Grand Lake St. Marys

Colleen M. Donahue, P.E., President, Donahue IDEAS
OWEA Watershed Workshop
October 30, 2014
Safety Moment (Arcadis-style)

NOTICE
An algae bloom has made this area potentially unsafe for water contact. Avoid direct contact.

When in Doubt, Stay Out.
Presentation Outline

- History
- The Problem
- Previous Studies and Work
- 2012 GLSM Alum Application
- Other Recent Work
- Future Needs
Grand Lake St. Marys Area
Grand Lake St. Marys Area
History of Grand Lake St. Marys

- Man-made reservoir (early 1800’s) - feeder reservoir for the Miami-Erie canal
- Largest inland lake in Ohio (~13,500 ac)
- Shallow lake (5-7 feet mean depth)
- Watershed (~112 sq mi):
  - Primarily agriculture
  - Septic tanks, package plants
History of Grand Lake St. Marys

- Hyper-eutrophic
- High phosphorus levels
- Cyanobacteria blooms
- Drinking water source for Celina WTP
- Economic asset for Ohio (>150M)
Grand Lake St. Marys Watershed

Watershed map courtesy of Tetra Tech
Harmful Algal Blooms (HABs) (since 1990s):
- abundant or excessive growth of algae
- planktonic bacteria (blue-green algae)
- primarily Planktothrix in GLSM
- depletes oxygen (fish kills)
- produce toxins:
  - neurotoxins (nerve)
  - hepatotoxins (liver)
  - dermatoxins (skin)*
The Problem

What health risks do humans face as a result of exposure to cyanotoxins?

Adverse health outcomes from exposure to cyanotoxins may range from a mild skin rash to serious illness or death. Acute illnesses caused by exposure to cyanotoxins have been reported. The table below summarizes the health effects caused by the most common toxin producing cyanobacteria.

The Primary Cyanotoxins and their Health Effects

<table>
<thead>
<tr>
<th>Cyanotoxins</th>
<th>Health effects</th>
<th>Most common cyanobacteria producing toxin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microcystin-LR</td>
<td>Abdominal pain</td>
<td>Microcystis, Anabaena, Planktothrix, Anabaenopsis, Aphanizomenon</td>
</tr>
<tr>
<td></td>
<td>Vomiting and diarrhea</td>
<td></td>
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<tr>
<td></td>
<td>Liver inflammation and hemorrhage</td>
<td></td>
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<tr>
<td></td>
<td>Acute pneumonia</td>
<td></td>
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<tr>
<td></td>
<td>Acute dermatitis</td>
<td></td>
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<tr>
<td></td>
<td>Kidney damage</td>
<td></td>
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<tr>
<td></td>
<td>Potential tumor growth promotion</td>
<td></td>
</tr>
<tr>
<td>Cylindrospermopsin</td>
<td>Tingling, burning, numbness, drowsiness, incoherent speech, salivation, respiratory paralysis leading to death</td>
<td>Cylindrospermopsin, Aphanizomenon, Anabaena, Lyngbya, Rhaphidopsis, Umezakia</td>
</tr>
<tr>
<td>Anatoxin-a group</td>
<td></td>
<td>Anabaena, Planktothrix, Aphanizomenon, Cylindrospermopsin, Oscillatoria</td>
</tr>
</tbody>
</table>

Symptoms range from allergic-like reactions (e.g., rhinitis, asthma, eczema, and conjunctivitis) to flu-like reactions (skin rashes, gastroenteritis, and respiratory irritation). Allergic or irritative dermal reactions of varying severity have been reported from recreational exposures to several freshwater cyanobacterial genera such as Anabaena, Aphanizomenon, Nodularia, and Oscillatoria. Endotoxins, the blue-green pigment of the cyanotoxins (phycocyanin) and dermal toxins produced by Lyngbya and Planktothrix species have been linked to skin and eye irritation from exposure during swimming.

Source: [www.epa.gov](http://www.epa.gov) - Nutrient Policy
The Problem

Source: AWWA Opflow, January 2012

Construction Cost: ~$6M
The HAB Photo Parade

Photos: Donahue IDEAS
The HAB Photo Parade

Photo: Donahue IDEAS
The HAB Photo Parade

Photo: Russ Gibson, Ohio EPA

Photo: Sam Hendren, WOSU

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Photo: Ohio EPA
The HAB Photo Parade

Photo: Lake Champlain International
The HAB Photo Parade

Photos from www.DarkeJournal.com
Two more toxins detected in Grand Lake St. Marys

Algae-based poisons pose serious risks to swimmers and other users. Health officials are taking no chances, urging extreme caution.

By Spencer Hunt
The Columbus Dispatch • Thursday July 1, 2010 5:14 AM

Two more toxins detected in Grand Lake St. Marys - ST. MARYS, Ohio - Last year, Joe Caperna made his grandchildren jump into his pool after swimming in Grand Lake St. Marys because they felt "itchy."

But when they visit him this year, he won't even let them touch the lake water, especially after seeing it turn emerald green last week. And he doesn't like the fishy, pungent smell that started bothering fellow residents two weeks ago.
The good, the bad and the algae
Phosphorus-fueled cyanobacteria are making Grand Lake St. Marys sick

By Doug Currie
The Columbus Dispatch • Monday July 12, 2010 10:15 AM
Comments: 0

The good, the bad and -
If non-toxic algae are the sweet grass at the bottom of a lake’s food chain, cyanobacteria - what most people call blue-green algae - are the weeds.

By that definition, Grand Lake St. Marys, Ohio’s most polluted lake and one of the state’s most troubled, is choking on noxious weeds. The state is warning people not to touch the water after tests found three toxins produced by cyanobacteria.

David Culver, an emeritus professor who runs Ohio State University’s Limnology Laboratory - which studies the ecology of lakes and fish hatcheries - says spikes in cyanobacteria are a sure sign of a sick lake.

“They grow like other critters, they look like other critters but they’re not as healthy as food for the zooplankton,” he said. “In lakes that have the best production of fish and good water quality for drinking and swimming, you have fewer.”

Cyanobacteria, unlike the “good” algae, have evolved to excrete toxins. That’s what makes them such a pain in the liver when they take over your swimming hole.

“You ask, Why do these organisms bother?” in the same way you ask, ‘Why do these weeds bother?’”
Feds send $1 million to help save Grand Lake St. Marys
Funds aim to curb flow of farm manure, fertilizers that create toxic algae

By Spencer Hunt
The Columbus Dispatch • Tuesday July 20, 2010 2:22 PM

Feds send $1 million to help save Grand Lake St. Marys -
The U.S. Department of Agriculture will set aside $1 million to help combat the toxic algae plaguing Grand Lake St. Marys in western Ohio, officials said today.

Ohio officials are warning people away from Grand Lake St. Marys.

The money will be spent through a federal program that encourages farmers to reduce the flow of manure and fertilizers that run off fields during storms. The pollutants feed vast blooms of stinking, fish-killing cyanobacteria, also called blue-green algae, which have spread across the 13,000-acre lake this summer.

This isn’t the first time the USDA has set aside money for Grand Lake St. Marys, located in Mercer and Auglaize counties. The agency spent $1 million for similar efforts in the area in April and $1.5 million in 2009.
State offers visitor discounts at Grand Lake St. Marys
Toxic algae killed tourism business there last year

By Spencer Hunt
The Columbus Dispatch • Tuesday February 1, 2011 3:47 PM

The state is offering for the first time "half-off" discounts at Grand Lake St. Marys shelter houses and its docks through this summer in an effort to lure tourists back to the troubled lake.

It also is continuing its 50 percent discount for camp sites, which it offered last year.

Health warnings centered on blooms of toxic blue-green algae scared tourists away from the 13,000-acre lake and state park during the past two summers, sending the local tourism economy into a tailspin.

The Ohio Department of Natural Resources offered the discounts for the first time last year while warning signs were in place. Officials released a plan last week in which they will take extra steps intended to keep the algae from returning.

"State park visitors bring critical tourism dollars to local businesses and communities across Ohio," State Parks Chief David Payne said in a release. "It is vital that we remain innovative in our ways to attract more visitors to Grand Lake St. Marys."

The algae, which can produce as many as four different liver and nerve toxins, feed on phosphorus from manure that rain washed off nearby farms. The algae grew so thick in the lake last summer that the state warned people not to touch the water, take boats out on the lake or eat any fish they caught there.
Toxic algae returns to Grand Lake St. Marys
State warns visitors to stay away from water

By Spencer Hunt
The Columbus Dispatch • Thursday May 19, 2011 3:14 PM
Comments: 0

Toxic algae returns to Grand Lake St. Marys -
The toxic blue-green algae that has plagued Grand Lake St. Marys for two years has returned to the western Ohio state park.

State officials today are warning visitors not to swim, wade or swallow any lake water. Warning signs are being posted at three beaches located at the eastern end of the lake.

The state says water samples taken earlier this week at the three beaches by the Ohio Environmental Protection Agency indicate the presence of toxic algae.

The bloom, the state says, is not confined to the beaches, but is visible over most of the lake.

This type of bloom holds the potential for producing algal toxins, including microcystin, such as those experienced at the lake in recent years.

Algal blooms can produce neurotoxins, which affect the nervous system, and hepatotoxins, which affect the liver.

Fed by phosphorus in manure that storms wash off nearby farms, blue-green algae grew so thick in Grand Lake St. Marys last year that
EPA hopes to keep Grand Lake St. Marys trouble-free
Cleanup goal is no health advisories for Grand Lake in 2012.

By Steve Bennish
Staff Writer

CELINA — All of Grand Lake St. Marys is being targeted for an early spring chemical treatment to short-circuit any potential harmful blue green algae blooms this year, the Ohio Environmental Protection Agency said Wednesday.

Officials have lined up about a third of the money to pay for the $5 million treatment with alum, or aluminum sulfate, said OEPADirector Scott Nally. Treatment could happen as soon as April 1 to get a head start on the blooms, he added.

The chemical binds to phosphorous to prevents it from fueling the hazardous cyanobacteria outbreaks that have at times shut down recreation on the lake.

Nally appeared at a summit and briefing along with state and local officials held at the Wright State University Lake Campus to share updates on lake restoration plans.

In 2011, a partial treatment reduced phosphorous levels in the lake’s center by a better-than-expected 56 percent.

A 50 percent reduction was the target for the treatment of the middle 4,000 acres of the 13,000-acre lake.

The goal for 2012 is to have no outbreaks that prompt health advisories, said Tom Knapke of the Grand Lake Restoration Commission, which organized the summit.

In another major undertaking, federal funding will pay for an 18-acre wetland being built this year on Praine Creek, a major feeder to the lake.

The wetland should help naturally filter farm field manure runoff, which feeds to the algae blooms. Additional filtration projects are under way at the other creeks on the lake.

Plans are being developed with the U.S. Army Corps of Engineers to by 2014 build an additional 80 acres of wetlands in locations in the lake that used to support them, said Jared Ebbing, Mercer County’s development director. The new wetland acreage could multiply within 20 years, he
Commitment to Grand Lake St. Marys Continues with Spring Alum Treatment

Author's Note: This latest update on the state DNR's efforts to solve the toxic algae problem at Grand Lake St. Marys is notable in that the state is leaving no stone unturned in what has become an immense and complex issue. Kudos to the Ohio DNR for its steadfastness in this regard, and here's hoping there will be some positive results this summer.

COLUMBUS, OH – A step toward improving water quality at Grand Lake St. Marys will occur this spring when an alum treatment will be applied to cover the entire lake. This treatment is part of Gov. John Kasich's approach to improve Grand Lake St. Marys through rough fish removal, dredging, installation of a treatment train, wetland creation, watershed improvements and other water quality initiatives.

“We are committed to improving the water quality at Grand Lake St. Marys,” said Ohio Department of Natural Resources (ODNR) Director James Zehringer. “A healthy and thriving lake will not only benefit the residents of Mercer and Auglaize counties, but this improvement will benefit all Ohioans.”

Ohio has offered steep discounts for campground reservations at Grand Lake Marys State Park, which obviously has seen a huge drop-off in campers since the lake problems first surfaced several years ago. One significant result was the findings of an outside company in determining the cause and solution of the toxic algae.

ODNR continues to work collaboratively with Ohio EPA to improve water quality in Grand Lake St. Marys. This is the second year an alum treatment has been applied to the lake.
Previous Studies and Work

- Grand Lake St. Marys Restoration Commission – Strategic Plan (01/31/11)
- Battelle – GLSM 2011 Aeration Testing (02/07/11)
GLSMRC Strategic Plan 01/30/2011

- Sequestration of Soluble Reactive Phosphorus (Chemical Treatment)
- Dredge Sediment Depositions
- Beneficial Use of Organic Waste
- Treatment Train Establishment
- Rough Fish Removal
- HAB Prevention Through Micro Nutrient Modification
- Aeration and Circulation
- Water Level Management
Study performed for GLSMRC
- Evaluated effectiveness of artificial circulation
  - DO, Chl, Secchi, Turbidity
  - Nutrient levels
  - Sediment Redox Potential Discontinuity (RPD)
- Improved DO levels at Airy-Gator site
- Allowed formation of RPD layer
- Recommended installation of aeration devices at strategic locations around S and E margins of lake
- Biomanipulation of fish stocks
Aluminum sulfate (alum) application
Treated ~40% of the lake area (~1,960 ha)
Two barges to apply alum
Over a period of 30 days
Application began in June
Algal bloom already underway
Impacted effectiveness of 2011 application
2012 GLSM Alum Application

- Team:
  - Donahue IDEAS
  - Tetra Tech
  - HAB Aquatic Solutions
- Turnkey project
- Scheduled for April and May 2012
- $5M project including post-treatment evaluation
2012 GLSM Alum Application

- Chemicals:
  - Aluminum sulfate (alum)
  - Liquid sodium aluminate (LSA)
  - 2:1 ratio (alum:LSA)
- Application area: same 40% as in 2011
- Two barges
- Two staging sites:
  - West (near the ODNR boathouse)
  - Public boat launch area
2012 GLSM Alum Application
2012 GLSM Alum Application

Schedule:

- Contract was fast-tracked by ODNR
  - Awarded - 03/06/2012
  - Contract – 03/29/2012 (WOW)
- Begin in early April; end by late May
- Continuous operation through weekends during daylight hours
- Beat the spring/early summer algal bloom
Permits:

- Notice of Intent (NOI) Pesticide application
  - Submitted – 03/26/2012
  - Received – 03/27/2012 (OMG)
- Application period: 04/01/12 - 05/16/12
- Work to be suspended if:
  - DO<2.5 mg/L
  - pH<6.0
- SPCC Plan
  - Dilution really is the solution
2012 GLSM Alum Application

Schedule:

- Plan of Work submitted 03/23/2012
- Began mobilizing 03/28/2012
- Began application 04/02/2012
- Worked extended days (many over 14 hours)
- Longest days (16.8 and 16.5 hours)
- Worked all weekends except Easter Sunday
- Limited by weather conditions (high winds)
- Complete by 04/30/2012
2012 GLSM Alum Application

Schedule:

Grand Lake St. Marys has early case of toxic algae

Associated Press

COLUMBUS, Ohio – Tests indicate the blue-green algae growth that has hampered tourism near a western Ohio lake appeared about two months earlier this year than last, possibly because of unseasonably warm weather.

The algae blooms, which produce a nerve toxin that can sicken humans, have led to previous closures of Grand Lake St. Marys and swimming advisories.

The algae didn’t show up last year until late May, but tests show it may have started growing in early March this year, The Columbus Dispatch (http://bit.ly/LJD8i) reported Wednesday.

Milt Miller, a co-founder of the Grand Lake St. Marys Restoration Commission, blames the unusually warm weather.

Daily high temperatures reported by the National Weather Service were at least 11 degrees above normal from March 12-25 and exceeded 80 degrees on March 20-22.

“Typically we don’t see those warm temperatures until May or June,” Miller said.
2012 GLSM Alum Application

Field staff – tracking parameters:

- pH
- Temperature
- Conductivity
- Transparency (Secchi disk)
- Number of barges (field check for daily reports from contractor)
- Field conditions (fish kills, etc.)
- Media (refer to ODNR)
2012 GLSM Alum Application

West End Staging Site
2012 GLSM Alum Application

East End Staging Site
2012 GLSM Alum Application

HAB Chemical Application Barge
2012 GLSM Alum Application

HAB Chemical Application Barge in Operation
Results:

2012 dose to the middle 40% of the lake:

- Higher than in 2011 (23.6 mg Al/L in 2012; 21.5 mg Al/L in 2011)
- Still less than recommended dose due to funding constraints (86 mg Al/L)
- Over 232 barges of chemicals applied
- Total of 1,808,888 gallons of alum and 904,344 gallons of LSA applied
Water Quality Results:

- During and post-application monitoring:
  - Three water column monitoring sites (same as OEPA)
  - Two OEPA YSI sonde buoys
  - One USGS YSI sonde buoy (not useable)
  - Six aluminum sample sites (OEPA)

- Post-application sampling:
  - Five lake sites at 0.5 m below and 1.0 m above
  - TP, SRP
  - Alkalinity
  - Chl and phytoplankton

2012 GLSM Alum Application
2012 GLSM Alum Application
2012 GLSM Alum Application

Water Quality Results:

- Phosphorus increased and remained high possibly due to wind mixing, lower lake levels, and early algal bloom

<table>
<thead>
<tr>
<th></th>
<th>TP (µg/L)</th>
<th>Chl (µg/L)</th>
<th>Chl/ TP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before (3/6)</td>
<td>83 ± 8</td>
<td>43 ± 1.2</td>
<td>0.52</td>
</tr>
<tr>
<td>During (4/4-4/25)</td>
<td>148 ± 20</td>
<td>107 ± 5.5</td>
<td>0.82</td>
</tr>
<tr>
<td>After (5/8-8/23)</td>
<td>216 ± 12</td>
<td>109 ± 5.1</td>
<td>0.54</td>
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</tbody>
</table>

*Before treatment, data were available from the three main lake sites (L-1, L-2, L-3) only. Chl results from OEPA were corrected downward; OEPA chl x 0.47
2012 GLSM Alum Application

Total Phosphorus Concentrations, Before, During and After Alum Treatment
**2012 GLSM Alum Application**

Water Quality Results:
- Low residual aluminum in water column

### Mean and Range of Total and Dissolved Aluminum Concentrations during 2012 Alum Treatment

<table>
<thead>
<tr>
<th>Location</th>
<th>Mean Total Al (mg/L)</th>
<th>Min Total Al (mg/L)</th>
<th>Max Total Al (mg/L)</th>
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<tbody>
<tr>
<td>Whole Lake</td>
<td>1.83</td>
<td>1.00</td>
<td>2.95</td>
</tr>
<tr>
<td>Inside Treatment Area</td>
<td>2.08</td>
<td>1.00</td>
<td>2.95</td>
</tr>
<tr>
<td>Outside Treatment Area</td>
<td>1.69</td>
<td>1.18</td>
<td>2.60</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Mean Dissolved Al (mg/L)</th>
<th>Min Dissolved Al (mg/L)</th>
<th>Max Dissolved Al (mg/L)</th>
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<tbody>
<tr>
<td>Whole Lake</td>
<td>1.29</td>
<td>0.20</td>
<td>2.71</td>
</tr>
<tr>
<td>Inside Treatment Area</td>
<td>1.68</td>
<td>0.74</td>
<td>2.71</td>
</tr>
<tr>
<td>Outside Treatment Area</td>
<td>1.07</td>
<td>0.20</td>
<td>2.45</td>
</tr>
</tbody>
</table>
2012 GLSM Alum Application

Water Quality Results:

- Chlorophyll (algal biomass):
  - Increased in early April
  - Declined dramatically in late April to early June
  - Appear to be associated with the TP decline
  - Decline observed at all sites
Chlorophyll a Concentrations, Before, During and After Alum Treatment
(Data collected by Ohio EPA (before and during treatment) has been corrected by a factor of 0.47.)
Continuous Surface DO and pH at YSI WEST in GLSM
2012 GLSM Alum Application

Diatom and Cyanobacteria Biovolume at Station L-1 in GLSM
Grand Lake St. Marys had algae in March, tests show
Warnings won't be posted till late May

By Spencer Hunt
The Columbus Dispatch • Wednesday May 9, 2012 5:19 AM
Comments: 3

Tests show toxic blue-green algae were growing in Grand Lake St. Marys as early as March this year.

The most-recent test, on April 18, detected the liver toxin produced by the algae at a concentration seven times higher than what the state uses to advise older visitors, young children and people with weakened immune systems not to wade or swim.

State officials said warning signs won't go up at the 15,000-acre western Ohio lake and state park until Memorial Day weekend, the start of the state's swimming season.

"At this point, there may be some boating on Grand Lake," said Carlo LoParo, spokesman for the Ohio Department of Natural Resources. "However, there is no water-skiing or full-body contact with the water because of lake temperatures."

Blue-green algae, also called cyanobacteria, are common in most Ohio lakes. They grow thick by feeding on phosphorus from manure, fertilizers and sewage that rain washes from farm fields into nearby streams.

As many as 19 public lakes, including Erie, have been tainted in recent years by toxic algae.

Algae grew so thick in Grand Lake in 2010 that the state warned people not to touch the water. Officials say it likely caused seven people to get sick that year. The algae can produce as many as four toxins.

The concentration of toxins was reduced in 2011 after state officials treated the central 5,000 acres of the lake with alum, a chemical that...
Water Quality Results Summary:

- Algal bloom began early
- Impact of treatment hard to visually observe
- Sampling and monitoring results show in-lake TP concentrations decreased but only temporarily likely due to the lower lake volume (23% less)
- Tetra Tech continued evaluation of results through contract with USEPA
  - Sediment Al and Al-P concentrations showed the alum treatments inactivated P
  - Lake TP was less in 2012 than in 2011
Conclusions/Recommendations:

- 2012 GLSM Alum Application is estimated to have removed over approximately 40,300 lb P (to as much as 183,100 lb) from bioavailability.

- Continued holistic approach to lake management:
  - Reduction in external (watershed) P loading
  - Reduction in internal (in-lake) P loading
  - Removal of lake sediment
  - Management to avoid re-suspension
Other Recent Work

- Dredging
- Rough fish removal
- Constructed wetlands
- Watershed management
Through ODNR:

- Now have 4 dredges
- Sediment removal is significant:
  - 2011 - 272,000 cubic yards
  - 2012 – 289,000 cubic yards
  - 2013 – 302,226 cubic yards!
- Disposal of spoils – biggest challenge
- Phosphorus harvesting?
Rough Fish Removal (aka Carp Derby)

- Annual competition (Get the Carp Outta Here):
  - Fish removal is significant:
    - 2011 – 8,142 lbs
    - 2012 – 12,831 lbs
    - 2013 – 15,541 lbs in 44 hours!
  - 2013 winner:
    - Doug Moran (20.5 + 15.7)

Photos: Grand Lake St. Marys Lake Improvement Association
Constructed Wetlands

- Prairie Creek artificial wetland
  - Managed through GLRC
  - Design by KCI Engineering
  - 200-acre wetland; $1.9M
  - Construction began spring 2012
  - Operation began June 2013
  - ~1.3 MGD
- Includes:
  - alum dosing station
  - settlement ponds
  - treatment wetlands
Constructed Wetlands

Prairie Creek artificial wetland

Performance in 2013:

- ~41% nitrogen reduction
- ~75% Total P reduction
- ~65% DRP reduction

Alum needed seasonally

Additional wetlands:

- 40-acre wetland adjacent to Prairie Creek; construction almost complete
- $2.1M funding for Coldwater Creek
- 319 Grant for Beaver Creek

Photo: Milt Miller, GLSMRC
Watershed Management

Lake Facilities Authority

- Authorized June 30, 2013
- Provide funding source for improvements
  - Property tax
  - Excise/lodging tax
- Authority to apply for grants and loans
- Authority to sell bonds
- Own and operate facilities for algae mitigation
- Developed by State Senator Keith Faber and Representative Jim Buchy
Algae toxins remain high in Grand Lake

State officials say water quality in Grand Lake is improving. Data show the opposite.
Average monthly algae toxin levels between Memorial Day and Labor Day in 2011, 2012 and 2013 show an increase every month except July, when the levels fell slightly.

Despite the readings, a state official said the lake is getting better.

“I talked to a lot of folks and they said the fishing has been the best it has been in a long time and a lot of folks in our department said fishing has been good and people around the lake said it looks better than it has in years past,” said Mark Bruce of the Ohio Department of Natural Resources. “We continue to do testing and while there was an advisory posted, we feel things are improving up there.”

This is the fifth consecutive year the state has placed a water advisory on Grand Lake due to unsafe levels of toxins produced by blue-green algae, also known as cyanobacteria. The advisory is posted when microcystin toxins exceed 6 parts per billion. The elderly, very young and people with compromised immune systems are told not to swim or wade in the water.

Between 2011 and 2013, average toxin levels ranged from a low of 11 ppb in May 2011 to a high of 90.3 ppb in May 2013. The only month the average monthly toxin level dropped was in July 2012 and July 2013 when it went from 36.2 ppb to 29.1 ppb.

Bruce said tests done on water leaving a treatment train on Prairie Creek showed significant reductions in nitrogen and phosphorus, nutrients that feed the blue-green algae. The treatment train diverts a small amount of water from the creek, funnels it through a series of manmade wetlands and treats it with alum, a chemical that deactivates phosphorous, the algae’s favorite food source — before emptying into the lake.

He could not point to any other data showing the 13,500-acre lake is improving. He added that the lake’s health is not based solely on toxin levels. Nutrient loading reductions at the treatment train site is a “positive step in the right direction,” he said.
Action Called In Ohio And Other States With Toxic Algae

An environmental group is calling for national policymakers to take action after a report shows significant increase in toxic algae. Ohio is on the list of states experiencing problems.

The nation is experiencing a massive outbreak of toxic algae on its lakes, rivers and
Toxic Algae Again Plaguing Grand Lake St. Marys

Posted: May 22, 2014 2:11 PM EST
Updated: Aug 14, 2014 2:11 PM EST
By: Associated Press

CELINA, Ohio - Signs were going up on the beaches of Ohio's largest inland lake Thursday warning visitors that toxic algae blooms are back.

Toxic blue-green algae is again making swimming hazardous at Grand Lake St. Marys in western Ohio. It's been a recurring problem at the 20-square-mile lake between Dayton and Toledo.

State officials have been testing near lake beaches this week after measurements of a liver toxin associated with the algae began to increase last month near where the city of Celina draws water into its treatment plant, according to The Columbus Dispatch. By the end of April, readings of microcystin measured four times higher than the state's safety threshold.

Ohio Department of Natural Resources spokesman Matt Eiselein said exact measurements are still being calculated, but the readings are "definitely over the safety level."

Blue-green algae are common in most Ohio lakes, fed by phosphorus from manure, fertilizers and sewage that rain washes from farm fields into nearby streams. As many as 19 public lakes, including Erie, have been tainted in recent years by toxic algae.

Algae grew so thick in Grand Lake in 2010 that the state warned people not to touch the water. Officials say it likely caused seven people to get sick that year.

The city of Celina spends about $450,000 a year to control algae at Grand Lake, and the state has spent more than $10 million trying to treat it. The Ohio Environmental Protection Agency says it could take years to reverse the situation.

The phosphorus runoff from area farms is such a summertime problem at Grand Lake St. Marys that nearby farmers now face state-mandated limits on the manure they spread on fields.
Man drowns near Grand Lake St. Marys

GRAND LAKE ST. MARYS — A Miami County man is dead after an apparent drowning near Grand Lake St. Marys over the weekend.

The Mercer County Sheriff’s Office said Kevin Miller, 54, of near Bradford died on Sunday.

Deputies said on Saturday, Miller had been swimming with family members at a campground near Grand Lake St. Marys when he suddenly went under water.

Miller was located about 15 minutes later, according to officials.

The Ohio Department of Natural Resources is also looking into this incident.
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Questions?