

Something's Amuck

Algae blooms return to Michigan shores



June 2006

Michigan Environmental Council



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“The practical solutions recommended in this report should be considered an important first step toward getting a handle on a growing and troublesome algae problem in our lakes.”

**— Rochelle Sturtevant, Extension Educator,
National Oceanic and Atmospheric Administration
Great Lakes Research Laboratory**

Acknowledgements

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The Michigan Environmental Council is a coalition of 72 environmental and public health organizations with more than 200,000 individual members. For 26 years, MEC has provided a voice for the environment at the State Capital.

In addition to serving as a clearinghouse of environmental information, MEC develops public policy, educates elected officials and the public, and provides training and support to member organizations.

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Glossary of Terms

Algae: A plant or plantlike organism that in excess can contribute to degraded water quality. Stimulated by excess nutrients like phosphorus, algae are aesthetically unpleasant, and in large quantities can cause the dieoff of fish by consuming oxygen as algae die and decay. The “death” of Lake Erie in the 1960s was largely caused by excess nutrients and algae.

Littoral zone: The area of a lake’s waters near the shore.

Microcystins: A group of hepatoxins (liver toxins) produced by a number of cyanobacterial genera, the most notable of which is the widespread Microcystis from which the toxins take their name.

Phosphorus: A nonmetallic element of the nitrogen family that occurs widely, especially as phosphates. Although phosphorus is an essential nutrient for living things in surface waters, an excess of it can significantly degrade those waters. Phosphorus can reach water from fertilizers, animal wastes, human wastes, and other sources.



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Cover photo courtesy of Dr. Henry Singer.

We must not wait another summer to defend our Great Lakes legacy

Spindly aquatic algae, once foul-smelling icons for Great Lakes pollution, are back. During the depths of the lakes' environmental troubles in the 1960s and '70s, the algae's population exploded. Vast clumps piled up on beaches, looking like untreated sewage and smelling like a pig farm . . . the algae have staged a comeback in every lake but Lake Superior. In some areas, they appear to be more pervasive than before. Scientists are struggling to figure out why."

— *Christian Science Monitor*, March 30, 2006

Beautiful lakes and beaches are part of the Michigan way of life. We spend our summers on Michigan's shores with our children and friends, enjoying refreshing cool waters, spectacular sunsets, boating and fishing, and building lifelong memories.

Our lakes and water resources are critical to Michigan's economic prosperity too. Our amazing waterways draw millions of tourists — and their dollars — to our state, but also serve the needs of our vital agriculture and manufacturing sectors.

But as we learned in the dirty water days of the 1960s and 1970s, protecting this way of life requires constant vigilance. Unfortunately, the health of our lakes is once again deteriorating.

The increasing number and extent of algae blooms in the lower four Great Lakes and Michigan inland lakes are indicators of declining ecological health. In the unusually warm summer of 2005, algae problems noticeably worsened in many bays and inlets of Lakes Michigan and Huron and in broad areas of Lake Erie.

One pound of phosphorus can stimulate the growth of as much 500 pounds of algae.

Unpleasant in and of themselves, algae blooms are more disturbing for what they often signal — an unhealthy and even deadly interaction of invasive aquatic species and water pollution.

Families who enjoy Michigan's lakes — and indeed all Michigan citizens and visitors to the state — have a right to clean and beautiful lakes and beaches. To assure this, governments and citizens must act to protect their water resources. The explosion of algae blooms in 2005 warned us that we must not wait another summer to defend our Great Lakes legacy.

Taking action now against algae will protect our water resources

State government must take the lead by:

- **Launching an all-out effort involving government and citizens to reduce phosphorus pollution** from fertilizers, dishwashing detergents, failing septic tanks and leaking sewage systems;
- **Educating Michigan residents on important ways they can contribute to the solution** by supporting needed changes in public policy and making simple changes in the household products they use;
- **Urging Michigan members of Congress to support a proposed \$20 billion Great Lakes rescue plan** that includes funding for wetland restoration and buffer strips that filter nutrient pollution and reduce its discharge to lakes and streams;
- **Demanding strong monitoring and research** to track progress and investigate additional solutions.

If Michigan residents and leaders take these reasonable steps, we can prevent a return to the dirty-water, green-slime days of the 1960s and 1970s and ensure Michigan families of today and tomorrow will enjoy clean and healthy waters.

Return of the green slime

In the early 1960s, scientists concluded that a massive area of Lake Erie, more than 1,400 square miles in size, was starved of dissolved oxygen — vital to fish and other aquatic life.

In 1968, Michigan acknowledged similarly ugly conditions on many of its lakes and streams. The state water resources commission admitted that 32 miles of Lake Michigan shoreline from south of Muskegon to Benona had “nuisance accumulations” of algae and that 36 of 47 monitoring locations in the Lower Peninsula had bacteriological counts above standards for swimming.

Scientists fingered too much phosphorus as the culprit. Present at high levels in laundry soaps and other consumer products, phosphorus was literally overfertilizing the waters of Lakes Michigan and Erie, which a federal official called “a dying lake.”

As phosphorus levels in the water climbed, plants such as algae were stimulated to grow. As they died, bacteria and fungi consumed oxygen as they fed off organic nutrients associated with the algae. This starved other organisms at the base of the food chain and game fish of the oxygen supply they needed. And the algae themselves, clinging to swimmers as well as structures, made water unfit for recreation or drinking.

Public disgust forced past action

After years of delay by government, public revulsion forced action in the late 1960s and early 1970s. Most critically, the Great Lakes states and Ontario controlled phosphorus in detergents. The Great Lakes quickly responded with visibly healthier water

and a reduction in algae blooms. By the late 1970s, only a few years after the controls took effect, the recovery of the Great Lakes was a national news story. “It’s one of the greatest success stories in American history,” said Russell Train, head of the U.S. EPA.¹

Are we headed for algae trouble again? Reports of algae blooms in Michigan, on the rise since about the mid-1990s, increased further in 2005. This is an early warning of a return of the widespread “green slime” that caused public revulsion and led to the historic cleanup of the Great Lakes in the 1960s and 1970s.

Lake Erie — canary in a coal mine

The problem seems to be most dramatic and worrisome in Lake Erie, which has suffered a recurrence of algae blooms and loss of oxygen since the mid-1990s, after a decade-long absence. As the *Toledo Blade* noted on July 9, 2005, “A potentially deadly form of algae that has appeared in western Lake Erie almost every summer since 1995 was found near Toledo this week in particles large enough to be seen by the human eye.”²

Because of concerns about harmful algae blooms and other threats to the ecological health of Lake Erie, federal agencies launched an “International



Algae at the shore makes our beaches unfit for wading, swimming and sand castles.

1 “In Fight Against Pollution, the Great Lakes Get a New Lease on Life,” *U.S. News and World Report*, September 27, 1976, 51.

2 Tom Henry, “Re-Emergence of Algae Threatens Water Quality,” *Toledo Blade*, July 9, 2005, <http://www.toledoblade.com/apps/pbcs.dll/article?AID=/20050709/NEWS06/507090356>.

3 Great Lakes Environmental Research Laboratory, National Oceanic and Atmospheric Administration, “2005 International Field Year on Lake Erie” fact sheet, <http://www.glerl.noaa.gov/ifyle/docs/IFYLEInfoSheet.pdf>.

4 Peter N. Spotts, “A Scourge of the 70s Returns to Great Lakes,” *Christian Science Monitor*, March 30, 2006, <http://www.csmonitor.com/2006/0330/p14s01-sten.html>.



Ingesting water tainted by toxic microcystins in some algae blooms can kill pets and other animals.

Field Year” on the lake in 2005 to better understand the sources of the blooms and to improve modeling of the problem.³

Algae on Lake Michigan beaches push visitors away

But the problem is bigger than Lake Erie. Petoskey resident Dr. Henry Singer described what he and his family saw along the Lake Michigan shoreline in 2005:

“For the past several years, progressively larger and very ugly algal blooms have fouled the near shore waters and beach. With a pudding-like consistency, the algae extend 5–7 feet off shore and are several inches thick, making wading or swimming extremely unpleasant. Additionally, when the algae gets tossed up on the shore by wind and wave action, it decomposes and becomes very unpleasant to smell and greasy to walk on. As a result, we have been reluctant to swim, sit on the beach, or beach comb — our favorite ways to spend a summer day on Lake Michigan. Our grandchildren have been deprived of swimming and playing on the beach — memories we cherished as children.”

The problem on Lake Michigan is widespread and worsening. In a March 30, 2006 report, the *Christian Science Monitor* noted the return of algae in the lake and observed, “The summertime appearance of dead clumps of odorous algae can close beaches and pinch property values. They also can trigger sudden shut-downs at nuclear power plants as algae clog pipes that suck cooling water from the lakes.”⁴

Some algae blooms are toxic to people, pets and fish

Bad as this is, the concern is no longer simply the aesthetics of slimy swimming beaches and river properties. Public health may also be at risk.

Jeff Alexander of the *Muskegon Chronicle* reported last summer that some of the algae blooms in Muskegon Lake (and perhaps other inland lakes) contain toxic microcystins. Microcystins are a group of liver toxins. When ingested via drinking tainted water while swimming, these poisons can cause vomiting, diarrhea, fever, rashes, and throat irritation. They can also kill pets or other animals.

Algal blooms are also a cause of reduced oxygen in the lakes, a condition that can kill off desirable fish life. In July 2005, the Muskegon County Health

Lawn care and algae blooms

Most American homeowners use fertilizers to assure green and healthy lawns. But many don’t realize that their lawns already have sufficient phosphorus to meet their needs.

Soil testing programs in Michigan and other states have found that up to 99% of samples provided by homeowners already have enough naturally occurring phosphorus without any additional contributions from fertilizers. Adding phosphorus fertilizers means much of this ingredient will run off into lakes and streams, stimulating algae blooms. Even homeowners who don’t live near lakes and streams can send excess phosphorus into Michigan waters through storm drains.

You can play an important role in reducing phosphorus pollution:

- Have your lawn soil tested. Many lawn care and nursery stores now provide soil testing services.
- Use phosphorus-free fertilizer. Any bag of fertilizer has a series of three numbers. The middle number indicates phosphate content and should read “0.” If your store doesn’t offer a phosphorus-free fertilizer, demand to know why.



Mats of algae appeared last summer in even some northern waters of Lake Michigan.

Photo courtesy of Dr. Henry Singer.

Department urged swimmers and boaters to use caution when using Bear Lake after tests found high levels of toxic algae in the popular waterway. It was the first time the health department had issued a warning about toxic algae in a Muskegon County lake. The lake remained open to swimming and boating.

“I don’t want to scare people, but the levels of microcystins we found are significant,” said Gary Fahnenstiel, director of the National Oceanic and Atmospheric Administration’s Lake Michigan Field Station, speaking of 2004 test results in inland lakes around Muskegon. “These are very high concentrations and are on the same order of magnitude as the highest concentrations of microcystins ever reported.”⁵

Fahnenstiel said people should avoid swimming, wading, windsurfing, canoeing or water-skiing in

areas of lakes with blue-green algal blooms, which might contain the microcystins. Dogs also should avoid those waters.

Salt water invaders

Some of the algae species are invaders from far-away salt waters. In the summer of 2003, researchers from Michigan State University observed nuisance levels of macroalgae blooming in Muskegon Lake. Upon further inspection, this algae was identified as *Enteromorpha*, a non-native algal genus native to oceans. “The algae covered 5 to 70 percent of the littoral [nearshore] zone in Muskegon Lake, and was later found washed up on the shoreline,” the researchers reported.⁶

Scientists from the Annis Water Resources Institute (AWRI) at Grand Valley State University last summer received a \$39,540 state grant to test for toxic algae in Mona, Muskegon, Bear, Duck and White lakes in Muskegon County, and Spring Lake and Lake Macatawa in Ottawa County. AWRI scientists plan to conduct the testing this summer, when warm water temperatures help algae grow.

5 Jeff Alexander, “Toxic Algae Blooming in Area Lakes: Scientists Blame Zebra Mussels,” *Muskegon Chronicle*, October 17, 2004.

6 “Algae Lab,” Michigan State University, http://www.msu.edu/~algaelab/Ent_webpage/ent.htm.

7 Huron River Watershed Council, “Get the Phosphorus Out,” *Monitoring Gazette*, Spring 2004, http://www.hrwc.org/pdf/04_spraas.pdf.

Why are algae blooms back?

Two leading suspects in the return of green slime are phosphorous pollution and invasive species. Both are making the Great Lakes and Michigan's inland waters more hospitable places for algae to grow and flourish — and thus less hospitable places for people and fish.

Fertilizing our waters: Phosphorus as plant food in our inland seas and lakes

Although phosphorus is an essential nutrient for living things in surface waters, an excess of it can significantly degrade those waters. Excess phosphorus accelerates plant growth and dieoff, resulting in loss of vital dissolved oxygen in the water and algae blooms.

One pound of phosphorus can stimulate the growth of as much 500 pounds of algae.⁷

Excessive phosphorus finds its way into Michigan's waters in a number of ways, including:

- Fertilizer runoff from residential lawns and agricultural lands, including lawns and lands not adjacent to a lake or stream;
- Waste from farm animals and pets running off into ground and surface water;
- Poorly maintained residential septic systems;

- Inadequate sewage treatment at community sewage plants due to storm-caused overflows or faltering treatment systems;
- Detergents draining into our sewer systems (including dishwashing soaps, which have higher legal phosphorus content levels than laundry detergents, thanks to a loophole in Michigan law);

In addition, phosphorus builds up over time in sediments at the bottom of our lakes, especially in shallow inland lakes and shallow bays of the Great Lakes. This phosphorous can be released again into our waters through several means, including scouring currents, dredging, and even the activity of bottom dwelling fish and wildlife.

Invasive mussels “clear the way” for algal growth

The Great Lakes are suffering from an onslaught of invasive species. More than 160 non-native species have entered the lakes from salt waters or other fresh waters and a new one is identified in the Great Lakes, on average, every eight months.

These invasive species disturb the valuable food chain of the Great Lakes, disrupt the chemical and physical character of our waters, and sometimes directly harm native fish populations.

The dishwashing detergent loophole

Michigan was one of the first states to control phosphorus in laundry detergents in the 1970s, but did not set a strict limit on phosphorus in dishwashing detergents. Dishwashing detergents sold in Michigan can legally contain up to 17 times the concentration of phosphorus found in laundry detergents.

The strict controls on phosphorus in laundry detergents are credited with playing a major role in cleaning up the Great Lakes and inland lakes in the 1970s and 1980s. As more and more homes rely on dishwashing machines, the dishwashing detergent loophole is playing a part in stimulating algae blooms in Michigan.

You can play an important role in reducing phosphorus pollution:

- Use low-phosphate or phosphate-free detergents. *Consumer Reports* noted in March 2005 that three of the top performing dishwashing detergents are phosphate free, including the second most effective dishwashing detergent tested. Said the magazine, “Green products can get dishes clean.” You can select low-phosphate or phosphate-free dishwashing detergent by checking labels and looking for a product with 2.0% or less phosphates.

The zebra and quagga mussels are two invasive species that appear to be contributing to the return of green slime. The zebra mussel is a bivalve mussel native to freshwater lakes of southeast Russia. Zebra mussels entered the Great Lakes in the mid-1980s, probably in the ballast water tank of an oceangoing freighter. Mussel populations exploded, clogging drinking water intakes, shipwrecks and other underwater structures and causing millions of dollars in taxpayer cleanup costs.

The quagga mussel is native to Ukraine and is also thought to have “hitchhiked” to the Great Lakes in the ballast water of an oceangoing vessel. First observed in Lake Erie in September 1989 near Port Colburne, the quagga mussel causes many of the same problems (damaging boats, power plants, and harbors and destroying the native mussel population) as the zebra mussel.

Scientists believe these mussels play a key role in the increase of algae blooms in one or both of the following two ways.

Clearing our waters for deeper algae growth

Mussels filter water, making it clearer. While conventional wisdom says “the clearer the better” when it comes to water, this may not be the case when it comes to the algae threat. Sunlight penetrates deeper into clearer water, delivering a key ingredient in algae growth. As researchers at the University of Wisconsin-Milwaukee have observed:

Prior to the invasion of zebra mussels, Lake Michigan waters were quite turbid [cloudy], and as a result light did not penetrate deep into the lake. *Cladophora* (a branching, green filamentous alga found naturally along the coastline of most of the Great Lakes), therefore, was limited to shallow water along the shoreline of Lake Michigan. Zebra mussels, now abundant where it is rocky, filter the water, thereby greatly increasing light penetration. This may allow for an increase in the abundance and depth distribution of *Cladophora*.⁸

Eating their way to algae blooms

The second hypothesis has to do with the eating habits of the mussels. As Michigan State University researchers have reported, “The mussels eat virtually everything they can filter — except for *Microcystis*, which they spit out. The theory is that the mussels help foster a blue-green algae bloom by reducing competing algae.”⁹ *Microcystis* is the liver toxin that caused advisories in Muskegon Lake in 2005.

To make matters worse, while algae cells are in the mussels, they may soak up the nutrients — including phosphorus — that they need to grow. As a result, the presence of non-native mussels in our freshwater lakes means that algae may now be found in areas with lower phosphorus levels.

As Dr. Alan Steinman, head of the Annis Water Resources Institute at Grand Valley State University, said this summer;

The major concern regarding the link between mussels and phosphorus is that it provides a mechanism for algal blooms in lakes with relatively low phosphorus levels, which historically is not typical. The nutrient ‘bath’ that the algal cells receive in the mussel gut presumably provides them with sufficient nutrients to compensate for the insufficient nutrients in the water column, allowing them to bloom. This is still being worked on...but the data are looking pretty strong.

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- 8 Great Lakes Water Institute, University of Wisconsin-Milwaukee, “What is *Cladophora*?”, <http://www.uwm.edu/Dept/GLWI/cladophora/>.
 - 9 Mike Martindale, “Mussels Linked to Toxin: MSU Study Says Harmful Blue-Green Algae Forms in Lakes Where Zebra Mussels Are Found,” *Detroit News*, March 12, 2004, <http://www.detnews.com/2004/oakland/0403/15/do4-89770.htm>.
 - 10 Michigan Department of Environmental Quality, Water Quality and Pollution Control in Michigan, May 2004, <http://www.deq.state.mi.us/documents/deq-wd-swqas-2004integratedreport.pdf>.
 - 11 The Minnesota law allows fertilizers with phosphorus to be used on lawns if a soil test indicates it is needed or if a new lawn is being established. In addition, the restrictions do not apply to fertilizers for agricultural crops, gardening or for applications by trained staff on golf courses.

Sending the green slime back into Michigan's history books

The time for the complacency that set in during the 1980s when algae blooms largely disappeared from the Great Lakes is over. Blaming the zebra and quagga mussels and doing nothing else is obviously not enough.

Addressing the algae problem requires a broad-based effort and aggressive action by the federal and state governments, businesses and citizens. No one source or sector can be allowed to defer action by pointing to others — since they all contribute. Here are the most important possible steps:

1. Reduce the use and runoff of phosphorus fertilizers

Addressing so-called “nonpoint” source pollutants like fertilizers is imperative. Controlling them at the source — through strict limits on phosphorus in products — is one solution.

According to the Michigan Department of Environmental Quality's 2004 report on the condi-

tion of Michigan waters, there are 6,045 lake acres and 136 river miles in the state that fail to meet water quality standards because of phosphorus pollution.¹⁰

Most residential soils in southern Michigan do not require phosphorus in fertilizers for plant growth, yet homeowners and some lawn care companies routinely apply phosphorus fertilizers. In the Kalamazoo River watershed, where excess phosphorus is a major water quality concern, cooperating local agencies, working through MSU Extension, have tested approximately 2,000 lawn soil samples submitted by residential property owners, and approximately 99% had adequate phosphorus to support healthy lawns without additional phosphorus fertilizers.

Minnesota has banned phosphorus lawn fertilizers except where soil tests indicate a lack of phosphorus. Michigan should enact such a law with reasonable exemptions.¹¹ Some phosphorus-free lawn fertilizer is already sold in Michigan. Consumers can verify they



Scientists believe non-native mussels play a key role in the increase of algae blooms.

Photo courtesy of Dr. Henry Singer.



People should avoid swimming, wading, windsurfing, canoeing or water-skiing in areas of lakes with blue-green algal blooms, which might contain toxic microcystins.

are using phosphorus-free fertilizer by checking the product label. Fertilizer bags have a series of three numbers. The middle number indicates phosphate content and should read “0.”¹² A coalition of local government officials and citizens in March called for a ban on the sale and use of phosphorous-based lawn fertilizers in Muskegon County.¹³ This reform with reasonable exceptions makes sense statewide.

2. Expand buffer strips and other incentives to reduce animal waste runoff

Farm fertilizers and animal waste runoff from farms and pets are also a serious concern. According to Stephen Carpenter, a University of Wisconsin zoology professor and director of the University’s Center for Limnology, the routine application of chemical fertilizers and manure to agricultural land poses a far greater environmental problem to freshwater lakes than previously thought.

In the Proceedings of the National Academy of Sciences, Carpenter blamed the buildup largely on industrial agriculture’s excessive use of fertilizer and

manure since the 1940s. The concentration could cause the eutrophication of lakes for centuries as the treated soil slowly washes into lakes and streams, Carpenter said. Another University of Wisconsin researcher hypothesizes that excess fertilizer use, especially from farms, may be triggering deformities in frogs.

Addressing the problem of excess farm fertilizer use requires some approaches different from those applied to residential fertilizer use. It is unlikely that the state will legislate tough restrictions on phosphorus content in farm fertilizers. Instead, the state, working with farm assistance programs and environmental agencies, should expand existing programs that help prevent excess farm fertilizer use and capture farm runoff.

The federal Conservation Reserve Enhancement Program (CREP) pays farmers to install vegetative buffer strips along drains, streams and lakes to help capture and treat phosphorus and pesticide pollution in farm runoff. But Michigan’s fiscal crisis has prevented it from taking full advantage of this program, which offers a federal match of seven dollars for

every state dollar invested. Michigan has so far provided approximately \$22 million in state funds and has attracted over \$150 million in federal funding, including incentive payments to landowners. This has paid for more than 55,000 acres of land stewardship activities, including approximately 32,000 acres of stream buffers and other practices along rivers, 14,000 acres of wetland restoration, and 9,000 acres of highly erodible lands planted to grasses and forbs.

The opportunity to use CREP to reduce farm runoff while benefiting farmers with incentive payments “is significant and only limited by the state’s ability to come up with matching dollars,” says a Department of Environmental Quality official. “We need to have dollars for them to spend dollars.”

A state contribution of \$50 million could lead to 250,000 additional acres of Michigan farmland enrolled in CREP, benefiting farmers, our waterways, and the public interest.

3. Control phosphorus content in dishwashing detergents

Because of a loophole in Michigan law, dishwashing detergents may legally contain more than 17 times the concentration of phosphorus that is allowed in laundry detergents. These soaps have an average phosphorus content of 5.84% by weight, compared to the laundry detergent upper legal limit of 0.5%. In the Huron River watershed alone, one estimate is that dishwashing soaps could stimulate the growth of millions of pounds of algae.¹⁴

Although a Minnesota phosphorus inventory suggests that dishwashing detergent supplies only 2.8 percent of that state’s phosphorus loadings, it is an easily controllable source. According to *Consumer Reports*, three of the top-performing commercially available dishwashing detergents contain little or no phosphorus.

4. Reduce leaking into groundwater, streams and lakes from failing septic systems and municipal sewers

The state should institute stronger controls on poorly maintained or failing septic tanks, and provide funding to reduce or eliminate raw sewage discharges by outdated municipal systems.

Most property owners with septic tanks do not regularly maintain or have those tanks inspected, leading to an unacceptably high rate of sewage releases that can have significant localized impacts. Although some counties in Michigan now require inspection and cleanout of septic tanks at the time of house sale, a statewide requirement for periodic inspection and cleanout should be legislated.

The draft EPA Great Lakes restoration strategy, made final on December 12, 2005, estimates \$13.7 billion in federal and state funding is needed over five years to improve municipal sewer systems to significantly reduce discharges of raw sewage. In addition, these and other funds are needed to address leaking pipes — a chronic problem in older, decaying service lines in many urban communities.

If such funds become available, it is critical that Michigan and its communities use a significant share of the funds for “soft path” methods of reducing sewage and other water pollution releases, including the construction of urban rain gardens, restoration of wetlands, and reduction of impervious surfaces such as paved parking lots, which interfere with the ability of soils to filter out phosphorus.

It is also critical to note that Michigan will be required to match any new federal Great Lakes restoration funding that becomes available. If the state fails to do so, other Great Lakes states will receive a disproportionate share of the funding. Among other options, the state should consider a bonding proposal, or a legislative allocation of general fund dollars for a revolving loan fund, to show the state’s commitment to participating in Great Lakes restoration activities that will also help reduce algae blooms.

12 The first numeral indicates phosphorus content; the third numeral indicates potassium content.

13 Jeff Alexander, “Water protectors call for ban on popular fertilizers,” *Muskegon Chronicle*, March 24, 2006.

14 Huron River Watershed Council, “Get the Phosphorus Out,” *Monitoring Gazette*, Spring 2004, http://www.hrwc.org/pdf/04_spraas.pdf.

15 The Harmful Algal Blooms site for the Great Lakes is: <http://www.glerl.noaa.gov/res/Centers/HumanHealth/hab/EventResponse/EventResponse.html>.

5. Educate the public about how they contribute to green slime and how they can contribute to the solution

The Michigan DEQ, companies manufacturing and selling fertilizers, Michigan Sea Grant, Michigan's conservation districts, local watershed councils, and other organizations (including MEC and its allies) should dramatically increase efforts to explain to the public that when you apply too much fertilizer to turf (and adjacent sidewalks) you are also fertilizing the lake or river the lawns drain into when it rains.

Although public education is sometimes dismissed as an excuse for inaction, recent history — including the success of seat belt and anti-smoking campaigns — shows that individual behavior can be changed by well-crafted message campaigns backed up by outreach. Lake and streamside owners need to understand the benefits of natural vegetation rather than mowing, seeding and fertilizing down to the water's edge. All residents, including those far from waterways, need to be informed that materials entering storm drains are not magically treated belowground — these nutrients, oils, sediments, and waste products drain directly into our surface waters.

Lake and streamside owners need to understand the benefits of natural vegetation rather than mowing, seeding and fertilizing down to the water's edge.



6. Support strong monitoring and research

A well-designed, consistently funded program of algae and water quality monitoring and research is critical to solving the problem. It is imperative both to document the number and extent of algae blooms, and to test further hypotheses about the role of mussels in exacerbating the problem as well as other hypotheses.

The National Oceanic and Atmospheric Administration (NOAA), part of the U.S. Department of Commerce, has now established a “Harmful Algae Blooms” website for the Great Lakes, but it and the associated program suffer from lack of funds.¹⁵ Adequate resources for this site will enable the public to report on algae problems and enable citizens and governments to understand locations, trends and sources.

Michigan can seek and capitalize on federal funding and commit at least \$100,000 per year of its own funds to algae bloom monitoring and response, identification of sources of pollution, and research both to establish cause and effect relationships regarding algal blooms and to develop methods to minimize or control bloom formation.

Michigan has done it before and we can do it again

Michigan's lakes and beaches are too valuable to neglect. So much of the Michigan way of life is tied to days on the beach, sparkling waters on a summer's day and the enjoyment of our 10,000 inland lakes and the Great Lakes. Michigan's prosperity and quality of life will always depend on protecting and preserving this legacy.

To foster a solution, and to protect the health of Michigan's economically valuable lakes for decades to come, MEC urges Governor Jennifer Granholm and the Michigan Legislature to embrace these bold but practical solutions to end algae blooms. Working with representatives of industries affected by potential controls, industries that benefit from clean water, lakefront property owners who want to enjoy their lakefront again, and scientists with data that can help pinpoint pollution sources and control methods, the governor and legislature can develop a strategy where all sectors and citizens who benefit from clear water and clean beaches will share in the responsibility of protecting and restoring Michigan's irreplaceable clean water heritage.

Doing so will demonstrate awareness of the urgency of the algae problem and give hope to Michigan citizens for a restoration of clean, healthy lakes. The governor and legislature should then act swiftly on the recommendations, fulfilling the need for the highest state commitment to protection of the state's majestic water resources.

Michigan has done it before, and we can do it again. When our amazing waters were pushed to the brink some three decades ago, Michigan residents rallied to their cause and demanded change. The Michigan Environmental Council, its 72 member groups around the state, and our diverse array of other allies who work every day to defend Michigan's waters urge you to join us in pushing our leaders to live up to their stewardship responsibility for our Great Lakes legacy.

To get involved in this effort, please contact us:

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Michigan Environmental Council Action Plan for Algae

1. Reduce the use and runoff of phosphorus fertilizers.
2. Expand the use of buffer strips and other incentives to reduce animal waste runoff.
3. Control phosphorus content in dishwashing detergents.
4. Reduce the leakage of human wastes into groundwater, streams and lakes from failing septic systems and municipal sewers.
5. Engage citizens in efforts to reduce green slime with a public education campaign.
6. Support vigorous monitoring and research.

**A sign at Petoskey State Park said,
“Algae along shoreline. No refunds on permits.”
Despite the warning and lingering seaweed smell,
the beach was full — but not appealing to many.
“Gross,” shouted a six-year-old boy from
Ann Arbor while inspecting the water.**

— Petoskey News Review, July 14, 2005



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