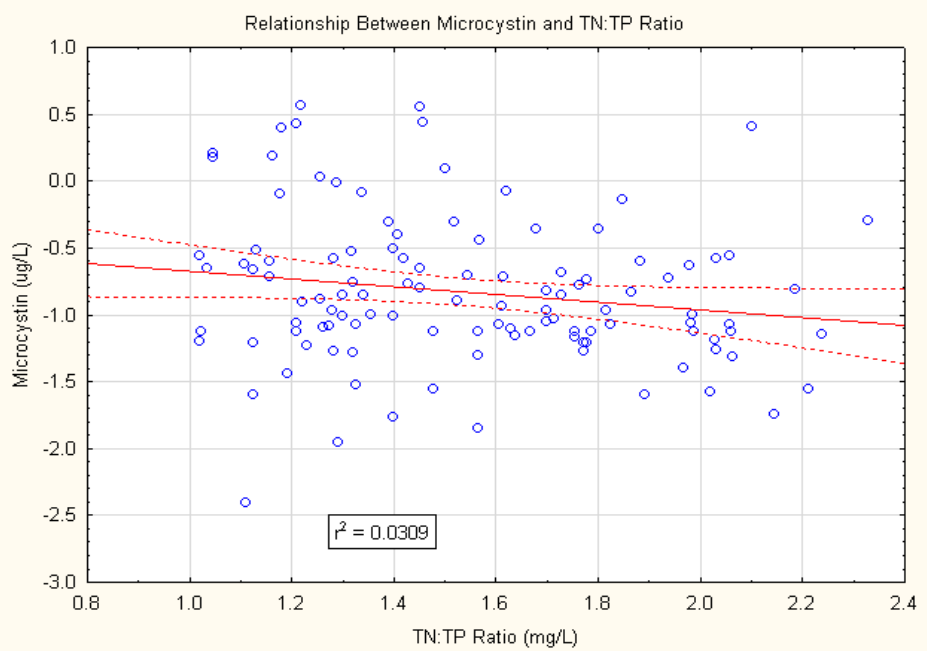




Nutrient Relationships: Microcystin All Lakes

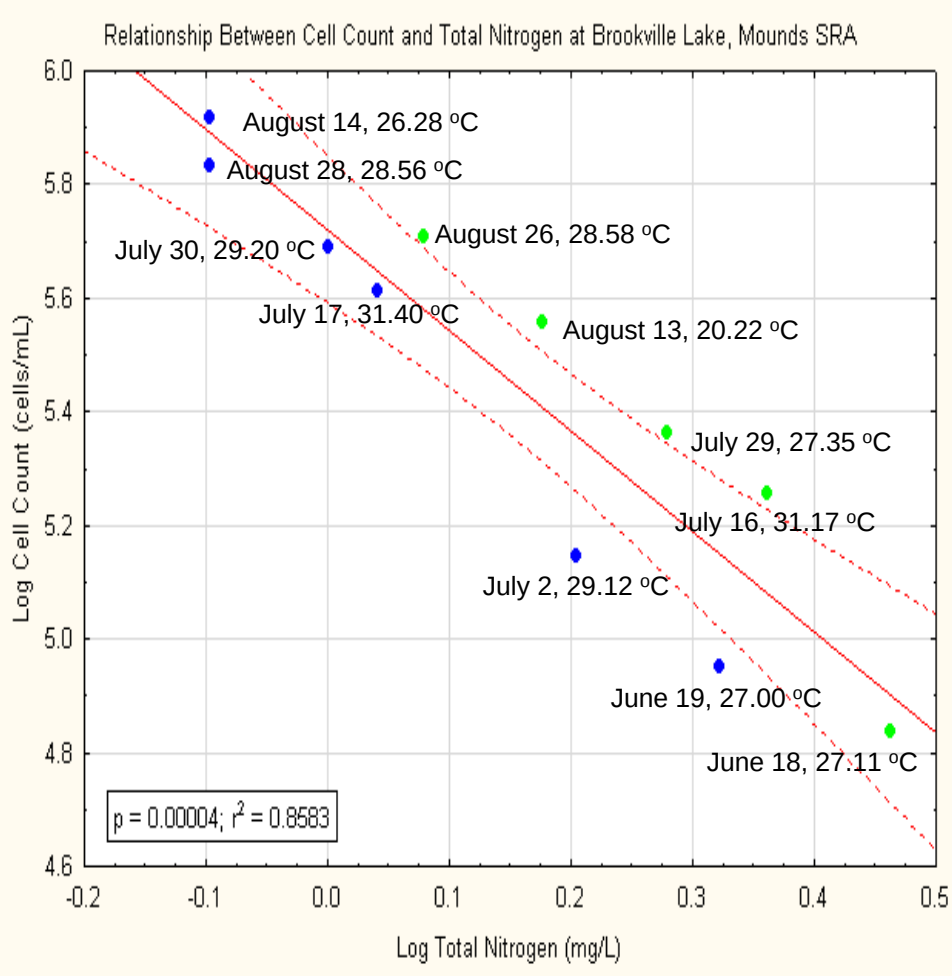


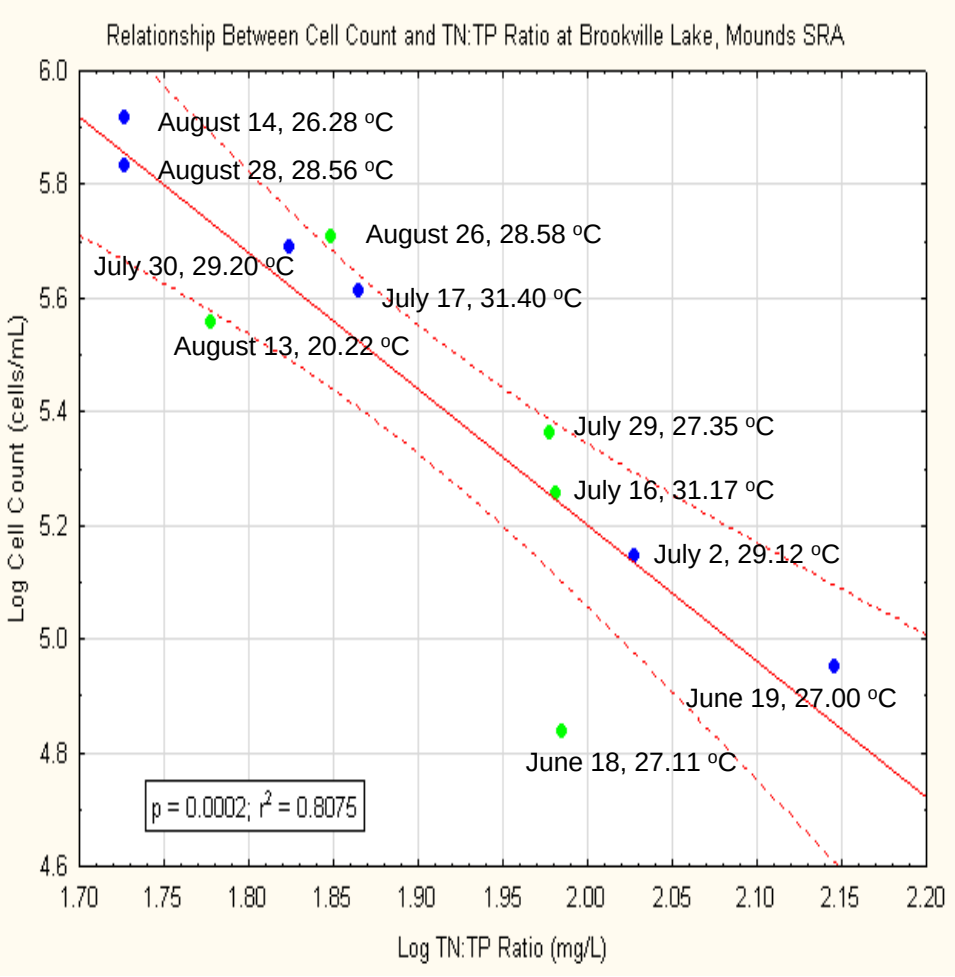




Brookville Lake

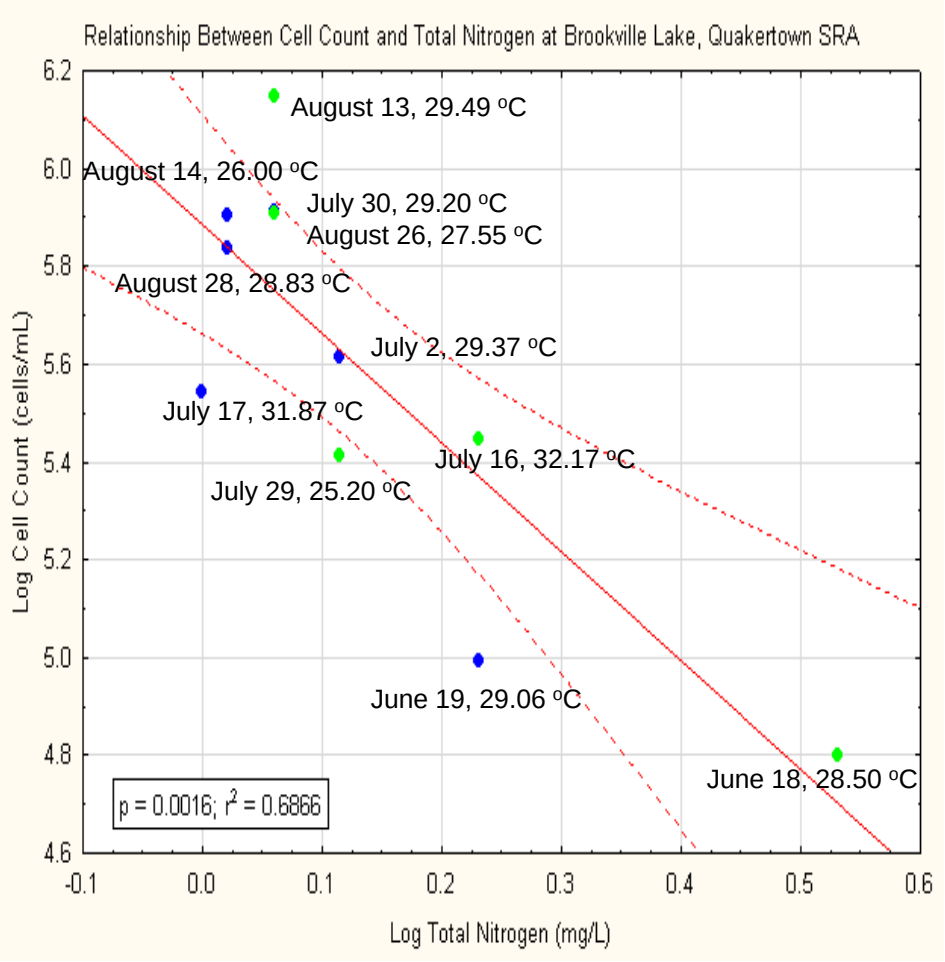
Mounds State Recreation Area

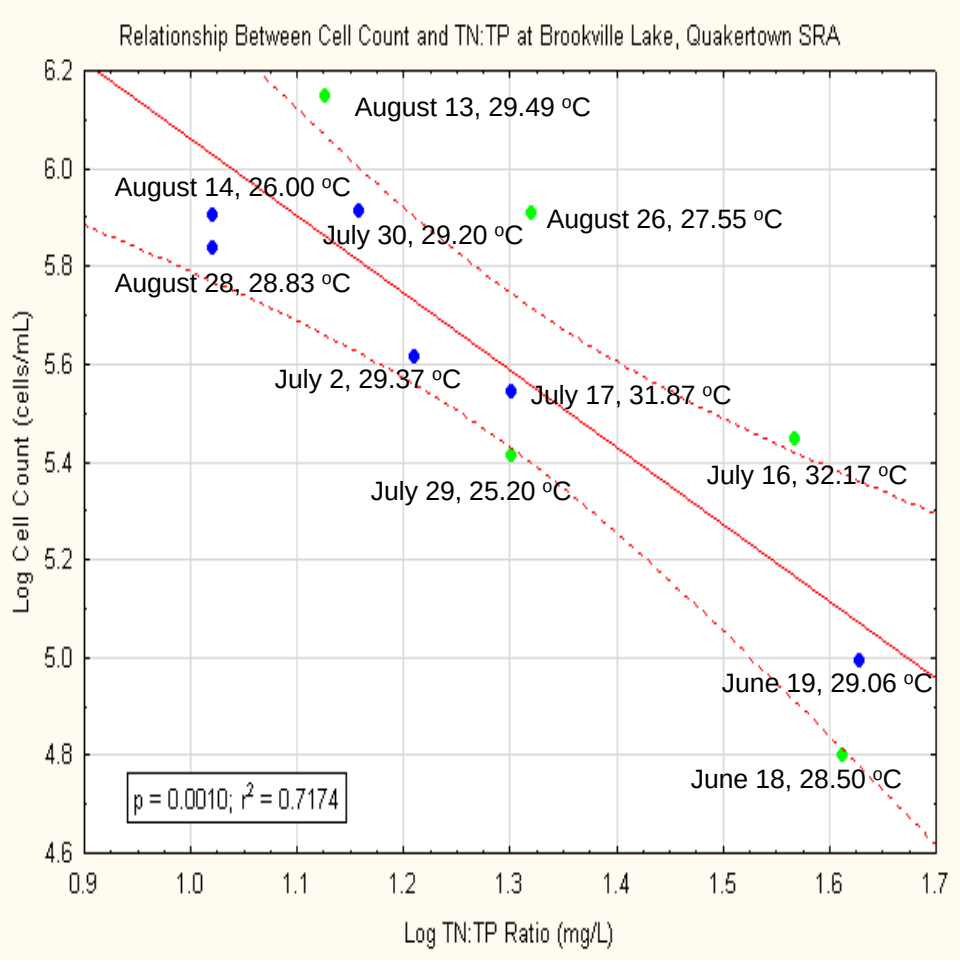




2012 2013

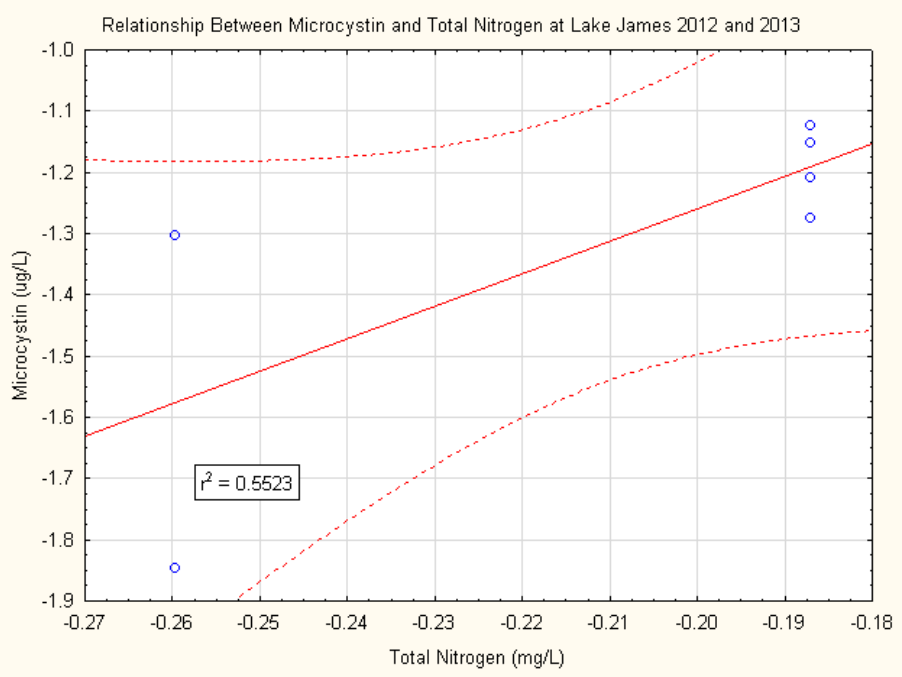
Brookville Lake
Quakertown State Recreation Area

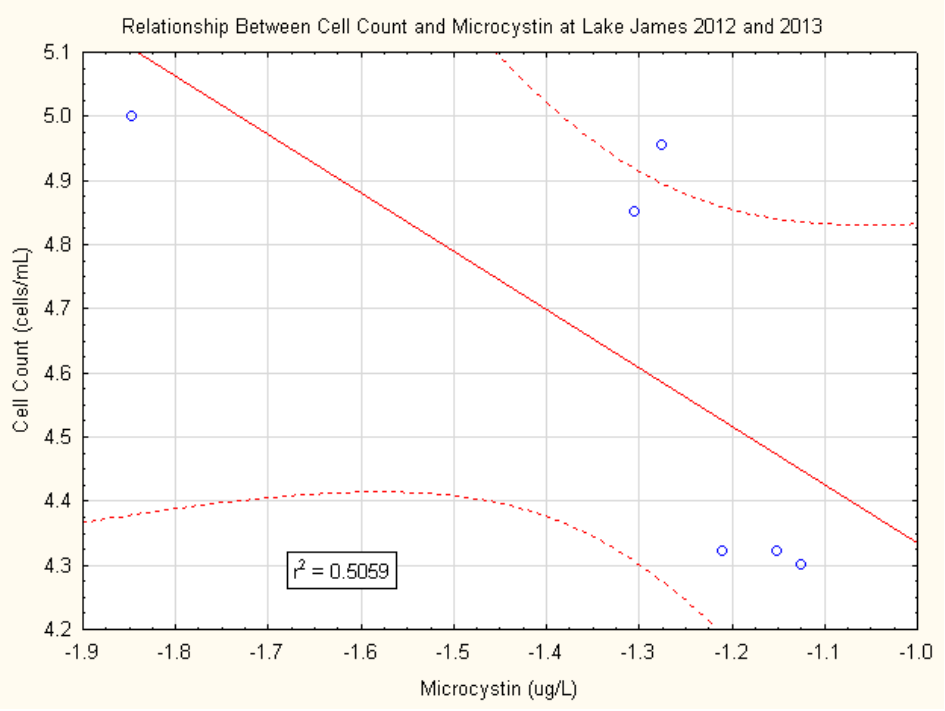




2012 2013

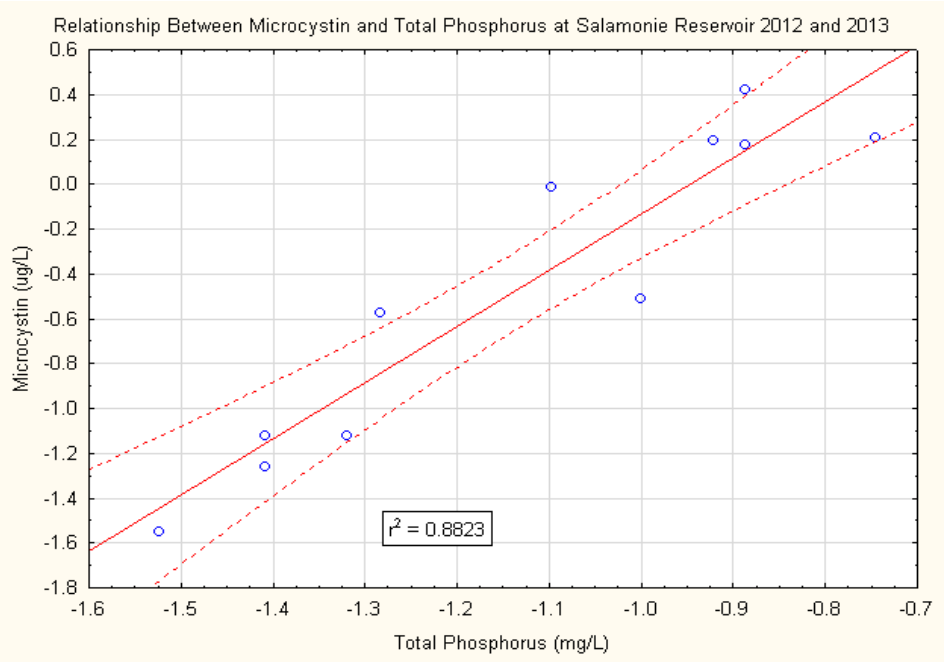
Lake James
Microcystin

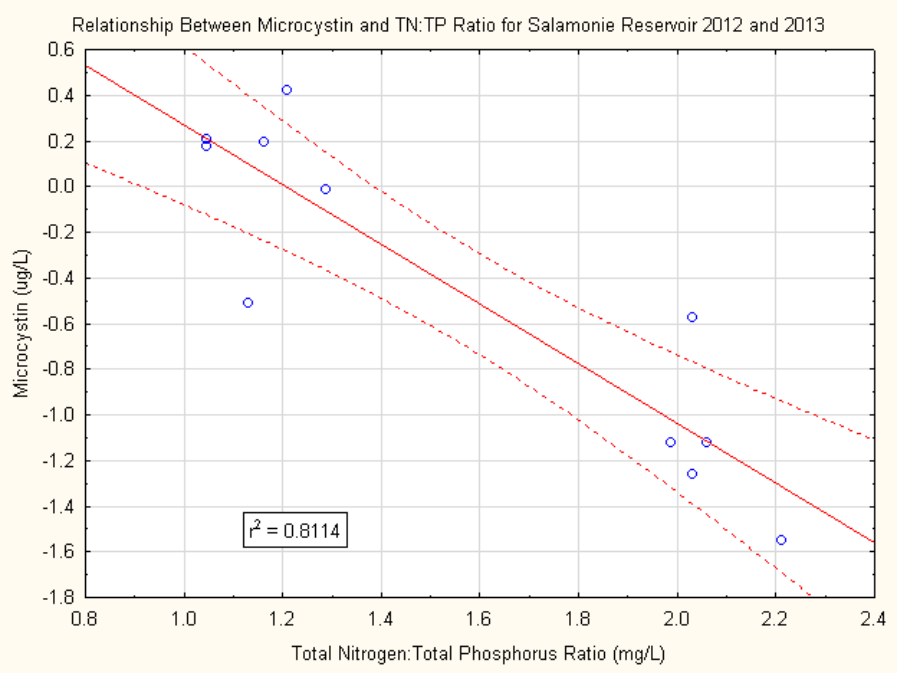




Salamonie

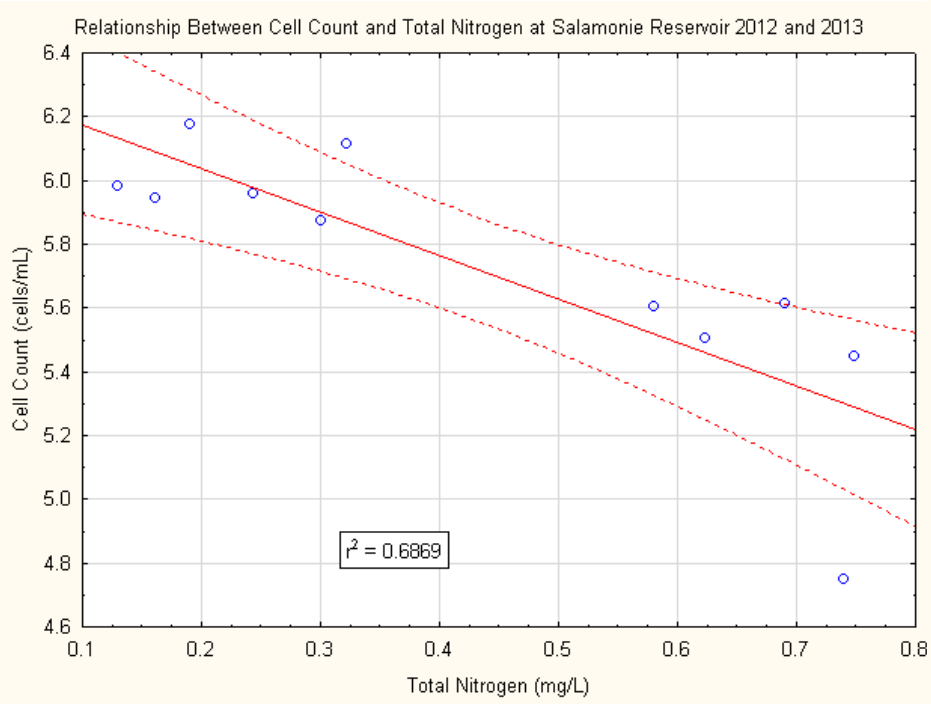
Microcystin

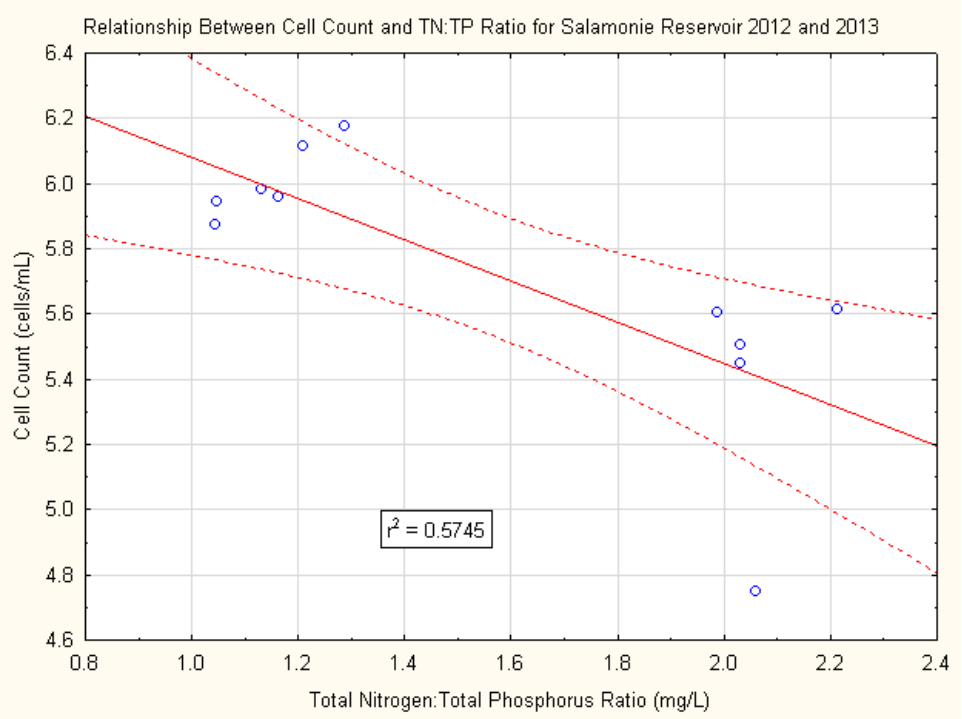




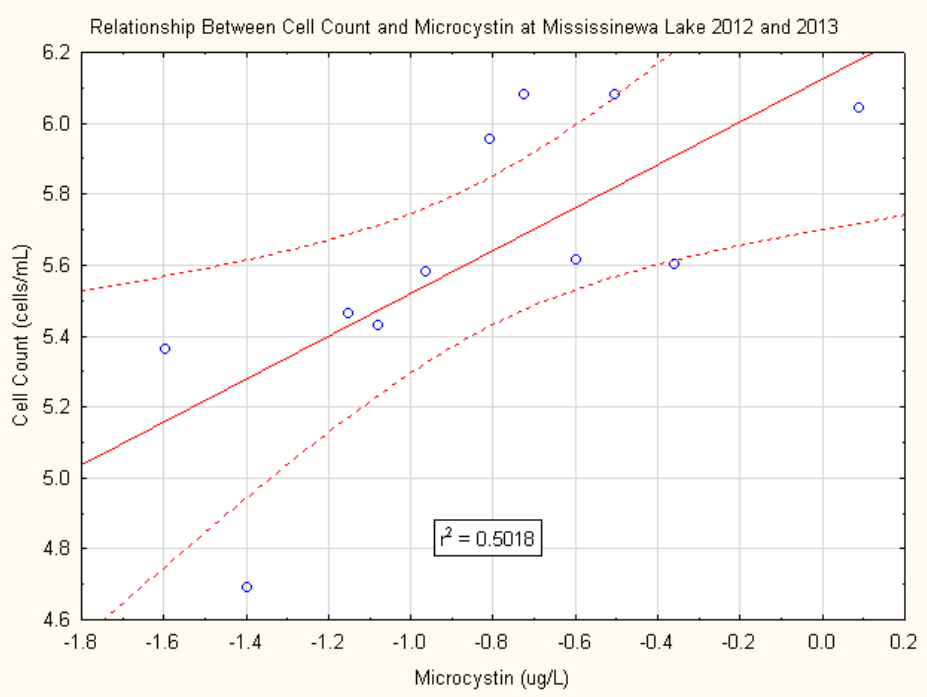
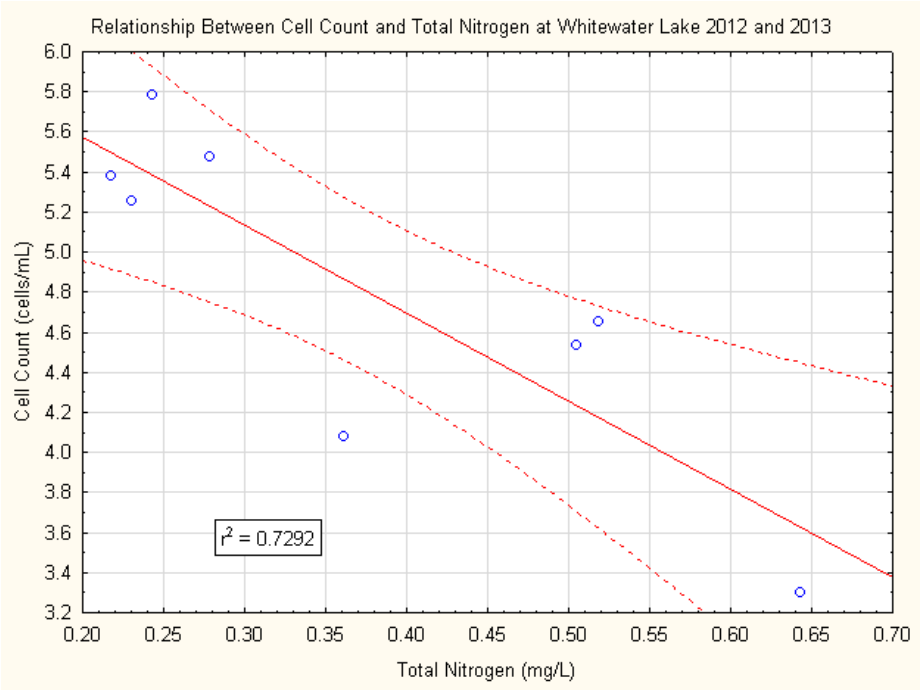
Salamonie

Cell count





Mississinewa



Whitewater