

TOXIC ALGAE:

COMING SOON TO A LAKE NEAR YOU?

A Joint Report from
Resource Media and
National Wildlife Federation

September 2013

“When we can’t go in, it becomes a lake you can only look at, but can’t touch. It’s our town’s economy. If you lose the lake you’re going to lose the economy.”

– Kim Straud, Spirit Lake, Iowa

“Because cyanobacteria affect drinking water sources in the U.S. and globally, there is real, increasing concern about the toxins they produce and the impacts they have on human, domestic pet and livestock health. Wildlife, fish and shellfish are affected too.”

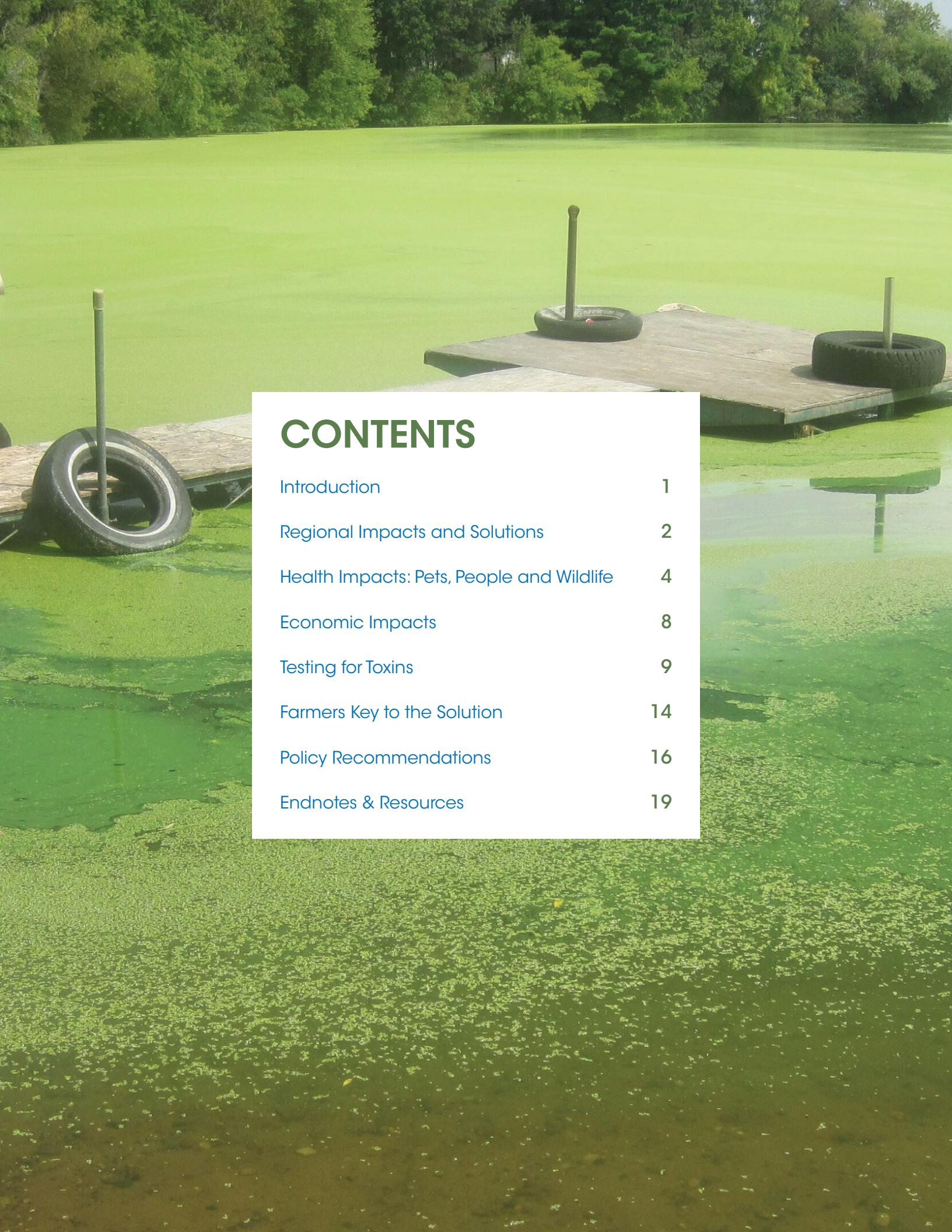
*– Hans Paerl, Professor of Marine and Environmental Sciences,
University of North Carolina*

“There’s kids that swim in that part of the river. Everybody that goes up there, probably half of them have dogs. I’d hate for this to happen to a kid.”

– Jerry Benedick, whose dog Axel died hours after swimming in the Willamette River near Eugene, Oregon, said he didn’t see any warning signs of the bloom. ([KVAL News, July 2013.](#))

Cover Photo: Lily Pond, near Quinn’s Corners in Pike County, Pennsylvania
Courtesy of: [Nicholas Tonelli, Some rights reserved](#)

Opposite: Tainter Lake, Wisconsin

The background of the image is a large, green, algae-covered body of water. In the foreground, there are several wooden docks or piers extending into the water. On these docks, there are several tires, some of which have poles or stakes inserted into them. The water is very green and appears to be covered in a thick layer of algae. The overall scene suggests a body of water that is not healthy or clean.

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Tainter Lake, Wisconsin. Algae blooms can create a stench.

INTRODUCTION

Summer: Time for Toxic Algae

Summer should be a time for fishing, boating and swimming with family on our nation's lakes.... Yet increasingly, it is also a time when the health threats posed by blue-green algae keep people out of the water. The green gunky stuff is strangling a growing number of inland U.S. waterways and releasing toxins that threaten the health of people, pets and wildlife. A new [online map](#) is the first attempt to show the scale and scope of reported freshwater harmful algal blooms (HABs) in 2013. It is a resource for communities to both report and track freshwater toxic algae outbreaks.

A familiar issue to Midwesterners and Great Lakes-area residents, the problem is spreading across the U.S. The same pollutants that create the annual Gulf of Mexico Dead Zone and coastal harmful algal spur freshwater toxic algae. Yet even though harmful algal blooms strike [all areas](#) of the United States, the issue continues to fly beneath the radar of national attention, because:

1. No federal agency currently tracks lake closures or health warnings nationally.
2. Few economic studies have assessed the national cost of freshwater HABs.
3. Not all states monitor or report the presence of algae-related toxins in freshwaters.

To provide more information on the scope of the problem, [Resource Media](#), a nonprofit communications firm, began tracking warnings and advisories in 2012 as they appeared in news reports and on state agency websites. It has developed the first national online map that shows the health warnings and advisories that have been issued over the summer of 2013. The website, [ToxicAlgaeNews.com](#), also includes a spreadsheet of locations and links to reporting sources. The map is a step in the right direction, but only displays reported outbreaks. Given the irregularities in state tracking and reporting, much more is needed to more accurately capture the true scale and scope of the problem, especially since freshwater toxic algae have been found in every mainland state.

Last summer, 20 states issued warnings as record drought and high temperatures baked the nation. This year, 21 states—some different than last year—have closed lake beaches and issued public health advisories for dangerous toxin levels. Yet in media coverage, freshwater HABs are still treated as a sporadic local concern, not a national water quality problem. Coverage rarely references the breadth of freshwater toxic algae outbreaks and their cumulative cost. A joint effort between Resource Media and the [National Wildlife Federation](#) is mobilizing citizens from Florida to the Great Lakes to call for more attention and support to restore our wetlands and streams. We must save our summers, our drinking water and the health of our cherished lakes and rivers.

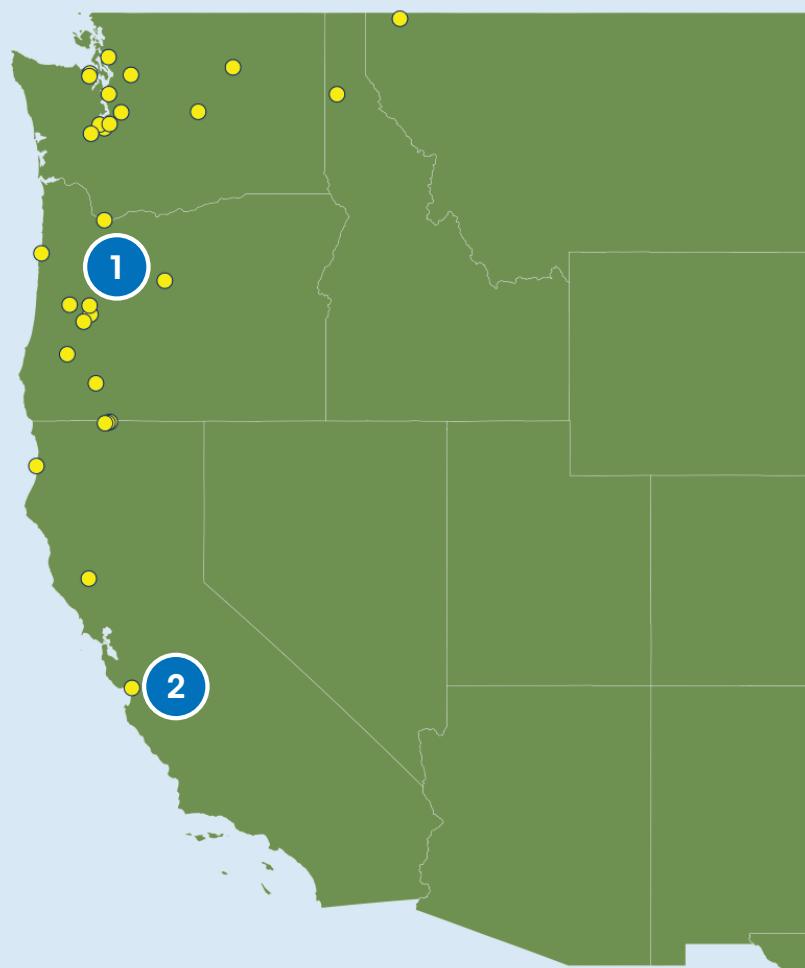
REGIONAL IMPACTS AND SOLUTIONS

Summer 2013: Toxic Algae Across the U.S.

In the absence of a national monitoring and reporting standard, Resource Media has tracked state-issued health advisories on the interactive website ToxicAlgaeNews.com. From May 5 through September 16, 2013, 21 states had reported warnings at over 147 locations on lakes, ponds and rivers. Markers on the map indicate where health advisories have been posted.

The map provides a sense of how vast the problem is, but because not all states test for freshwater algal toxins, more comprehensive monitoring is needed.

For more information on each affected water body, refer to the interactive map on ToxicAlgaeNews.com.



1 Oregon's Midsummer Triathlon became a summer biathlon after Multnomah County officials closed Blue Lake due to toxic algae this August.

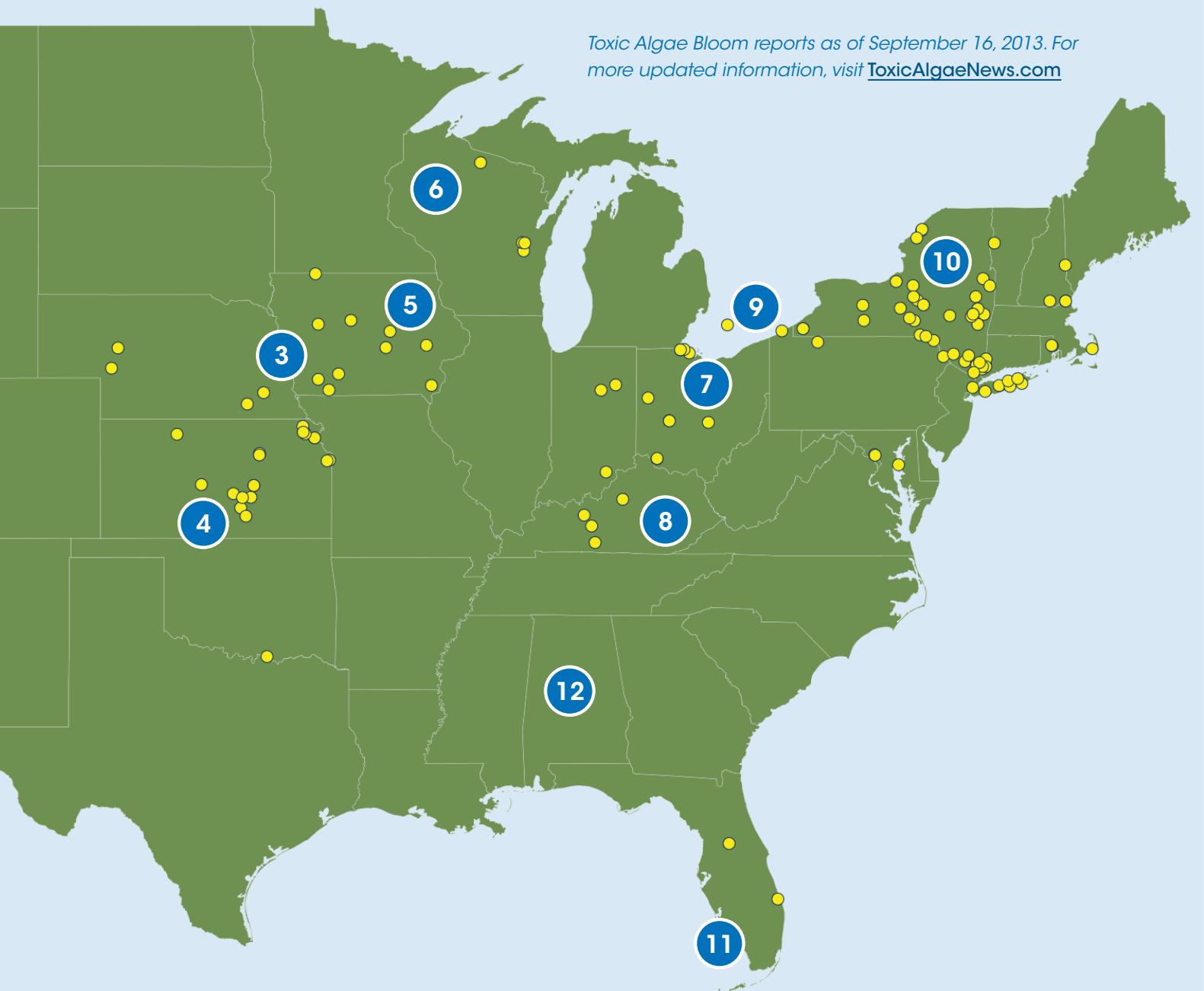
2 California's inland Pinto Lake near Watsonville has some of the nation's most toxic algae. In 2010, microcystin washed from it into the ocean and poisoned sea otters in the Monterey Bay. Researchers have found that toxins can live for some time in shellfish, posing new risks for human and wildlife.

3 Throughout the **Midwest, Great Plains, and Northeast**, the National Wildlife Federation is working with farmers to educate peers about how and why to use cover crops to boost soil health and farm productivity while improving water quality.

4 Wichita, Kansas, has spent several million dollars adding ozone treatment for the water it uses from Cheney Reservoir, where elevated levels of cyanobacteria are a regular occurrence.

5 In Iowa, heavy rains washed unusually high levels of nitrogen and phosphorus from farm fields and livestock pens into waters this spring and early summer, prompting toxic algae outbreaks.

6 Tainter Lake, Wisconsin, known for its mats of toxic algae, passed a local rule requiring all waterfront property, including agricultural lands, to maintain an unmowed 35-foot-wide buffer strip along the water's edge.



7 Farmers in the Maumee Rivershed Basin of **Ohio** are collaborating with the USDA to research and hone best management practices on their farms that protect water quality.

8 For the first time, **Kentucky** officials found toxic algae this summer at four lakes which collectively draw more than 5 million people a year. Visitors to the lakes have complained of rashes and stomach problems.

9 Toxic algae has become a regular occurrence in **Lake Erie**, due primarily to agricultural runoff. Thick mats of algae have closed beaches, deterred fishing, and diminished outdoor recreation opportunities.

10 **New York** had 50 laboratory confirmed toxic algae warnings, an indication of how a strong monitoring system can reveal the true depth of the problem.

11 In southeast **Florida**, a massive toxic algae outbreak covered St. Lucie River and Indian River Lagoon with fluorescent green slime this summer, prompting warnings from health officials to not touch the water. Scores of dolphins, manatees, birds and fish have died, and thousands of residents have protested, calling for a statewide emergency management plan to stop the toxic slime.

12 A new USGS-funded project in **Alabama** is tracking toxic algae in 350-400 freshwater sites around the southeastern U.S. Most states in the region do not currently monitor HABs.

HEALTH IMPACTS: PETS, PEOPLE AND WILDLIFE

What is Toxic Algae?

Most algae are not harmful to humans, and green algae are essential parts of a healthy aquatic ecosystem. But toxic algae, including blue-green algae, are different. Despite the name, blue-green algae are actually made up of types of bacteria known as cyanobacteria that can produce toxins, including a group known as microcystins. The algal cells are usually too small to be seen, but sometimes can form visible colonies, called an algal bloom. These “blooms” can be various colors, including blue, bright green, brown, or red, and in some cases may look like paint floating on the water. Toxic algae outbreaks are becoming more common, affecting a growing number of freshwater sources.¹

Where Does it Come From?

Fertilizer and manure runoff from agriculture, which is unregulated, has become the leading source of nutrients that freshwater algae thrive on nationwide. Failing septic systems in smaller rural communities, and residential lawn fertilizer (especially in lakeside neighborhoods), are also a significant contributor, and are largely not regulated either. Municipal and industrial wastewater also contribute, but those sources have declined because they are generally regulated under the Clean Water Act.

Will it Get Worse?

The increase in unregulated pollution is exacerbated by a changing climate.

“[Global warming](#) and intensification of major storms and droughts play major roles in the spread of toxic blue-green algal blooms worldwide,” says Hans Paerl, Professor of Marine and Environmental Sciences at University of North Carolina.

In the spring, high rainfall brings nutrients into lakes and waterways. If a drought follows, the flow of water slows and water volume decreases, yet the phosphorus and nitrogen remain. This increases the concentration of nutrients, and the water becomes stagnant and warm.

“[It’s like you’re setting up a culture in a petri dish](#),” Paerl says. “You add the nutrients, close it off and heat it up. That’s cyanobacteria 101.”

Federal corn-ethanol policies that have spurred high corn prices and this year’s record planting of corn – causing [two million](#) acres of marginal, erosive former grasslands to be plowed under – are central to the problem. Corn is a notoriously [“leaky”](#) plant, which refers to its inability to use all the chemical fertilizer or manure that’s been applied to the land to boost growth. In addition, the timing of fertilizer application has changed. More farmers now apply fertilizer and liquefied manure after the fall harvest to prepare for the following growing season. With no crops to absorb nutrients, spring snowmelt and rains wash it into waterways.

Health Risks to People

Cyanobacteria can produce liver and nerve toxins and toxic chemicals affecting cells and the skin. In some cases, certain toxins can cause asthma-like symptoms, severe vomiting, diarrhea or irritated skin or eyes. At least one of the toxins has been classified as possibly carcinogenic by the International Agency for Research on Cancer. Children are most at risk.

Exposure can occur in a number of ways, including drinking water from a contaminated water body, drinking untreated water or taking part in activities like swimming or jet-skiing.² Unfortunately, algal blooms tend to concentrate in shallow areas of a pond or lake that are accessible to people and pets seeking relief from summer heat.

In 2010, Ohio confirmed seven toxin-caused illnesses from cyanobacteria in Grand Lake St. Marys, and at least 21 others possibly linked to lake exposure, including a case in which an individual was temporarily blinded. The only known human death occurred in Madison, Wisconsin in 2002, when a teenaged boy died after swimming in a golf course pond infested with blue-green algae. In 2011, U.S. Senator Jim Inhofe became ill by swimming in an algae-infested lake near his Oklahoma home.

"In the summer we have to keep all the windows closed or leave town because of the toxic fumes coming off the lake."

- Peg McAloon, resident, Tainter Lake, Wisconsin



Virgil Miller

Toxic blue-green algae plagues a Wisconsin lake. Regular blooms hurt tourism and property values and are changing many family traditions.

Avoiding Exposure to Blue-green Algae

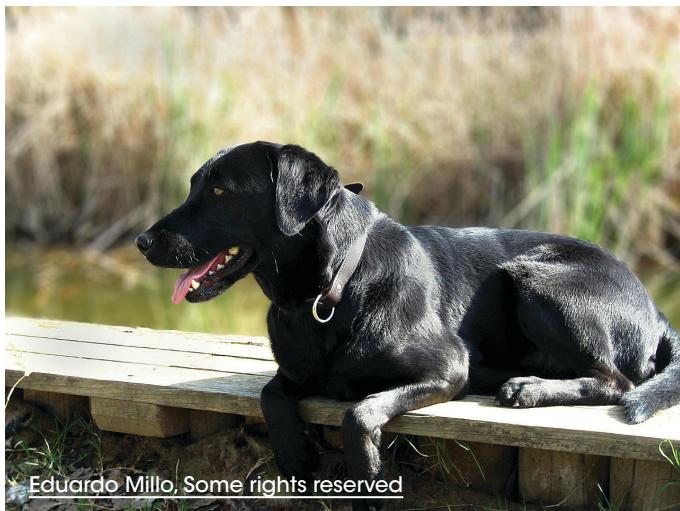
HABs may occur and not result in official warnings. If you see suspicious algae blooms or surface scum that is green, blue, or white, looks like foam or paint, remember: When in doubt, stay out.

The NY State Dept. of Health also advises:

- Never drink untreated surface water, whether or not algae blooms are present.
- If washing dishes in untreated surface water is unavoidable, rinsing with bottled water may reduce possible residues.
- Stop using the water and seek medical attention if symptoms such as skin, eye or throat irritation, allergic reactions or breathing difficulties occur while in contact with untreated surface waters.

Dogs in Danger

Toxins produced by blue-green algae can be lethal to pets—especially dogs. According to the [Vermont Veterinary Medical Association](#), cyanobacteria produce some of the most powerful natural poisons known. Animal and pet fatalities are not monitored nationally, but a scan of news reports shows at least 27 confirmed dog deaths since 2001, which is likely only a fraction of the number of animals that die a painful death every year.



 Eduardo Millo, Some rights reserved

Water-loving dogs are at especially high risk of exposure to toxic algae. Dogs can be exposed through drinking tainted water, eating clumps of algae or licking fur after being exposed to tainted water. Toxic algae poisoning is often fatal to dogs.

Dogs usually become sickened or poisoned by swallowing water that has blue-green algae or toxins in it or by eating the algae itself. They can even ingest the toxins by licking algae from their fur as they clean themselves after leaving an affected lake or pond. Some are attracted to the smell, says Deon van der Merwe, with the Kansas State University Veterinary Diagnostic Laboratory. "When wind blows the scum to the end of a lake or pond and it starts to get stinky and rotten, some dogs will seek out and ingest it."

Keeping Dogs Safe

Prevention is essential, since most dogs won't survive exposure to toxic algae, says Deon van der Merwe, Kansas State University Veterinary Diagnostic Laboratory. Experts recommend owners watch for beach postings and water quality notices before swimming or allowing your dog to play in the water.

Don't let a dog drink or swim in water if:

- It appears slimy or looks like foam, scum or mats on the surface of the water.
- The color is weird. Harmful algal blooms can be blue, bright green, brown or red and may look like paint floating on the water.
- It stinks. Some (but not all) harmful algae produce a nauseating smell.

If a dog has been exposed:

- Rinse the animal off immediately. Wear gloves to be safe and use clean, fresh water.
- Watch for symptoms. Take pets to the vet immediately if they suffer from diarrhea or vomiting; weakness or staggering; or drooling, difficulty breathing or convulsions.
- Report the incident to the state health department.

—Source, [Environmental Protection Agency](#)

Fish and Wildlife in Trouble

Fish and certain wildlife such as waterbirds are at risk. Toxic algae has killed brown pelicans in the Gulf of California and bald eagles in southeastern Florida. Research studies illustrate the harmful impacts of toxic algae on fish and wildlife, including:

- Deaths of sea otters in California were linked to shellfish that contained toxins originating in freshwater algae that were carried to the coast.³
- Deaths of other birds, including grebes and ducks, have been associated with toxic algae outbreaks in many locations around the world.⁴
- Algal toxins can affect the development, growth, and survival of exposed fish.⁵

The breakdown of algae can lead to oxygen depletion in bottom waters that can be deadly for fish. This happens every summer in Ohio's Grand Lake St. Marys. This year, several hundred fish including gizzard shad, bluegill and crappie were found floating in the lake's shoreline channels.



Toxic algae can be deadly to fish and wildlife, including bald eagles.



Dead fish resulting from toxins or oxygen depletion in Lake Binder, Iowa.

Florida Success Story: Fish and Fishermen Return

The story of Florida's Oklawaha Chain of Lakes, though still unfolding, exposes the high costs of pollution and the wisdom of investing in restoring waterways that are choked with harmful algal blooms. Beginning in the late 19th century, canal dredging and wetlands drainage projects changed the lakes' hydrology, caused extensive sedimentation and kicked off decades of nutrient pollution. The lakes' fisheries showed remarkable resilience, and remained a popular destination, home to the nation's most lucrative bass tournaments. But in the 1970s, algae choked the lakes, and the last fishing camp closed.

In 1985, a massive restoration of the Oklawaha Chain of Lakes began, thanks to state legislative leadership. State agencies set limits on how much phosphorus went into the lakes. Wetlands were restored on the site of former farmland to filter water and remove excessive nutrients. Thanks to these and other efforts, most areas in the lakes support thriving, healthy aquatic vegetation, and tremendous bass and panfish fisheries. The success story is so powerful that B.A.S.S., the nation's largest fishing organization that was founded in large part in the 1970s to fight pollution, brought its Elite Series tour back to the Oklawaha Lakes. The pros are still raving about that tournament. Meanwhile, real estate values in the area have risen and outdoor-related tourism thrives.

ECONOMIC IMPACTS

The Cost of Toxic Algae

As toxic algae outbreaks shut down beaches and sections of lakes across the United States during prime summer months, local communities watch helplessly as tourists, anglers and boaters take their families and their dollars elsewhere. Tourism traffic dries up and property values fall. In addition, cities grapple with increased water treatment costs and increased monitoring and maintenance costs.

"I've been told by several people, 'Frank, we love your place but we're not going to allow our children in the water, so we're not going to be back!'"

- Frank Rybeck, resort owner, Lake Kegonsa, Wisconsin

The impact of freshwater toxic algae is just one small component of the bigger problem of excess algae overall that includes loss in water clarity, decline in water quality and decline in recreation enjoyment due to excessive algal growth. A 2009 report estimated the annual costs of eutrophication—the over-enrichment by nutrients such as nitrogen and phosphorus—in fresh water bodies across the U.S. at \$2.2 billion.⁶ If toxic algae represent just five percent of these impacts, the annual loss would reach over \$100 million annually.



Algae invading Grand Lake St. Marys' channels.

However, Lake Erie offers an idea of how far toxic algae's impacts could extend. There, runoff from intensive agriculture and some point sources has spurred algae growth and a dead zone on the bottom of the lake's central basin, reducing fish habitat, and scaring off recreational users. [Local leaders](#) say algae could paralyze tourism and recreation in eight northern Ohio counties accounting for \$11.5 billion of the state's economy.

Looking to the coasts, the costs of toxic red tides in marine waters have been more extensively studied and estimated at nearly \$82 million annually.⁷ That figure includes \$38 million in commercial fisheries losses, \$37 million in public health costs, \$4 million in recreation and tourism impacts and \$3 million in coastal monitoring and management.

TESTING FOR TOXINS

A Haphazard, State-by-State Approach

States often walk a fine line between providing information to keep people safe, and scaring off potential visitors to a lake or river. In a review of news clips over the summer of 2013, Resource Media noted that news coverage frequently highlighted that recreation users were not aware of the problem. If lake visitors happen to miss a posted health advisory, the water's appearance may not warn them away. That's because toxic algae can be visible one day, and not visible the next, while toxins can linger. Also, the toxic algae itself may be difficult to differentiate from beneficial green algae.



Nara Souza | Florida Fish and Wildlife Commission

Algal bloom forming a thick surface layer in Lake Dora, Florida.

With the exception of Lake Erie, where NOAA conducts monitoring, no federal agency systematically addresses the nation's freshwater systems that are impacted by toxic algae. Under the Harmful Algal Bloom and Hypoxia Research and Control Act, which is up for reauthorization, NOAA is monitoring and predicting freshwater HABs in Lake Erie, but otherwise focuses on coastal marine occurrences.

Therefore, it is up to states or municipalities to test for toxic algae on their own and to determine how to share that information with the public. Many states that do have programs only regularly monitor the largest and most popular lakes and only test other waters after being alerted by the public. For example, trained volunteers test the waters on Lake Champlain, which has battled toxic algae for years and whose monitoring and reporting duties are shared by several states. Only 23 states appear to provide information to residents about toxic algae—for a list see this [EPA page](#).

Oregon, Ohio and New York offer extensive online reporting of toxic algae, as does California's Klamath Basin Monitoring Project. They host websites with maps, but the information presented and ease of locating warnings and past outbreaks differs – showing once again the need for national standards. A look at Lake Erie illustrates more discrepancies in state-based reporting. In September, 2013, Ohio issued a drinking water and health advisory during a toxic algal bloom in western Lake Erie. In contrast, the state of Michigan, which shares the same waters but does not currently have a formal monitoring or advisory program, issued no health advisories during that same time period.

New York State: Robust monitoring

Though New York state has the highest number of toxic algae warnings posted this summer, it doesn't mean that it has the nation's highest amount of toxic algae, said Greg Boyer, Director of the Great Lakes Research Consortium at State University of New York. It's that the state has good monitoring. In the last few years, the state of New York has increased its monitoring, activating its network of citizen water quality monitors that are spread across 250 lakes.

In other states with agricultural runoff such as North Carolina that don't appear on the map, "their problem with toxic blue green algae is likely just as bad or worse than New York's problem," Boyer said. "But you don't hear about it because they don't have the same level of monitoring programs."



Cristiano Valli, some rights reserved

Indigenous tribes that live along the Klamath River and depend on salmon for food have led monitoring for toxic algae in California.

California: "A Sleeping Green Giant"

In California, few waterbodies are regularly monitored for toxic algae. A notable exception is the Klamath Basin Monitoring Project near the Oregon border, where indigenous tribes that depend on salmon and mussels first blew the whistle on frequent and severe algae blooms along their river and in the Klamath reservoirs. There, microcystin levels have been recorded far above [World Health Organization \(WHO\)](#) health standards.

"The river is their connection to their way of life," said Crystal Bowman, director of water quality for the Karuk tribe. "If the river's sick, they'll be sick." Studies of Klamath salmon have found that algal toxins accumulate in the liver, said Bowman, posing bioaccumulation risks for salmon and salmon eaters.

Further south, permanent signs around Pinto Lake near Monterey warn users not to drink the water, eat the fish or allow pets in the water due to microcystin levels that are among the highest recorded nationwide.

"One of the reasons we know about the levels is that Pinto Lake has been studied – unlike so many other locations in the state and country that likely have toxic algae," said scientist Robert Ketley, Senior Utilities Engineer with the city of Watsonville. "The problem is a sleeping green giant."

Toxic Algae Reports by State

COUNT	STATE
50	New York*
18	Kansas
12	Washington
10	Iowa
10	Ohio
9	Oregon
6	California
4	Kentucky
4	Nebraska
4	Wisconsin
3	Indiana
3	Massachusetts
3	Maryland
2	Florida
2	New Hampshire
2	Rhode Island
1	Idaho
1	Montana
1	Oklahoma
1	Vermont
147	TOTAL

The table to the left shows the count of water bodies/ beaches with toxic algae reports issued by state or federal agencies or reported in local news outlets between May 5 and September 16, 2013. The reports have been tracked by Resource Media and posted on the interactive website ToxicAlgaeNews.com, where more information on the tracking methodology can be found.

Since only state-based reports have been tracked, the chart should not imply that toxic algae does not occur in states not on this list.

Southeast

Alan Wilson, an associate professor at Auburn University in Alabama, is working with state agencies, academics and other researchers to monitor 350-400 freshwater sites in the southeast and eastern United States in a U.S. Geological Survey-funded project. The end goal is a database on regional cyanobacteria blooms and toxins.

Wilson's lab has documented scores of toxic algae blooms over the last two summers. "Many cash-strapped southeastern state agencies don't have resources to test the water or issue warnings," he said. "Those that do test may set very high toxicity thresholds, and therefore don't issue warnings. The concentration of what some agencies say is dangerous is well over what I'd want to send my kids into."

*[New York State](#) reports on both visual and laboratory-confirmed toxic algae blooms. This number reflects only laboratory-confirmed blooms. New York's program shows how a strong monitoring system can reveal the breadth of toxic algae occurrences.

Snapshot: State Monitoring Efforts in the Southeast

Accurately tracking harmful algal blooms (HABs) in the US can be challenging because of the disparity among state monitoring programs. First, does a state monitor? If so, how robust are those efforts? And, does a state notify the public about toxic algae? The answers can differ significantly across state boundaries.

A brief survey of monitoring efforts in just one region of the United States—the Southeast—demonstrates how efforts can vary state-by-state.



A piecemeal approach: The degree to which states monitor for toxic algae varies greatly across state boundaries. A survey of Southeastern states underscores how monitoring efforts can vary state-by-state.

Alabama

There is no formal harmful algal bloom monitoring and reporting program in Alabama, and no publicly available information on where harmful algal bloom events have occurred. The state has reported impairments of a number of water bodies due to excessive nutrient levels, including on the Department of Environmental Management's most recent impaired waters list.

Florida

Florida coordinates the efforts of its Department of Health, Department of Environmental Protection, Fish and Wildlife Conservation Commission and water management districts. Florida districts with past toxic algae will routinely test for toxicity and investigate reports of blooms or fish kills. Information is shared with other agencies and local county health units, which may then issue a public advisory. Florida does not keep a public database of advisories or closures, although this information can be obtained by contacting the relevant agencies.

Georgia

Georgia focuses its resources on coastal blooms such as red tides. It has a response plan that provides information on cyanobacterial blooms, but does not have any formal monitoring or reporting program. If local health agencies receive a complaint of a freshwater bloom or scum, they will determine if there is a threat to public health. Georgia does not post a public database of harmful algal bloom advisories or closures.

Kentucky

The Kentucky Department of Environmental Protection does not monitor harmful algal blooms, though it does coordinate with the U.S. Army Corps of Engineers in development of advisories covering water bodies under Corps control.

Mississippi

Mississippi has no formal HAB monitoring and reporting program, though its Department of Environmental Quality staff do respond to requests from individuals about potential blooms, including sampling and analysis as needed. If a harmful algal bloom is confirmed (typically involving small private water bodies on farms), the agency notifies the individual making the contact, but does not issue a public advisory.

North Carolina

The North Carolina Department of Environment and Natural Resources (DENR) previously conducted regular monitoring for harmful algal blooms with funding from the Centers for Disease Control and Prevention (CDC). Since this funding ended, DENR now relies on reports of blooms or fish kills, which they investigate.

If toxicity is determined (using WHO guidelines), DENR may issue a public health advisory. DENR also shares its information with local health agencies, which have the jurisdiction to close a water body to public recreation. It does not post a public database of advisories or closures.

South Carolina

South Carolina does not have a formal harmful algal bloom monitoring and reporting program, though the state is supporting research. For example, the South Carolina Algal Ecology Laboratory involves a partnership between the University of South Carolina's Belle Baruch Institute and the Marine Resources Division of the South Carolina Department of Natural Resources. The laboratory is researching factors that create toxic algae blooms, their impacts and management actions.

Tennessee

The Tennessee Department of Environment and Conservation does not regularly monitor for harmful algal blooms. They will investigate complaints of blooms or sickness, and issue an advisory should conditions be found toxic.

Virginia

A cooperative effort by the Virginia Department of Health and Department of Environmental Quality has led to the Harmful Algal Bloom Task Force in Virginia. While the Task Force primarily focuses on coastal blooms such as red tides, they have been trying to establish baseline values for cyanobacterial cells at several lakes to determine if there are any sites that require routine monitoring. If toxicity is detected they will issue an advisory to the public and the media. In some cases, they will close the lake to public recreation.

Grand Lake St. Marys: "This Used to Be A Popular Boating and Fishing Lake"

Grand Lake St. Marys in Ohio, a 13,500-acre reservoir, has drawn local visitors to recreate and relax. Since 2009, toxic algae have carpeted areas of the shallow lake surface from May through October, due mostly to a high concentration of runoff from hog and poultry operations nearby and failing home septic systems. The state has spent more than \$8 million fighting algae at the lake alone, including on two chemical treatments to starve the algae by removing phosphorus from the water.



Lake Improvement Association, Some rights reserved

A jet ski churns up thick blue-green algae (toxin-producing cyanobacteria) on Grand Lake St. Marys.

In addition, the Grand Lake St. Marys Lake Improvement Association estimates that toxic algae and public health advisories caused local business revenue to decline 35–40 percent annually due to slow tourism seasons—up to \$80 million total. "This used to be a popular boating and fishing lake but many people won't vacation here anymore," says Deb Borns, a realtor and lifelong resident of Celina, Ohio. "If I went out on the lake today, I'd see 10 percent of the boats I used to see. The economy has improved. Real estate values and interest in our lake has not."

The other costs are immeasurable. An Ohio man, Danny Jenkins, was hospitalized and temporarily paralyzed in 2011 after he rinsed algae scum off of his dog, Casey, after it swam in the lake. The dog later died.

FARMERS KEY TO THE SOLUTION

Some farmers are working with their conservation districts and state programs to help solve the vexing challenge of freshwater toxic algae. Still, there is a long way to go before the majority of U.S. farmers improve fertilizer timing and reduce the amount they apply. Growing cover crops (see sidebar, "Don't Farm Naked") helps keep nutrients in the soil when both are most at risk of being washed away in storms. They also can produce bountiful yields amid drought and other extreme weather. Though the use of cover crops is growing, adoption is still rare—just three percent to seven percent of farms use them, according to the USDA.

Wetlands and streamside buffers also keep nutrients out of the water. The Conservation Stewardship Program, the Wetlands Reserve Program and other Farm Bill programs pay farmers to protect the environment by using cover crops, maintaining wetlands and planting streamside buffers and other techniques to control runoff. Yet the Farm Bill remains in limbo, and current proposals include harsh austerity cuts to conservation programs.

"Don't Farm Naked": Why Cover Crops Work

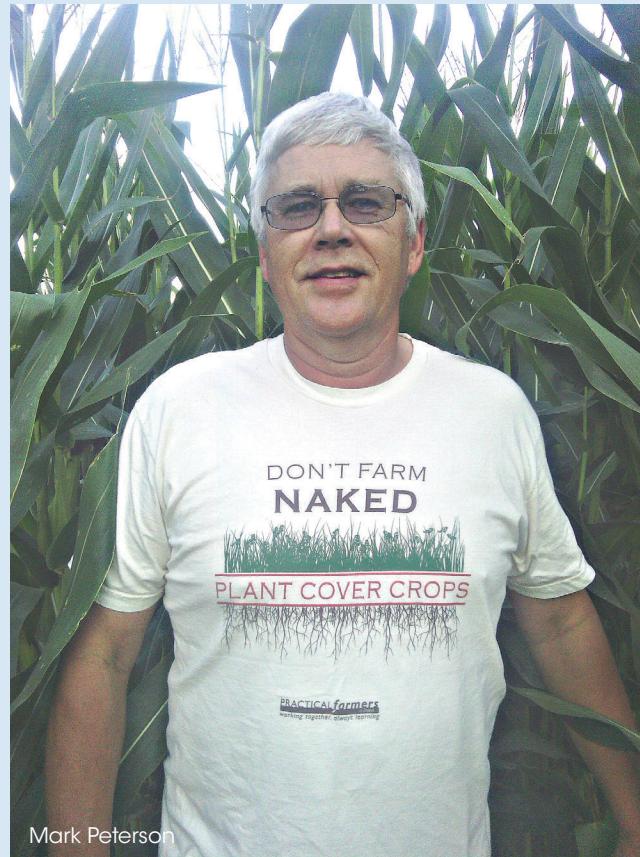
Farmers like Mark Peterson, who grows corn, soybeans and cereal rye near Stanton, Iowa, are taking voluntary steps to keep fertilizer on the farm by using cover crops, buffer strips, and more timely fertilizer application. "If we keep our nutrients on the farm," he says, "they don't go down the river, polluting Iowa's water and increasing the dead zone in the Gulf."

"One of the most effective things I do is use cover crops to soak up nutrients that move with any rainfall," he says. "I aerial seed cereal rye before harvest so that it is already sprouted and growing by the time harvest is over. That way there is always something growing in the field which helps protect the soil and scavenge nutrients. This also will help build up organic matter over time."

"I'm not alone in this practice – more and more farmers are shifting to a spring fertilizer application, along with planting cover crops. Why? It's good for the farm. We like to say, 'Don't farm naked!' Cover crops prevent the land from staying bare over the wintertime. They prevent soil erosion, keep the nutrients in the soil and improve soil health."

"It is time for the government to put its money where its mouth is and provide funding for conservation education that will improve soil and water quality. We should also link conservation compliance to crop insurance. Farmers are getting a big subsidy on our crop insurance, and in exchange we must take care of our soil and water not only for ourselves, but for the future generations. Melanie and I have five sons and two grandchildren—so far. I want to leave, for them, the farm and the environment in even better shape than what we started with."

– Mark Peterson, Stanton, Iowa



Farmer and cover crop champion Mark Peterson.

"It is time for the government to put its money where its mouth is and provide funding for conservation education that will improve soil and water quality."

– Mark Peterson

POLICY RECOMMENDATIONS

Americans treasure our blue lakes, the fish and wildlife that depend on them, and the summers on our inland shores. Given the threats that freshwater toxic algae pose to our drinking water, health and economy, we need concerted state and federal action to reduce pollutants and curb the spread. We need standardized state monitoring and reporting of health advisories, and more research on the cost of toxic algae. Toward this end, the National Wildlife Federation is calling for the following solutions.

Solution 1:

Restore And Strengthen Clean Water And Watershed Restoration Funding

Clean water programs provide critical funding for sewage treatment upgrades, regional ecosystem restoration efforts, wetlands and stream restoration and other watershed cleanup efforts. But as Congress prepares to debate 2014 funding this September, the House Appropriations Committee is proposing significant cuts to critical programs.

Solution 2:

Support Wetland And Stream Protection Programs

In addition to the CWA, federal and state-funded wetland and stream conservation and restoration projects that are strategically targeted can reduce nutrient pollution and toxic algal blooms. For example, fertilizer runoff to Florida's nutrient-laden Lake Okeechobee should be reduced through nutrient retention on the farms and in the Lake's watershed. Restoration projects like the Central Everglades Planning Project should be supported to remove pollution that is now being channeled out of the Lake and into the St. Lucie and Caloosahatchee estuaries on Florida's East and West coasts.

Solution 3:

Adopt Water Pollution Limits

The Clean Water Act requires polluters to meet water quality standards. EPA must do more to actively engage State and Tribal governments in adopting and enforcing protective limits on phosphorus and nitrogen pollution discharges in all states.

- EPA and the State of Florida must strengthen Florida's numeric nutrient standards, which can greatly reduce the amount of phosphorus and nitrogen discharged into Florida waters.
- EPA should establish nutrient reduction clean up plans for areas plagued with toxic algae blooms such as Lake Erie's western basin. EPA should also continue its active engagement with the Chesapeake Bay states to reduce sediment and nutrient pollution.

Solution 4:

Pass a 5-year Farm Bill That Promotes Healthy Soils and Reduces Agricultural Runoff

Soil and wetland conservation programs in the Farm Bill foster the use of cover crops and restored wetlands that reduce toxic algal blooms. Yet Congress' inability to pass a 5-year Farm Bill jeopardizes basic conservation compliance and funding for popular USDA programs. [We need a Farm Bill that:](#)

- Makes basic soil, water and wetland conservation practices a requirement for taxpayer-subsidized crop insurance. Without these requirements, taxpayers will be underwriting practices that spur toxic algae outbreaks.
- Maintains soil and wetland conservation funding. Programs should be supported to promote more efficient use of chemical fertilizer, the strategic use of cover crops, manure management on livestock operations and the conservation and restoration of wetland and riparian buffers.
- Includes a Great Waters Regional [Conservation Partnership Program](#) that consolidates several existing conservation programs. This program will fund restoration projects that will store water flows, reduce soil erosion and filter phosphorus and nitrogen pollution in significant watersheds across the country.

Solution 5:

Reauthorize the Harmful Algal Bloom and Hypoxia Research and Control Act

Congress should support [HABHRCA](#) and authorize funding for expanded research on causes, impacts and costs of toxic algae blooms. It should also include increased monitoring (including facilitating more systematic and uniform monitoring by states and other agencies, in support of some type of federal tracking system), and increased implementation of nutrient reduction and other programs to address the problem.



Thousands have rallied this summer in Florida for state action to reduce pollutants that are spurring toxic algae in the St. Lucie river.

"I Fish and I Vote"

"More than half a century has past since I first wet a line in Florida waters, near where I grew up in Miami. When I think about the most serious problems plaguing the places where I've lived and visited the most, they are algae blooms fueled by nutrient pollution. I've watched algae blooms kill vast areas of seagrass meadows in Florida Bay. I've watched Lake Okeechobee—America's bass-fishing mecca—turn bright green except for the silver dead fish floating in it. And most painfully, I've watched the waters I call home, the waters of the St. Lucie River and Indian River Lagoon, where I make my living as a fishing magazine publisher and guide, turn green again and again.

"This time, the pollution is worse than anyone can remember. Right now, almost two billion gallons of nutrient-laden runoff are spilling into this estuary, which is one of the most if not the most biologically diverse estuarine ecosystems in North America.

"We have lost our seagrasses and shellfish. The forage fish, crustaceans and juvenile predators that depend upon those habitats are now without a home. We are losing generations of wildlife that sustain our quality of life and economy here on Florida's Treasure Coast and in the Gulf Coast's Caloosahatchee Watershed, where they are receiving even more dirty water. Meanwhile, we must abide here by the no-contact signs—health warnings about even touching the water. The waters themselves are matted with blue-green algae and teem with infectious bacteria. Like most of the fishing guides here, I've lost all my summer business and that is business we likely won't get back until this pollution stops and the ecosystem – and recreational economy is restored."

– Capt. Mike Conner, Fishing Guide, South Florida



"I've lost all my summer business and that is business we likely won't get back until this pollution stops."

– Capt. Mike Conner

ENDNOTES

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RESOURCES

Go to [ToxicAlgaeNews.com](#) for a full list of resources.

Also see:

- [EPA Nutrient Pollution and Harmful Algal Blooms](#)
- [Centers for Disease Control](#)
- [NOAA, Harmful Algal Bloom Related Links](#)
- [U.S. Geological Survey Real Time Water Quality](#)

Reporting:

- If you know of a freshwater toxic algae bloom not reported on the map, you can submit a report via: [ToxicAlgaeNews.com/report.php](#)
- If you encounter a freshwater toxic algae bloom, we encourage you to photograph the conditions and share your photos via Flickr, tagging the photo as toxic algae. Also post your photos on Twitter, using the hashtag #toxicalgae.

[Follow #ToxicAlgae on Twitter](#)

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